

Aligning Perspectives on Health, Safety and Well-Being

Teresa Mendonça McIntyre
Scott E. McIntyre
David J. Francis *Editors*

Educator Stress

An Occupational Health Perspective

 Springer

Aligning Perspectives on Health, Safety and Well-Being

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This book is dedicated to the five generations of educators in our family who emulated the values of education, service, integrity, selflessness, and passionate investment in youth and their future. In particular, to our mother Isabel, a dedicated educator and a woman of faith who inspired us to invest our lives and careers in the betterment of others and in supporting the creative process in teaching, research, and practice.

*Teresa Mendonça McIntyre and
Scott E. McIntyre*

This book is dedicated to my father, John, and mother, Carolyn; my daughters, Ashleigh and Heather; and my partner, Kristi, for their constant encouragement and unwavering support of my educational pursuits, and to the many great teachers and colleagues from whom I have learned so much and benefitted so greatly.

David Francis

Foreword 1

That teaching can be a hazardous profession is beyond question. US Bureau of Labor Statistics data (US Department of Labor, 2015) show a 2014 incidence rate for occupational injuries and illnesses of 4.2 cases per 100 public school elementary and secondary teachers, exceeding the overall incidence rate for service industries (3.0), and even the manufacturing (4.0) and construction (3.6) sectors.

Early reviews by Rogers (1926) and others (Review of Educational Research, 1931) illustrate a longstanding concern about the health and well-being of teachers, but in recent years this literature has expanded dramatically. A literature search crossing “teacher” with “stress,” “injury,” “safety,” or “health” shows a tripling of the number of articles in peer-reviewed journals in the decade 2000–2009 compared to all years past, with the number on pace to double again in the current decade. Consistent with the interests of the present volume, the great majority of this work focusses on the psychological well-being of teachers and psychosocial stressors encountered in educational environments.

Sample findings from the National Institute for Occupational Safety and Health Quality of Worklife Survey show that this focus is well-founded. Cumulative (2002–2014) data from the survey suggest, for example, a pattern in which teachers as a whole, from preschool to postsecondary instructional settings, experience workload demands in excess of workforce norms. Descriptive results show that teachers much more commonly reported working beyond normal duty hours, having difficulty taking time off, and working second jobs. At the same time, they were less likely to report that monthly incomes sufficed to meet family needs – a prescription for stress according to the effort-reward model (Siegrist, 1996). Correspondingly, teachers reported reduced health-related quality of life and more frequent experience of stressful working conditions.

Surprisingly, in the presence of exponential growth of the scientific literature on stress in the teaching profession, few efforts have been made to distill this information for researchers and practitioners – something the present volume accomplishes nicely. The volume has several distinguishing qualities. It delivers a truly international perspective on stress in teachers, with contributions from North America, Europe, Scandinavia, and Australia. Treatment of stress in teachers is exceptionally

comprehensive, inclusive of job stress theory, risk factors, stress-related outcomes, research methodology, intervention modalities, and research translation. Of special importance, the volume is unique in bringing an occupational health psychology (OHP) perspective to understanding and preventing stress among teachers. In this regard, it draws broadly on occupational stress theory and models rooted in the behavioral sciences to help understand the sources and mechanisms of stress in teachers and to frame interventions. Further to the OHP perspective, a systems approach to understanding and preventing stress among teachers is evident throughout the volume. Risk factors for stress are addressed at the level of teacher individual differences, the organization of work, school context (policy, practice, and climate; labor-management relations), and societal and political forces. In turn, the volume advances explanatory models and avenues for intervention that recognize the collective influence of these different factors.

In sum, it is not just access to fresh and authoritative information on the causes and control of teacher stress that commends this volume, but also the OHP framework in which this information is grounded.

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Foreword 2

Teachers play a critical role in shaping the lives of our children. Teachers not only facilitate learning, but they can strongly influence a child's social and emotional development. Today, teaching is one of the most stressful occupations; this is true not only in the USA but in many countries around the world. High levels of stress are affecting teachers' health and well-being, causing teacher burnout, lack of engagement, job dissatisfaction, poor performance, and some of the highest turnover rates ever seen. Although the study of educator stress, health, and well-being is not new, most of this literature lacks a strong theoretical and conceptual basis. Ably edited by Teresa Mendonça McIntyre and colleagues, this volume opens horizons by creating a landscape of new ideas for the next generation of research on teachers' health and well-being.

In addition to facilitating learning, teachers are key agents of socialization, helping students reach their highest potential and develop into responsible citizens. But, over the past years, teaching has become increasingly stressful due to changes in policies such as high-stakes testing, the "de-professionalization" of the public's view of teaching that has occurred in numerous countries, and the cutbacks in supportive services in schools that have placed a greater burden on teachers, especially in schools that serve high rates of disadvantaged children. This volume takes on this large task of helping the reader to conceptualize and make sense of the data on teacher stress and burnout as well as beginning to articulate solutions. One of the many important features of this book is the number of international contributors that provide perspectives from different culture contexts. Interestingly, although education is structured in various ways across these culture contexts, it appears that educator stress, and its consequences, are a ubiquitous concern in the modern world.

The book's title *Educator Stress: An Occupational Health Perspective* signals the introduction of a broadened conceptual model for understanding both the causes and the potential solutions to preventing and reducing teacher stress and thus improving teachers' physical health, psychological well-being, instruction, and relationships with their students and colleagues. By taking a novel "occupational health perspective," the book utilizes both theory and research to argue for the need to understand and intervene to support the teacher's functioning and resilience from

both an individual perspective and an organizational perspective. While individual models of intervention/prevention have been relatively well-studied, the paucity of conceptualization and research at the organizational level is remarkable and emblematic of why there has been so little quality research on effective solutions to improve the lives of teachers.

Each section and chapter add to the quilt of ideas that build toward a multilevel, occupational health-focused perspective from which to consider educators' social, emotional, physiological well-being and its impact on the quality of their instruction. While broad theories of occupational health are useful, teachers work in quite unique circumstances compared to many other professions. This is partly because of the rigid structure of what we call "school," the lack of job autonomy, and the dramatic increase in the unique work demands in the past few decades. It is not surprising that this "crisis" was forewarned just 60 years ago by Seymour Sarason when he characterized teaching "as the loneliest profession."

There is a need for greater innovation in developing and assessing the effectiveness of policies and programs to reduce educators' stress and improve their well-being. In particular, there is a need for further work on the conceptualization and careful testing of organizational strategies to improve "work processes" such as reducing excessive work demands, increasing job control, creating more collaborative leadership, and building more effective school cultures. As this book breaks new ground for the science of the study of the needs of educators, it also provides a roadmap for future science. I look forward to the influence of this book in generating rigorous science that helps us to better understand and intervene to improve the lives of educators and all the lives of the youth they touch.

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Preface

I can honestly say that my mental health was damaged this past year and it will take me a while to recuperate. I teach at an inner-city middle school. Actually, next year I am changing schools so I can escape my present situation. Teacher, personal communication, June 1, 2014

Education is a core value of developed societies, and it is recognized that supporting education in developing countries is key to their economic and civic development. Educators¹ are perhaps the most important element in achieving quality education, their key role in student development and academic success being one reason why the teaching profession still attracts young people that want to make a difference and why, for many years, teaching was considered to be a “noble” profession. Despite the fact that the importance of educators is still undisputed, the quote from the middle school teacher above suggests that a lot has changed over the past 50 years in a teacher’s job description, their daily challenges, how they feel about their jobs, and their ability to carry on their duties professionally and personally. It is common knowledge that many beginning teachers quit the profession during their first 5 years and that teacher morale is at an all-time low. Educator stress is a topic that seems to encapsulate many of the struggles and challenges that teachers face today. Therefore, it is no surprise that both educators and education researchers have tried to better understand the causes of stress in educators, its consequences, and how to reduce it. While much progress has been made in understanding educator stress, there has been less success in developing effective approaches that can ameliorate this problem. One of the reasons for this may be the lack of existing dialogue between disciplines that address this topic such as education, psychology, occupational safety and health, public health, etc., as well as a lack of dialogue among scientists, practitioners, and policy makers.

¹Educator is defined by the Oxford English Dictionary as “a person who provides instruction or education; a teacher.” We opted to emphasize the term “educator” due to its connection with the broader mission of teachers to not only instruct but also educate, i.e., support the overall development of the student rather than academic achievement alone. However, in this volume the terms educator and teacher will be used interchangeably.

The idea for this book was fueled by the editors' collaboration in the past 8 years on an Institute of Education Sciences-funded grant (McIntyre et al., 2011, grant#305A110080 to the University of Houston) which sought to expand knowledge on the link between teacher stress, teaching effectiveness, and student outcomes. The editors came from different backgrounds (health, organizational psychology, and education), which generated a rich dialogue in approaching this topic. We also came to realize that there is a seeming split between education, psychology, and occupational health fields, in research and practice on educator stress. For instance, occupational health models and concepts are seldom applied in education research, and education research on teacher stress does not often appear in occupational health publications, especially in the USA. There also seems to be a relative neglect of teacher well-being on the part of funding sources both in education and occupational health. This realization inspired the editors to organize a volume that would encourage a dialogue on educator stress among researchers and practitioners from different disciplines and backgrounds and bring the subject to the forefront.

This volume stems from an effort by the editors to bring together researchers from different perspectives, educators, and policy makers (e.g., union leaders) to report on the state-of-the-art thinking and practices on this vital topic for educators and quality education. This purpose is in line with the book's series "Aligning Perspectives in Health, Safety and Well-Being" which emphasizes that synergies ensuing from interdisciplinary dialogue can generate more robust knowledge and promote more effective practices and policy in achieving healthier and safer workplaces and societies. While there have been many books published on the topic of teacher stress, there has not been an integrative and comprehensive review of theory, research, methodology, and intervention on the topic of stress in educators.

A novel aspect of this book is that it uses *an occupational health framework* to examine the problem of educator stress, by presenting theory-driven intervention strategies to reduce stress load, thereby supporting educator resilience and healthy school organizations. Very often the problem of educator stress is dealt with by focusing on the teachers alone, by increasing teachers' skills in managing their daily challenges and investing in teacher training. While these approaches are needed and supported by empirical evidence, they tend to address the symptoms of educator stress without confronting the roots of the problem, which lie with policies (federal, state, district, school levels), school organization (e.g., leadership style, teacher autonomy/participation), and work characteristics (e.g., levels and type of demand, pace of work, colleague support). While occupational health (OH) approaches have been widely used in addressing stress and other work issues in various service professions (e.g., health professionals), there seems to be a lag in terms of applying occupational health strategies to reducing educator stress. OH approaches focus on supporting the development of healthy school cultures that reduce toxic physical and social environments and promote policies and evidence-based practices that support teachers and their health and well-being.

Another important feature of this volume is its *international focus*. The problem of educator stress is global, affecting teachers in Africa and Asia, as well as in

Europe and North America. While there are many commonalities to the experience of stressed teachers, it is important to recognize that the problem of educator stress is embedded in its cultural, geographic, and economic context. This volume provides an international perspective on key challenges facing educators, such as teacher stress, teacher retention, training effective teachers, teacher accountability, and developing healthy school systems. We have to recognize that most of the contributors are from developed countries, which is where most of the research on teacher stress has evolved, but the chapter authors have made an effort to cover the topic internationally to reflect the diversity of experiences and potential solutions to educator stress, one chapter focusing on contextual and cultural differences affecting educator stress.

This volume is divided in four parts that aim to present a comprehensive coverage of the topic, including defining the problem, understanding educator stress, solving the problem (intervention), and moving forward in research, practice, and policy. *Part I* starts out by introducing and defining the problem of educator stress from an international point of view and also examining educator stress in the context of current education policy and challenges. Several chapters address the consequences of educator stress in terms of mental health and well-being, biological pathways to disease vulnerability, teaching self-efficacy, and attrition. *Part II* reviews the main conceptual models that explain educator stress while applying an occupational health framework to education contexts. It covers well-known models of work stress such as the job demands-control-support model, the effort-reward imbalance model, and the job demands-resources model. It ends with a proposal of an integrative theory of educator stress. *Part III* starts with the definition of what constitutes a healthy school organization as a backdrop to the following chapters, which review the application of stress and occupational health psychology theories to intervention. Interventions are presented at three levels: individual (e.g., mindfulness interventions), individual-organization interface (e.g., mentoring), and organizational (e.g., job redesign). New directions in intervention are addressed in a chapter on schools and cyberbullying. *Part IV* presents a review of methodological issues facing researchers on educator stress and identifies future trends for research on this topic, including the use of new technology advances in educator stress research. It includes a discussion on the translation of educator stress research into practice and policy, including teacher training and development. It ends with a commentary by the editors on the implications of an occupational health perspective to furthering educator stress research, practice, and policy.

This volume is also largely inspired by the teachers, principals, and districts with whom we have collaborated in the past 8 years. Through the course of our grant, we witnessed firsthand the extraordinary stress that teachers experience daily, but also their incredible resilience. We also received many emails from teachers around the USA, and even Canada, expressing their appreciation for our pursuit of this topic. One of them stated, “*I am happy about the idea of someone realizing that teachers are stressed, that someone cares enough to look at how stressful our job is*” (Teacher, personal communication, Fall 2011). We want to acknowledge these educators and educators in general for their support and inspiration to this volume. The

many contributors in this volume provide a diversified reflection on stress in educators and make recommendations for research, practice, and policy to promote healthy school organizations, support teachers and their well-being, and thus impact the quality of education. We hope this volume will be helpful to policy makers, school officials, educators, school counselors, and others that strive to dignify the teaching profession and promote the core value of educator health and well-being.

Houston, TX, USA

Teresa Mendonça McIntyre
Scott E. McIntyre
David J. Francis

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Part I

Defining the Problem of Educator Stress in the Context of Current Education Challenges

I am happy about the idea of someone realizing that teachers are stressed; that someone cares enough to look at how stressful our job is.

Teacher, personal communication, Fall 2011

Part I presents a comprehensive account of the state of the art in research on educator stress prevalence, sources and consequences. Its seven chapters cover traditional topics such as educator mental health and attrition, current education concerns such as the impact of education reform and accountability, and novel trends such as the biological effects of educator stress and of cultural factors. It is the longest section of the book, reflecting where the focus of educator stress research has been, which is on characterizing educator stress. The rich information presented by the vast literature reviewed contributes to defining the problem of educator stress. As a whole, the information in this section leaves no doubt that educator stress is a serious problem facing education today, with vast implications that go well beyond teacher well-being. As such, educator stress merits immediate attention by school administrations and policy makers.

In the first chapter, Rebecca Collie and co-authors describe school context and education system factors affecting the experience of stress in educators, placing the problem of educator stress in the broader context of schools and education policies. Occupational support, especially from principals, interpersonal relations with colleagues and students, and education policies regarding standardized testing and educational innovations, are the key context and system factors reviewed. Teaching has been often described as being highly stressful; Chap. 2 by Cheryl Travers presents an overview of the nature, sources, and consequences of educator stress, including its impact on teachers' mental health, job satisfaction and performance. The topics are addressed internationally and variations in stress experience with school and individual teacher characteristics are also reviewed. The subsequent three chapters focus more on the educator. Chap. 3 by Schonfeld and colleagues, examines the relationship between job stressors and mental health in teachers. It reports epidemiological, cross-sectional and longitudinal research findings on teachers' depressive symptoms, burnout, and somatic symptoms, and also presents a critical review of this research. Silja Bellingrath and Brigitte Kudielka, in Chap. 4, review a novel

and growing body of psychobiological research on physiological system responses to stress in educators, in the context of McEwen's Allostatic load model. These findings aid in understanding how chronic work stress creates disease vulnerabilities in teachers. The relation between educator stress and teaching efficacy is examined by Einar Skaalvik and Sidsel Skaalvik in Chap. 5 as well as evidence tying both to teachers' job satisfaction, work engagement, burnout and attrition. The authors present a theoretical model of these relations illustrated by the results of an interview study on senior Norwegian teachers who either stayed or exited the profession. Stephanie Cano and colleagues' Chap. 6 addresses a major concern in education today, the problem of educator turnover, reviewing evidence on individual (e.g. gender, ethnicity, seniority) and school context factors (e.g. student population, type of school). The chapter presents a unique study which used survival analysis to compare attrition rates and determining factors between charter and public school teachers in the state of Texas in the U.S. Part I ends with Chap. 7 by Christopher McCarthy and co-authors, which places the problem of educator stress in global context. The chapter examines contextual factors related to culture, government and school, and its relations with burnout and work outcomes (job satisfaction and attrition), internationally. Some of these factors are particularly timely such as the role of cultural attitudes involving respect for teachers, educational reform and accountability efforts, teachers' autonomy and school leadership.

Together, these seven chapters testify to the vast knowledge accumulated on the topic of educator stress while also presenting a critical review of the questions left unanswered and the methods used to investigate this topic. Unfortunately, as can be seen in Parts II–IV of this volume, this knowledge has not been translated enough into changing policy, school or teacher practices to address the problem of educator stress.

Chapter 1

School Context and Educational System Factors Impacting Educator Stress

Rebecca J. Collie, Nancy E. Perry, and Andrew J. Martin

Abstract This chapter explores three context and education system factors that are implicated in educators' experiences of stress in the workplace: occupational support, interpersonal relationships, and educational policy changes. More precisely, the first factor concerns occupational support provided to educators to conduct their work with a specific focus on principals' provision of autonomy support. Autonomy support stems from self-determination theory and refers to the extent to which an authority figure supports individuals' self-determination in a particular context. The second factor concerns the relational context of teaching with a focus on educators' relationships with students and colleagues. The third factor concerns the impact of systemic factors in educational policy. For this, we have focused on the impacts of standardized testing and educational innovations. Together, the three overarching factors represent defining features of school and educational systems that shape educators' work and their experiences of stress in that environment. Overall, our aim is to broaden understanding of the role that schools and educational systems play in educators' psychological functioning at work.

Keywords Teacher stress • Perceived autonomy support • Interpersonal relationships • Standardized testing • Educational innovations • Educational systems

This chapter explores three factors relevant at the school- and system-level that are implicated in educators' experiences of stress. Educator stress has been of interest to researchers for almost four decades (Kyriacou, 2011). It has been investigated in

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many different countries and shown to be a significant concern for schooling systems worldwide. Indeed, teaching is regularly cited as one of the most stressful occupations (Dicke et al., 2014; Gallup, 2014; Hakanen, Bakker, & Schaufeli, 2006; Roeser et al., 2013). Three main approaches to conceptualizing stress are evident in the literature (Kyriacou, 2011). The first defines stress as the level of work pressure or demands that are placed upon teachers (e.g., workload; Klassen & Chiu, 2011). The second defines stress as the emotional or behavioral responses that result from teaching work (e.g., anxiety; Kyriacou, 2011). The third views stress as a transaction between the work demands and the teachers' resources to manage those demands (e.g., Lazarus, 1966).

In the current chapter, we refer to research that has utilized all of these definitions under the banner of educator or teacher stress. It is also worth noting that additional literature has examined constructs related to stress such as emotional exhaustion and well-being. Emotional exhaustion is one component of the burnout framework (alongside depersonalization and reduced accomplishment) and refers to feelings of emotional fatigue and being depleted of emotional resources (e.g., Maslach, Schaufeli, & Leiter, 2001). Of relevance, emotional exhaustion represents the stress dimension of burnout (Maslach et al., 2001). In contrast, well-being refers to satisfaction with and healthy functioning in life generally (referred to as general well-being) or at work specifically (referred to as work-related well-being; e.g., Ryan & Deci, 2001), and is negatively associated with educator stress (Collie, Shapka, Perry, & Martin, 2015a). Well-being is particularly salient because it may help teachers to deal more effectively with taxing experiences in their work and broader life (e.g., Fredrickson, 2001) and, thus, reduce the experience of stress. In the current chapter, we make reference to emotional exhaustion (and burnout more broadly) and well-being where relevant in our examination of context and systems factors that influence teachers' experiences at work.

1.1 Context and System Factors Influencing Educator Stress

Researchers working in countries including the U.S. (McCarthy, Lambert, & Reiser, 2014), Canada (Collie, Shapka, & Perry, 2012; Klassen & Chiu, 2010, 2011; Perry, Brenner, Collie, & Hofer, 2015; Trépanier, Fernet, & Austin, 2013), the UK (Chaplain, 2008), Australia (De Nobile & McCormick, 2005), Hong Kong (Pang, 2012), and Malta (Boyle, Borg, Falzon, & Baglioni, 1995) have demonstrated that workload, student behavior, and lack of social support are three significant sources of stress for educators worldwide. In endeavoring to understand what impacts these sources of stress, several factors have been shown to be salient (e.g., teachers' personal characteristics, other motivational and well-being constructs). In the current chapter we focus on context and system factors. More precisely, we focus on three factors that have been shown to be prominent in teachers' experiences of stress and well-being: (a) the provision of occupational support from leadership (with a focus on autonomy support), (b) the relational context of teaching (with a focus on

teachers' relations with students and colleagues), and (c) approaches to teaching and learning that are affected by educational policy (with a focus on standardized testing and educational innovations).

In addition to playing a significant role in influencing educator stress, the three factors are also relevant to the main sources of stress experienced by teachers. Occupational support provided by principals and interpersonal relations at work impact the stress that educators experience from student behavior and social support (e.g., Collie et al., 2012; Van Droogenbroeck, Spruyt, & Vanroelen, 2014). In addition, occupational support, interpersonal relationships, and educational policy changes impact teachers' actual workload (via new expectations, adjusted work tasks, collaborative teaching efforts, discipline procedures, etc.) and their perceptions of this (e.g., occupational support may buffer the perceived demands of a job; see Chap. 11).

The three factors also reflect variables shown to be fundamental in employee functioning in several different organizational models of well-being such as the job-demand-control-support model (see Chap. 9), the job demands-resources model (see Chap. 11), and self-determination theory (Deci & Ryan, 2012). For example, high quality interpersonal relationships with students and colleagues are a form of social support, which is centrally featured in organizational models (e.g., Deci & Ryan, 2012; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Schaufeli & Taris, 2014). Moreover, standardized testing and educational innovations have the potential to be viewed as a job demand or job resource depending on how they are perceived by teachers (see Chap. 11). Taken together, the three factors represent context and system factors that are relevant to key sources of educator stress and that are centrally-located in major organizational models of well-being. In the following sections, we discuss the three context and system factors in greater detail with links to prior empirical work and implications for research and practice.

1.1.1 Occupational Support at Work

When educators perceive that they are provided with adequate school-based and system-level support for their work, they are less likely to experience stress and more likely to experience well-being at/through work. Although there are many different types of support (e.g., see the next section on relationships which are a form of social support), in this section we focus on occupational support via the concept of autonomy support. Autonomy support originates from self-determination theory (Deci & Ryan, 2012) and concerns the extent to which authority figures foster a climate of empowerment and self-determination for all individuals within that context (Deci & Ryan, 2008; it has some similarities with decisional control and social support in the job demand-control-support model of work stress; see Chap. 9). With respect to educators' work, principals play an important role in fostering an autonomy supportive work climate at school (Klassen, Perry, & Frenzel, 2012). Principals act in autonomy-supportive ways when they invite teachers' input in school-level

decision making, provide teachers with choices and options in the work they undertake, encourage teachers to ask questions about how the school is run and the work assigned to them, attempt to understand issues from teachers' perspectives, and convey confidence in teachers' ability to do their job effectively (Baard, Deci, & Ryan, 2004; Klassen et al., 2012).

Research supports a link between autonomy support and educators' experiences of stress and well-being. For example, in a cross-sectional, survey-based study conducted among 266 mainland Chinese middle school teachers, Nie, Chua, Yeung, Ryan, and Chan (2014) showed that teachers who perceived their work climate to be autonomy supportive (measured using a scale adapted from Baard et al., 2004), reported lower levels of workload stress (adapted from Pettegrew & Wolf, 1982). Similarly, in another cross-sectional, survey-based study, Pearson and Moomaw (2005) examined perceptions of empowerment and stress among 171 U.S. elementary, middle, and high school educators. Empowerment was operationalized as principals' efforts to involve teachers in decision-making, invite their input in the development of school policies, and take their concerns seriously. Thus, it is similar to autonomy support. Stress was operationalized as administrative workload, instructional workload, and stress related to the working climate. All items were developed by the researchers. The findings showed that when teachers felt their principal supported their empowerment, they experienced lower levels of stress.

Researchers have also linked perceived autonomy support with well-being. For instance, Collie and Martin (2017) conducted a multilevel, cross-sectional, survey-based study among 115 Australian secondary school mathematics teachers and students in their 115 mathematics classrooms. The researchers assessed perceived autonomy support (using Klassen, Perry, and Frenzel's, 2012, scale that was adapted from Baard et al., 2004) and work-related well-being (using Parker and Martin's (2009) scale on happiness and enjoyment of work). Findings showed that when teachers felt that their principal was autonomy supportive, they reported greater well-being. Of particular importance, teachers' well-being was directly and positively associated with students' scores on a test of mathematics. Moreover, perceived autonomy support was indirectly associated (also positively) with students' test scores via well-being. Taken together, these findings indicate the salience of (perceived) autonomy support for positive teacher and student outcomes.

An important feature of autonomy-supportive work climates is that they promote satisfaction of the basic psychological needs of autonomy, competence, and relatedness (Deci & Ryan, 2012). Autonomy at work refers to the need to feel self-determined, that one acts as the origin of one's behaviors, and that one has a sense of choice over one's work tasks (deCharms, 1968). Competence at work refers to the need to feel effective in the activities one conducts at work and in one's interactions with others (Deci & Ryan, 2012). Relatedness at work refers to one's need to feel connected via high quality relationships to work colleagues (including fellow teachers and administrative staff) and students (Deci & Ryan, 2012). As these definitions suggest, there is some synergy with constructs described in other organizational models of well-being (e.g., decisional control, social support; see Chaps. 9 and 11). When individuals experience satisfaction of the needs for autonomy,

competence, and relatedness within their work environment, this contributes to their general sense of well-being.

In a study conducted among 409 Canadian elementary, middle, and secondary teachers (using a cross-sectional, survey-based design), Klassen et al. (2012) examined perceived autonomy support (with a scale adapted from Baard et al., 2004) and the basic psychological need for relatedness, operationalized as connecting with, being committed to, and valuing relationships with their students (items were developed by the researchers). Findings demonstrated that when teachers perceived their school principal to be autonomy-supportive, this was associated with satisfaction of the basic psychological need for relatedness with students and, in turn, lower emotional exhaustion (one component of the burnout construct assessed with the Maslach Burnout Inventory; Maslach & Jackson, 1981).

Unfortunately, not all work climates are autonomy-supportive. In some cases, employees are pressured into feeling, thinking, and acting in ways that are prescribed by others (Reeve & Cheon, 2014). This is known as a controlling work environment and, in schools, it may involve principals' behaviors such as dictating what teachers teach, as well as when and how they teach; monitoring teachers' work closely; inducing feelings of guilt or shame; and rejecting teachers' input in decision-making. When teachers work in a controlling environment such as this, it can detrimentally impact their well-being and lead to stress. For example, Bartholomew, Ntoumanis, Cuevas, and Lonsdale (2014) asked 364 Spanish physical education teachers about the pressures they experience at work in a cross-sectional, survey-based study. The operationalization of job pressure encompassed supervisor, evaluation, and time constraint pressures (thus, relevant to the job-demand-control-support and job demands-resources models; see Chaps. 9 and 11). They found that when teachers experienced greater job pressure, they also reported higher basic psychological need thwarting (i.e., low autonomy, competence, and relatedness; assessed by the Psychological Need Thwarting Scale; Bartholomew, Ntoumanis, & Thøgersen Ntoumani, 2011). In turn, these teachers reported greater burnout, which was examined as a higher-order factor (comprising emotional exhaustion, depersonalization, and reduced accomplishment), and assessed with the Maslach Burnout Inventory – General Survey (Schaufeli, Leiter, Maslach, & Jackson, 1996). Thus, while autonomy support is associated with lower stress and burnout, controlling work environments appear to elevate these experiences among educators.

In addition to being impacted by the autonomy support provided by principals, teachers are also impacted by the autonomy support (or control) promoted by the educational system more broadly, such as from the school board or even governmental departments overseeing education (Deci & Ryan, 2012). The extent to which system-level authorities act with a top-down approach is likely to hamper teachers' perceptions of autonomy support. More precisely, if teachers are expected to implement new curriculum or policy without consultation or choice, this may be viewed as controlling rather than autonomy supportive behavior. Indeed, when compared with 13 other occupations, U.S. teachers were the least likely to perceive that their opinions counted at work (Gallup, 2014). Research is beginning to show that

bottom-up approaches to reform (that make allowances for the unique nature of individual schools) can lead to more effective changes (e.g., see Ehren, Perryman, & Shackleton, 2015 for an example among Dutch teachers). Moving forward, further research is needed to understand whether such approaches are effective and realistic in other schooling systems given time and budget constraints.

In summary, research has indicated the significance of autonomy support in influencing teacher stress and well-being. In this section, we reviewed studies looking at autonomy support from the self-determination theory framework; however, occupational support is also addressed in other organizational models of well-being (see Chaps. 9 and 11). Thus, additional research considering other operationalizations and how they intersect with autonomy support is an important direction for research. In the studies described above, cross-sectional, survey-based designs were generally employed. With the exception of emerging multilevel research (e.g., Collie & Martin, 2017), there is now a need for other research methods such as longitudinal designs, assessments of autonomy support via observations, and in-depth qualitative examinations of autonomy support. At the same time, the existing research does clearly indicate the importance of autonomy support and thus, provides several implications for practice.

Implications for Practice Several suggestions for promoting autonomy supportive work climates are provided above. To recap, efforts by principals to be autonomy supportive, for example, include inviting teachers' input in decision making, and offering teachers choice in their work where appropriate. Avoiding typical controlling behaviors (e.g., inducing shame or guilt, monitoring teachers' work closely) is another relevant approach by principals that may help to reduce educator stress and improve well-being. Similar approaches at the system-level may also help to improve teachers' perceptions of support. These could include efforts by school boards to consult with teachers on policy change and to provide teachers with greater autonomy in what, how, and when they teach parts of the curriculum.

1.1.2 Relational Context of Schooling

At its heart, teaching is relational work. It involves effectively interacting both formally and informally with colleagues to plan and teach, with students to best engage them in learning and effectively manage the classroom, and with parents to share news about their child's experiences and development. As noted earlier, relatedness, belonging, and connectedness are widely accepted as basic psychological needs that are central to healthy human functioning (Deci & Ryan, 2012). Among educators, this refers to the need to feel connected via high quality relationships with work colleagues (including fellow teachers and administrative staff) and students (Klassen et al., 2012). Positive relationships with students' parents are also part of the relational context of schooling, but are generally less central to educators' everyday working lives (however, see Lambert, McCarthy, O'Donnell, & Wang, 2009 for a

discussion of parental influence on educator stress). In this section, our focus is on how educators' relations with students and colleagues can impact their experience of stress.

Importantly, teachers' relationships with students and colleagues are influenced by both school context and system factors. For example, particular school characteristics (e.g., availability of funding, socio-economic status of students) or the psychosocial climate can influence the extent to which high quality relationships are possible (e.g., Jennings & Greenberg, 2009). At a system-level, teaching is different from other professions in several ways. A key example of this is that teachers often work alone in their own classrooms. As such, teachers spend most of their time with "clients" (i.e., students) and may be isolated from their colleagues for much of the work day (Klassen et al., 2012). Accordingly, teachers' perceptions of relatedness with colleagues may be quite different from other professions and their relations with "clients" may be more involved than in other professions (Collie, Shapka, Perry, & Martin, 2016; Klassen et al., 2012). Moreover, the fact that teachers share students (e.g., in secondary settings, across general and special education settings) may influence how teachers relate to one another and their students differently than in other professions. Next, we consider teachers' relationships with students and colleagues in greater depth.

1.1.2.1 Teacher-Student Relationships

Adaptive teacher-student relationships are a central factor in determining teachers' experiences of stress and well-being (Spilt, Koomen, & Thijs, 2011). As noted above, teacher-student relationships are shaped by school context and system-level factors. One such contextual factor is the composition of the student population. In general, teachers often feel overwhelmed and ill-prepared to cope with the many challenges that diverse groups of students present for effective teaching and learning (Perry, Yee, Mazabel, Lisaingo, & Määttä, 2017). In particular, teachers feel challenged to meet the needs of students with disabilities and high abilities, students whose home language is different from the school language, and students who are disadvantaged in life. This can result in stress. Indeed, greater stress is reported by teachers who have a higher proportion of students with emotional/behavioral disorders or learning difficulties/disabilities in their class (e.g., Greene, Beszterczey, Katzenstein, Park, & Goring, 2002; Lambert et al., 2009; Yoon, 2002), by teachers working in high poverty urban school settings that are often hindered by low resources and over-crowding (e.g., Shernoff, Mehta, Atkins, Torf, & Spencer, 2011), and by teachers who lack confidence in their ability to manage disruptive behavior in the classroom (e.g., Klassen & Chiu, 2011; Pas, Bradshaw, & Hershfeldt, 2012). Together, these school context factors may be associated with greater educator stress because their associated challenges (which are often concomitant with fewer resources) may make it harder for adaptive teacher-student relationships to form.

The school level in which an educator works may also influence the nature of teacher-student relationships given that the characteristics of elementary, middle,

and secondary schools influence how and with whom different members of the school community interact (Crosnoe, Johnson, & Elder, 2004). Among 485 Canadian elementary, middle, and secondary teachers, Collie et al. (2016) examined the basic psychological need for relatedness with students (using items developed by Klassen et al., 2012) and teachers' general and work-related well-being. Work-related well-being refers to teachers' satisfaction with and healthy functioning at work. This was operationalized with respect to teachers' concerns about their workload, organizational-level issues, and their interactions with students, and it was assessed using the Teacher Well-being Scale (Collie et al., 2015a). General well-being refers to well-being in one's life broadly (operationalized as healthy psychological functioning) and was assessed using the Flourishing Scale (Diener et al., 2010). Using a cross-sectional, survey-based design, findings demonstrated that relatedness with students laid a positive foundation for work-related well-being among elementary teachers, but not among middle and secondary teachers (the relationship was non-significant).

The authors suggested that systematic differences across school levels may have played a part in this finding. More precisely, elementary teachers generally work with one group of students across a school day, whereas middle and secondary teachers often switch between several classes of students. In addition, students' social, emotional, and academic developmental varies greatly across school levels (Roeser, Eccles, & Sameroff, 2000). These differences may mean that educators in the upper grades form different bonds with their students than those in the lower grades. In addition, perhaps middle and secondary teachers gain their well-being from other aspects of their work—such as their relationships with colleagues.

Also at a systemic level, educator stress can vary based on differences in schooling systems. Klassen, Usher, and Bong (2010) conducted a cross-sectional, survey-based study among 210 Canadian, 137 U.S., and 153 Korean elementary and middle school teachers. They assessed stress with a single-item, "I find teaching to be very stressful" (Boyle et al., 1995), and found that Canadian and U.S. teachers reported significantly higher stress than Korean teachers. This may have occurred because Korean teachers are less stressed, or due to different cultural expectations and norms that influence how teachers interpret and report stress. Further research on cross-cultural differences is important (see Chap. 7).

In this section, we have highlighted three ways in which teacher-student relationships and, in turn, teacher stress and well-being are impacted by contextual factors. Once again, cross-sectional, survey-based designs appear to be a frequent approach; however, studies using other methodologies are also emerging in the literature (e.g., longitudinal, qualitative; see Pas et al., 2012; Perry et al., 2015). Continued work with diverse methods will help to spur understanding of the impact of context and system factors on teachers' relationships with students. Moreover, research looking at how other contextual factors influence teacher-student relationships is important in future work (e.g., schoolwide discipline procedures and approaches). Taken together, the literature highlights that school- and system-level factors can play a large role in impacting teacher stress via the ways they shape how teacher-student relationships are formed.

Implications for Practice The provision of adequate support and training for teachers to build rapport and work effectively with students from different backgrounds and with different needs is important (Martin & Dowson, 2009). Intervention programs aimed at improving relationships between teachers and disruptive students have shown promising effects (e.g., Spilt, Koomen, Thijs, & van der Leij, 2012). School-wide programs that support the development of high quality relationships and a caring school community are another relevant school-level approach to support teacher-student relationships and well-being (Jennings & Greenberg, 2009). At the system-level, attention should be directed towards the nature of schooling institutions, how this shapes and constrains teacher-student relationships, and how aspects of this could be adjusted to better promote positive interpersonal interactions among teachers and students.

1.1.2.2 Relationships with Colleagues

Much like the research on teacher-student relationships, the literature has shown that high quality collegial relationships are associated with reduced educator stress and burnout, and greater well-being (Collie et al., 2016; Greenglass, Burke, Konarski, 1997; Ju, Lan, Li, Feng, You, 2015; Van Droogenbroeck et al., 2014). For example, in the Collie et al. (2016) study introduced above, the basic psychological need for relatedness with colleagues was also examined (using the Work-Related Basic Need Satisfaction Scale; Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010) alongside teachers' general and work-related well-being. Findings demonstrated that a sense of relatedness with colleagues was positively associated with both teachers' work-related well-being and general well-being.

Another way that educators' relationships with colleagues influence their experiences of stress is via the collaboration that they undertake with respect to their work tasks. Collaboration refers to educators working together to plan and teach lessons, discuss and implement strategies, observe one another's teaching, and develop their skills (Ronfeldt, Farmer, McQueen, & Grissom, 2015; Vangrieken, Dochy, Raes, & Kyndt, 2015). Although teacher's work has historically involved teachers working alone in their classrooms, there is an increasing push for teacher collaboration (Ronfeldt et al., 2015). Collaboration is relevant at both the school- and system-levels given that certain policies or reforms may influence or determine when, how, and how often teachers collaborate with one another. If teachers do not "buy-in" to the value of such collaborative policies, this may result in greater stress. Even when teachers perceive that collaboration has value (Vangrieken et al., 2015), the increased workload and interpersonal conflict that can result from such collaborations may be stressful for teachers (e.g., Achinstein, 2002).

For example, Johnson (2003) examined the impact of collaboration at four schools using a mixed-methods, survey and interview research design. Participants were 126 Australian elementary and secondary school teachers who were asked about the nature, extent, and outcomes of collaborative work at their school, and what conditions help or hinder collaboration. A subsample ($n = 26$) were also

interviewed about their personal experiences of collaboration. Work intensification, loss of autonomy, interpersonal conflict, and factionalism among different groups were identified by the participants as key drawbacks of collaboration. These all have the potential to elevate teacher stress (e.g., Van Droogenbroeck et al., 2014). At the same time, however, moral support, morale boosting, and professional learning were identified as important benefits of collaboration—and may be beneficial to educator well-being (e.g., Collie et al., 2016).

In summary, research indicates that high quality relationships with colleagues are beneficial for educator well-being. With respect to collaboration, however, the findings are less clear. Collaborative relationships may promote stress, well-being, or both in different ways depending on how collaboration is implemented and perceived by teachers. Research in this area has utilized a variety of data (including surveys and interviews) and analytic approaches (qualitative and quantitative). Longitudinal research is an important avenue for future research to understand different ways that collaboration can change over time and how this shapes educator well-being.

Implications for Practice When collaboration is allowed to develop and evolve naturally such that teachers are able to work with their colleagues in ways that suit them, this is known as collaborative cultures (Hargreaves & Dawe, 1990). In contrast, when collaboration is put in place by administrators and demanded of teachers, this is known as contrived collegiality (Hargreaves & Dawe, 1990). Importantly, when improperly implemented contrived collegiality may negatively impact relations between colleagues and could lead to increased educator stress. System-level reforms that are implemented from the top-down may leave little room for the natural development of collaborative cultures. Thus, administrators and policy-makers may want to be mindful of the impact that such policies can have on the relational nature of teaching. At the same time, efforts such as providing structured time for collaborative efforts, providing ongoing and relevant professional development, and creating roles for teachers to guide professional learning communities may be helpful to promote effective collaboration (Fulton & Britton, 2011). The impact of policy on educator stress is further explored below.

1.1.3 Systemic Factors in Educational Policy

A third source of stress for educators concerns shifts and developments in educational policy. Here we focus on standardized testing and educational innovations as two systemic factors that affect teachers' work lives, their teaching and, ultimately, students' learning.

1.1.3.1 Standardized Testing

Standardized testing and accountability have gained much attention over the past decade as ways to assess student achievement and measure teacher and school effectiveness (Nichols & Berliner, 2007; Pang, 2012; Smith & Kovacs, 2011). One unintended consequence of such testing, however, is that it can impact educator stress and well-being. von der Embse, Kilgus, Solomon, Bowler, and Curtiss (2015) conducted a cross-sectional, survey-based study of 8,084 U.S. elementary, middle, and secondary teachers. They examined two factors of stress related to standardized testing using their Educator Test Stress Inventory: sources of stress (e.g., pressure to raise test scores) and symptoms of stress (e.g., anxiety, perspiration during testing). Findings showed that a sizeable proportion of participants reported high stress (28%; identified as scores one standard deviation above the mean).

There are several possible reasons for why this finding may have occurred. von der Embse and colleagues (2015) suggest that educator stress and anxiety may be elevated when standardized testing results are used to determine job tenure, or if they are linked to merit or performance pay. In addition, poor student performance may result in teachers being dismissed, supervised in their teaching, or labeled an 'ineffective' teacher (Kruger, Wandle, Struzziero, 2007)—all highly stressful outcomes. Another way in which standardized testing can influence educator stress is the increased workload that occurs from expectations to “teach to the test” and the increased administrative work that is required for testing. Smith and Kovacs (2011) conducted a cross-sectional, survey-based study among K-8 teachers in one U.S. school district. Using questions that they developed, they asked teachers for their perceptions of the extent to which mandated tests had left little time to teach non-tested content, increased pressure on teachers, and narrowed the curriculum. They also asked whether the tests had helped improve achievement. Although half the teachers agreed that testing helped improve achievement (54%), significant numbers felt that testing left little time for non-tested content (79%), increased pressure on teachers (86%) and narrowed the curriculum (53%). Together, these perceptions are relevant to workload stress due to the pressures they place on teachers.

In other research, Dworkin (2009) examined the impact of accountability and standardized testing on teachers over the past three decades. The Dworkin Teacher Burnout Scale (Dworkin, Chafetz, & Dworkin, 1986) was used to assess alienational burnout, which refers to feelings of powerlessness, normlessness, meaninglessness, isolation, and estrangement at work. Among over 6000 U.S. K-12 teachers, Dworkin used cross-sectional designs, but compared mean-levels of burnout across teachers' with different years of experience. Trends within these samples were then examined across studies conducted between 1977 and 2004. Dworkin found that prior to the accountability movement, teachers generally reported an increase in burnout as they gained experience in the profession up to around five years and that this then slowly decreased over the course of the career. However, since the advent of accountability and standardized testing, significantly greater levels of burnout were evident among teachers and these no longer decreased as markedly as teachers progressed through their career.

Taken together, standardized tests and accountability appear to be detrimental for teacher well-being for a variety of reasons. At the same time, research that has examined this link is relatively limited. More research (using diverse methodologies) is thus an important further direction. Because students tend to perform better when their teachers are less stressed and experience greater well-being (e.g., Collie & Martin, 2017), this is an issue that is relevant to the very achievement outcomes that standardized tests are endeavoring to measure.

Implications for Practice Given the concerns raised above and that standardized testing is likely here to stay, it is important to consider ways in which the tests can be run to ease educators' stress. Researchers have provided suggestions including inviting teachers' input in the development of standardized tests and using the test results to provide additional resources to schools as needed (e.g., Barksdale-Ladd & Thomas, 2000). Another approach would be to use standardized test results as a genuine diagnostic test for student assistance rather than teacher assessment/accountability. This would take the pressure off teachers and would also move towards a more formative assessment approach, where results could be used to illuminate areas that need further attention among the students (e.g., Barksdale-Ladd & Thomas, 2000). Another valuable characteristic of this focus is that it would be aligned with growth approaches to learning (e.g., Dweck, 2015; Martin, 2015). Such approaches view ability as incremental and, therefore, focus on individual academic growth. They encourage students (and teachers) to compare themselves to their previous performance rather than to peers (Martin, 2015). Such approaches may be less stressful for teachers because they focus on how students are progressing rather than externally mandated achievement levels. Moving forward, research is needed to determine the extent to which this is empirically supported.

1.1.3.2 Educational Innovations

Educational innovations involve new programs, teaching and learning approaches, or curriculum guidelines that require professional development and implementation in the classroom or school (Ellis, 2013). Innovations are generally applied because they are considered to be a missing piece that will help to improve school effectiveness (Ellis, 2013). However, given the frequency with which innovations come and go, teachers can become wearied by the revolving door of such reforms (Chang, 2009; Hargreaves & Dawe, 1990). Innovations may lead to negative experiences for teachers if they are characterized by conflict and ambiguity (Chang, 2009), if teachers do not feel well-supported to implement the innovation (Collie, Shapka, Perry, & Martin, 2015b), or if teachers do not value the innovation (Evers, Brouwers, Tomic, 2002). Teachers' motivation and perceptions of their ability to apply the innovation also make an important difference in whether they view the reform as a challenge or threat (Gregoire, 2003).

In a recent study, Van Droogenbroeck, Spruyt, and Vanroelen (2014) examined burnout among 1,878 Belgian elementary and secondary teachers who were aged 45 years or older. With a cross-sectional, survey-based study, they used the Dutch version of the Maslach Burnout Inventory (Horn & Schaufeli, 1998) to assess the three components of burnout. They also used several items they self-developed to assess teachers' perceptions of: autonomy, their teaching workload and non-teaching workload, and support for implementation of policy changes. Findings showed that perceptions of inadequate support for implementing policy changes predicted lower autonomy, that autonomy predicted lower satisfaction with workload and, in turn, greater emotional exhaustion. Thus, inadequate support for implementation was associated with greater burnout via loss in autonomy and lower workload satisfaction.

A good example of an educational innovation that is common across many schooling systems worldwide is the increasingly central role of technology (e.g., Mueller, Wood, Willoughby, Ross, & Specht, 2008). Over the past three decades, information communication technologies (ICTs) have become embedded in teachers' work; teachers are expected to utilize ICTs in their teaching, instruct students on the use of ICTs, and conduct administrative work via ICTs (e.g., email, report writing). However, research suggests that ICTs are still being underused in schools (Mueller et al., 2008). One reason for this may be that ICTs can be stressful to implement effectively. For example, Al-Fudail and Mellar (2008) videotaped nine elementary and secondary teachers using ICTs in the classroom and interviewed the teachers about their experiences afterwards. They found that time taken to install, prepare and troubleshoot technology, lack of technical support and training, and the time taken to train less skilled students were all sources of stress for teachers that made them feel frustrated, annoyed, nervous, uncomfortable, or disappointed.

In summary, educational innovations can be detrimental for educator well-being if they are not accompanied by appropriate support and training. Moreover, the loss of autonomy that can go hand-in-hand with innovations can also be stressful for teachers (Van Droogenbroeck et al., 2014). As described above, this area of research has seen both quantitative survey and qualitative interview study designs. Once again, longitudinal research is an important direction for research in order to understand how teacher stress and burnout fluctuate throughout the implementation of educational innovations.

Implications for Practice The provision of adequate training and ongoing support appears to be crucial to help reduce educator stress (e.g., Van Droogenbroeck et al., 2014). Moreover, helping teachers to see the value of such innovations is also important for educators well-being (Evers et al., 2002). The findings also highlight that in addition to the typical approach in innovation development of considering the impact that such reforms have on students, it is also worth considering the impact on teachers. Teacher "buy-in" to the innovations' value and any associated stress that they feel concerning its implementation are likely to play significant roles in its eventual effectiveness.

1.2 Future Directions

In order to further understand how school context and systemic factors are implicated in educators' experiences of stress and well-being, there are several salient areas of research that deserve attention. In particular, there is a need for more research that examines the role of educator's personal (e.g. gender, ethnicity) and job characteristics (e.g. position, school level) in impacting stress, as well as on how school- and system-level characteristics (e.g. school socio-economic status) constrain and shape teachers' interpersonal relationships with students and colleagues. The fields of occupational health psychology, and educational leadership, policy, and administration have important knowledge to add on these topics (see Chaps. 7, 9, 10, 11 and 12). Such research is important for developing knowledge of whether there are certain groups of teachers or certain types of schools/systems that require additional or targeted support to foster well-being. Moreover, efforts to develop effective teacher well-being interventions depend on this knowledge to ensure they are appropriate to the broader organizational factors and targeted relevantly to teachers.

Only limited research has examined the direct impact of standardized testing and educational innovations on educator stress (e.g., von der Embse et al., 2015). More research in this area is needed, especially given that student outcomes might be detrimentally impacted if teachers become stressed during administration or implementation of the tests/innovations. In designing future studies in this area, a fruitful avenue is to focus on intervention designs that examine the extent to which different types of training or ongoing support help to reduce teacher stress and increase the effectiveness of the innovation. This is important for not only improving teacher outcomes, but those of students as well.

Another area that deserves attention is the value of considering educator well-being alongside educator stress to better inform knowledge of educators' working experiences. Although teaching can be stressful for educators, it is also a meaningful and joyful profession (e.g., Keller, Frenzel, Goetz, Pekrun, & Hensley, 2014). Thus, exploring educator well-being in addition to stress has the potential to provide a broader understanding of teaching work—both the ups and downs. Moreover, such research will better acknowledge the aspects of educators' work that help, not just hinder psychological functioning at work (Collie et al., 2015a). An important consideration for research on well-being is to consider various definitions (e.g., work-related well-being, life satisfaction) to further nuance knowledge in this area.

A final area worth mentioning is the need for more research utilizing diverse methodologies (e.g., longitudinal, multilevel, interview, observation). For instance, more intervention work is needed to understand the extent to which educator stress can be reduced. Emerging research is suggesting that wellness (e.g., Sharrocks, 2014) and mindfulness (Roeser et al., 2013) programs for teachers may help to reduce stress and burnout, and increase well-being. The extent to which improvements in school context and educational system factors also lead to reductions in educator stress and improvement in well-being is another important area that is

being examined in the occupational healthy psychology field (see Chaps. 15, 16 and 17). Such research is critical given the links between teacher well-being and student achievement (e.g., Collie & Martin, 2017). In addition, the costs associated with teacher stress and ill-health (e.g., due to absence, lost learning) provide further impetus for broadening knowledge in this area.

1.3 Conclusion

Stress is a salient issue for educators' psychological functioning at work with ramifications that extend to students, schools, and schooling systems. In the current chapter, we considered three school context and educational system factors that are implicated in educators' experiences of stress. The first factor concerned the occupational support provided to teachers in their work with a specific focus on autonomy support provided by the principal. The second factor was the relational context of teaching with a focus on teachers' relationships with students and colleagues. The third factor was the impact of systemic factors in educational policy with a focus on standardized testing and educational innovations. Together, the three factors represent defining features of schooling and educational systems that help to shape teachers' work and their working environment. As the chapter has shown, they are also centrally implicated in educators' experiences of stress and the related processes of burnout and well-being. In sum, educator stress is influenced by school- and system-level factors and these need to be taken into account to ensure that educators are flourishing in their work and teaching effectively.

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Chapter 2

Current Knowledge on the Nature, Prevalence, Sources and Potential Impact of Teacher Stress

Cheryl Travers

Abstract This chapter will review current research on teacher stress, identifying its nature, causes and prevalence within the contemporary teaching context. It will also examine the potential impact teacher stress can have on teachers, the pupils they teach and wider society. In addition, it will review the evidence regarding the relative influence of key school-related factors, demographics and individual teacher characteristics on teacher stress, so as to identify those teachers who are most ‘at risk’. It will conclude by offering a critique of the methodologies employed, whilst suggesting some innovative approaches for investigating teachers’ working lives. Teaching has been acknowledged as one of the most stressful of all occupations. Reports on the prevalence of stress among educators suggest that the pressures that these particular professionals encounter, are increasing. This is in spite of a large amount of research into their working experiences. Many of the identified sources of teacher stress have remained consistent over time, though constantly changing sociological and environmental factors and educational practices and policies have brought other stressors into the frame.

Keywords Nature of teacher stress • Prevalence of teacher stress • Teacher individual characteristics • Teaching context • Innovative methodologies

2.1 Introduction

Teacher stress has been of interest to researchers and other educational stakeholders for around 40 years (e.g. Chaplain, 2008; Kyriacou, 1987, 2001; Kyriacou & Sutcliffe, 1978a, 1978b, 1979; Travers & Cooper, 1993, 1996). With a few notable exceptions (e.g. Milstein & Farkas, 1988), teaching has been consistently viewed as

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a highly stressful occupation across a range of cultural contexts (e.g. Antoniou, Polychroni, & Vlachakis, 2006; Barnes, Crowe, & Schaefer, 2007; Borg & Falzon, 1989, 1990, 1993; Chan, 2002; Lazuras, 2006; Pisanti, Gagliardi, Razzino, & Bertini, 2003; Wilson, Mutero, Doolabh, & Herzstein, 1990). The field has come a long way since Kyriacou began searching for published research on the topic in the early 1970's and Coates and Thoresen embarked on their investigations into job-related teacher anxiety at around the same time (Coates & Thoresen, 1976).

Scholars have continued to attempt to identify the potential sources of teacher pressure and stress, subsequent responses and outcomes, and the interaction of certain demographic and biographical variables (e.g. age, experience and gender) with certain teacher job characteristics (e.g. job status, type of school), and teacher perceptions and experience of stress. A number of those researchers have experienced stress first-hand while teaching in schools and colleges. For example, in the U.K., Jack Dunham started his career teaching pupils with special needs, before becoming a psychologist and helping fellow teachers cope with stress (Dunham, 1992, 1995; Dunham & Varma, 1998). Kyriacou revealed that his interest in studying stress in those who educate our children, was fueled whilst working in poverty-stricken and troubled U.K. schools in the early 1970's, an era which recognized excessive levels of teacher pressure, by providing monetary incentives known as 'stress allowances' (Kyriacou, 2001). In a similar vein, my own research in United Kingdom primary and secondary schools over twenty five years ago, aimed to investigate their working experiences following some of their own experiences (Travers & Cooper, 1993, 1994, 1996). Following my graduation from university in the late 1980's, teaching in a U.K. college had highlighted the many teaching-related variables which could lead to stress, and motivated me to conduct in-depth and large scale research in this area.

My research project received a considerable amount of attention from teacher unions, leaders of schools, politicians, the media, and from teachers themselves. I received letters from burned-out teachers and also, frequently (and rather disturbingly), from families of teachers who had left teaching due to stress. I received one harrowing letter from a mother whose teacher son had recently taken his own life, blaming the pressures faced day to day in his role in school. On a personal note, as a parent of two young daughters, I also spent ten years on the governing body of their local U.K. village primary school and saw, first hand, the problems of managing teacher stress and leading a school under pressure. Therefore, though I can vouch for those who claim that much satisfaction can be gleaned from teaching youngsters and children (e.g. Borg & Falzon, 1989), I also know how stressful the role can be.

Utilizing in-depth interviews from a selection of 40 primary and secondary teachers working in schools in the North of England, a nationwide cross-sectional survey of almost 1790 teachers, and a study of the psychophysiological responses to stress of 56 primary and secondary school educators working in three schools in London, my overall project was considered unprecedented in its magnitude and scope (Travers & Cooper, 1993, 1994, 1996). In the early 1990s, the U.K. had been

undergoing a number of educational changes and reforms (Educational Reform Act, 1988) and the profession itself was under incredible scrutiny. The result was such that extra pressures were imposed upon teachers, with greater levels of uncertainty, job insecurity and the restructuring of teaching itself (Cox, Boot, Cox and Harrison, 1988; Esteve, 1989).

Fast forward twenty five years, and educators teaching in contemporary schools and colleges around the World, continue to experience stress from working within a constantly changing educational and social landscape (Lambert & McCarthy, 2006). In particular, teacher autonomy has declined over the last 10 years or so, in many contexts. For example, the ‘*No child left behind*’ (2001) era in the United States has reduced the independence of teachers, during a decade marked by standardization and high stakes testing (NCES, 2012). Teachers are expected to execute various and diverse activities, while facing enormous volumes of individual, social and professional responsibilities (Adams, 2001). This chapter will review current research on teacher stress, identifying its nature, causes and prevalence within the contemporary teaching context. It will also examine the potential impact teacher stress can have on teachers, the pupils they teach and wider society. In addition, it will review the evidence regarding the relative influence of key school-related factors, demographics and individual teacher characteristics on teacher stress, so as to identify those teachers who are most ‘at risk’. It will conclude by offering a critique of the methodologies employed, whilst suggesting some innovative approaches for investigating teachers’ working lives.

2.2 What Do We Mean by Teacher Stress?

Scholars have tried to capture the essence of teacher stress, its key features and how it manifests itself in the working life of a teacher (Abel & Sewell, 1999; Borg, 1990; Borg & Riding, 1991; Boyle, Borg, Falzon, & Baglioni, 1995; Yang, Wang, Ge, Hu & Chi, 2011). Kyriacou (2001) defines teacher stress as “the experience by a teacher of unpleasant emotions, such as anger, anxiety, tension, frustration or depression, resulting from some aspect of their work as a teacher” p. 28).

A teacher may become stressed when they perceive an imbalance between situational demands in their working experience and their ability to respond adequately to these (Engelbrecht & Eloff, 2001; Nhundu, 1999; Wisniewski & Gargiulo, 1997). Kyriacou and Sutcliffe (1979) suggest that teacher stress is:

a response to a negative affect usually accompanied by potentially pathogenic physiological and biochemical changes resulting from aspects of the teachers job and mediated by the perception that the demands made upon the teacher constitute a threat to his or her self-esteem, and well-being and by coping mechanism activated to reduce the perceived threat (p. 89).

This has been reinforced more recently by Geving (2007), who suggests that when demands are perceived as excessive, yet control, autonomy and decision-making are low, stress is more likely to occur. This is in line with the underlying

premise of one of the most widely cited models of occupational stress, the ‘Demands-Control Model’ of Karasek (1979, 1998), which is addressed in Chap. 9 of this book. His model suggests that control buffers the impact of job demands on strain and can help enhance job satisfaction, by providing the opportunity to engage in challenging tasks and learn new skills (see also De Lange, Taris, Kompier, Houtman, & Bongers, 2002). Further, another majorly influential scholar in the field, Lazarus, states that cognitive appraisal occurs when a person is faced with a potential stressor (i.e., and this can result in the stressor being viewed as either a threat or not). The individual then may subsequently engage in primary and secondary appraisal (i.e. what does it mean and how can it influence me?) (Lazarus, 1966; Lazarus & Folkman, 1984) and if it is deemed a threat, may subsequently exhibit a stress response (i.e. anxiety or withdrawal). So, the stress levels encountered by an individual teacher are likely to depend upon the interaction between the specific stressors they experience in their work, their appraisal of the stressor and their perceived ability to cope with it, i.e. as a consequence of the stress process/transaction (Engelbrecht & Eloff, 2001).

Researchers have also focused on the notion, causes and outcomes of teacher burnout (Bas, 2011; Hultell, Melin, & Gustavsson, 2013; Schwab, Jackson, & Schuler, 1986). Burnout is a multidimensional concept which is theoretically distinct from stress and is defined as being the by-product of prolonged stress, whereby individuals experience emotional, physical and attitudinal exhaustion (Maslach & Goldberg, 1998; Motseke, 1998; Van der Lin de, van de Westhuizen, & Wissing, 1999; Wisniewski & Garigulio, 1997). Friedman (2000) conceptualizes burnout as a “work-related syndrome, stemming from the individuals’ perception of a significant gap between expectation of successful professional performance and an observed far less satisfactory reality” (p. 595). Burnout manifests itself as exhaustion, cynicism and ineffectiveness. It is the antithesis of engagement, which is characterized by energy, involvement and efficacy (Maslach, Jackson, & Leiter, 1996). Teachers have been found to be particularly at risk of burnout, and the most vulnerable are those who have been unsuccessful in coping effectively with stress over a long period of time and/or those whose dreams of impeccable professional performance, have been replaced by feelings of depersonalization and a lack of accomplishment (Guglielmi & Tatrow, 1998; Vandenberghe & Huberman, 1999). Studies have suggested that teachers’ burnout levels are stable over time, but Hultell and colleagues (Hultell, Melin, & Gustavsson, 2013) suggest that this might be because longitudinal studies on burnout have mainly used a variable-based approach. Using the Scale of Work Engagement and Burnout (SWEBO, Hultell, & Gustavsson, 2010), they tracked 816 student/beginning teachers in Sweden and collected data using questionnaires over five time periods: two during their higher education and three during the initial period of employment. The results of the study confirmed previously identified relationships between identified predictors of burnout, and also that burnout is relatively stable over time. But, of interest is that the findings support the usefulness of a person-based approach when studying change in burnout over time. This approach offers a new non-linear perspective on the development of burnout, compared to studies only using variable-based methods. Hultell and

Gustavsson suggest that studies which capitalize on this alternative method when studying change over time, will hopefully lead to new insights, not only into the burnout process but also on development in other variables relevant to teaching.

2.3 How Prevalent Is Teacher Stress and Burnout?

Any employee may experience a specific level of work-related stress as a result of the particular demands and challenges in their profession. However, the incidence of job stress and burnout in human service organizations, in particular, is high (e.g. Cherniss, 1980; Dewe, Cox, & Leiter, 2000). Biggs (1988) argues that, those working in helping professions, are particularly prone to stress due to their idealistic goals. Greenberg (1984) suggests that those human service professionals who care for others, have a tendency to make heavy emotional investments in their roles. Teachers, especially, have the responsibility for day to day direct care for their students, and thus are potentially more vulnerable. When compared to comparable professional groups, they are consistently found to be a particularly 'at risk' group, in both developed and under-developed countries, and more likely to suffer from stress. (e.g. Antoniou, Polychroni, & Vlachakis, 2006; Borg & Falzon, 1990; Chan, 2002; Dunham & Varma, 1998; Feldman, 1998; Hui & Chan, 1996; Jacobsson, Pousette, & Thyelfors, 2001; Johnson, Cooper, Cartwright, Donald, Taylor, & Millet, 2005; Kyriacou, 1987, 2000; Pithers & Soden, 1998; Soyibo, 1994; Travers & Cooper, 1996; Wahlund & Nerel, 1976).

When asked to rate their experience of stress at work, typically between a quarter to almost eighty per cent of teachers surveyed, rate their job as 'very' or 'extremely' stressful (e.g. Hillman, 2015; Phillips, Sen, & McNamee, 2007; Travers & Cooper, 1996). The U.K. Health and Safety Executive (HSE) ranked teaching as the most stressed job after finding that 41.5% of teachers self-report as 'highly stressed'. This is of particular concern, when they found that a random sample from the general U.K. population showed that about 20% of the workers reported very high or extremely high levels of stress at work (HMSO, 2000). Other studies have found that teachers show high levels of exhaustion and cynicism related to their work (Hakanen, Bakker, & Schaufeli, 2006; Maslach et al. 1996; Prieto, Soria, Martinez, & Schaufeli, 2008; Schaufeli & Enzman, 1998).

Cooper and various co-investigators in the U.K. (myself included) have studied over 80 various professions over the years, finding that teachers regularly rank among the most highly stressful job roles, displaying poorer levels of mental health and job satisfaction than doctors (Cooper & Roden, 1985), dentists (Cooper, Watts, Baglioni Jr, & Kelly, 1988), and nurses (Cooper & Mitchell, 1990). More recently, Johnson and others compared 26 occupational groups, and ranked teaching as one of the six most stressful jobs, both physically and psychologically, second only to ambulance drivers (Johnson et al., 2005).

Such data is cause for concern, not least because it signifies a high degree of pain and suffering experienced by individual teachers. In addition, it highlights the loss

of trained staff from a profession that is already at a breaking point due to the pressure from recruitment and retention challenges (Brill & McCartney, 2008; Cochran-Smith, 2004). Teachers are also essential for the actualization of school goals and objectives (Bluett, 1998; Rocca & Kostanski, 2001) and such high levels of stress may hamper their well-being and performance, therefore impacting on pupils, schools and the wider society.

2.4 What Causes Teacher Stress?

Over time teacher stress research has revealed that the main sources of stress for educators are largely similar to those affecting other comparable occupational groups (e.g. Benmansour, 1998; Pithers & Soden, 1998; Travers & Cooper, 1996). For example, teachers complain of a lack of time (Coates & Thoresen, 1976; Kyriacou, 1987), poor relationships with colleagues and school leaders (Troman, 2000), inadequate resources (Chaplain, 1995; Greenberg, 1984), role conflict and role ambiguity (Blase, 1986; Pearlin, 1989), coping with change (Brown, Ralph, & Brember, 2002; Kyriacou, 2001), being evaluated by others (Brimblecombe & Ormston, 1995), and workload (Borg, 1990). Others that are more teacher-specific, are things like dealing with large class sizes (Trendall, 1989), and student and pupil behavior (Friedman, 1995; Punch & Tuettemann, 1990).

When we studied the topic of teacher stress in the U.K. in the late 1980's and early 1990's, it seemed as though a teacher's job was as stressful as it could be. However, the role of the educator is becoming even more complex, demanding and less easily defined, related in no small part to a more complex and challenging world (Bar-Yam, Rhoades, Booth Sweeney, Kaput, & Bar-Yam, 2002). The literature on teacher well-being from around the globe shows that multiple aspects of teachers' lives are related to their motivation, burnout, and job (dis)satisfaction, including individual and school characteristics (e.g. Carr, 2002). A teacher's motivation and job satisfaction have generally been linked with the fulfilment of intrinsic factors, such as working with children. Whilst negative outcomes, such as job dissatisfaction and burnout, have been found to be associated with extrinsic factors, such as poor pay, work overload, and the deterioration of the status of the teaching profession (IIEP, 2004; Spear, Gould and Lee, 2000). For the purpose of this chapter, I will focus on a number of aspects which I feel are of contemporary interest and relevance.

2.4.1 *Constant Changes in Teaching and Education*

Teachers are working within a profession that is constantly undergoing educational paradigm shifts, with the consequence being that teachers report high levels of stress (Brown et al., 2002; Kyriacou, 2001). My own research in the early 1990's

found that dealing with change, and the consequences of that, was a major source of stress for teachers in the U.K. (e.g. Travers & Cooper, 1993, 1996). Many educational changes relate to increasing demands and challenges, such as the rationalization of personnel, increased specialization, the growing scope of syllabi and a higher number of learners per class. Against this backdrop, the rewards of teaching have become increasingly obscured by these demanding work conditions which typify many schools (Borman & Dowling, 2008; Kyriacou, Kunc, Stephens, & Hultgren, 2003).

Ingersoll argues that stress is largely the result of teachers believing that they have no voice in the current educational system, that they are being increasingly micro-managed as part of change processes and that their autonomy has dwindled (Ingersoll, 2006). The concept of teacher autonomy refers to the professional independence of teachers in schools, especially the degree to which they can make autonomous decisions about what they teach to students and how they teach it. In the U.S., teachers claim that the '*No Child Left behind*' (2001) era has led to reductions in the discretion and autonomy that a teacher has in their own classroom. Data from the National Center for Education Statistics, (NCES) based on a nationally representative sample of more than 37,000 American public school elementary and secondary teachers, showed that educators reported less classroom autonomy in the school year 2011–12 compared to 2003–04 (Sparks, Malkus, & Ralph, 2015).

Research has found that teacher autonomy (e.g. around classroom structure and organization and the curriculum) is positively associated with teacher job satisfaction and teacher retention (Guarino, Santibañez, & Daley, 2006; Ingersoll & May, 2012; Pearson & Moomaw, 2005). Those teachers who perceive that they have less autonomy, are more likely to leave their positions, either by moving from one school to another, or leaving the profession altogether (Berry, Smylie, & Fuller, 2008; Ingersoll, 2006; Ingersoll & May, 2012). Therefore, this is an important topic for administrators and policymakers to consider when trying to improve teacher satisfaction and reduce teacher attrition rates (Ingersoll, 2006; Liu & Meyer, 2005; Pearson & Moomaw, 2005). Historically, research has shown that factors such as role ambiguity (lack of clarity about a task) and role conflict (conflicting demands) can also be potential sources of stress (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). Change can introduce these two role stressors into what may have been a previously stable teaching role (Kelly, 1974).

Another change-related factor that may enhance teacher stress, is the increasing accountability for student achievement gaps and the increasing number of policies for reform which have been devised to improve schools' and teachers' performance. School efficiency and grades have become paramount and are associated with school improvement and teacher effectiveness. Such drives are usually accompanied by enhanced workloads, increased responsibilities and the implementation of a variety of new and challenging interventions to increase pupils' test scores (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008; Boyd & Shouse, 1997; Lambert & McCarthy, 2006). At one time, teachers may have coped with this change by creating opportunities for more autonomy in their classroom, via classroom structure and

organization and the curriculum, but it is less likely that they have this autonomy in the current educational climate (Shernoff, Mehta, Atkins, Torf, & Spencer, 2011).

It is therefore, no surprise that high numbers of teachers experience psychological distress, mental and physical fatigue, and psychological burnout, when compared with other professions (e.g. Guglielmi & Tatrow, 1998; Kovess-Masfety, Rios-Seidel & Sevilla-Dedieu, 2007; Travers & Cooper, 1993, 1996). The pressures, and their effects, can lead to strong negative emotions that can interfere with a teacher's capacity to deliver high quality instruction and can compromise their health (Emmer & Stough, 2010; Maslach & Jackson, 1981; Sutton, 2004). This experience of negative affect may also undermine a teacher's sense of professional self-efficacy (Skaalvik & Skaalvik, 2009; Yoon, 2002) and over-tiredness may lead to professional burnout (Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010).

2.4.2 The School Context, Culture and Environment

Research has also increasingly investigated the impact of varying school contexts, socio-cultural and economic situations on teacher stress (e.g. Bhagat, Steverson, & Segovis, 2007; Eres & Atanasoska, 2011). If differences do exist between groups of teachers, due to the context, then it is useful to identify them so that strategies for stress amelioration can be targeted more specifically and successfully (Skaalvik & Skaalvik, 2009). Relevant contextual factors may include population increases, diversity in school populations, increases in the cost of living, crime and its effects on learner behavior, conditions of service, new rules and regulations of the education department, curriculum changes, performance appraisal systems and demands of unions (Mestry, 1999).

Scholars have particularly reported on the challenging working conditions in high poverty, urban or inner city schools which may link to other related factors, such as overcrowding, limited resources, and physical deterioration of the premises (Atkins, Graczyk, Frazier, & Adil, 2003; Boyd & Shouse, 1997; Capella, Frazier, Atkins, Schoenwald, & Gliss, 2008). In more recent times, research has shown that urban teachers are often burdened by policies that emphasize test scores, teach high numbers of students with complex learning and mental health needs that go unmet, and report high rates of job dissatisfaction when compared to their suburban or rural counterparts (Langley, Nadeem, Kataoka, Stein, & Jaycox, 2010; Shernoff, Mehta, Atkins, Torf, & Spencer, 2011; Smylie, 1999). This level of dissatisfaction with their job, might lead to teacher turnover/attrition and some researchers have found that some inner city schools have lost up to 40% of new teachers within their first few years of teaching (Barnes, Crowe, & Schaefer, 2007; Shann, 1998).

Systematic research on teacher well-being has typically been conducted in high-income countries such as the U.S., France, Germany, and the United Kingdom. Pithers & Soden (1998) have argued that there are more similarities than differences when comparing teacher stress internationally. Other studies in low- and middle-income countries, such as South Africa, Iran, India, and Jordan, have suggested that

determinants of teacher burnout are similar to those in the United States (e.g. Mohammadi, 2006). However, there is growing concern that teachers in low-income (LIC) or conflict affected (CAC) countries are increasingly demotivated, which may partially explain deteriorating teaching performance and student learning outcomes, high rates of turnover and absenteeism, and misconduct in those affected areas (Bennell & Akyeampong, 2007; Moon, 2007).

Importantly, teachers in LICs are often ill-equipped for the challenges of teaching and face many hardships in their work and personal lives that threaten their well-being and effectiveness in the classroom. Among the many challenges they face are increasing workloads, due to education reform, low and infrequent compensation, lack of professional recognition and development opportunities, lack of accountability, and lack of voice (Bennell & Akyeampong, 2007; Guajardo, 2011). Such problems may be particularly acute in CAC's, where limited resources, coupled with historic and/or endemic violence, can severely affect teaching conditions.

Chang (2009) has argued that, in order to frame teacher burnout, the inherent cultural beliefs or economic development of different countries or cultures must first be examined. For example, using a combination of quantitative and qualitative measures of burnout and stress, a cross-cultural study compared 97 Israeli teachers' stress and burnout levels with those previously found for teachers in the U.S. (Pines, 2002). Burnout was measured by the Burnout Measure (Pines & Aronson, 1988) and stress by three qualitative questions, e.g. 'What are the most burnout-causing stresses at work? Israeli teachers reported more stress related to larger class sizes, longer work hours, less administrative support, fewer resources, and exposure to dangerous environments than their American counterparts. However, despite the experience of a greater number of stressors, Israeli teachers reported lower burnout than American teachers. This finding was partly explained by further examination of the inherent cultural beliefs among Israelis. For example, Israeli teachers had a greater sense of importance and value in serving as a teacher than American teachers.

2.4.3 The Teacher's Role and Level of Experience

Aspects of the teachers' role may make them more or less vulnerable to stress and studies have investigated the impact of being in a leadership role. Using measures of psychological well-being and mental health (Crown Crisp Experiential Index, Crown, & Crisp, 1979) and jobs satisfaction (Warr, Cook, & Wall, 1979) and a causes of stress index of 39 items, Cooper and Kelly (1993) assessed stress amongst 2638 head teachers of primary and secondary schools in the U.K., together with principals/directors of further and higher education establishments. They found that those in primary and secondary schools suffered from the lowest job satisfaction and the poorest mental health. Work overload and handling relationships with staff seemed to be problematic, but the type of stressor varied with the managerial level

of the teacher. My own work found that those in middle managerial positions (i.e. deputy head teachers) were especially vulnerable, largely due to their dual role of manager and classroom teacher (Travers & Cooper, 1993, 1996).

More recent findings show that younger and less experienced teachers have the highest rates of job burnout of all teachers (Brewer & Shapard, 2004; Maslach, Schaufeli, & Leiter, 2001). Data from the Association of Teachers and Lecturers (ATL) in the U.K. shows that in 2011, 10,800 newly qualified teachers did not take up a post, a level up from 3600 in 2005. Also, 40% of new teachers were not in the classroom after a year in post in 2011, compared to 20% in 2005 (Cockcroft, 2015). These outcomes may be due to a number of possible reasons identified in other studies, such as a lack of school-based support system and pupil misbehavior for which they may not feel fully prepared in their training (Becker, Keller, Goetz, Frenzel, & Toxer, 2015, Garner, 2015). Another factor may be the school climate which they find themselves in, for example being put off by their exhausted and stressed colleagues and the emotional contagion that may result (Bakker & Schaufeli, 2000).

Huberman (1993) suggested that a teacher's response to their role and the resultant stress, vary over time. He interviewed 160 Swiss high school teachers and highlighted length of tenure and its' effect on perception of the job. This led to the identification of certain stages resulting from the stress experienced and associated worries and frustrations as a teacher's career unfolded, i.e. a period of self-doubt; disenchantment and reassessment. Depending on whether their concerns at each of these stages were resolved or not, they might continue with their career as a teacher or decide to leave the profession for good.

2.4.4 Teachers' Relationships in School

Teachers are exposed to a host of relationships in their role and their reaction to the job has been found to be affected by the quality of these relationships (e.g. with pupils, fellow teachers, school leaders and parents).

It is no surprise to find that a fundamental factor affecting teacher stress is that of student (mis)behavior (Carson, Weiss, & Templin, 2010; Montgomery & Rupp, 2005; Schonfeld, 2001; Sutton & Wheatley, 2003). However, findings tend to be inconclusive, because teachers' interactions with students also can result in job satisfaction (Chaplain, 1995). A teacher's character, experience and outlook can also affect whether student behavior is a potential stressor or not. Younger, less experienced teachers can be affected more than their older, experienced colleagues (Brown & Nagel, 2004). Using the Student Control Ideology Scale (Willower, Eidel, & Hoy, 1973) and the Maslach Burnout Inventory (Maslach & Jackson, 1981), Bas studied 376 teachers from 12 elementary schools in Turkey, and found that teachers' student control ideologies affected their perceived burnout levels, in that teachers with a custodial ideology, were found to experience depersonalisation, reduced personal accomplishment and emotional exhaustion more often. (Bas, 2011).

Janzen and Phelan (2015) talk about “the emotional toll of obligation and teachers disengagement” (p. 347). They explain that it is the binding responsibility to respond to “the other” that lends teaching its moral integrity, but also takes a tremendous emotional toll on those who teach. Obligation is of particular importance today, given that education is increasingly being structured by particular performance-driven ideologies and this may lead to marked feelings of self-doubt, guilt, anxiety and shame in teachers (Ball, 2003). The impact of this emotional toll may lead to burnout and consequently may have a negative impact on students (Crocco & Costigan, 2007). Coates and Thoresen (1976) also found that teacher anxiety could lead to student anxiety, and other aspects of a pupil’s behavior, so the interaction is complex, but worthy of study.

Research accounts of teacher emotions and the cultures within schools, have noted that unsatisfactory social relationships with other adults (e.g. colleagues, head teachers/principals, parents and inspectors) can lead to hostile emotions in teachers and stress reactions. Using the labor process theory, Troman argues that the intensification of work and government policies promoting managerialism in schools, are the root of the problems - especially in what he sees as an increasing climate of low trust (Troman, 2000).

As indicated in Chaps. 1 and 7, the relationships which teachers enjoy with other teachers are important predictors of their motivation and stress reactions (see also Kirk & Winthrop, 2007). Social support from colleagues, defined as interpersonal transactions that provide emotional, instrumental, or informational support perceived as beneficial to educators, is perhaps the most widely investigated moderator of teacher stress to date (House, 1981). Interestingly, some evidence suggests that social support from colleagues provides a stronger buffer against stress than other sources of support (e.g. friends and family) and can also promote relational trust at an organizational level (Bryk & Schneider, 2002).

Greenglass, Burke and Konarski (1997) examined the antecedents and consequences of burnout, including the roles of work stressors and social support from supervisors and co-workers, in a sample of 833 Canadian teachers at all levels within a Canadian school board. Employing the Maslach Burnout Inventory (Maslach & Jackson, 1986) they measured emotional exhaustion, depersonalization and reduced personal accomplishment, they found that co-worker support contributed to the prediction of burnout, particularly to decreased depersonalization and increased feelings of accomplishment. Further, Griffith, Steptoe, and Cropley (1999) conducted a questionnaire survey of 780 primary and secondary school teachers in London and found that the presence of social support as an effective coping strategy can affect a teacher’s perception of stress. More specifically, Sarros and Sarros (1990), in a sample of 491 Australian secondary school teachers, found that support from ones’ principal was a significant predictor of lower levels of burnout, measured by the Maslach Burnout Inventory (Maslach & Jackson, 1986), as was support between teachers themselves. The benefits of good teacher relationships extend beyond the experience of stress, and research in the U.S. has shown that schools where high levels of cooperation exist among staff have the largest gains in student achievement over time (Lee & Smith, 1996).

It is not just relationships with other adults in school that are potential sources of stress for teachers; pressure can also come from their dealings with parents. Continual exposure to challenging behavior from parents, can seriously deplete the teacher's emotional and physical resources, leading to self-doubt, loss of satisfaction from teaching, impulsivity, rigidity or feelings of anger and guilt (Prakke, van Peet, & van der Wolf, 2007). The perception of teachers' ability to handle challenging behaviors such as unsatisfied, over protective, neglectful and/or excessively worried parents, has a large impact on stress. Also, mismatches between parents and teachers perceptions of each other's roles can have a negative impact on teacher stress and well-being (Lawrence-Lightfoot, 2003). A number of studies have shown that there are many barriers to the attainment of ideal parent involvement and parent-teacher interactions (Chavkin, 1993) and parental (mis)behavior ranks near the top of many teachers stress surveys (Sakharov & Farber, 1983).

2.4.5 Aspects of the Individual Teacher

There are a number of features related to the actual teacher, (i.e. individual characteristics, personality, or biographical variables such as age, gender and ethnicity), that have been found to influence their experience of, and reactions to, stress in their role (Aftab & Khatoon, 2012). A particular teacher may experience an event as extremely stressful, while another may experience excitement and challenge (Albertson & Kagan, 1987; Dworkin, Haney, & Telschow, 1990; Worrall & May, 1989). In general, research has established a link between the incidence of stress and an individuals' personality (e.g. Akinboye & Adeyemo, 2002; Readeke & Smith, 2004; Riolli & Savicki, 2003). In his study of 447 primary school teachers in Cyprus, Kokkinos (2007) found that personality characteristics, as well as contextual factors, are associated with stress or burnout dimensions. Regarding personality, he found that teachers' personality traits were significant predictors of three burnout dimensions. High levels of neuroticism and low levels of agreeableness were predictive of emotional exhaustion. Regarding depersonalization, neuroticism was the most important predictor, whereas personal accomplishment was predicted by low levels of neuroticism and high levels of extraversion and conscientiousness. Context factors, such as found that managing student (mis)behavior, teachers' appraisal by students, workload, and time constraints, were predictors of burnout. This provided support for a transactional model of psychological distress, in which both environmental and personality variables need to be considered. Individual differences regarding such aspects as agreeableness, extraversion, neuroticism, self-concept, type A personality and locus of control, etc., have been identified as important predictors of psychological distress in workers in general (Baghy & Rector, 1998; Cooper, Kirkcaldy, & Brown, 1994; Davey, 1994; Rosenberg & Pace, 2006) and many studies have found the same for teachers (e.g. Travers & Cooper, 1993; Wilson, Mutero, Doolabh, & Herzstein, 1990).

Research investigating the potential differing stress-related experiences of stress between males and females has been inconclusive, with some researchers finding that women are more prone to stress than men (e.g. Arroba and James, 2002; Melhuish, 1998).and others concluding there are no differences (e.g. Fontana & Abouserie, 1993; Martocchio & O’Leary, 1989; Philips & Segal, 1996).

When it comes to teachers, however, some studies in the past have highlighted differences between male and female teachers (e.g. Laughlin, 1984; Travers & Cooper, 1991). More recent studies have found that male teachers report more psychological and physical stress than their female counterparts (Mondal, Shrestha, & Bhaila, 2011) and report greater concern with insecurity and financial matters, while females express issues with intrinsic facets of their jobs (Rosenblatt, Talmud, & Ruvio, 1999). Others have found that female teachers complain more of burnout than male teachers (e.g. primary school teachers, Bhadoria & Singh, 2010; secondary school teachers, Ravichandran & Rajendran, 2007).

Though in the main, this has been under-researched, ethnicity may also be a potential demographic variable which contributes to the experience of stress (e.g. a study of migrants, Bhugra & Jones, 2001). Miller and Travers (2005, 2007) explored ethnicity and teacher stress, by carrying out a nationwide investigation into the mental well-being and job satisfaction of 208 minority ethnic teachers across a variety of schools in the U.K., derived from the U.K. National Union of Teachers (NUT) database of minority ethnic teachers, alongside an advertisement in the NUT’s Teacher magazine. Analysis revealed that ethnic minority teachers compared with other comparable occupations and teachers generally, were experiencing poorer mental health and lower job satisfaction. Some minority ethnic teachers reported that they encountered ethnic discrimination on a daily basis, or at least several times per week, and that this was a contributory factor in their experience of stress. Many of the teachers believed they worked within an institutionally racist environment. Analysis discovered that ‘total stress’, ‘total self-esteem’, ‘working conditions job satisfaction’ and ‘total discrimination’ were the major predictors of mental ill-health (General Health Questionnaire GHQ, Goldberg, & Hillier, 1979) in the minority ethnic teachers. Job dissatisfaction (Warr, Cook, & Wall, 1979) was predicted by ‘total discrimination’, ‘workload’, ‘total general health’, ‘resolution strategy’, and the ‘lack of status and promotion’. This is an area that needs further investigation, as schools become increasingly diverse environments,

2.4.6 Conclusion

It is possible that the failures of some past research to elicit demographic and biographical differences, may be accounted for by a lack of suitability of the particular underlying theories or, for that matter, a lack of theory at all. Indeed, Worrall and May (1989) considered much of the earlier research into teacher stress to lack a theoretical focus. Research has found that, when it comes to predicting teacher stress, organizational predictors (e.g., classroom and school climate, workload,

role ambiguity), more consistently predict teacher stress compared to individual factors, (e.g., gender, age, years of experience, prior mental health functioning) (Burke & Greenglass, 1995; Dorman, 2003), but it may be that the underlying models and subsequent analysis, are failing to unearth complex interactions and effects. It may also be that the methodologies employed are not sufficiently sensitive to identify the issues. I will conclude this chapter by arguing for the use of more in-depth and innovative methodologies that may shed more light on possible individual characteristics/teacher stress interactions (e.g. use of diary methodologies).

2.5 What Are the Consequences of Teacher Stress?

Occupational stress has been found to result in a variety of manifestations for those suffering from it, i.e. psychological or cognitive (e.g. dissatisfaction, poor decision-making, frustration, low self-esteem) (e.g. Moore, 2012); emotional (e.g. feeling upset, becoming depressed, low mood) (e.g. Hammen & DeMayo, 1982), physiological (e.g., heart disease, psychosomatic illness, fatigue) (e.g. Blase, 1986) and behavioral (e.g. appetite affected, smoking, alcohol consumption, drug abuse, violence, sleep problems) (e.g. Montgomery & Rupp, 2005). Occupational stress is also associated with increases in negative work-related outcomes, such as job dissatisfaction, ill-health, absenteeism, higher turnover and lower productivity (e.g. Kyriacou & Sutcliffe, 1979).

Teachers are no exception to this (e.g. Lazuras, 2006). Stress can also affect those with whom a stressed employee interacts, in this case pupils, fellow staff and the teachers' family and friends. The potential impact on pupils is of major concern, as the quality of teaching is crucial for student's achievement and well-being, and student-teacher relationships affect achievement (Hamre & Pianta, 2005; Mashburn et al., 2008) and reduce their risk of academic failure (Rimm-Kaufman, Pianta, Cox, & Bradley, 2003). The consequences of teacher stress will be addressed in detail in Chaps. 3, 4, 5, 6 and 7 of this book. In this section, we will present a brief overview of the impact of teacher stress in terms of: impact on the individual teachers' health and well-being, their satisfaction and commitment to the profession, and their performance in the classroom.

2.5.1 Impact on the Individual Teachers' Health and Well-Being

Studies have identified a multitude of severe negative consequences of teacher stress for teachers themselves, such as burnout, as well as poor and long term mental, and physical, health (e.g. see Chap. 3; see also Kyriacou, 1987; Rothi, Leavey, & Loewenthal, 2010; Thomas, Clarke, & Lavery, 2003; Travers & Cooper, 1993).

Teachers may experience a single stress related outcome, but it is more likely that they respond with a variety of symptoms of stress. For example, as job stress increases, psychological outcomes may result, with the teachers' job satisfaction dwindling (Guglielmi & Tatrow, 1998). However, the resultant stress and burnout may then be associated with behavioral aspects, such as, minimalist coping responses, whereby, teachers spend less time preparing for lessons, take less personal responsibility for students' learning, and invest less energy in teaching (Hughes, Cavell, & Willson, 2001; Lens & Neves de Jesus, 1999; Maslach & Goldberg, 1998).

Teachers have been found to report low morale, and illnesses such as hypertension, diabetes, ulcers and heart attacks (Biggs, 1988; Saptoe, 2000). The Schools Advisory Service (2003), the largest independent provider of teacher absence insurance in the U.K., showed that one in three teachers took sick leave in the previous year as a result of work-related stress.

If a teacher reaches the stage of burnout, due to constant attempts to function in stressful situations, it may lead to a subtle, but progressive, erosion of behavior, attitudes, health, and positivity that eventually inhibits their ability to function effectively in their role (Berg, 1994). This is confirmed by Wrobel (1993), who argues that a significant number of teachers perceive that they are working in a very stressful place and will ultimately experience failure in their careers, or experience 'job compassion fatigue' (Cordes & Dougherty, 1993). A study by Tang, Wing-Tung, Schwarzer and Schmitz (2001) of 269 Chinese teachers indicated that the stress resource factors of self-efficacy and proactive attitude were negatively related to burnout and mental ill health contributed to burnout and was negatively linked to their mental health.

2.5.2 Impact on Teachers' Satisfaction and Commitment to the Profession

Over time, studies in a number of cultural contexts have highlighted the impact of teachers' work "intensification" on their job satisfaction (Hargreaves, 1994) and also suggest that this mirrors wider societal trends toward overwork (Naylor, 2001). A range of factors such as imposed and centralized system accountability, lack of professional autonomy, relentlessly imposed changes, constant media criticism, reduced resources, and moderate pay all relate to low teacher satisfaction in many developed countries around the world (e.g., Dinham & Scott, 1998, 2000; Scott, Stone, & Dinham, 2001; Vandenberghe & Huberman, 1999).

The consequences have been that teacher's job satisfaction has dwindled, with a reduction in their ability to meet students' needs, and significant incidences of psychological disorders that have led to increased absenteeism, and high levels of claims for stress-related disability (Farber, 1991; Troman & Woods, 2001). But of

key interest and concern must be the finding that teacher dissatisfaction and stress appears to be a main factor in teachers' dwindling commitment to the profession (Huberman, 1993; Schonfeld, 1990a, 1990b; Troman, 2000; Wilson, 2002; Wisniewski & Garglino, 1997; Woods, Jeffrey, Troman, & Boyle, 1997). This may be emotionally (i.e. how they feel about the job), cognitively (i.e. what they think about the job) or behaviorally (i.e. whether they choose to stay or leave). Teacher stress has been found to result in such negative consequences as early retirement, long and excessive absences, new teachers leaving during training, and an increase in teachers leaving the profession within their first five years (Lhospital & Gregory, 2009; Travers & Cooper, 1993).

Twenty five years ago, Travers and Cooper (1993) found that 66% of the 1790 primary and secondary teachers studied had considered leaving the profession in the 6 months leading up to the study. More recently, Darling-Hammond (2003) found that nearly 30% leave within the first five years, with even greater attrition from teachers in highly disadvantaged areas. She cites data presented by the Texas Center for Educational Research which estimated that the state's annual turnover rate of 15%, which includes a 40% turnover rate for public school teachers in their first three years, costs the state a "conservative" \$329 million a year, or at least \$8000 per recruit who leaves in the first few years of teaching (Texas Center for Educational Research, 2000). Jackson and Rothmann (2006) also report on a similar crisis in South Africa.

Ingersoll (2001, 2003) has been tracking the teaching profession and reveals that poorer and urban schools have higher levels of turnover due to their poor working conditions and claims that these schools are usually the most centralized and the most micromanaged in this era of accountability. His research has also found that 40–50% of beginning teachers leave the profession within 5 years. Ingersoll further reports that in the U.S., many districts are struggling with teacher shortages, especially in mathematics, science and special education. In some cases, prospective, and as of yet unqualified, teachers are being asked to train whilst on the job, despite having little or no classroom experience. The image of teaching as a stressful and poorly paid job is also deterring new graduates. In California, the number of people entering teacher preparation programs, dropped by more than 55% from 2008 to 2012, according to the California Commission on Teacher Credentialing (2015). Nationally, the drop was 30% from 2010 to 2014, according to this federal data.

A report from Gov.U.K. in England (2014) revealed that the number of temporary filled teacher posts stood at 3210, which was an increase from 2300 the year before. As Ingersoll has found in the U.S., the number of teachers working without a formal teaching qualification in the U.K. was found to be just over 20,000, up from 16,600. In addition, in the 12 months prior to November 2014, the U.K. state sector lost nearly 50,000 teachers, representing the highest teacher exit for 10 years and an increase of more than 25% over five years. More worrying are the claims by GOV.UK of the 10,000 qualified teachers who chose not to work in a classroom after their training. This situation creates added stressors for leadership in schools, and a recent survey by the National Association of Head teachers in the U.K. found

that 59% of schools were 'struggling' to recruit staff and 20% had failed to recruit at all. This may explain why they found that 29% of head teachers suggested they planned to leave the profession in the next five years.

2.5.3 Impact on Teachers' Performance in the Classroom

It may be just as great a risk to have unsatisfied and stressed teachers stay in their jobs, rather than leave, as those teachers with the highest rates of stress and burnout, are actually the least likely to leave their jobs; a phenomenon characterized as 'on-the-job retirement'. These teachers may, instead, be absent frequently, invest less time preparing engaging and creative lessons, and distance themselves from their students and their work (Dworkin, Hany, & Teschow, 1988; Hughes et al., 2001).

Teachers who are dissatisfied with their work, or are highly stressed, display lower work commitment, and negatively impact on student motivation through emotional contagion (Hatfield, Cacioppo, & Rapson, 1993) and poor performance (Osher et al., 2007; Tsouloupas et al., 2010). They may also fail to satisfy their students' needs for autonomy and competence (Klussman, Kunter, Trautwein, Lüdtke, & Baumert, 2008; Ryan & Deci, 2000). Furthermore, teachers who are burned out, and have low motivation, are also shown to have lower self-efficacy about their abilities to teach (Friedman & Farber, 1992).

When a teacher is stressed, this may impact on their own performance, and also that of their pupils. Prolonged teacher stress is considered to impact classroom climate and the quality of teacher-student relationships, both considered core resources for effective teaching and student learning (Hamre & Pianta, 2005; LaParo et al., 2009). The quality of student-teacher relationships is strongly linked to student achievement (Hamre & Pianta, 2001; Mashburn et al., 2008). Teachers are among the first non-parental adult role models young children are exposed to, and who through example, shape the development of key social skills (Jennings & Greenberg, 2009). Not surprisingly, the quality of students' early relationships with teachers, predicts later school engagement and achievement – especially among high-risk students (Bergin & Bergin, 2009; Rimm-Kaufman et al., 2003). Even more worrying, is the finding that teachers experiencing higher stress are more likely to criticize their students, lose their temper, and resort to punitive discipline strategies when compared with teachers experiencing lower stress (Lens & Neves de Jesus, 1999; Yoon, 2002). Stress also impacts teachers' ability to deliver instruction effectively, which has implications for student learning and achievement (Ransford, Greenberg, Domitrovich, Small, & Jacobson, 2009). Recent studies have also found that teachers experiencing the highest burnout rates struggle the most to implement new curricular practices (Ransford, Greenberg, Domitrovich, Small, & Jacobson, 2009) and are less likely to refer students for school based support services (Pas, Bradshaw, Hershfeldt, & Leaf, 2010).

2.6 A Move Towards More In-Depth and Innovative Research Methodologies to Study Teacher Stress

How can we advance our exploration of the area of teacher stress, when so much has been done already? Much research has utilized quantitative, cross-sectional survey type approaches from a typically positivistic viewpoint (e.g. Yang et al., 2011). Some have made use of single items to capture the extent of stress experienced by a teacher, others have used a list of items to create an overall stress score. These are usually combined with measures of mental and physical ill health (e.g. General Health Questionnaire (GHQ), Travers & Cooper, 1993), behavioral indices of stress, (e.g. absenteeism, loss of temper, and sleeplessness, e.g. Bermejo-Toro & Prieto-Ursúa, 2014) and physiological indices (e.g. levels of cortisol over time, e.g. Flook, Goldberg, Pinger, Bonus, & Davidson, 2013). Further, a number of studies have used powerful statistical techniques to identify causal pathways linking the different variables involved in teacher stress (Caprara, Barbaranelli, Steca, & Malone, 2006; Collie, Shapka, & Perry, 2012; Tellenback, Brenner, & Lofgren, 1983; Worrall & May, 1989).

These approaches have led to the discovery of many of the sources and symptoms of stress in teachers, but the field seems to be in a bit of a methodological rut. We need approaches to explore more deeply the dynamic interplays between teacher characteristics and style, the stressors they encounter and the context they work within.

Qualitative methodologies have been frequently employed, such as interviews or focus-groups, but these can lead to retrospective interpretation of events and accounts of responses and impact when investigating teachers' working lives (Travers, 2011). This may lead to misinformation and bias, with a lack of insight into the nuances of the situation and the active ingredients which may subsequently lead to stress outcomes. Data approaches employed may have resulted in limited data analysis which could be unrepresentative of the true picture of stress in the teaching profession.

Researchers have increasingly been advocating a more holistic approach, incorporating mixed methods and combining both qualitative and quantitative methods in order to gain a fuller picture of educators' working experiences (e.g. Travers & Cooper, 1996; Zembylas & Papanastasiou, 2004). In the future study of teacher stress, greater use should be made of more in-depth and innovative methodologies, such as the use of Event Sampling Methods (ESM) (e.g. Daniels, Hartley & Travers, 2006), also known as Ecological Momentary Assessment methods (EMA) (Stone, Shiffman, Schwartz, Broderick, & Hufford, 2002), or written paper or electronic diaries (Travers, 2011). These can be used to observe teacher stress as it is 'lived', and enables us to identify the most powerful and toxic stressors, and also the active ingredients assisting teachers to be resilient and even thrive in their role (Day, 2012, 2014, 2016). Diaries may also help us to access the less researched and harder to measure aspects of teachers' reactions to their job, such as emotions, and the impact these may have (Sutton & Wheatley, 2003).

A number of researchers have more recently employed diary-based approaches to investigate teacher stress (e.g. Daniels, Hartley, & Travers, 2006; McIntyre & McIntyre, 2011; McIntyre, McIntyre, Mehta, Durand, Taylor, & Francis, 2011; McIntyre et al., 2016). Daniels, Hartley, and Travers (2006) studied two groups in the UK - human resources staff and secondary school teachers - and asked them to rate the extent to which they believed varying levels of a pre-defined stressor influenced positive affect, negative affect, and work performance. Participants then carried personal digital assistants for five working days, and provided data on levels of the pre-defined stressor and on momentary negative and positive affect. For both samples, momentary negative affect was more strongly associated with stressors for those participants who believed stressors caused them to feel greater negative affect. For both samples too, the association between participants' momentary negative affect and average levels of stressors across the working week was moderated by beliefs concerning stressors' impact on work performance.

McIntyre's and others' work has also looked at the feasibility of Ecological Momentary Assessment (EMA) in the study of teacher stress in 202 sixth through eighth grade teachers from 22 urban middle schools in the southern United States. EMA was implemented via an iPod-based Teacher Stress Diary (TSD) and teachers recorded demands, stress responses, and resources during 12 days (6 waves) over 2 years. The results supported the feasibility of using EMA to study work stress longitudinally and the value of continued feasibility monitoring, for teacher stress, especially. Chap. 12 by McIntyre and colleagues presents an empirically derived model of teacher stress based on EMA data, which accounts for the dynamic nature of stress over time.

Over the last 14 years a written reflective diary methodology has been used with a variety of occupational and student groups, both for data gathering and to enhance the self-awareness/skills of the diarists (Travers, 2013; Travers, Morisano, & Locke, 2015). This has led to the discovery of diaries as very powerful tools for investigating such complex phenomena as stress (Travers, 2011). This is a methodological approach which could support research investigating the working experiences of teachers. The process of logging experiences, actions and feelings as close to their occurrence as possible, is a great source of authentic and timely data. It helps reduce retrospective bias and captures the detail that other quantitative and qualitative methodologies may miss (Millward, 2006; Symon & Cassell, 1998). Diaries are also helpful in longitudinal research, when we need to evaluate intervention strategies or ongoing experiences (Travers, Randall, & Cheyne, 2014). In addition, diarists benefit from keeping the diary and become 'action researchers' of their own experiences (Travers, 2011). Therefore, diaries serve a dual purpose, as they provide researchers with rich data and also help diary keepers gain crucial insights into their situation. Diarists also claim that the very act of keeping the diary acts as an intervention by helping them cope with stress and devise more effective coping responses (Travers, 2011).

However, diary approaches do require particular skills on behalf of the writer and the researcher, as well as a big commitment on the behalf of the diarist. Overly pressured and stressed teachers may be reluctant to take part in such intense projects due

to workload pressures. However, teachers are usually familiar with this approach data gathering due to reflective practice forming part of their teacher training. Reflective writing has traditionally been widely used in educational settings across a range of applications to improve professional practice (Brookfield, 1995; Cheetham & Chivers, 1996; Gibbs, 1988; Moon, 1999, 2005).

A great deal of teacher stress research has focused on the individual teacher and their inability to cope, therefore paying attention to the dysfunctional strategies used by teachers to address the problems they face. More recently, researchers have started to pose the question as to why some teachers are able to cope more successfully than others whilst having the same stressful experiences and in similar work environments (Howard & Johnson, 2004). The use of diary methodologies could enable us to explore teachers' experiences in more depth from the viewpoint of the individual teacher and examine the role that they play. They may also help us gain insight into more context-specific factors and aspects as they 'live; through them. Researchers have identified the most frequent coping actions used by teachers and these tend to be direct action techniques or palliative techniques (e.g. Benmansour, 1998; Borg & Falzon, 1990). Direct action is when a teacher use approaches which eliminate the source of stress, e.g. gaining insight and taking steps to reduce its impact into the future. Strategies such as managing or organizing oneself more effectively, developing new knowledge, skills and working practices, negotiating with colleagues, all can be direct action approaches and can lead to a teacher changing their situation or enabling others to change it. Palliative techniques do not deal with the source of the stress itself, but rather aim at lessening the symptoms and the feeling of stress that occurs. These can be physical (e.g. activities that help the teacher retain or regain a sense of being relaxed, by relieving any tension and anxiety that has built up) or mental (e.g. trying to change how they appraise the situation). Typically, these approaches are measured by pre-defined lists of coping strategies included in a survey or questionnaire (e.g. Travers & Cooper, 1993). A diary approach would enable us to see which approaches teachers take and the outcomes of these. If used alongside a collection of other stress measures, it may be possible to assess the positive and negative impact of particular strategies and also the types of strategies used by more successful and resilient 'copers'. This could then be used to help us to best inform educational policy makers on how to alleviate the situational pressures in schools, as well as advise individual teachers themselves (Moon, 2007).

Since I began investigating teacher stress around 25 years ago, not a great deal has improved for the teacher. Indeed, even more stressors and strains have come into the frame to impact on their wellbeing and performance in the classroom. Despite a multitude of international scholars studying the phenomenon, with the ultimate aim of alleviating the pressures faced by those teaching our young people, I feel that little has moved on. The outcomes of teacher stress can be detrimental for all relevant stakeholders and so we cannot afford to be complacent in our scrutiny of this phenomenon.

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Chapter 3

Consequences of Job Stress for the Mental Health of Teachers

Irvin Sam Schonfeld, Renzo Bianchi, and Peter Luehring-Jones

Abstract This chapter examines research on the relationship between job stressors and mental health (depressive symptoms, burnout, and mental disorders such as depression) in teachers. Teachers are exposed daily to job stressors (e.g., student disruptiveness) that have been linked to adverse mental health effects. Epidemiologic research indicates that when compared to members of other groups, teachers experience higher rates of mental disorder, although some studies question that conclusion. Large-scale studies indicate when compared to members of other occupational groups, teachers are at higher risk for exposure to workplace violence, with its adverse mental health consequences. Longitudinal research has linked teaching-related stressors to depressive and psychosomatic symptoms, alcohol consumption, and burnout. Research on the efficacy of workplace coping has been weak. Recent research suggests that burnout may be better conceptualized as a depressive syndrome than a separate entity.

Keywords Teachers • Stress • Depression • Burnout • Violence • Coping

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Teaching is a popular occupational choice; teachers comprise a little more than 3% of the U.S. civilian workforce (Bureau of Labor Statistics, 2015), yet some epidemiological evidence shows that teachers experience mental health problems at a disproportionately high rate when compared to the rates found in other occupational groups. Whether emanating from students or organizational conditions, work stress has been identified as a contributor to these problems. Among all occupations for which a college degree is required, teaching has among the highest turnover rates, for example, higher than that of nurses (Ingersoll, 2013). However, high rates of turnover have *not* been a function of excess retirements (Ingersoll, 2001; Ingersoll & May, 2012), and more likely reflect the stressfulness of the working conditions many teachers face (Ingersoll, 2001; Ingersoll & May, 2012).

Workplace stressors affect teachers' mental health (MH) *and* turnover intentions. By MH, we refer to both psychological symptoms (e.g., depressed mood) and mental disorders (e.g., major depression). Stressors that affect teachers have consistently been identified in both qualitative and quantitative research. These stressors include: student fighting, disruptiveness, and indifference; unsupportive administrators; and overly prescriptive supervisors who limit teacher autonomy (Finlay-Jones, 1986; Ginsberg, Schwartz, Olson, & Bennett, 1987; Hastings & Bham, 2003; Ingersoll, 2001; Schonfeld, 2006; Schonfeld & Santiago, 1994; Shirom, Oliver, & Stein, 2009; Sinclair, Martin, & Croll, 2002; Younghusband, 2008).

This chapter comprises seven sections. The first examines epidemiologic research on the risk and prevalence¹ of mental disorders and high levels psychological distress in teachers as compared to prevalence estimates in other groups. The second and third sections cover within-occupation research on the relation of workplace stressors to teacher MH and burnout. The fourth section evaluates the *longitudinal* research covered in the previous sections. The fifth underlines ways to improve methodological practices in research on stress and MH. Because workplace stressors are thought to give rise to both burnout and depression, the sixth section examines burnout-depression overlap. Treatment implications of burnout-depression overlap are also discussed. The last section underlines conclusions that can be drawn from the outlined research evidence. The breadth of the research presented in the chapter should be regarded as extensive but not exhaustive, and considered in relation to the other chapters in this book.

3.1 Epidemiologic Findings

Epidemiology is a scientific discipline devoted to the study of the distribution of diseases and their causes in different populations. Epidemiology can provide useful information on how mental disorders vary by occupation and clues to their causes (Eaton,

¹One-year prevalence refers to the proportion of the population that had the disorder in question during the one-year period under study. Six-month prevalence refers to the proportion with the disorder at any time during a six-month period, and so forth.

Anthony, Mandel, & Garrison, 1990). This section examines research that compares the risk of MH problems in teachers to the risk in other groups.

3.1.1 *Main Epidemiologic Findings*

To our knowledge, the first study (Smith & Hightower, 1948) to link specific occupations to mental disorder was conducted at the Mayo Clinic, using consecutive series of admitted medical patients and the primitive psychiatric nomenclature of the era. Smith and Hightower found that 33% of the enrolled teachers ($n = 122$) were diagnosed with “functional disease” or neurosis, a finding that contrasted with the rates of mental disorder found in physicians (10%), clergy (24%), and control patients (7%). Apart from that first study, additional research on mental disorder in teachers would not emerge for several decades.

Among the studies that indicate a higher-than-average risk of mental disorder (or psychological distress) in teachers is a massive (> 28,000 hospitalized for affective disorder and > 144,000 general population controls) case-control study² conducted in Denmark (Wieclaw, Agerbo, Mortensen, & Bonde, 2005). The study team found that female but not male teachers were at above-average risk for hospitalization for affective illness. Research conducted in Finland (Kokkinen, Kouvonen, Koskinen, Varje, & Väänänen, 2014) indicated that a group comprising teachers, social workers, and healthcare workers experienced significantly elevated rates of hospitalization for severe MH problems (31 per 10,000 person years). Kokkinen et al. suggested that the emotional demands of the human interactions required of those job incumbents may have contributed to their elevated rates. Other investigators also estimated the prevalence of disorders in mixed groups of teachers and other professionals. Stansfeld, Rasul, Head, and Singleton (2011), in a study of almost 5500 British workers, found that the point prevalence³ of the most commonly occurring mental disorders (e.g., depressive disorder, generalized anxiety disorder) in teachers (combined with research professionals) was higher (15%) than average (13%). Lee et al. (2007) found that that the six-month prevalence rates for generalized anxiety disorder (11% v. 8%) and major depression (13% v. 4%) in a sample of Hong Kong teachers ($n > 2000$) were higher than estimates for the general adult Hong Kong population.

Some studies examined the prevalence with which teachers experienced high levels of symptoms of psychological distress rather than formal diagnoses of mental disorder. Finlay-Jones (1986) found that 17% of his sample ($n > 2000$) of Western Australia teachers experienced severe psychological distress as reflected in very high scores (scores at or above a predetermined threshold) on the General Health

²A case-control is not the kind of study that can ordinarily yield an estimate of the prevalence of a disorder although it can reveal whether an attribute of individuals such as their occupational title is associated with a disorder.

³Point prevalence is a kind of instantaneous prevalence.

Questionnaire⁴ (GHQ; Goldberg, 1972), almost double the proportion found in a normative random sample of Australian residents who were administered the same instrument. In another Western Australia study, Tuettemann and Punch (1992) found that 45% of the secondary school teachers sampled ($n = 574$) averaged scores on the GHQ that reflected high levels of distress; the proportion of highly distressed teachers compared very unfavorably to the proportions found in the general Australian population and in other Australian professionals.

To our knowledge, Eaton et al. (1990) published the first modern study to link occupation to mental disorder in a representative sample of [U.S.] community residents ($n > 11,000$). The study team found that the one-year prevalence of depression among individuals classified as “other teachers” and “counselors” was significantly higher (10%) than the 5% average. The category “other teachers” included pre-kindergarten and special education teachers; the counselors included educational and vocational counselors. The prevalence rate for secondary school teachers (1%), however, was significantly below average; the rate for elementary school teachers was average. Eaton et al. hypothesized that the elevated rate among “other teachers” reflected the impact of a lack of control over the work environment.

Eaton et al.’s finding of both a below-average rate (in secondary school teachers) and an average rate (in elementary school teachers) of MH disorders mirrored results from other epidemiological research. Kovess-Masféty, Sevilla-Dedieu, Rios-Seidel, Nerrière, and Chan Chee (2006) found that the lifetime prevalence of psychiatric disorder (e.g., depression, anxiety disorders; alcohol abuse or dependence) in French schoolteachers was no higher⁵ than the prevalence in non-teachers who worked for the French national education system ($n > 5400$); teachers and non-teachers did not differ on mean levels of distress. Fan et al. (2012) in a large ($n > 20,000$) study found the point prevalence of depression in a group comprising Washington State teachers, professors, librarians, and lawyers to be 4%, not significantly different from the state average. Findings from research (Wulsin, Alterman, Timothy Bushnell, Li & Shen, 2014) involving more than 200,000 western Pennsylvania residents indicated that the risk of depressive disorder for those who worked in “educational services” (teachers, librarians, professors) was no higher than average.

Although the majority of the research cited indicates that teachers are at higher-than-average risk of depression and distress, some studies indicate that they are not. Because depression and psychological distress (Bell, Russ, Kivimäki, Stamatakis, & Batty, 2015) are risk factors for suicide, we examined suicide risk in teachers. Epidemiologic studies conducted in New Zealand (Andersen, Hawgood, Klieve, Kølves, & De Leo, 2010), Japan (Tanaka et al., 2001), Canada (Mustard et al., 2010), Denmark (Agerbo, Gunnell, Bonde, Mortensen, & Nordentoft, 2007), Colorado (Stallones, Doenges, Dik, & Valley, 2013), 21 U.S. states (Stack, 2001), and England and Wales (Meltzer, Griffiths, Brock, Rooney, & Jenkins, 2008) indi-

⁴The GHQ, despite a name that suggests physical health, assesses psychological distress. Finlay-Jones used the 30-item version of the GHQ.

⁵One exception was when sociodemographic factors were controlled, male (but not female) teachers had a higher lifetime prevalence of anxiety disorders than male non-teachers.

cate that teachers (or teachers and members of related occupational groups) are at average or lower-than-average risk.

3.1.2 Exposure to Violence

Population-based research is also pertinent in work-related violence exposure. The impact of exposure to violence or its threat is physically and psychologically debilitating (Bloch, 1978). Over a 5-year period, Bloch, who evaluated every officially recognized Los Angeles teacher-victim of student-initiated violence and serious threat (e.g., of murder, rape), found extremely high levels of depressive and anxiety symptomatology as well as PTSD-like symptoms (e.g., high levels of arousal); Bloch labeled the condition “combat neurosis.” He found that teachers exposed to threats of violence experienced greater psychiatric morbidity than the victims of actual violence (e.g., assault). Compared to members of most other occupational groups, teachers are victims of violence at higher rates (Harrell, 2011; Hashemi & Webster, 1998; Islam, Edla, Mujuru, Doyle, & Ducatman, 2003; LaMar, Gerberich, Lohman, & Zaidman, 1998; Peek-Asa, Howard, Vargas, & Kraus, 1997; Wieclaw et al., 2006). Moreover, because all these studies relied on officially reported incidents, they likely underestimated the risk (Schonfeld, 2006). Schonfeld and Feinman (2012), in a daily diary study that minimized recall error, found that, over a two-week period, 6.3% of 252 New York City teachers were subject to at least one threat of student-initiated violence and 26.2% observed at least one episode of student-on-student violence; no teacher, however, was assaulted.

3.1.3 Evaluation of the Epidemiologic Evidence

The majority of the epidemiological studies discussed above indicates that teachers experience MH problems (disorders and high levels of distress) at higher rates than members of other groups. Teachers are more exposed to violence than members of other occupational groups, and exposure to violence is a risk factor for MH problems (Schonfeld & Chang, 2017). Problematic aspects of the epidemiologic research include (a) grouping teachers with other professionals in a way that obscures prevalence estimates specific to teachers and (b) grouping elementary and secondary school teachers together although their jobs are different.

There is suggestive evidence (Eaton et al., 1990) that special education teachers are at high risk for depression. The epidemiological evidence, however, does not differentiate among the range of working conditions to which teachers are exposed. Some schools provide less healthful conditions than others (Schonfeld, 2000). The impact of job conditions is discussed in in the next section.

3.2 Within-Occupation Research on Job Stressors and Mental Health

Because job conditions in schools vary, this section is devoted to within-occupation research. Generally, researchers have taken two approaches to evaluating the stressors that affect teachers. In the first approach, studies have catalogued various stressors associated with adverse MH consequences; these include pupil-related difficulties, interpersonal conflicts, and violence or its threat (Schonfeld & Farrell, 2010). The second approach has focused on investigating the validity of psychosocial models that relate occupational stressors to MH outcomes. These theoretical constructions (Guglielmi & Tatrow, 1998; Karasek, 1979) involve concepts such as lack of autonomy, high workloads, and unsupportive colleagues or administrators. The literature reviewed in this chapter is generally of the first approach. Later chapters in this book review research conducted within the framework of those theoretical models.

At least two related explanations (Schonfeld, 2001) underlie the view that school environments in which stressors are most prevalent contribute to the development of MH problems in teachers. The first, which springs from the occupational health psychology literature (e.g., Karasek, 1979), is that some school environments are so chaotic that they thwart teachers' goals and deprive teachers of the autonomy required to work in a meaningful way, giving rise to considerable distress. The second explanation, which owes much to the education literature, is that teachers in many schools become distressed because they are often exposed to aggressive social interactions initiated by students and, sometimes, by supervisors (Blase, 1986).

Given the nature of the literature, we turn to research in which MH symptoms, rather than mental disorders, are the outcomes of interest.

3.2.1 A Brief Look at Cross-Sectional Findings

Cross-sectional studies dominate the published research on the relationship between teaching-specific stressors and MH symptoms. Cross-sectional studies are useful from an actuarial standpoint because they show that stressors covary with psychological symptoms. A meta-analysis of correlational studies (Montgomery & Rupp, 2005) found that the associations between stressors and emotional responses (e.g., depressive and anxiety symptoms) are, on average, low-moderate ($r_{\text{mean}} = .25$).

A limitation of cross-sectional studies is that they are largely unable to provide evidence pertaining to cause and effect. For example, a correlation between student disrespect and concurrent depressive symptoms in teachers cannot establish the temporal priority of the hypothesized cause (disrespect) over the hypothesized effect (symptoms). By contrast, some longitudinal study designs are superior because they are more helpful in establishing temporal priority. Ideally, longitudinal studies should evaluate the relation of working conditions at baseline (time 1) to

later (time 2) symptoms while statistically controlling for time 1 symptoms, thus adjusting for any initial confounding of the stressors and symptoms.

3.2.2 *Longitudinal Research Findings*

Like the epidemiologic evidence, within-occupation, longitudinal research is international in scope. A study conducted in Australia (Dollard & Bakker, 2010) examined the impact of a pattern of school policies and procedures advanced by upper management and aimed at spreading practices designed to benefit the psychological health of teachers. This pattern of policies, labeled “psychosocial safety climate” (PSC), predicted two kinds of effects one year later: a reduction in the number/intensity of stressors (emotional demands and work pressure) to which teachers ($n = 209$) were exposed and an increase in skill discretion (opportunities for skill development). PSC, however, did not predict decision authority (influence over how work gets done). Other analyses linked job stressors at the one-year follow-up to *concurrent* psychological distress. Brenner, Sörbom, and Wallius, (1985), who followed Swedish teachers ($n = 72$) over a school year, found that pupil-related stressors in the fall and spring terms were *concurrently* related to work overload (Tellenback, Brenner, & Löfgren, 1983) and that overload was *concurrently* related to depressive and psychosomatic symptoms. In a study (Kinnunen, 1988) in which Finnish teachers ($n = 142$) were evaluated 6 times during the fall term, workday stressors (e.g., poor student motivation) in September predicted both workday and weekend symptoms (e.g., depression, irritability, etc.) in December; however, symptom levels in September were not controlled. Other analyses (Mäkinen & Kinnunen, 1986) indicated that fall-term student motivation was inversely related to symptoms during the spring; fall-term symptoms, however, were not controlled.

Three better-controlled longitudinal studies shed more light on the relation of working conditions to MH. In a small ($n = 36$), short-term study (Travers & Cooper, 1994) involving London teachers at the beginning of the school year, management structure (e.g., nonparticipation in decision-making) and job insecurity at baseline predicted an increase in blood indicators of alcohol consumption three months later, although no effects on other symptoms were observed (perhaps owing to ceiling effects and/or lack of statistical power). Shirom et al. (2009) in a study of Israeli high school teachers ($n = 404$) found that stressors assessed at the beginning of the school year (e.g., disciplining students) predicted psychosomatic symptoms at the end of the school year, controlling for initial symptoms. In a one-year, three-wave study involving new female New York City teachers ($n = 184$), Schonfeld (2001) found that episodically occurring stressors (e.g., student disruptions) exerted potent adverse effects on depressive symptoms, self-esteem, job satisfaction, and motivation to remain in the profession, controlling for baseline levels of those factors. He ruled out reverse-causal effects. Schonfeld also found that support from friends and relatives, colleagues, and supervisors had beneficial effects on one or more outcomes.

3.3 Workplace Stressors and Burnout

Burnout has been increasingly used in research on the adverse effects of work stress. The burnout syndrome is often defined as a combination of emotional exhaustion (EE), depersonalization (DP; also called cynicism), and a reduced sense of personal accomplishment (PA) with regard to the job (or lack of professional efficacy). As currently conceived, burnout is assumed to develop in response to a chronic impossibility of coping with workplace adversities (Maslach, Schaufeli, & Leiter, 2001). EE is thought to be burnout's central component. The Maslach Burnout Inventory (MBI; Maslach, Jackson, & Leiter, 1996) embodies this conceptualization (Maslach et al., 2001; Schaufeli, Leiter, & Maslach, 2009). A related, alternative conceptualization holds that burnout comprises EE, physical fatigue, and cognitive weariness, and grows out of chronic exposure to workplace stressors (Shirom & Melamed, 2006). This conceptualization is embodied in the Shirom-Melamed Burnout Measure (SMBM). Burnout is associated with health problems (Toker, Melamed, Berliner, Zeltser, & Shapira, 2012) and worse student outcomes (Brunsting, Sreckovic, & Lane, 2014).

We turn now to the relationship between workplace stressors and burnout.

3.3.1 A Brief Look at Cross-Sectional Findings

Disruptive student behavior is thought to be a central factor in the development of burnout, but lack of support from colleagues, working at schools serving children from economically disadvantaged families, high levels of job demands, insufficient training, and autocratic school administrators are factors that have been concurrently linked to burnout (Chang, 2009). A recent synthesis of research on special education teachers found that fewer years of experience, amount of interaction with students having emotional disturbance as opposed to other disabilities (e.g., intellectual disability), role conflict, and lack of administrative support are risk factors for burnout (Brunsting et al., 2014). A meta-analysis of correlational studies (Montgomery & Rupp, 2005) found low-moderate associations between job stressors and burnout ($r_{\text{mean}} = .27$).

Another arm of the cross-sectional literature has examined personality and burnout. Chang (2009) found that low-hardiness, being a "type A" person, having low levels of self-esteem, being a "feeling type" rather than a "thinking type," and having a neurotic personality are related to increased risk of burnout. A problematic aspect of the above findings is that there is likely construct overlap between burnout and these personality traits. For example, a component of hardiness is resistance to stressful situations, which by definition suggests low levels of burnout.

3.3.2 Longitudinal Research Findings

We mention a number of longitudinal studies that, despite methodological limitations, underline some factors that may influence burnout risk. In a study of 244 Canadian teachers, Burke, Greenglass, and Schwarzer (1996) reported that disruptive students and, to a lesser degree, the extent of school bureaucracy predicted burnout one year later. The findings, however, are problematic because burnout at baseline was not controlled. In a two-year, four-wave study of 79 Australian teachers, Goddard, O'Brien, and Goddard (2006) observed that at wave four, teacher perceptions of the innovativeness of the work environment were inversely, but *concurrently*, related to EE. Innovativeness was also concurrently related to lower DP and a higher PA. In a growth study⁶ involving 600 U.S. teachers, Pas, Bradshaw, and Hershfeldt (2012) found that teacher preparedness, collegial leadership (e.g., the principal treats teachers as equals), teacher affiliation (e.g., friendliness among staff), and parent and student involvement predicted lower EE; baseline EE, however, was not controlled.

In a study of 940 Dutch teachers, Taris, Peeters, Le Blanc, Schreurs, and Schaufeli (2001) found no effect of lack of equity at baseline (inequitable relationships with students, colleagues, and management) on the three MBI components one year later. The study team also examined the relationship of job stress (brought about by students, colleagues, and management) to the MBI. The relationship, however, was complicated by artifacts of scale construction (see Kasl, 1978; Schonfeld, Rhee, & Xia, 1995). Job stressor questionnaire items referenced the teacher's feelings and MBI items referenced workplace adversity. Thus the relation of job stress to the MBI was likely influenced by the confounding of the independent and dependent variables. In addition, the path coefficients from baseline student and colleague stressors to later MBI subscales were negative, suggesting that teachers who were more exposed to stressors at time 1 experienced less burnout at time 2 and teachers who were less exposed at time 1 experienced more burnout at time 2, findings that are difficult to reconcile with the bulk of the research literature.

Four longitudinal studies examined the relation of baseline stressors to later burnout, controlling for burnout at baseline. First, in the earlier-mentioned study of Israeli high school teachers, Shirom et al. (2009) found that "heterogeneous classes" (which make it difficult to adapt the level of instruction to each student's instructional needs) were the only baseline stressor that affected burnout. The other stressors (e.g., disciplining students) that predicted psychosomatic symptoms did not predict burnout at follow-up.

Second, Llorens-Gumbau, and Salanova-Soria (2014), in a study of 274 Spanish schoolteachers, found that obstacles to effective teaching such as students' lack of discipline at baseline led to high levels of burnout (exhaustion and cynicism combined) 8 months later, controlling for burnout at baseline. Third, González-Morales,

⁶In psychological research, a growth study examines individual change, such as change in scores on a burnout scale, as a function of time.

Rodríguez, and Peiró (2010) studied burnout in 444 Spanish schoolteachers. Because the stressor-burnout analyses were not straightforward,⁷ one of us used information found in the publication to build an analysis in which time 2 EE was regressed on a number of time 1 factors, including EE, stressors (e.g., student misbehavior), and sociodemographic factors; baseline stressors predicted exhaustion 6 to 9 months later. Finally, in another reanalysis, this one involving data collected by Dollard and Bakker (2010), baseline emotional demands (but not work pressure or resources) predicted EE one year later, controlling for baseline EE. Thus the evidence from the best-controlled longitudinal studies suggests that job stressors contribute to burnout.

3.3.3 Longitudinal Studies Involving Coping and Burnout

Other longitudinal studies have examined coping, a factor that may reduce stressor exposure or mitigate stressor impact on burnout. Although there is more to coping than the following dichotomy, for the purpose of this chapter, we distinguish two types of coping: problem- and emotion-focused. Problem-focused coping involves “taking steps to remove or to evade [a stressor], or to diminish its impact” (Carver & Connor-Smith, 2010, p. 685). Emotion-focused coping refers to behaviors that are used to manage distress resulting from a stressor’s impact.

Parker, Martin, Colmar, and Liem (2012), in a one-year,⁸ two-wave study of Australian teachers ($n = 430$), observed that problem-focused coping (e.g., sticking to timetable or plan) and emotion-focused coping (e.g., disengaging) did *not* predict later MBI scores. Emotion-focused coping, however, was *concurrently* related to greater burnout and burnout predicted more emotion-focused coping one year later. Emotion-focused coping, as assessed in this study, was likely confounded with the DP subscale. Depersonalization, considered a form of disengagement, is thought to be a means to cope with job stressors (Taris, van Horn, Schaufeli, & Schreurs, 2004).

González-Morales et al. (2010) found that two problem-focused coping strategies (support/advice seeking and taking direct action) assessed at baseline failed to predict EE and DP (PA was not assessed) 6–9 months later. Another longitudinal study involving Spanish schoolteachers (Carmona, Buunk, Peiró, Rodríguez, & Bravo, 2006) found that direct-action coping was related to lower levels of burnout 5–6 months later, controlling for burnout at baseline; however, the absence of measures of job stressors made the results equivocal. A 2-year, 3-wave longitudinal study of Belgian schoolteachers (van den Tooren, de Jonge, Vlerick, Daniels, & Van de Ven, 2011) used coping, as assessed at *wave 3*, to predict *wave 2* outcomes (e.g.,

⁷González-Morales et al. regressed time 2 EE on time 1 *and* time 2 stressors, finding that time 2 stressors and EE were concurrently related; the original analyses made it difficult to establish the temporal priority of stressors over EE.

⁸The time lag was inadvertently omitted from the publication, and we thank P. Parker (personal communication, March 8, 2015) for supplying it.

EE). The use of a dependent variable that antedated the predictor was not conducive to developing a realistic evaluation of the impact of coping. A one-year study conducted in the Netherlands (Taris et al., 2004) found that baseline coping in the form of psychological withdrawal was related to a time 2 *increase* in exposure to the stressor inequitable teacher-student exchanges.

3.4 Evaluation of the Longitudinal Findings on Mental Health and Burnout

On balance, though more research is needed, the evidence from high-quality longitudinal studies (e.g., Dollard & Bakker, 2010; González-Morales et al. 2010; Llorens-Gumbau & Salanova-Soria, 2014; Schonfeld, 2001; Shirom et al., 2009; Travers & Cooper, 1994) suggests that exposure to high levels of work-related stressors (especially student-related stressors) adversely affects teacher MH. In a number of longitudinal studies (e.g., Burke et al., 1996; Pas et al., 2012), methodological limitations prevent investigators from drawing firm causal conclusions.

The longitudinal evidence that workplace coping is effective in combatting burnout is largely absent (e.g., González-Morales et al., 2010; Parker et al., 2012). Schonfeld (2001) obtained similar null results in evaluating longitudinally the link between six types of workplace coping (e.g., direct action, advice seeking, discipline use) and depressive symptoms. The findings associated with coping echo an idea raised by Pearlin and Schooler (1978), namely, that in contrast to personally organized roles such as spouse or parent, the impersonality of many work roles makes those roles unaccommodating to individual coping efforts. Evidence from the best controlled longitudinal studies (González-Morales et al.; Parker et al.; Schonfeld) is consistent with that view.

3.5 Recommendations Regarding Research on the Impact of Teachers' Working Conditions on Mental Health and Burnout

Weaknesses of longitudinal research on teachers include (a) not controlling baseline MH/burnout when linking time 1 stressors to later MH/burnout, (b) relying on cross-sectional findings during the last (or any) wave of data collection, and (c) not testing reverse causal hypotheses (e.g., the influence of baseline MH on the occurrence of later stressors). Going forward, Kasl (1983) underlined the view that the timing of longitudinal data collection has to be carefully planned. If too much time elapses between data collection points, such as the five-year intervals in the study by Wilhelm, Dewhurst-Savellis, and Parker (2000), much can occur that obscures the assessment of effects (e.g., forgetting, quitting, etc.).

Kasl (1983) also warned that longitudinal studies that have arbitrary starting points can be problematic, especially regarding research on veteran workers, such as long-serving teachers. He noted that the “causal dynamics between the risk factor and the health outcome have already played themselves out and we only pick up minor temporal fluctuations in the two variables” (p. 90). Furthermore, the “casualties” of stressful conditions are likely to have dropped out of the picture before the researcher arrives at the scene, removing from research samples individuals upon whom stressors have had the greatest impact. Researchers have to consider both when in a career trajectory to launch a longitudinal study (e.g., the beginning) and the timing of data collection (e.g., once per month, once per term, once per year, etc.).

Llorens-Gumbau and Salanova-Soria (2014) and Schonfeld and Feinman (2012) conducted preliminary qualitative research with teachers who helped the investigators figure out what to assess in the landscape of teacher stress. Having teachers team with researchers can be a good idea. Teachers can provide advice regarding the timing of waves of data collection, the types of teachers to target (e.g., novice teachers), the most important stressors, and school-specific protective organizational resources (or harmful organizational conditions). Teacher advisers can also suggest items to add to, or delete from, research instruments and pilot those instruments before they are used in research on job stress.

3.6 Burnout and Depression in Teachers. Different Labels, Same Phenomenon?

Because burnout and depression have generally been studied as different entities, we chose to review research on them separately. In recent years, however, the distinctiveness of burnout with respect to depression has increasingly been questioned (Bianchi, Schonfeld, & Laurent, 2015a, 2015b). This section provides an overview of the extent to which burnout and depression overlap. First, the latest literature on burnout-depression overlap is reviewed. Second, the idea that the singularity of burnout lies in its association with the occupational context is examined. Third, the treatment implications of burnout-depression overlap are outlined.

3.6.1 Burnout-Depression Overlap: Recent Empirical Findings

Research has increasingly questioned the relevance of a distinction between burnout and clinical and subclinical forms of depression. Teachers with high levels of burnout symptoms have been found to report as many depressive symptoms as clinically depressed patients (Bianchi, Boffy, Hingray, Truchot, & Laurent, 2013). In a study of

5575 French schoolteachers, 90% of those categorized as burned out⁹ met criteria for provisional diagnoses of depression (Bianchi, Schonfeld, & Laurent, 2014). Schonfeld and Bianchi (2016), in a study of 1386 U.S. teachers, found that 86% of teachers categorized as burned out met criteria for provisional diagnoses of depression. When MBI-assessed burnout and depression were treated dimensionally, the correlation between them, when corrected for measurement error, was .79 (Bianchi et al., 2014). The corrected correlation between SMBM and depressive symptom scores was .84 (Schonfeld & Bianchi, 2016). The correlation between the SMBM and the MBI (Shirom & Melamed, 2006) is comparable to the correlation between depressive symptoms and either the SMBM or the MBI. In addition, burnout has been linked to depressive cognitions (Bianchi & Schonfeld, 2016) and attentional alterations found in depression (Bianchi & Laurent, 2015). Recent research using advanced factor analytic methods indicates that symptoms of depression (and anxiety) and EE reflect the same construct (Schonfeld, Verkuilen, & Bianchi, 2017). The above findings underscore the problem of construct redundancy involving burnout vis-à-vis depression.

The inseparability of burnout and depression was further documented in two longitudinal studies. In these studies, burnout and depressive symptoms were observed to cluster, and increase or decrease synchronously over time (Ahola, Hakanen, Perhoniemi, & Mutanen, 2014; Bianchi, Schonfeld, & Laurent, 2015c). Ahola et al. concluded that “burnout could be used as an equivalent to depressive symptoms in work life” (p. 35)—in agreement with earlier, isolated views of burnout-depression overlap (Schonfeld, 1991).

These recent findings suggest that burnout may be better conceived of as a depressive syndrome. Remarkably, Freudenberger (1974), the originator of the burnout construct, noted that the burned-out person “looks, acts and seems depressed” (p. 161). Based on current knowledge, it can be hypothesized that the burned-out person looks, acts, and seems depressed because he or she *is* depressed.

3.6.2 *Burnout as a Job-Related Syndrome*

In order to distinguish burnout from depression, some have argued that burnout is etiologically anchored in the occupational context, whereas depression is context-free (e.g., Maslach, Schaufeli, & Leiter, 2001). At least three problems undermine this view.

First, the “job-relatedness” of a given condition is not nosologically discriminant. For example, a job-related depression remains a depression. The involvement of a specific domain in the etiology of an illness does not imply that a new nosological category should be introduced (Bianchi et al., 2015a, 2015b).

⁹Burnout, like depression, has been treated both as a continuous factor and nosologically (Schonfeld & Bianchi, 2016). The *International Classification of Diseases (ICD-10)* identifies burnout as a state that influences health status.

Second, a definition that limits burnout to the occupational domain is arbitrary *and* self-fulfilling (Bianchi, Truchot, Laurent, Brisson, & Schonfeld, 2014). Some investigators (e.g., Kristensen, Borritz, Villadsen, & Christensen, 2005) proposed context-free conceptions of the syndrome. However, in the MBI-related conceptualization, the definition of burnout, which links it to the occupational domain, is self-fulfilling; the very items of the MBI *a priori* confine burnout to work.

Third, even when burnout is assessed with the MBI, it remains linked to non-occupational factors such as stressful life events and a history of mood disorders (Bianchi et al., 2014; Dyrbye et al., 2006; Schonfeld & Bianchi, 2016). At the same time, work stress can play an important role in the etiology of depression (Schonfeld, 2001; Stansfeld & Candy, 2006; Tennant, 2001). In summary, the idea that the nosological singularity of burnout lies in its job-relatedness is not viable.

3.6.3 *Treatment Implications*

The association of burnout with a depressive clinical picture suggests how burnout should be treated. There have been many more high-quality clinical trials to assess the efficacy of treatments for depression than trials to assess the efficacy of treatments for burnout. Research has identified effective psychotherapeutic and pharmacologic treatments for depression (Gitlin, 2009; Hollon & Dimidjian, 2009). Such treatments may help teachers suffering from burnout in (a) the short run, by re-energizing sufferers and re-triggering motivation for action (i.e., combating anhedonia and dysphoria), and (b) the long run, by helping to lift the despair that can be an impediment to developing effective classroom strategies. In terms of primary prevention, it is important to identify depressogenic aspects of occupational environments to protect teachers from burnout/depression. For example, some supervisors, by setting unreachable objectives for teachers, sentence teachers to repeated feelings of failure and experiences of unresolvable stress that are at the heart of depression.

Overall, the emergence of burnout/depression involves environmental factors and factors internal to the teacher. Some teachers are exposed to considerable disrespect and student-on-student violence (Schonfeld, 2006; Schonfeld & Feinman, 2012), conditions that are normatively stressful (Schonfeld & Farrell, 2010). On the other hand, internal dispositions (e.g., idiosyncratic appraisals) also contribute to burnout/depression (Alarcon, Eschleman, & Bowling, 2009; Swider & Zimmerman, 2010). In order to restore adaptive balance, changes must be considered at both the level of the individual and the organization.

3.7 **Conclusions**

A number of studies (Dollard & Bakker, 2010; González-Morales et al., 2010; Llorens-Gumbau & Salanova-Soria, 2014; Schonfeld, 2001; Shirom et al., 2009; Travers & Cooper, 1994) are sufficiently well-designed to allow us to conclude that

high levels of job stressors (e.g., student disruptiveness) adversely affect teachers' MH. Although the epidemiologic findings are mixed, population-based research indicates that teachers are at above-average risk for exposure to violence, with its own adverse effects on MH (Bloch, 1978). Longitudinal evidence that teachers' coping efforts are effective, however, is weak (González-Morales et al., 2010; Parker et al., 2012; Schonfeld, 2001).

Research also underlines burnout-depression overlap, whether both are treated dimensionally *or* nosologically. Although construct overlap is a fundamental problem in scientific research (Cole, Walter, Bedeian, & O'Boyle, 2012), we believe the overlap has a positive side because extensive clinical trials have shown that therapies are effective in helping depression sufferers recover and may thus benefit "burnout" sufferers.

3.7.1 *Wider Ramifications*

The problem of stressful working conditions affecting teacher MH has far-reaching ramifications. People do not ordinarily leave jobs that they find psychologically satisfying. When teachers leave their jobs, they mostly find work that pays them less and requires them to work more hours (Frijters, Shields, & Price, 2004), suggesting that earnings are not an important driver of attrition. Often, it is the most qualified teachers who leave (Boyd, Lankford, Loeb, & Wyckoff, 2005). Why do teachers leave? Stressful job conditions have a corrosive effect on MH and job satisfaction, and reduce teachers' motivation to remain in the profession (Schonfeld, 2001). The number of student-related disciplinary events to which teachers are exposed predicts attrition independently of other factors including the percentage of impoverished students in schools (Feng, 2010). High rates of teacher attrition adversely affect student achievement (Boyd, Grossman, Lankford, Loeb, & Wyckoff, 2008).

Although the purpose of this chapter is not prescriptive, we provide some closing thoughts about improving teacher MH. Based on the research findings we described, we outline two broad approaches. First, school districts have to take steps to ensure the safety of teachers. These steps include ensuring accuracy in the reporting of crimes *and* threats against teachers, even if the reporting is an embarrassment to administrators and school districts. Otherwise there is no credible basis for implementing measures to reduce teacher victimization. A number of violence prevention programs, although not perfect, have been shown to be somewhat effective (Schonfeld, 2006). Administrators and teachers can jointly decide what type of program is most appropriate for their schools. Second, school administrators have to do more to reduce teachers' exposures to other depressogenic aspects of the school environment such as endemically disrespectful behavior initiated by students.

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Chapter 4

Biological Pathways to Stress-Related Disease Vulnerability in Educators

Silja Bellingrath and Brigitte M. Kudielka

Abstract Teaching has often been described as a highly demanding occupation with increased risk for effort-reward-imbalance, burnout and elevated rates of premature retirement. A growing number of studies report associations between chronic work stress and dysregulations in various stress sensitive physiological systems in educators. Teachers are confronted with a wide range of stressors, including destructive and aggressive behavior of students or conflicting demands from supervisors, colleagues, students and students' parents, which leaves many with a general perception of being rushed and chronically over worked. After presenting the methodology to measure stress markers commonly used in psychobiological studies, the present chapter summarizes findings on alterations in the endocrine stress system, the autonomic nervous system and the immune and blood coagulation system associated with chronic work stress in otherwise healthy educators. Results will be discussed in the framework of McEwen's Allostatic Load Model, which assesses the cumulative burden exacted on the body through repeated attempts of adaptation to stressful situations in multiple physiological systems.

Keywords Educator stress • Effort-reward-imbalance • Burnout • Allostatic load

4.1 Introduction

The psychosocial work environment has been established to be a prominent determinant of health and well-being (Benach, Muntaner, & Santana, 2007). The two organizational stress models that have received most attention in the literature are the Job-Demand-Control model (Karasek & Theorell, 1990) and the

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Effort-Reward-Imbalance model (Siegrist & Peter, 1996). The Job-Demand-Control model postulates that job strain results from the combined effects of high job demands and low job control. However, both high demands and low control may also have independent effects on psychological strain and health outcomes. The risk of psychological strain and physical illness are assumed to be especially elevated when the psychological demands of the job are high but control is low (high strain jobs). The model of Effort-Reward-Imbalance builds on the notion of social reciprocity. It states that the experience of a failed reciprocity between high work-related effort and low occupational rewards, in terms of salary, promotion prospects or appreciation by supervisors, leads to a state of emotional distress, which can result in sustained stress reactions. Overcommitment (OC), the intrinsic component of the ERI model, is a motivational pattern of excessive work-related commitment and a high need for approval. Evidence from epidemiological as well as prospective studies based on the above described models, suggests that chronic stress at work is a relevant risk factor for the progression and development of disease such as cardiovascular disease, type 2 diabetes as well as psychiatric and psychosomatic conditions (Backe, Seidler, Latza, Rossnagel, & Schumann, 2012; Siegrist, 2005; Tsutsumi & Kawakami, 2004; van Vegchel, de Jonge, Bosma, & Schaufeli, 2005).

4.2 Stress and Strain in Educators

In comparison with other occupations (Nübling & Hasselhorn, 2010), teachers show increased levels of emotional demands and self-reported stress at work (Unterbrink et al., 2007). Moreover, a study by Hinz et al. (2014) showed that 1074 teachers from German primary, secondary and grammar schools reported more ERI and more mental health problems as assessed with the general health questionnaire (GHQ-12) when compared with two population samples ($N = 824$; $N = 792$). Teachers working full time exhibited more ERI and more mental health problems, whereas school type was not associated with work stress and mental health. Next to perceived stress levels, growing prevalence of sickness absence, high attrition rates and early retirement in the teaching profession are a major problem for modern societies (Jalongo & Heider, 2006) as they pose a considerable financial burden to the public budget. According to statistics from the *UK Health & Safety Executive* from 2006 and 2007, mental health problems especially stress, depression and anxiety accounted for 46% of days lost due to work-related illness, thereby constituting the main cause of absences due to work-related illness (Cooper & Dewe, 2008). Furthermore, clinical diagnoses of depression and work-related exhaustion (burnout) were shown to be the leading cause for premature retirement in teachers as well as in principals in Germany (Weber, Weltle, & Lederer, 2002, 2005). Burnout is a non-psychiatric syndrome, which is considered to be a response to chronic stress and defined by the three core dimensions emotional exhaustion, work-related cynicism, and feelings of work inefficacy or reduced productivity (Maslach & Jackson, 1986). Burnout is furthermore associated with a plethora of physical symptoms

such as recurrent headaches, gastro-intestinal discomfort, disturbed sleep patterns, or non-specific pain and has been positively associated with various illnesses such as infections, cardiovascular diseases, or type 2 diabetes (Melamed, Shirom, Toker, Berliner, & Shapira, 2006; Melamed, Shirom, Toker, & Shapira, 2006).

A large body of research has explored the many factors, including both organizational as well as personal conditions, that give rise to stress and burnout in the teaching profession (Cameron & Rupp, 2005). According to Bauer et al. (2007) a sample of 949 German teachers from grammar and secondary schools (German: Gymnasien and Hauptschulen) rated 'destructive and aggressive behavior of pupils' as the primary stress factor, along with 'size of school class', whereas Borg and Riding (1991) suggest four primary dimensions of stressors reported by 710 Maltese primary school teachers: student misbehavior, time/resource difficulties, professional recognition needs, and poor colleague relations. Finally, Schaarschmidt (2004) stressed the importance of a perceived lack of support from colleagues and supervisors (heads of school/principals). Finally, educator stress and burnout are not only the cause for negative health consequences in teachers, they also impact negatively on educational performance and thus diminish future prospects and learning behavior of the students. Klusmann, Kunter, Trautwein, Lüdtke, and Baumert (2008) observed that in 1798 German mathematics teachers, a self-regulatory style characterized by work engagement and resilience (healthy-ambitious style) according to the Occupational Stress and Coping Inventory (AVEM; Schaarschmidt et al., 1999), was associated with lower levels of emotional exhaustion measured with the Maslach Burnout Inventory (MBI) (Maslach & Jackson, 1986) and higher levels of job satisfaction as assessed with the Work Satisfaction Scale of the Job Diagnostic Survey (Hackman & Oldham, 1975), compared to less favorable self-regulatory styles (unambitious, excessively ambitious, resigned style). In a subsample of those teachers ($n = 318$) the association between self-regulatory style and instructional quality, including four key aspects -classroom management, tempo, cognitive activation, and perceived social support- was examined. Instructionally quality was assessed via student ratings using a comprehensive instrument developed by Kunter, Klusmann et al. (2007). Teachers with the healthy-ambitious self-regulatory style received the most favorable student ratings with respect to tempo, cognitive activation, and perceived social support. Furthermore, students taught by teachers characterized by the healthy-ambitious self-regulatory style also reported to feel more competent and autonomous (Intrinsic Need Satisfaction in Class Scale by Kunter, Baumert, & Köller, 2007). No direct link, however, could be found between teachers' self-regulatory styles and students' mathematics achievement.

To sum up, these empirical findings support the notion that teacher burnout has not only personal but also interpersonal implications (student-teacher relationships) and thus teacher occupational well-being is an important policy challenge in current times. This is even more relevant considering findings that suggest that emotions can potentially spill over from one person to another, a process also called emotional contagion (Bakker, Westman, & Schaufeli, 2007).

Based on the findings summarized above, a growing number of studies investigates the psychobiological pathways that link work stress to an increased risk for

disease outcomes. A better understanding of underlying mechanisms is essential for the development of effective interventions to prevent health impairments and diminished job performance in the teaching profession. Previous work has implicated two main pathways through which stress can impact on physical health. On the one hand, stress can influence people's health behavior (e.g. smoking, choice of diet, exercise) (Siegrist & Rödel, 2006) and, on the other hand, stress can directly initiate unfavorable alterations in different physiological systems, thereby increasing an individual's vulnerability to a range of physical diseases.

4.3 The Physiological Stress Response

The present chapter will review current findings on the relationship between chronic work stress in teachers and alterations in the regulation of the physiological stress response.

The stress response has evolved as a highly adaptive reaction to ensure survival when an organism is confronted with a physical or psychological challenge. The amygdala, together with the hippocampus, and the prefrontal cortex, is responsible for the detection of environmental threats. The hippocampus exerts inhibitory control over the amygdala by activating memory of previous experiences, whereas the inhibitory influence of the prefrontal cortex over amygdala activity is based on executive functions, such as attention and meta-cognition (Danese & McEwen, 2012). In the case of challenge, the amygdala triggers a) the release of corticotropin releasing hormone (CRH) as neurotransmitter in the locus coeruleus (LC), which leads to the activation of the sympathetic nervous system (SNS) and b) CRH secretion from the paraventricular nucleus of the hypothalamus (PVN) initiating the neuroendocrine stress response via the hypothalamus-pituitary-adrenal (HPA) axis.

Two pathways can be differentiated with regard to SNS activation. The neural pathway of the sympatho-adreno-medullary (SAM) axis represents the innervation of effector organs by noradrenergic synapses, whereas the endocrine pathway describes the release of catecholamines (epinephrine and norepinephrine) by the adrenal glands. Circulating catecholamines stimulate effector organs via adrenergic receptors. In the face of challenge, catecholamine secretion leads to a rapid mobilisation of energy as well as a down-regulation of less important organ functions (e.g. gastrointestinal tract and reproductive systems). Furthermore, catecholamines have a substantial impact on cardiovascular functioning during stress, increasing heart rate, cardiac output, and blood pressure (Kudielka & Kirschbaum, 2007). The activation of the HPA axis involves three stages: After its release into the hypophyseal portal system, CRH initiates the secretion of adrenocorticotropin (ACTH), beta-endorphin, and other peptides from the anterior pituitary gland. ACTH then triggers the secretion of glucocorticoids (GCs) and adrenal androgens from the zonae fasciculata and reticularis of the adrenal cortex (Chrousos & Gold, 1992). GCs, such as cortisol, bind to two receptors, the mineralocorticoid receptor (MR) and the glucocorticoid receptor (GR), which are co-expressed abundantly in neurons of the lim-

bic structure. Nuclear MRs and GRs are responsible for genomic effects, which occur in a time frame of hours, whereas rapid, non-genomic effects on cells (mediated via membrane receptors) can take place within several minutes or even faster (de Kloet, Karst, & Joels, 2008). The HPA axis is regulated by the negative feedback action of cortisol on its receptors in the hippocampus, hypothalamus and pituitary gland. This feedback loop suppresses the secretion of CRH, ACTH and cortisol itself. When investigating the regulation of the HPA axis, one can differentiate between three core mechanisms, namely baseline activity in terms of circadian rhythmicity, reactivity in response to acute stress, and sensitivity of feedback regulation (Schulz & Vögele, 2015). GCs have a multitude of effects, including adaptation to increased metabolic demands under acute stress as well as a dampening of immune and inflammatory responses, to ensure access to resources needed to cope with challenge. Furthermore, GCs have important regulatory effects on the cardiovascular system, the regulation of fluid volume and response to haemorrhage as well as on behavior, appetite control and affective and cognitive processes, such as learning and memory (McEwen, 2003).

4.3.1 Allostatic Load

The same processes that are adaptive under acute stress conditions, may ultimately promote disease development when occurring chronically (McEwen, 2007). McEwen's allostatic load model provides a theoretical framework to study the protective short-term effects of stress mediators and the harmful effects of the same mediators during chronic or repeated stress exposure. It postulates that an organism responds to challenge by initiating an allostatic response, a complex pathway for adaptation and coping, and shuts off this response when the challenge has passed. The term allostasis, originally introduced by Sterling and Eyer (1988) depicts a fundamental physiological principle 'maintaining stability through change' in order to maximize survival. The effective coordination of allostatic responses depends on the brain's evaluation of threat (Herman, Ostrander, Mueller, & Figueiredo, 2005; McEwen, 2007) and subsequent physiological responses, which are predefined by inter-individual differences in various factors such as genetics, experiences (trauma, life events), coping styles or health behaviors (Juster, McEwen, & Lupien, 2010). As long as these allostatic responses are limited to the period of challenge, adaptation and thus protection is ensured. However, if allostatic responses are sustained over months and years, the individual reaches the state of allostatic load (AL).

AL captures the cumulative physiological burden exacted on the body through repeated attempts of adaptation, by postulating a sequential and reciprocal chain of dysregulation in multiple systemic mediators. Stress hormones (epinephrine, nor-epinephrine, cortisol and dehydroepiandrosterone-sulfate [DHEA-S]) in combination with pro- and anti-inflammatory cytokines (such as interleukin-6 or tumor necrosis factor- α) are termed primary mediators. The prolonged secretion of such primary stress mediators might damage the brain and body leading to secondary

outcomes. Secondary outcomes are changes on a sub-clinical level in metabolic factors (such as blood lipids, i.e. total cholesterol, high density lipoprotein cholesterol and triglycerides, visceral fat, insulin, glucose and glycosylated hemoglobin [HbA1c]), cardiovascular parameters (heart rate, systolic and diastolic blood pressure), parameters of the immune system (c-reactive protein (CRP)) and the blood coagulation system (fibrinogen, D-dimer). Such changes are a result of the compensation for over and/or under production of primary mediators. Allostatic overload is finally reached when physiological dysregulation leads to manifested disease endpoints such as cardiovascular or psychiatric diseases referred to as tertiary outcomes (McEwen, 2006).

In the remaining part of this chapter, studies on the relationship between teacher stress and physiological stress markers will be reviewed according to the above described taxonomy proposed by McEwen. After a brief and exemplary introduction into the measurement methods of the most frequently studied biomarkers of each section, first studies on primary mediators will be summarized, followed by studies on exemplary secondary outcomes.

4.4 Measurement of Primary Mediators

4.4.1 *Basal Cortisol Secretion Assessed with the Cortisol Awakening Response (CAR) and Cortisol Day Profiles*

In humans, the typical cortisol secretion follows a distinct circadian rhythm, with a marked increase (about 50–100%) during the first hour after morning awakening in the majority of people (Wüst et al., 2000) and decreasing levels over the remaining day. Wilhelm and co-workers (2007) showed in a sleep laboratory study, that this elevation in cortisol is a genuine response to awakening, as the transition from sleep to the waking state was found to be a prerequisite for the cortisol awakening rise (CAR) to occur. The CAR is interpreted to be an adaptive response, providing the resources necessary to meet the anticipated demands of the upcoming day. To ensure optimal assessment of the CAR, four to five saliva samples (directly after awakening, 15, 30, 45, and 60 min after awakening) on at least 2 days should be collected with strict reference to awakening time. Magnitude and time course of the CAR are influenced by a variety of factors, including genetic factors, age and sex, awakening time and sampling compliance. For detailed practical recommendations and the use of the CAR in ambulatory settings see Stalder and coworkers (2016).

A range of studies has demonstrated an association between the CAR and psychosocial variables, stress and health. Depressive symptomatology (Bhagwagar, Hafizi, & Cowen, 2003, 2005) has been repeatedly shown to be associated with a higher CAR. Chronic fatigue syndrome (Nater et al., 2008) and posttraumatic stress disorder (de Kloet et al., 2006) on the contrary, were associated with a lower CAR. In light of these hyper- as well as hypocorticolemic patterns, the interpretation of individual differences in CAR levels is still under debate.

A cortisol day profile covers the cortisol waking level, potentially the morning peak and the decrease over the course of the day finally reaching low evening levels. Mostly, alterations in the rhythmicity of cortisol secretion across the day, especially flattened cortisol cycles, have been associated with negative health outcomes, including early mortality from cancer (Sephton, Sapolsky, Kraemer, & Spiegel, 2000), obesity and disrupted glucose metabolism (Rosmond, Dallman, & Bjorntorp, 1998).

4.4.2 Hair Cortisol

A relatively new and promising tool for the analysis of cumulative exposure to stress hormones is the measurement of cortisol in hair. Hair segmental analysis has been proposed to provide a retrospective calendar of cumulative cortisol exposure over time. Supportive evidence for the validity of hair cortisol as an index of long-term systemic cortisol output has been accumulated over the past years (Stalder & Kirschbaum, 2012). Hair cortisol measures were shown to be relatively robust against a number of potential confounders such as natural hair color, frequency of hair washes, use of oral contraceptives and smoking status (Dettenborn, Tietze, Kirschbaum, & Stalder, 2012).

4.4.3 Reactivity of Cortisol After Psychosocial Stress Paradigms

Basal hormone assessments do not necessarily reveal information on the integrity and regulation of reactivity of the neuroendocrine axes. Therefore, a variety of challenge tests have been developed, using either psychosocial laboratory stressors, mimicking real-life stressors or pharmacological agents. A meta-analysis by Dickerson and Kemeny (2004) showed that acute psychological stress protocols only elicit solid cortisol responses if they are characterized by uncontrollability, social-evaluative threat or forced failure.

The Trier Social Stress Test (TSST) has become the gold-standard for the experimental induction of moderate psychosocial stress in laboratory settings (Kirschbaum, Pirke, & Hellhammer, 1993). It consists of a brief preparation period (3 min), a free speech in the form of a job interview (5 min) and a mental arithmetic task (5 min), both in front of an audience. The audience is introduced as a team of experts in monitoring nonverbal behavior and the participants expect to be videotaped for a later analysis of their performance. The audience gives no verbal or facial feedback with respect to the performance. Among others, levels of total plasma cortisol, free salivary cortisol, ACTH, epinephrine and norepinephrine, cytokines and blood coagulation parameters have been shown to rise significantly in response to the TSST. Sampling time points should cover pre-stress levels, anticipatory stress levels, the initial stress response, peak level and recovery. However, exact timing

always depends on the dynamic of the selected outcome variable (Kudielka, Hellhammer, & Kirschbaum, 2007).

4.4.4 Reactivity and Feedback Sensitivity After Pharmacological Challenge Paradigms

While psychological stressors are central stimuli that require processing at higher brain levels, pharmacological challenges act at different levels of the HPA system and operate in a dose-dependent manner. The Dexamethasone Suppression Test (DST) is a standard protocol used to measure altered HPA axis feedback regulation (Kudielka, 2013). It tests HPA axis negative feedback efficiency by determining the degree to which endogenous cortisol release is suppressed by intake of oral dexamethasone. This synthetic GC acts primarily by binding to GRs in the pituitary gland, mimicking the negative feedback effects of endogenous cortisol such that ACTH and cortisol release is reduced. Pre-medication with dexamethasone takes place the night before cortisol samples are collected. A high proportion of patients with various affective disorders have elevated cortisol levels after applying the DST (Holsboer, 2000), thus overriding the suppressive effect of exogenous dexamethasone. In PTSD patients on the other hand, enhanced cortisol suppression following dexamethasone intake has been typically observed (Yehuda et al., 1993).

Stimulation with exogenous CRH allows the assessment of pituitary as well as adrenal reactivity. The application of these two agents can also be combined. The combined DEX/CRH-test has proven to be more sensitive (above 80%) in detecting differences in HPA axis regulation, examining the stimulating effects of CRH-administration on the organism's ACTH and cortisol release under the suppressive action of dexamethasone. In contrast to healthy control subjects, patients with acute major depression show increased ACTH and cortisol responses to the combined DEX/CRH test, which can be explained by a central CRH hyperactivity as well as alterations in feedback sensitivity (Heuser, Yassouridis, & Holsboer, 1994). Finally, adrenal sensitivity to ACTH signals can be determined by administration of a low-dose (1 µg) of exogenous ACTH₁₋₂₄ (Synacthen) (Darmon et al., 1999).

4.4.5 Interactions Between the HPA Axis and the Immune System

Acute as well as chronic stress affects the activity of immunocompetent cells via the release of neuroendocrine mediators. Glucocorticoids regulate a variety of immune cell functions. They regulate the innate immune response to infection and can shift adaptive immune responses from T-helper-1 to T-helper-2 cell activity (Glaser & Kiecolt-Glaser, 2005). In healthy individuals, quick changes in immune function after acute stressors are usually interpreted as an adaptive process. However, chronic

dysregulations of the neuroendocrine axes, especially in the form of glucocorticoid resistance, have been established to be a risk factor for the development of viral infections as well as chronic, inflammatory diseases (Kemeny & Schedlowski, 2007). The term cytokine refers to a broad group of small proteins that play an important role in the communication and interaction between cells. They act in concert with specific cytokine receptors as well as cytokine inhibitors in order to regulate the human immune response, for example by modulating the balance between humoral and cellular immunity.

To assess basal immune system activity, one can either assess levels of circulating cytokines or the expression of cytokines after stimulation with certain mitogens such as phytohemagglutinin (PHA) or lipopolysaccharide (LPS). Furthermore, the total numbers of leukocytes as well as the number of circulating lymphocyte subsets, namely B (originating from bone marrow) cells, T (maturing in the thymus) cells, T-helper cells, cytotoxic T cells and Natural Killer cells can be quantified using flow cytometry. To investigate white blood cells' sensitivity to the anti-inflammatory properties of glucocorticoids, white blood cells are exposed to LPS *in vitro* and the production of interleukin-6 in the context of varying concentrations of the synthetic glucocorticoid dexamethasone is measured (DeRijk, Petrides, Deuster, Gold, & Sternberg, 1996).

4.5 Results on Primary Mediators

4.5.1 *Stress Hormones*

Pruessner, Hellhammer and Kirschbaum (1999) were the first to investigate alterations in HPA axis activity in relation to teacher burnout. The CAR was assessed on 2 days in 66 middle-aged German school teachers. Furthermore, feedback sensitivity was measured with the DST. Burnout was measured according to the Maslach Burnout Inventory (MBI) and Teacher Burnout Scale (TBS) (Maslach & Jackson, 1986; Seidman & Zager, 1987). The transformation of the seven burnout subscales into one z variable and splitting it at 0 resulted in two groups with high ($n = 30$) and low ($n = 36$) burnout. Teachers with high burnout scores showed lower overall cortisol levels on both sampling days and a stronger cortisol suppression after the administration of dexamethasone. Furthermore, higher levels of perceived stress (Perceived Stress Scale by Cohen, Kamarck, & Mermelstein, 1983) were related to higher increases of cortisol levels during the first hour after awakening, although only after dexamethasone pretreatment. The subgroup of teachers with high levels of perceived stress and high burnout scores, showed lower overall cortisol secretion and stronger increases after awakening in the DST. They were also more likely to have lower levels of self-esteem (Questionnaire of Competence and Control, Krampen, 1991) and more somatic complaints (Freiburger Checklist of Bodily Complaints, Fahrenberg, 1986). The results of this study were the first to indicate that teacher stress is likely to be reflected in altered HPA axis basal as well as feedback regulation.

Acknowledging the high attrition rates and high levels of premature retirement of teachers in Germany (Weber et al., 2005), Bellingrath, Weigl, and Kudielka (2008) set out to analyze whether adverse psychosocial job-characteristics in terms of effort-reward-imbalance (ERI) (Siegrist & Peter, 1996) in addition to consequences of job stress such as burnout and vital exhaustion (VE) (Appels, Hoppener, & Mulder, 1987) are associated with HPA axis dysregulation in educators. A comprehensive assessment of basal HPA axis activity was conducted in a sample of 135 middle-aged teachers from all German school types, including primary, secondary and grammar school as well as vocational schools. Participants collected saliva on two working days, one leisure day, and after pre-medication with dexamethasone to assess basal cortisol day profiles and HPA axis negative feedback sensitivity. As compliance with saliva sampling procedures is crucial to obtain valid data (Kudielka, Broderick, & Kirschbaum, 2003), electronic monitoring devices (MEMS® Track Cap; AARDEX, Ltd., Switzerland) were used to ensure accurate timing of saliva collection. Basal cortisol activity was not associated with burnout or exhaustion, or any component of Siegrist's ERI/OC model. However, after dexamethasone, higher burnout (in terms of MBI-subscale emotional exhaustion and lack of accomplishment and TBS-subscale career satisfaction and perceived administrative support), VE and lower reward from work were significantly related to stronger cortisol suppression, pointing to an increased feedback sensitivity of the HPA axis. To conclude, adverse job characteristics and consequences of job stress appeared to be associated with a subtle dysregulation of the HPA axis, manifested as heightened negative feedback function, even though all teachers were working and in a good health status.

In order to assess whether the cumulative exposure to stress hormones over a longer period of time is associated with different measures of work stress, Qi et al. (2014, 2015) recently investigated hair cortisol concentrations in female kindergarten teachers. In the first study ($N = 39$), higher ERI scores were significantly associated with higher levels of hair cortisol, which can be interpreted as the cumulative cortisol secretion during the month prior to the assessment. In the second study ($N = 43$), the authors focused on the Job-Demand-Control model (Karasek & Theorell, 1990) and the concept of need for recovery (NFR). The subjective need to recuperate from work-induced fatigue has been considered to be a link between work stress and physiological strain reactions and has previously been associated with burnout and chronic fatigue. No significant associations emerged for job demands or job control measured with the Chinese version of the Job Content Questionnaire (C-JCQ) (Cheng, Luh, & Guo, 2003) with hair cortisol levels. Need for recovery however (NFR scale, Van Veldhoven, & Meijman, 1994) was significantly but inversely correlated with hair cortisol concentrations, controlling for age, job demands and job control. The result is in line with findings of a flat diurnal cortisol slope being associated with fatigue in non-clinical populations (Kumari et al., 2009).

Previous findings suggest that not only characteristics of the work place and their presumed consequences, but also personality traits such as high self-esteem, relate to the regulation of the HPA axis (Pruessner et al., 2005; Pruessner, Lord, Meaney,

& Lupien, 2004). The belief in one's own ability to successfully complete a task and reach goals (self-efficacy) has been suggested to be a protective factor with the potential to buffer the negative effects of work stress on health and job performance (Schmitz & Schwarzer, 2000). In line with this, Schwerdtfeger, Konermann, and Schonhofen (2008) investigated possible associations between self-efficacy and HPA axis activity in a sample of 42 middle-aged high school teachers. Teachers were divided into two groups with high vs. low self-efficacy based on a median-split. Subjects with high self-efficacy, measured with the German teacher self-efficacy scale by Schmitz and Schwarzer (2000), showed a lower CAR and fewer somatic complaints assessed with the Giessen Subjective Complaints List (Brähler & Scheer, 1995).

Finally, the relationship between work-related ruminative thoughts and basal HPA axis activity was recently investigated by Cropley, Rydstedt, Devereux, and Middleton (2015). One hundred and eight teachers from U.K. primary and secondary schools were asked about their work-related thoughts, sleep and activities in a paper-pencil diary at 10 pm. At the same time they provided a saliva sample for evening cortisol assessment. The CAR was assessed the following morning. Subjects with high rumination tendencies showed higher evening cortisol levels, controlling for leisure activities or work patterns during the evening. Furthermore, the percentage increase in cortisol concentration from awakening to 30 min was significantly greater in the low ruminators compared with the high ruminators and this effect appeared to be associated with sleep disturbance during the previous night.

To sum up, indicators of job stress as well as personality factors relevant to the teaching profession have been shown to relate to alterations in basal activity of the HPA axis and to increased negative feedback sensitivity, assessed by CAR, day profiles, dexamethasone suppression test (DST) and hair cortisol levels. Inconsistencies in findings can most likely be explained by methodological differences in HPA axis assessment, differences in the psychometric properties of the different stress measures as well as sample characteristics. Moreover, in order to really understand the mechanisms mediating stress-related disorders, knowledge of the variables that affect cortisol responses to acute stress are utterly important. Therefore, in a next step, Bellingrath and Kudielka (2008) investigated reactivity of ACTH and cortisol to acute psychosocial stress in a sample of 53 teachers from all German school types. In the total group, adverse job characteristics in terms of ERI and the stress promoting coping style overcommitment (OC) were only marginally associated with HPA axis responses to the TSST. However, looking only at those subjects who responded with a cortisol increase >2.5 nmol/l ($N = 30$), a significant association between high levels of OC and lower ACTH as well as plasma and salivary cortisol responses emerged. These results remained significant controlling for depressive symptoms, measured with the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983). With regard to ERI, higher stress levels were solely related to stronger plasma cortisol increases after TSST exposure. Overall, the association between ERI/OC and a blunted HPA axis response to acute psychosocial stress may reflect an adaptation of the neuroendocrine system to prolonged or repeated stimulation due to chronic work stress.

In an independent sample of 53 healthy, middle-aged teachers from all German school types, Wolfram and colleagues (2013b) investigated ACTH and cortisol responses to pharmacological challenge. ACTH, plasma cortisol and salivary cortisol were measured before and after stimulation with (a) Synacthen and (b) the combined DEX/CRH-test. The MBI-subscale emotional exhaustion, the core component of burnout was related to higher plasma cortisol profiles after Synacthen injection, pointing to a heightened sensitivity to ACTH signals of the adrenal cortex. OC on the other hand, was significantly associated with attenuated ACTH, plasma cortisol and salivary cortisol concentrations following the DEX/CRH-test, suggesting hypo-reactive pituitary as well as adrenal cortex responses in teachers with high levels of OC. The observed attenuated HPA axis response was assumed to be not purely of pituitary and adrenal but also of central origin, which is in line with findings of a reduced HPA axis reaction to psychosocial stress in teachers with high levels of OC reported by (Bellingrath & Kudielka, 2008).

To summarize, the reactivity of the HPA axis to acute stress induced either pharmacologically or by a psychosocial stress paradigm in different teacher samples, was especially associated with a behavioral pattern of excessive work-related commitment as well as consequences of chronic work stress (e.g., emotional exhaustion).

Finally, student teachers were shown to be especially vulnerable to higher levels of work-related stress in the second phase of their teacher training, which is very practically oriented (Schaarschmidt & Kieschke, 2007). To investigate the magnitude of the reaction to a natural and potent self-relevant stressor, namely a graded demonstration lesson in this second phase of teacher training, Wolfram, Bellingrath, Feuerhahn, and Kudielka (2013a) compared cortisol responses to a demonstration lesson with a non-stress control day under naturalistic conditions. In a sample of 21 healthy student teachers, cortisol levels declined after the demonstration lesson. However, cortisol levels after the demonstration lesson were significantly higher when comparing these post-stress cortisol concentrations to the time-matched cortisol levels on the control day. Additionally, it can be assumed that the heightened cortisol levels already before the start of the demonstration lesson reflect anticipatory stress responses in student teachers.

4.5.2 Cytokines

The relationship between immunological factors and exhaustion in terms of teacher burnout was first assessed by von Känel, Bellingrath, and Kudielka (2008). Considering that burnout has been previously associated with an increased risk of CAD (Melamed, Shirom, Toker, Berliner, & Shapira, 2006) and that chronic low-grade systemic inflammation contributes to atherosclerosis, circulating levels of pro- and anti-inflammatory cytokines were assessed in 167 teachers from all German school types. Levels of tumor necrosis factor (TNF)- α and interleukin (IL)-4 and IL-10 were determined in fasting morning plasma. Analyses were adjusted for

demographic factors (age, gender), medication, life style factors (smoking status, alcohol consumption, sleep quality), metabolic factors (mean arterial blood pressure, heart rate, BMI, total cholesterol/high-density lipoprotein cholesterol ratio, serum triglyceride levels, and fasting glucose levels) and symptoms of depression and anxiety as assessed by the HADS. Higher levels of total burnout symptoms in terms of an MBI-sum score (generated by summing up individual scores of the three subscales), independently predicted higher TNF- α levels, lower IL-4 levels, and a higher TNF- α /IL-4 ratio. Such findings suggest an association of burnout and increased systemic inflammation along a continuum of symptom severity and therefore provide one possible explanation for the increased atherosclerotic risk observed in burned-out individuals.

Teachers' immune system responses to acute stress were assessed by Bellingrath, Rohleder and Kudielka (2010) in 55 healthy individuals from all German school types. Lymphocyte subset counts and lymphocyte production of tumor-necrosis-factor (TNF)- α , interferon (IFN)- γ , interleukin (IL)-2, IL-4, IL-6 and IL-10 were measured 45 min before and immediately after the TSST. High levels of adverse job characteristics in terms of ERI and unfavorable coping in terms of OC were associated with lower numbers of natural killer (NK) cells (CD16+/56+) whereas only high levels of OC were related to a lower increase in T-helper cells (CD4+) after stress. Furthermore, subjects with high levels of ERI showed an overall increase in pro-inflammatory activity, with higher TNF- α production at both time points and elevated pre-stress IL-6 production. Additionally, the production of IL-10 decreased after stress in subjects with high levels of ERI. The ratios of TNF- α /IL-10 and IL-6/IL-10 were also significantly increased in subjects high on ERI. Previous research has demonstrated that clinical depression is associated with a diminished sensitivity to the anti-inflammatory properties of glucocorticoid hormones, possibly due to elevated resting levels of cortisol (Miller, Freedland, & Carney, 2005). As high ERI/OC has been established to be a risk factor for the development of depression, it can be speculated that reduced glucocorticoid sensitivity might help to explain how chronic work stress can lead to disease. Therefore, changes in lipopolysaccharide (LPS)-induced interleukin (IL)-6 production and inhibition of IL-6 production by dexamethasone in reaction to the Trier Social Stress Test (TSST) were assessed in 46 healthy teachers from all German school types to test whether chronic work stress is accompanied by alterations in glucocorticoid sensitivity of the innate immune system (Bellingrath, Rohleder, & Kudielka, 2013). High ERI was associated with an increase in pro-inflammatory potential, reflected in elevated IL-6 production before and after stress, and with a lower capacity of dexamethasone to suppress IL-6 production *in vitro* over all measurement time points (GC sensitivity).

In sum, a number studies so far focused on alterations in primary mediators in the framework of the allostatic load model in teacher samples. Findings on HPA axis functioning are mixed but a majority of studies suggest a subtle HPA axis hypoactivity associated with stress in teachers. As only cross-sectional studies are available so far however, one can only speculate that such a hypocortisolemic or hyporeactive state is a result of a functional adaptation to excessive exposure to stress hormones over time and longitudinal studies in teachers are warranted in

order to test this hypothesis. With respect to immune functioning, signs of low-grade systemic inflammation and a dampened innate immune defense as well as a less effective anti-inflammatory regulation by glucocorticoids have been observed in relation to adverse job-characteristics in terms of ERI and an unfavorable coping style with work demands in healthy teachers.

4.6 Measurement of Secondary Outcomes

4.6.1 Blood Coagulation Factors

Blood clotting is a rapid response to tissue damage. Thrombin converts fibrinogen to fibrin, leading to fibrin deposition and the activation of platelets to form blood clots (coagulation). As damaged tissue is repaired, the fibrin clot must be dissolved in order to maintain the fluidity of blood (fibrinolysis). The break-down of fibrin chains by plasmin yields soluble fibrin fragments such as D-dimer, which indicates activation of the entire hemostatic system, i.e. coagulation and fibrinolysis. A great number of epidemiological and experimental studies support the role of enhanced coagulation, impaired fibrinolysis as well as hyperactive platelets in the development of atherogenesis, atherothrombosis, and acute coronary syndromes (Austin, Wissmann, & von Känel, 2013). In the case of acute fight-or-flight stress responses, a prothrombotic state is an adaptive physiological response to prevent excessive bleeding in case of injury. However, when it comes to chronic stress, such as job-related stress, a sustained low-grade hypercoagulability is likely to pose harm to the cardiovascular system over time, contributing to the progression of atherosclerosis. In line with this, hemostasis factors, like fibrinogen and D-dimer have been shown to predict cardiac events in patients with CVD but also predicted disease risk in individuals with apparently good health at study entry (Danesh et al., 2001; Emerging Risk Factors Collaboration, 2012).

4.6.2 Heart Rate and Heart Rate Variability

Heart rate (HR) represents the number of contractions made by the heart in a given period of time, usually per minute. Resting heart rates ranging between 50 and 90 beats per minute (bpm) are considered to be normal (Boudoulas, Borer, & Boudoulas, 2015). However, the heart rate flexibly adapts to the organism's physical needs and therefore shows a wide variability depending on different conditions or activities (such as sleeping or waking, resting or exercising, being male or female, young or old). Even though there are many factors that determine heart rate, the influence of the autonomic nervous system is of major importance. Heart rate variability (HRV) has become the accepted term to describe variations in instantaneous heart rate and

inter-beat (RR) intervals. The analysis of heart rate variability has been shown to be a reliable measure of the neural control of the heart (Thayer, Ahs, Fredrikson, Sollers, & Wager, 2012). Measures of vagally-mediated HRV have been shown to be independently associated with inflammatory markers and biomarkers for the metabolic syndrome, and with mortality and morbidity (Jarczok et al., 2013; Thayer, Yamamoto, & Brosschot, 2010).

4.7 Results on Secondary Outcomes

4.7.1 Coagulation Factors

Kudielka, Bellingrath, and von Känel (2008) investigated whether two blood coagulation markers, fibrinogen and D-dimer, are associated with vital exhaustion (VE), a known psychosocial risk factor for coronary artery disease (CAD) (Appels, Falger, & Schouten, 1993) in $N = 150$ teachers from all German school types. Meta-analyses have established elevated levels of both markers as biological risk factors for the development and progression of CAD (Danesh et al., 2001). Plasma fibrinogen and D-dimer concentrations were measured in 150 healthy middle-aged teachers. Linear regression analysis yielded a significant association between vital exhaustion and fibrinogen but not D-dimer controlling for relevant covariates. This finding supports the notion that elevated fibrinogen levels might be positively linked to VE. Furthermore, von Känel, Bellingrath, and Kudielka (2009c) assessed whether longitudinal changes in symptoms of depression and anxiety over 21 months relate to those in fibrinogen and vice versa in a sample of 57 healthy middle-aged teachers from all German school types. They showed that an increase in depressive symptoms between study entry and follow-up was significantly and independently associated with increase in fibrinogen levels. Interestingly, after additionally controlling for baseline depression, the association between changes in depression and fibrinogen was no longer significant. In contrast, taking into account baseline fibrinogen levels, maintained the predictive value of fibrinogen change for depression change. Thus, one can speculate that elevated fibrinogen might be one biological mechanism by which chronic work stress may impact on teachers' cardiovascular health in the long run.

Not only a sustained low-grade hypercoagulability is a threat for the cardiovascular system, but also a hypercoagulable state in response to acute psychosocial stress has been shown to contribute to atherothrombotic events. In order to investigate the relationship between exhaustion and depression, and reactivity of the blood coagulation system, 38 healthy teachers from all German school types were confronted twice with the Trier Social Stress Test (von Känel, Bellingrath, & Kudielka, 2009a). Elevated levels of exhaustion (VE) as well as depression (HADS depression subscale) correlated with reduced D-dimer increase from pre-stress to immediately post-stress. Also, elevated exhaustion and depression were associated with attenu-

ated recovery of D-dimer levels between 20 and 45 min post-stress. This finding suggests an attenuated immediate D-dimer stress response and post-stress delayed recovery of D-dimer levels with elevated exhaustion and depressive symptoms. Particularly, the prolonged hypercoagulability after stress cessation might contribute to the atherothrombotic risk previously observed with exhaustion and depression, even at subclinical levels.

Finally, von Känel, Bellingrath, and Kudielka (2009b) investigated whether overcommitment (OC), effort-reward-imbalance (ERI), and the OC-by-ERI interaction relate to an exaggerated procoagulant stress response to the TSST in 52 healthy teachers from all German school types. During recovery from stress, elevated OC correlated with D-dimer increase and a smaller fibrinogen decrease. OC was not associated with coagulation changes from pre-stress to immediately post-stress. Follow-up measures of elevated ERI correlated with D-dimer increase during recovery when OC was low but not when OC was high. Thus, one can conclude that OC not only predicted but also moderated the effect of ERI on stress-induced hypercoagulability, particularly during the recovery period. To sum up, adverse psychosocial job characteristics in terms of ERI, excessive work-related commitment as well as exhaustion and depressive symptoms, were associated with signs of sustained low-grade hypercoagulability as well as hypercoagulability after stress in healthy middle-aged teachers.

4.7.2 Heart Rate and Heart Rate Variability

Decreased cardiac vagal tone, measured in terms of HRV has been repeatedly shown to be associated with adverse psychosocial work characteristics (Jarczok et al., 2013). Pieper, Brosschot, van der Leeden, and Thayer (2007) investigated ambulatory measures of HR and HRV in 73 teachers from Dutch secondary schools in order to assess whether worry episodes, in which stress is anticipated but not yet present, are related to increased HR and decreased HRV. Participants reported the number and characteristics of worry episodes and stressful events every hour over 4 days on computerized diaries. Worry episodes and stressful events were both, independently, associated with elevated levels of HR and decreased levels of HRV, compared with situations rated as neutral. Results were not affected by any psychological or biobehavioral covariates.

4.7.3 Allostatic Load – Summary Index

Finally, Bellingrath, Weigl, and Kudielka (2009) aimed to investigate the relationship between indicators of work-related chronic stress in teachers and disease risk not only with respect to single mediators but with a cumulative measure as suggested by McEwen (2003), prior to the onset of a manifest clinical disease.

Therefore, ERI, exhaustion and two summary allostatic load indices were assessed in 104 female teachers from all German school types. Allostatic load was analyzed according to McEwen's classical model comprised of ten parameters (cortisol, epinephrine, norepinephrine, dehydroepiandrosterone-sulfate (DHEA-S), waist/hip-ratio (WHR), glycosylated haemoglobin (HbA1c), high density lipoprotein (HDL), total cholesterol/HDL-ratio, systolic and diastolic blood pressure) and an extended index (adding tumor-necrosis-factor- α (TNF- α), C-reactive protein (CRP), fibrinogen, D-dimer, percent-body-fat, triglycerides, and glucose). Both composite AL-indices were significantly increased in women with high ERI levels or suffering from exhaustion, reflecting subtle dysregulation across multiple stress-sensitive systems. Despite the limitations of a cross-sectional analysis in a relatively small, solely female study sample, these findings potentially underline an advantage of a composite AL score in quantifying future disease risk in apparently healthy and working teachers, compared to a confined investigation of single biological risk factors.

To sum up, alterations in various secondary outcomes in terms of the allostatic load framework have been observed in stressed but otherwise healthy teachers, ranging from sustained low-grade hypercoagulability, hypercoagulability after stress, elevated HR and lowered HRV. Furthermore, the usefulness of a composite AL index for the assessment of stress related disease vulnerability in educators has also been suggested. However, due to the cross-sectional nature and small sample sizes of the studies summarized above a general conclusion seems premature and further research is needed that sheds more light on the development of strain reactions over time.

4.8 Outlook and Concluding Remarks

Taken together, the existing studies aiming to investigate the mechanisms that underlie the associations between educator stress and negative health outcomes suggest that already in healthy subjects, adverse job characteristics as well as consequences from chronic work stress such as exhaustion, seem to be reflected in subtle changes in multiple psychobiological stress markers before a potential disease manifestation.

In order to develop suitable preventive measures targeted to the specific strains of the teaching profession, further experimental research is needed that sets out to analyze how specific stressors that impair teachers' well-being as well as their instructional ability, impact on stress physiology. In recent years, there has been growing research activity that investigates the effects of established stress management programs, such as the stress inoculation training developed by Meichenbaum (1985) or mindfulness-based stress reduction (MBSR) (Kabat-Zinn, 2005), not only on behavioral outcome measures and subjective stress but also on physiological stress markers. For example, Hammerfald et al. (2006) demonstrated that cognitive-behavioral stress management training can attenuate endocrine responses and alter cognitive

appraisal under acute laboratory stress conditions in a sample of healthy adults working in various occupations, whereas Kemeny et al. (2012) recently investigated the effects of a time-intensive contemplative meditation in combination with training in emotion regulation in a sample of 82 healthy female school teachers. Teachers in the training group showed reductions in self-reported negative affect, rumination, depression and anxiety and increases in positive affect. Furthermore, teachers in the training group also demonstrated lower systolic (SBP) and diastolic (DBP) blood pressure during the recovery period of the Trier Social Stress Test (TSST) at follow-up, compared with the control group. No group differences were found in DBP or SBP reactivity during the TSST. The amount of meditation practice however was related to lower blood pressure reactivity during the task.

In conclusion, precise knowledge about psychobiological mechanisms could help to develop specific diagnostic tools and prevention programs that would allow targeting risk factors such as motivational overcommitment or dysfunctional work-related attitudes regarding achievement as well as an unsatisfactory reward culture at the work place, that are predictive of adverse strain reactions in teachers. Furthermore, such knowledge could furthermore encourage the implementation of structural and organizational changes that protect teachers from mental and physical disorders due to chronic work stress. Finally, alternative methods of measuring stress in daily life, such as ambulatory assessment, that allow the investigation of subjective experiences linked to a particular time and context, could help to advance such knowledge on psychobiological pathways to stress-related disease vulnerability in teachers in the future (Conner & Barrett, 2012; Kudielka, Gierens, Hellhammer, Wüst, & Schlotz, 2012).

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Chapter 5

Teacher Stress and Teacher Self-Efficacy: Relations and Consequences

Einar M. Skaalvik and Sidsel Skaalvik

Abstract During the last decade the research literature has shown a growing interest in teacher stress and teacher self-efficacy and how these constructs are related. In this chapter, we review current research on relations between teacher stress and teacher self-efficacy, how these constructs are influenced by the school context, and how they relate to teacher engagement and well-being. Teacher stress and teacher self-efficacy are consistently shown to be negatively related and to predict teachers' cognitive, emotional, and behavioral responses differently. For example, teacher stress correlates negatively with teacher job satisfaction and job commitment, but positively with burnout and teacher attrition, whereas teacher self-efficacy correlates positively with teacher job satisfaction and job commitment, but negatively with burnout and teacher attrition. We propose a model of relations between stressors in the school environment, social support, teacher self-efficacy, teacher stress, and outcome variables such as work engagement and burnout. We then report an interview study which examines experiences of stress and self-efficacy among senior teachers who chose early retirement after long periods of sick leave and teachers who were still teaching and thriving at the ages of 63 and 65.

Keywords Teacher stress • Teacher self-efficacy • Social support • Work engagement • Teacher burnout • Teacher well-being

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5.1 Introduction

The shortage of well qualified teachers has long been a problem in many countries (e.g., Ingersoll, 2001; Hong, 2012). This problem is increasing because of teacher attrition – the departure of teachers from their teaching jobs. A large number of teachers leave school for non-retirement reasons, especially during their first years of teaching (Hong, 2012). In Norway, many teachers also leave the profession through early retirement which can be taken at 62 years of age by the choice of the employees, although ordinary retirement age is 67. One reason for leaving the teaching profession is stressful working conditions (Weiss, 1999).

Kyriacou (2001) defined teacher stress as “the experience of unpleasant and negative states, such as anger, tension, disappointment or depression, which arise from teaching responsibilities” (p. 104). The definition builds on a conceptualization of stress as a negative emotional experience resulting from the teacher’s perception that the work situation constitutes a threat to his or her self-esteem or well-being (Kyriacou, 2001). In Occupational Health Psychology teacher stress is conceptualized as the result of a mismatch between job demands and the teacher’s ability to cope with the demands, or as a mismatch between job demands and job resources (e.g., Hakanen, Bakker, & Schaufeli, 2006).

The conceptualization of stress as resulting from job demands or aspects of the work as a teacher has led to attempts to identify stressors or contextual factors that relate to teacher stress. A number of contextual factors have been identified as stressors in empirical studies including time pressure and workload, student diversity, discipline problems or student misbehavior, poor student motivation, value conflicts, the requirement that teaching should be adapted to individual students’ needs, lack of rewards and recognition, lack of shared decision making, lack of personal autonomy, conflicts with colleagues, parents or the school administration, lack of administrative support, low pay and low status (e.g., Betoret, 2009; Fernet, Guay, Senécal, & Austin, 2012; Friedman, 1995; Hakanen et al., 2006; Klassen & Chiu, 2011; Kokkinos, 2007; Skaalvik & Skaalvik, 2009, 2011a, 2011b, 2015). In a study of 523 teachers in Norwegian senior high school Skaalvik and Skaalvik measured teachers’ perception of seven potential stressors in school. The stressor which correlated strongest with teachers’ stress responses was a combined workload/time pressure variable. A couple of recent studies also indicate that a performance oriented school goal structure, emphasizing test results and social comparisons, may be experienced as stressful whereas a mastery oriented goal structure, emphasizing effort and improvement, is associated with feeling of belonging, engagement, and job satisfaction (Devos, Dupriez, & Paquay, 2012; Skaalvik & Skaalvik, 2011b, 2013).

Two recent semi-structured interview studies, using open-ended questions, also identified a number of stressors that teachers named as responses to challenges and stress. Shernoff, Mehta, Atkins, Torf, and Spencer (2011) interviewed 14 urban U.S teachers and found nine main sources of stress: limited resources and support, excessive workload, school-level disorganization, disruptive student behavior,

accountability policies, student diversity, urban poverty, role overload, and teacher preparation. In open ended interviews of 34 Norwegian teachers and former teachers, Skaalvik & Skaalvik (2015) found eight main categories of teacher stressors that were identified by more than half of the teachers: workload and time pressure, student diversity, the requirement that teaching should be adapted to the needs of the individual student, disruptive student behavior, lack of autonomy, lack of shared goals and values, problems related to teamwork, and lack of status. Skaalvik and Skaalvik reported that teachers at different ages experienced the same stressors at school, but that senior teachers needed increasingly more time to recover from stress.

Teacher stress may have detrimental consequences for both teachers and the quality of education. Possible consequences of teacher stress are lower job satisfaction (Collie, Shapka, & Perry, 2012), lower levels of commitment (Klassen et al., 2013), higher levels of burnout (Betoret, 2009), and increased teacher attrition (Skaalvik & Skaalvik, 2011a). Research evidence consistently shows that teacher stress is predictive of higher levels of burnout, or of particular dimensions of burnout, particularly emotional exhaustion (Betoret & Artiga, 2010; Hakanen, et al., 2006; McCarthy, Lambert, O'Donnell, & Melendres, 2009; Schwarzer & Hallum, 2008; Skaalvik & Skaalvik, 2007, 2009, 2011a) and lower levels of commitment (Klassen & Chiu, 2011; Klassen et al., 2013). Skaalvik and Skaalvik (2010, 2011a) also reported that emotional exhaustion and burnout mediated the relations between stressors at school and teachers' job satisfaction and motivation to leave the teaching profession. Burnout, which is often conceptualized as a syndrome of emotional exhaustion, depersonalization, and reduced personal accomplishment (Maslach, Jackson, & Leiter, 1996), may therefore be taken as an indicator of teacher stress. Researchers have also consistently found that teacher stress is negatively correlated with teacher self-efficacy (e.g., Betoret, 2009; Collie et al., 2012).

5.2 Teacher Self-Efficacy

A common conceptualization of teacher self-efficacy is that it refers to teachers' beliefs in their ability to influence valued student outcomes (e.g., Soodak & Podell, 1996; Wheatley, 2005). Nevertheless, teacher self-efficacy has been defined and measured in different ways by different researchers. For instance, in an early attempt to measure teacher efficacy, Armor et al. (1976) asked two single questions focusing on (a) teachers' general beliefs about what can be achieved through education and (b) teachers' beliefs about their personal teaching ability. The former of these questions measures teachers' general beliefs about limitations to what can be achieved through education, which Skaalvik and Skaalvik (2007) referred to as "external control". The latter question taps teachers' beliefs about their personal teaching ability. These constructs are conceptually different and positively, but weakly correlated (Skaalvik & Skaalvik, 2007).

During the last two decades, most research on teacher self-efficacy has been based on social cognitive theory (Bandura, 1977, 1997, 2006). This theoretical perspective emphasizes the involvement and exercise of human agency – meaning that people can initiate, execute and control what they do. According to this conceptualization, people are self-organizing, proactive, self-regulating, and self-reflecting (Bandura, 2006). Bandura (2006) contends that self-efficacy is the most central mechanism of human agency because self-efficacy beliefs determine how environmental opportunities and impediments are perceived and affect peoples' goals and behaviors, their choices of activities, how much effort is expended on an activity, and how long people will persevere when confronting obstacles (see also Pajares, 1997; Schunk & Meece, 2006).

5.2.1 Defining and Measuring Teacher Self-Efficacy

Within the framework of social cognitive theory, teacher self-efficacy has been conceptualized as a multidimensional construct (Bandura, 2006). The multidimensional nature of teacher self-efficacy is supported in several studies by means of confirmatory factor analyses (Avanzi et al., 2013; Klassen, et al., 2009; Skaalvik & Skaalvik, 2007). Based on this perspective, Tschannen-Moran & Woolfolk Hoy (2001, p. 783) defined teacher self-efficacy as a teacher's "judgment of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated." Based on this definition, they developed a much used "Teachers' Sense of Efficacy Scale" (TSES) measuring self-efficacy for instruction, classroom management and student engagement. Skaalvik and Skaalvik (2007, 2010) provided a similar but broader conceptualization of the construct as individual teachers' beliefs in their own ability to plan, organize, and carry out activities that are required to attain given educational goals. Following Bandura's (1997) recommendation in the item construction they developed a six-dimensional "Norwegian Teacher Self-Efficacy Scale" (NTSES: Skaalvik & Skaalvik, 2007) tapping self-efficacy for instruction, adapting education to individual students' needs, motivating students, keeping discipline, cooperating with colleagues and parents, and coping with changes and challenges (for a cross-cultural validation, see Avanzi et al., 2013). An example of an item measuring self-efficacy for motivating students is: "How certain are you that you can wake the desire to learn even among the lowest-achieving students?" Schwarzer, Schmitz and Daytner (1999) developed a short one-dimensional instrument that has been used by several researchers (Schwarzer TSES). This scale also followed Bandura's recommendation for item construction. One example of an item is "I am convinced that I am able to successfully teach all relevant subject content to even the most difficult students."

5.2.2 Sources of Self-Efficacy

Bandura emphasizes that the most influential source of self-efficacy is *mastery experiences* – i.e. prior experiences of succeeding or failing when working on similar tasks or type of tasks to the one at hand. As explained by Pajares (1997), individuals judge the effects of their actions, and their interpretations of these effects help create their efficacy beliefs. Accordingly, we may assume that a major source of teacher self-efficacy is prior perceptions of successful or less successful teaching experiences, including experiences of classroom management, instructing and motivating students, and cooperating with colleagues and parents (Skaalvik & Skaalvik, 2015). Such experiences may be affected by stressful working conditions (see Sect. 5.2.5). We believe that stressors that interfere with the actual teaching, for instance discipline problems, have a particularly negative effect on teacher self-efficacy. However, being forced into practices that is unfamiliar, without prior training, may also lead to a decreased self-efficacy.

A teacher's self-efficacy may also be affected by *vicarious experiences*, e.g. observing how a colleague is maintaining classroom management. Self-efficacy can also be affected by verbal persuasion, for example, receiving feedback that colleagues believe in their abilities. To be effective, verbal persuasions have to be realistic and reinforced by real experience (Stipek, 2002). Social support, both emotional and instrumental support, may be seen as variations of verbal persuasion. According to Bandura (1997) a fourth source of self-efficacy is physiological arousal. For instance, a teacher noticing that her heart is beating and her hands are clammy when entering the classroom may lose confidence in her own ability to manage the teaching.

5.2.3 Correlates of Teacher Self-Efficacy

Social cognitive theory postulates that self-efficacy beliefs determine how environmental opportunities and impediments are perceived and how they affect peoples' goals and behaviors. According to Bandura (1997), people with low self-efficacy tend to dwell on their shortcomings and magnify the severity of possible threats, which may be both energy-consuming and lead to increased anxiety. In contrast, high self-efficacy is assumed to result in increased engagement and self-efficacious people are expected to persevere when faced with challenges.

In an early review of research, Ross (1998) reported that teacher self-efficacy predicted teachers' attitudes and strategies, for example teachers' referral for special education. A number of recent international studies have shown that teacher self-efficacy is positively correlated with adaptive outcome variables such as job commitment, engagement and job satisfaction (e.g., Avanzi et al., 2013; Collie, et al., 2012; Gilbert, Adesope, & Schroeder, 2014; Klassen & Chiu, 2010; Klassen et al., 2013; Skaalvik & Skaalvik, 2010, 2014) whereas it is negatively correlated with teacher burnout, or its dimensions, (Avanzi et al., 2013; Brouwers & Tomic,

2000; Saricam & Sakiz, 2014; Skaalvik & Skaalvik, 2007, 2008, 2010, 2014; Tang, Au, Schwarzer & Schmitz, 2001). Most of these studies measured teacher self-efficacy by means of the TSES (see Sect. 5.2.1) whereas Skaalvik and Skaalvik used the NTSES, Tang et al. used the Schwarzer TSES, and Brouwers and Tomic used a Self-Efficacy Scale for Classroom Management and Discipline developed by Emmer and Hickman (1991). The studies included teachers from preschool to high school in a number of countries (Canada, Dominican Republic, England, Hong Kong, Italy, Netherlands, Norway, and Turkey).

Similarly to teachers, Federici and Skaalvik (2011, 2012) showed that principal self-efficacy is positively associated with engagement and job satisfaction, and negatively correlated with burnout and motivation to quit. Principal self-efficacy was measured by the Norwegian Principal Self-Efficacy Scale (Federici & Skaalvik, 2011) and 1818 Norwegian principals from elementary school and middle school participated in the study.

Although most of these investigations were designed as correlational, cross-sectional studies, several of them used SEM analyses in which self-efficacy predicted the assumed outcome variables. A common underlying assumption in these studies is that teacher self-efficacy affects job satisfaction and engagement positively and burnout negatively. Longitudinal studies of the impact of teacher self-efficacy are scarce. However, in a longitudinal study of 458 German teachers, using the Schwarzer TSES, Schwarzer and Hallum (2008) found that self-efficacy at time 1 predicted burnout one year later, even when controlling for burnout measured at time 1.

5.2.4 Age and Gender Differences in Teacher Self-Efficacy

Surprisingly, few recent studies have examined how age and gender affect teacher self-efficacy, the results to date showing small, and inconsistent, effects. A few recent studies examined teacher self-efficacy for male and female teachers and found no significant relation between gender and teacher self-efficacy (Betoret & Artiga, 2010; Saricam & Sakiz, 2014; Simbula, Guglielmi, & Schaufeli, 2011). Betoret and Artiga (2010) studied 724 Spanish primary and secondary teachers by means of the Schwarzer TSES, Saricam and Sakiz (2014) investigated 118 Turkish special education teachers by means of the TSES, and Simbula et al. (2011) studied 104 Italian elementary and secondary school teachers using an eight-item Occupational Self-Efficacy Scale developed by Di Fabio and Taralla (2006). A few studies also indicate that age is either unrelated, or weakly related, to teacher self-efficacy (Betoret & Artiga, 2010; Tang, et al., 2001).

A problem with the studies examining relations between age and self-efficacy is that they have been designed as survey studies among practicing teachers. Many of the teachers experiencing the strongest stress and the lowest mastery expectations may have left the teaching profession and are not included in the surveys. International studies show a high attrition rate among the youngest teachers

(e.g., Chang, 2009) and Norwegian senior teachers tend to leave the profession by early retirement (see introduction). If stress, exhaustion or low mastery expectations are important reasons for leaving the teacher profession, survey studies among practicing teachers may provide only a limited insight on relations between age and teacher self-efficacy. Therefore, we need studies of stress and self-efficacy among those who have left the teaching profession.

5.2.5 Relations Between Teacher Stress and Teacher Self-Efficacy

A number of recent studies have explored the relation between teacher stress and teacher self-efficacy. Most of these studies used cross-sectional designs whereas few studies have examined causal models of this relationship. Studies also vary with respect as to how teacher stress is defined and measured. Some researchers define stress in terms of stressors in the school environment and measure teacher stress by asking teachers about the sources of stress and the intensity of stress (Collie et al., 2012; Gilbert et al., 2014; Klassen & Chiu, 2010, 2011; Klassen et al., 2013). An example of an item used by Collie et al. is: “How great a source of stress is maintaining class discipline?” (See Collie et al., 2012). These studies, measuring self-efficacy by means of the TSES, show that intensity of the sources of teacher stress is negatively correlated with teacher self-efficacy.

Although student misbehavior may lead to an increased workload some of these studies, using the Teacher Stress Inventory (Boyle et al., 1995), discriminate between student behavior stress (also referred to as classroom stress) and workload stress (Collie et al., 2012; Klassen & Chiu, 2010; Klassen et al., 2013). In these studies workload stress refer to teaching preparation, marking, paperwork, and administrative work. The findings indicate that student behavior stress is more strongly correlated with teacher self-efficacy than is workload stress (Collie et al., 2012; Klassen et al., 2013). For example, in a study of 664 elementary and secondary school teachers in British Columbia Collie et al. (2012) found that student behavior stress predicted lower teacher self-efficacy ($\beta = -.32$) whereas workload stress did not predict teacher self-efficacy significantly. Also, in a study of 1187 preservice teachers Klassen et al. (2013) found stronger negative correlations between student behavior stress and self-efficacy than between classroom stress and self-efficacy for teachers in Canada England, and Hong Kong although the correlations were low (negative correlations ranging between $-.10$ and $-.27$). In all these studies teacher self-efficacy was measured by means of the TSES. The results support the notion that stressors interfering with the actual teaching have the strongest effect on teacher self-efficacy (see Sect. 5.2.2).

A few studies which explored relations between area-specific teacher stress (student behavior and workload) and corresponding areas of teacher self-efficacy revealed somewhat stronger relations. For example, in a study of 113 US elementary

school teachers Yoon (2002) found a correlation of $-.45$ between a measure of student behavior stress and self-efficacy for managing student behavior. In a SEM analysis of a large sample of Canadian teachers, Klassen and Chiu (2010) found that student behavior stress negatively predicted classroom management self-efficacy ($\beta = -.38$) although its relation with self-efficacy for instruction and students' engagement was weaker ($\beta = -.25$ and $-.23$, respectively). Also, Klassen and Chiu (2010) in a study of 813 elementary to secondary school teachers in Canada found that classroom stress predicted classroom management self-efficacy stronger than workload stress ($\beta = -.52$ and $-.16$, respectively). In a study of 1592 Norwegian elementary school teachers, Skaalvik and Skaalvik (2008) measured teacher self-efficacy by means of the NTSES and found that disruptive student behavior was negatively correlated with teachers' self-efficacy for motivating students ($r = -.27$) and for maintaining discipline ($r = -.27$), but more weakly correlated with other dimensions of self-efficacy (ranging from $r = -.06$ to $r = -.15$). In comparison, work overload was most strongly correlated with self-efficacy for adapting teaching to students' needs ($r = -.15$) but was uncorrelated with other dimensions of self-efficacy. These studies suggest that the relation between teacher stress and teacher self-efficacy might be better studied within domains (e.g., student behavior) since the relations across domains are weaker.

Based on a conceptualization of job stress as resulting from job demands and job resources (see Chap. 11, Job Demands-Resources Model, e.g., Hakanen et al., 2006), occupational health psychology researchers measure teachers' perception of job demands (e.g., student misbehavior and workload) and job resources (e.g., social support) and estimate to which degree these variables are associated with teachers' stress responses, self-efficacy, job satisfaction, engagement, burnout, and motivation to leave the teacher profession. For instance, in a SEM analysis of data from 806 Canadian teachers in elementary school and high school Fernet et al. (2012) found that teacher self-efficacy was negatively predicted by teachers' perception of student misbehavior ($\beta = -.46$). Teacher self-efficacy was measured by means of a French-Canadian version of the Classroom and School Context Teacher Self-Efficacy Scale (Fernet, Senécal, & Guay, 2005). In the context of the Job-Demands-Support Model (see Chap. 9), occupational stress researchers have also measured job conditions that are assumed to act as resources that buffer the impact of job demands on work stress (e.g., Karasek, 1979), such as decision latitude (perceived control) and workplace social support (e.g. from supervisors/colleagues). Skaalvik & Skaalvik (2008) measured four dimensions of job resources: decision latitude and positive relations with parents, colleagues, and the school leadership. All these contextual variables were positively correlated with an overall measure of teacher self-efficacy measured by means of the NTSES (correlations between .14 and .41). Out of these job resources, a positive relation with parents was the strongest predictor of self-efficacy. In a research review, Beltman, Mansfield and Price (2011) show that social support from colleagues and the school administration constitute strong protective factors. In accordance with this finding, a number of studies have shown that social support and positive social relations with colleagues, parents, and the school administration are positively related to teacher self-efficacy, motiva-

tion and job satisfaction, and negatively related to burnout and teacher attrition (Hakanen, Bakker, & Schaufeli, 2006; Leung & Lee, 2006; Schaufeli & Bakker, 2004; Scheopner, 2010; Skaalvik & Skaalvik, 2010, 2011a).

A common assumption among researchers is that teacher self-efficacy mediates the relation between job demands/resources and outcome variables such as job satisfaction, work engagement, and teacher burnout (e.g., Collie et al., 2012; Fernet et al., 2012). This conceptualization may be perceived as a variant of the Job Demands-Resources Model developed by Demerouti, Bakker, Nachreiner, and Schaufeli (2001). Following this assumption, several researchers conducted SEM analyses to test direct and indirect relations (via teacher self-efficacy) between job demands/resources and outcome variables such as job satisfaction and burnout. For example, in the study of 806 French-Canadian teachers in elementary school and high school Fernet et al. (2012) found no direct relationship between student disruptive behavior and teacher burnout measured by means of a French-Canadian version of the Maslach Burnout Inventory. However, they found an indirect relation mediated through teacher self-efficacy. Also, a negative relation between principals' leadership behavior and teacher burnout was mediated through teacher self-efficacy. A study of Norwegian elementary and middle school teachers indicated that workload affects job satisfaction negatively, mediated through teacher self-efficacy (Skaalvik & Skaalvik, 2010). Similar findings were reported by Klassen and Chiu (2010) and Collie et al. (2012).

Betoret (2009), in a study of 724 Spanish primary and secondary school teachers, adopted an alternative conceptualization of the relation between workplace stress and self-efficacy. In a SEM analysis, he let perception of stressors in the school environment mediate the relation between self-efficacy and teacher burnout. Self-efficacy was indicated by the Schwarzer TSES and a four-item Classroom management self-efficacy scale. For both teachers in primary education and secondary education, self-efficacy predicted perception of stressors ($\beta = -.35$ and $-.66$, respectively) which again predicted burnout ($\beta = .71$ and $.87$, respectively). In the model context, no direct relation was found between self-efficacy and burnout. This alternative model is in accordance with Social Cognitive theory which contends that self-efficacy beliefs determine how environmental opportunities and impediments are perceived (Bandura, 2006).

5.2.6 Conclusions

A large body of research reveals a low to moderate negative correlation between teacher stress and teacher self-efficacy. Also, teacher self-efficacy predicts several outcome variables, such as job satisfaction, engagement, burnout, and intention to leave the teaching profession. Teacher self-efficacy is associated with increased job satisfaction and work engagement as well as decreased burnout and less desire to leave the profession. A few studies indicate that the relation between stress and self-efficacy is stronger within domains than between domains. However, few studies

have tailored sources of stress to corresponding dimensions of self-efficacy. There is also a lack of research exploring whether low teacher self-efficacy in one area (e.g., self-efficacy for keeping discipline) generalizes to other areas (e.g., self-efficacy for motivating students) over time. Therefore, there is a need for longitudinal studies which measure multiple sources of self-efficacy and corresponding areas of teacher stress.

There is also a lack of longitudinal studies of the relationship between teacher stress and teacher self-efficacy. Hence, no conclusions can be drawn regarding the causal direction of this relation. We suggest that the relationship between these constructs is likely reciprocal. Several researchers have analyzed theoretical models assuming that teacher stress affects teacher self-efficacy. For instance, student behavior stress may reduce the teachers' expectations of being able to motivate the students and of being able to carry out the instruction according to their intentions. On the other hand, teachers with low mastery expectations may perceive the school and classroom contexts as being more stressful.

The reciprocal relation between stress and self-efficacy can be easily illustrated. The existence of stressors in school may negatively impact a teachers' self-efficacy, which in turn may result in negative emotions. For example, classroom-related stressors, such as student misbehavior, may interfere with the instructional processes and thereby reduce a teacher's self-efficacy for instruction. The lower self-efficacy may in turn lead to negative emotions like anxiety. On the other hand, the experience of student misbehavior may trigger negative emotions (e.g., anxiety) directly, which in turn affects self-efficacy. Hence, the stressors in the school environment may both affect self-efficacy and stress responses, which may affect each other in a reciprocal manner. Additionally, job resources, such as social support from colleagues and the school administration, may moderate the impact of stressors in the school environment on teachers' self-efficacy as well as their stress responses. We propose a model of relations between stressors in school, teacher self-efficacy, teacher stress responses and outcomes, such as job satisfaction, work engagement, depression and burnout (Fig. 5.1).

The model proposes that stressors or job demands in the school environment may lead both to decreased self-efficacy and increased stress responses among teachers. Also, it proposes that job resources as illustrated by social support may increase teachers' self-efficacy and reduce stress responses. Furthermore, the model also proposes that job resources, particularly social support, may moderate the impact of stressor in the environment on both self-efficacy and stress responses, as indicated by the dotted lines. Self-efficacy in turn is expected to increase teachers' job satisfaction and engagement and to reduce depression and burnout whereas teacher stress responses are expected to increase depression and burnout and to decrease job satisfaction and engagement.

Since most of the previous research on teacher stress and self-efficacy is based on survey methodology using cross-sectional designs, with all of the shortcomings of that design, we propose that the model presented be tested in future research through the use of longitudinal studies. There is also a need for qualitative studies using open-ended interviews about teacher stress, mastery expectations and related

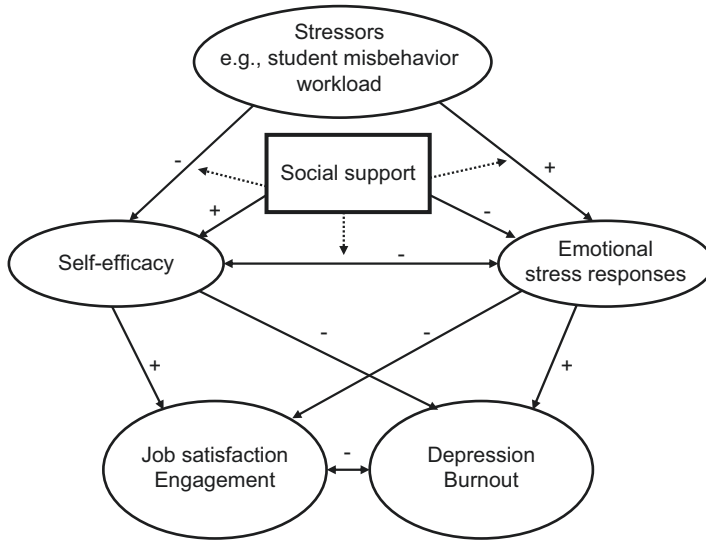


Fig. 5.1 Theoretical model of relations between stressors in the school environment, teacher self-efficacy, teacher stress responses, and job satisfaction, engagement, depression, and burnout

outcomes (Wheatley, 2005). In the present study, we used the model as a framework for analyzing interview data on self-efficacy and stress among Norwegian senior teachers.

5.3 The Present Study

This qualitative study was designed to shed light on the following research questions:

1. How do senior teachers who are still teaching, and teachers on early retirement after long periods of sick leave, describe their teaching careers?
2. Do they describe school context variables, the teacher's role, and changes in educational practices during their careers differently?
3. How do they describe the experience of stress and teaching self-efficacy?

5.3.1 Participants

In the present study, we analyzed qualitative interviews with four Norwegian senior elementary school teachers of both sexes, between 62 and 65 years of age. All four had started their teaching career in their mid-twenties. The four interviews were part

of a larger interview study of 34 teachers (Skaalvik & Skaalvik, 2015). In the original study, seven schools from a middle sized city and three schools from the district surrounding the city were randomly selected. One young teacher (23–34 years), one middle aged teacher (35–50 years), and one senior teacher (51–65 years) were randomly selected from each of these schools. To find teachers in early retirement, the working teachers were asked if they knew teachers who recently had left their teaching position before the retirement age of 67 years. Four former teachers who had left school during the last two years were identified through this process and were asked to participate in the study.

For the present study, two of the former teachers, Tim and Heidi,¹ were selected because they had taken early retirement after several long periods (more than three months) of sick leave. Tim had taken early retirement at the age of 62 after long periods of sick leave. In Norway, the earliest age for early retirement is sixty-two. Heidi had also taken early retirement at the age of 62 after a long period of sick leave followed by three years with disability pension. The other two participants, Hanna and Irene, were selected because they were still teaching and in the interviews communicated high self-efficacy and job satisfaction (see Sect. 5.4.2).

5.3.2 *The Interviews*

Individual interviews were conducted in semi-structured format. All interviews started with asking the respondents what were their immediate thoughts about working as a teacher. Next, follow-up questions, such as the following, were asked: “Can you tell me more about that?” (i.e., the topics of the respondents’ responses), “Do you have any examples which illustrate that?”, and “Can you elaborate on that?” Then, the interviewer asked open-ended questions about job satisfaction, mastery experiences and expectations (self-efficacy), challenges in the profession, and reactions to and consequences of challenges. The interviews lasted between 60 and 90 minutes and were conducted in an office or empty classroom chosen by the respondent. Before the interview, the teachers were informed that participation was voluntary, that they could withdraw from the interview at any time, and that they did not have to answer questions if they felt uncomfortable. The interviews were taped and transcribed.

5.3.3 *Data Analysis*

After the interviews, we read the transcripts several times searching for topics and thematic patterns. The statements were sorted into six groupings derived from the theoretical model in Fig. 5.1: (1) challenges and stressors (e.g., discipline

¹Fictional names are used for all four informants in order to protect their confidentiality.

problems), (2) social support (e.g., supportive colleagues), (3) mastery experiences and expectations (e.g., statements of self-beliefs), (4) stress responses (e.g., anxiety and headache), (5) positive outcome variables (e.g., job satisfaction), and (6) negative outcome variables (e.g., depression and burnout). The statements within each of these groups were then classified into sub-categories, for instance different types of stressors and stress responses. We then read the transcripts again searching for characteristics and patterns of experiences for each informant. At each step in this process the authors first worked individually and then compared their classifications. In cases of differences between the authors, we reached agreement about the classifications and the patterns of experiences by discussing the reasoning for the classification.

5.4 Results

5.4.1 *Characteristics of the Norwegian School Impacting Teachers: Shared Experiences*

All four teachers started their teaching careers in the 1960s. The descriptions of the school system and how it had changed over the years were similar for all informants. All informants had taught in schools with separate classrooms where they had responsibility for their own classes. They also taught most of the school subjects in their classes, which in the Norwegian school system is based on a national curriculum. In the 1960s and 1970s, the content of the instruction was to a large extent based on textbooks. Even so, all informants felt that they had a large degree of autonomy regarding both instructional methods and what content of the curriculum they paid most attention to. When they started their careers, Norwegian schools had a moderate degree of homogeneity because students with disabilities were placed in special schools or in special classes. Furthermore, all four respondents emphasized that they started their careers in schools that were teacher-centered – where conveying knowledge to the students was seen as the primary instructional method.

All respondents reported on important changes in the school system and the teacher's role towards the end of their careers. From the 1980s and 1990s the classes became more heterogeneous because of the Norwegian inclusive school policy. With only a few exceptions, all special schools were closed. Also, the practice of establishing special classes within each school was stopped. As a consequence, the teachers had to handle larger student diversity in their classes. Along with this change came a stronger requirement that teaching should be adapted to individual student's needs. All participants emphasized that this change led to a heavier workload and to an increased feeling of time pressure.

Participants also reported that towards the end of their careers the teacher's role and the educational practices were undergoing changes – from a teacher-centered to

a student-centered practice. In the 80's and 90's a teacher-centered instruction was no longer recognized as an adequate method by their colleagues and the school administration. In the late 90's, they were required to change into a student-centered practice. Students were given problems and working programs and supposed to work more actively with problem solving, either independently or in groups. The teacher's role changed from a heavy emphasis on conveying knowledge to the entire classes of students to that of a stronger emphasis on guiding and supervising individual students or groups of students in their work.

All teachers also reported that since the 90's it became more common that teachers worked in teams. In many schools, including the schools where our informants were teaching, the teachers at each grade level constituted a "grade level team". Teachers in the grade level team worked together planning their teaching.

5.4.2 *Tim and Heidi*

Both Tim and Heidi reported that they had left the teaching profession unwillingly because they felt that they were no longer able to cope with its requirements. They had both been on sick leave for long periods before taking early retirement. Heidi had also been on disability pension for three years before she reached 62 years of age and could take early retirement. They both attributed the long periods of sick leave to stress and exhaustion. Heidi also said that the reason for taking early retirement was that she was worn out and that she had lost faith in her teaching abilities (low self-efficacy).

Both these respondents talked enthusiastically about their early careers as teachers. They responded to the introductory question about their immediate thoughts on working as a teacher by emphasizing their job satisfaction, strong engagement, strong beliefs in their teaching abilities, and high expectations of succeeding (high self-efficacy) during the first part of their careers. Both said:

"I feel that I succeeded during the first 20 years as a teacher. Actually, I *know* that I did and I am pleased with what I achieved during those years" (Heidi); "I am academically solid and I have had positive relations with the students. In particular, I had positive feedback from students with social and learning problems showing me that they felt that I cared about them" (Tim).

Job satisfaction during their early careers was primarily related to working with the children using a teacher-centered instructional method. Job satisfaction was also related to having a high degree of autonomy and positive social relations at work. They particularly pointed out that they had felt that they were recognized and valued both by their colleagues and by the parents of the students. When reflecting on the early period of their careers, neither of them talked about the work in terms of stress, although they both emphasized that the workload was high. They both told about their extremely high ambitions that over time would turn into negative self-evaluations. Tim said that he tried to perform 110 percent and Heidi said that she always had her students in mind, even during vacations.

During the last years of their teaching, after age 50, both Tim and Heidi reported a loss of mastery expectations. They attributed the lack of self-efficacy to the changes in school and in the teacher's role (increased workload, more paperwork and documentation, larger student diversity, more discipline problems, reduced autonomy as a consequence of working in teams, and the change from teacher-centered to student-centered practices). Both these informants attributed the loss of self-efficacy particularly to changes in the teacher role that included both a student-centered educational practice and working in teacher teams. Both Tim and Heidi at first resented changing their instructional practices because they strongly believed that a teacher-centered practice would result in the best student learning. Leaving this practice was, therefore, not compatible with their educational beliefs and values. They also doubted their own ability to adopt a student-centered practice, reflecting a lack of self-efficacy. Heidi said:

"I used to teach in front of the class. That was what I used to do and I was good at it."

When they eventually felt pressured to change into a student-centered practice, they both felt that they did not manage to do it. Heidi said:

"I did not believe that I could do it. I did not manage it as well as I wanted to and I was not able to cope with the situations that occurred. In the end, I just did not have the strength that was needed to do a good job."

Both Tim and Heidi reported that the loss of both mastery experiences and mastery expectations were followed by severe stress symptoms. Additionally, changing into a practice that ran counter to their educational beliefs was stressful in itself. Heidi said that towards the end, she dreaded teaching. She also said that she did not sleep well at night and suffered from irregular heartbeat, headache, and a stiff neck. Tim reported that he started focusing on his inadequacy, on what might go wrong, and on what he might have done differently. As a result, he felt that he had lost control over the situation. The end result was that Tim and Heidi felt both emotionally and physically exhausted. Heidi said that she did not have the strength to take responsibility for a class of students and during the last few years of her professional life she worked as a part-time teacher in different classes. She also said that she had to suppress negative feelings towards the students, indicating a development towards depersonalization. Tim also said that he did not manage the student-centered practice and that he felt that he lost control. In the end he returned to the teacher-centered practice, which he called the traditional way. However, this was negatively assessed by his colleagues. Due to exhaustion and depression both Tim and Heidi had long periods (more than three months) of sick leave during the last 2–3 years of their professional life.

Both Tim and Heidi felt that they left the teaching profession because they were not able to cope with the changes. They felt that they left the profession with little honor resulting in a loss of self-esteem. They said:

"I feel that I have lost face. I do not want any other teacher to leave the position this way. I feel that the way I left the position cast a shadow [over me]. I have symptoms of what you may call depression. That is the reason that I left the teaching profession. I try to avoid meeting former colleagues, pupils or parents" (Tim); "I hope the grief will fade away with

time. But I do not think it will disappear completely. I think I always will think back on my professional life and how it ended. The stress still sits in me. If I get too much responsibility within limited time, I feel exhausted and lose control. I just cannot take on responsibilities” (Heidi).

Common to Tim and Heidi was also a feeling of a lack of social support from colleagues and the school administration. As a result, they also avoided seeking support from their colleagues. They were both agreed that their teaching career might have taken another course if they had received adequate social support and internal training. Heidi believed that she lost faith in herself because the changes in school, particularly into a student-centered practice, were not followed by appropriate training, and because she felt that she had no one at school with whom she could talk about her problems. Tim also believed that his professional life might have ended differently if he had been offered professional development to handle the change into a more student-centered practice. He also emphasized that the school principal had her own problems and that, as a result, she was not responsive to his situation. They said:

“My colleagues had enough problems themselves so I did not seek support for my problems” (Heidi); “At my school, there were two groups of teachers, a conservative group and a group of teachers who had adapted the new [student-centered] method. As time went on, there was little communication between the groups. I belonged to the first group that eventually became very small. When I retired, there were only two of us” (Tim).

5.4.3 *Hanna and Irene*

At the time of the interviews, Hanna was 63 years old and Irene was 65. They were still working as teachers. Hanna and Irene described the same changes in school and in the teacher role as did Tim and Heidi – an increasing amount of paperwork and documentation, larger student diversity, reduced individual autonomy as a consequence of working in teams, and the change from a teacher-centered to a student-centered practice. Similar to Tim and Heidi, Hanna and Irene reported that the changes were introduced without any systematic training. They particularly emphasized the increased workload in school. Hanna felt that she did not get as much time for the individual students as she wanted and they both reported that they at times felt extremely tired. Hanna also reported several physical symptoms such as stiff neck and pain in her shoulders that she attributed to the workload. She said:

“Last year I was dead tired. I felt that I did not have a private life anymore because I was working all the time. I had pain in my shoulders and I did not sleep well at night.”

In spite of the heavy workload and the changes in school they both talked enthusiastically about the teaching profession and underscored high job satisfaction throughout their careers. They stated:

“I made the right choice. I thrive as much today as I did the first years as a teacher.” (Hanna); “Working as a teacher has been fantastic. I have been a teacher for 40 years and it has been a good life” (Irene).

Like Tim and Heidi, both Hanna and Irene related their job satisfaction to working with the students and seeing students learn and grow and that this gave meaning to the job. However, both of them also emphasized the importance of positive social relations, both with colleagues and the school leadership.

Both Hanna and Irene repeatedly emphasized a strong feeling of accomplishment as teachers and that they had high mastery expectations (self-efficacy) related to instruction as well as to classroom management, engaging the students in the schoolwork, and solving conflicts among the students. They also talked about mastery expectations and collegial relations at the same time. They both described an atmosphere of friendliness and appreciation among the colleagues. Hanna accentuated that she was given responsibilities at school, for example, leading a group to develop the local curriculum in language arts. She felt that she was valued and respected by both the school administration and the colleagues. Irene also emphasized that she received positive feedback from colleagues, parents, and the school administration.

They both described their colleagues, particularly the teacher teams they were working with as supportive, both emotionally and instrumentally. They both said that the team members helped each other and learned from each other. Hanna said:

“We [the team] help and support each other and benefit from each other’s strengths. Being able to talk with colleagues about problems and discuss possible solutions makes me feel safe. If I have a problem, I feel certain that I will be supported by the team.”

Common to Hanna and Irene was also that they did not oppose changing from a teacher-centered to a student-centered practice. Also, like Time and Hanna, they were not offered any professional development when asked to implement a student-centered practice. Instead, they used the teacher teams to get ideas and to learn from each other in order to manage the new practice. At the time of the interviews both felt that they managed the student-centered practice and felt comfortable with this approach.

5.5 Discussion

As previously noted, recent research provides overwhelming evidence of a low to moderate negative association between teacher stress and teacher self-efficacy. The strongest relations are found in a few studies where stress and self-efficacy are measured within the same domain, for instance stress caused by student misbehavior and self-efficacy for managing student behavior. Although more studies are needed measuring teacher stress and teacher self-efficacy within the same domain, the few available studies suggest that the relation between teacher stress and teacher self-efficacy may be better understood by using multidimensional measures of these constructs and estimating relations both within and across domains.

The relationship between teacher stress and teacher self-efficacy is conceptualized by many researchers as teacher stress negatively affecting teacher self-efficacy.

Some researchers have also analyzed models whereby teacher self-efficacy is assumed to influence teacher stress. However, because there are few longitudinal studies a firm conclusion concerning causal relations between the constructs cannot be drawn. We suggest that the relation between these constructs is likely reciprocal. Because stress is associated with negative emotions, is energy consuming, and leads to emotional exhaustion, it may be assumed to affect self-efficacy negatively. On the other hand, Bandura (1997) contends that people with low self-efficacy view many aspects of their environment as being fraught with danger, dwell on their coping deficiencies and thereby magnify the severity of possible threats. Thus, low self-efficacy may also be expected to increase emotional stress.

Based on the analysis in the introduction, we recommend that researchers discriminate between, but also analyze relations between stressors in the school environment, teacher self-efficacy, emotional stress responses, and long term outcomes of stress. We presented a model (Fig. 5.1) in which stressors in the school environment may result both in lower teacher self-efficacy and stronger emotional stress, and that teacher self-efficacy and emotional stress affect each other in a reciprocal manner. The model also proposes that job resources, particularly social support, might increase self-efficacy and reduce stress responses as well as moderate the effect of stressors in the environment on both teachers' self-efficacy and emotional stress. Furthermore, the model proposes that high self-efficacy may increase outcomes such as job satisfaction and engagement and decrease outcomes such as burnout and depression. On the other hand, experiences of stress may influence job satisfaction and engagement negatively and increase burnout and depression. The relation between stress and burnout is well documented in previous research whereas the novel components in the model are self-efficacy and the reciprocal relation between self-efficacy and stress.

The model needs to be tested in future research, both by means of case studies and large scale longitudinal studies. In this chapter, we have used the model as a framework for analyzing the stories told by four teachers. We interviewed two groups of teachers in this study. All four informants reported high self-efficacy, strong engagement, and job satisfaction during the first part of their careers. All informants also experienced the same stressors at school. The stressors included time pressure and a heavy workload, an increased amount of paperwork and documentation, increased student diversity, reduced autonomy, and student misbehavior. All informants reported the same changes in the educational practices, e.g. a change from a teacher-centered to a student-centered practice. In spite of these similarities, the two groups of teachers reported quite different development of self-efficacy, emotional stress and work outcomes.

At the end of their careers, Tim and Heidi experienced severe stress and had long periods of sick leave followed by early retirement. Heidi also had disability pension for three years before she reached 62. They both reported a development leading to extremely low self-efficacy, low job satisfaction, depressed mood, and reduced engagement in the last years of their careers. They attributed this development to workplace stress. In comparison, Hanna and Irene were 63 and 65 years of age and

still working as teachers. Like Tim and Heidi, they also reported that they had periods when they felt extremely tired and exhausted. However, they still felt high engagement and job satisfaction as well as high self-efficacy and had no intentions of leaving the teaching profession by early retirement.

In our interpretation, the interview data supports the theoretical model we presented in Fig. 5.1. Tim and Heidi described a process whereby stressors in the school environment led to both a lack of self-efficacy and severe stress responses. These experiences in turn led to physical symptoms, sleeping problems, emotional exhaustion, reduced engagement and depressed mood. Hanna and Irene, who also perceived the same stressors in the school environment, particularly time pressure and a heavy workload, did not report reduced self-efficacy and experienced more moderate levels of stress. The findings support our expectation that social support moderates the impact of environmental stressors on self-efficacy and stress responses. Both Tim and Heidi emphasized a lack of social support from colleagues and the school administration whereas Hanna and Irene underscored that they had received both emotional and instrumental support from their colleagues and felt that they were valued and respected by the school administration. The importance of social support is emphasized in the Job Demand-Control-Support model (van der Doef & Maes, 1999) and evidenced both in research on students (e.g., Federici & Skaalvik, 2014) and teachers (Hakanen et al., 2006; Skaalvik & Skaalvik, 2011a, 2016). Pines and Aronson (1988) particularly emphasized that actively seeking social support might function as a barrier against burnout. The two groups of teachers also differed in their attitudes towards changing from a teacher-centered into a student-centered instructional practice. Hanna and Irene willingly changed their practices and used the teacher teams to get ideas and to learn from each other in order to manage the new practice. In comparison, Tim and Heidi long resisted changing their educational practice, but were eventually required to do so. They reported two reasons for resisting using a student-centered practice. One reason was that they had low mastery expectations for conducting a student-centered practice, partly because they had not been offered professional development in order to manage this educational practice. They were afraid of losing control over the students if they changed into this practice. The other reason was that they believed that a student-centered practice would result in less systematic student learning. Therefore, the student-centered practice was inconsistent with their educational values. Tim and Heidi therefore experienced a lack of value consonance which Skaalvik and Skaalvik (2011a, 2011b) define as the degree to which a teacher shares the prevailing educational beliefs, values, and practices at school. Because teaching is a profession that is typically driven by values, ethical motives, and intrinsic motivation (Sahlberg, 2010) a lack of value consonance may be particularly stressful in the teaching profession. For instance, Skaalvik and Skaalvik (2011b) found a strong association between teachers' report that they shared the prevailing norms and values at the school where they were teaching and their feeling of belonging and job satisfaction. In our interpretation, the requirement of a student-centered practice resulted in work-related stress for Tim and Heidi, partly because it ran counter to their educational beliefs

and values, and partly because they had low self-efficacy for this instructional practice and were afraid of losing control.

Teachers may experience a lack of value consonance, that their educational beliefs and values contradict the prevailing values and practices at school, even if they are not required to change their own educational practice. Such situations are similar to what Rosenberg (1979) refers to as a dissonant context. For instance, because Tim and Heidi first resisted changing their instructional practices along with their colleagues, the school environment likely became a dissonant context for them. As pointed out by Rosenberg (1979), a context or an environment is not dissonant in itself, but may be so for a given individual who do not share the norms, values, and behavioral patterns in the membership group. Rosenberg (1979) points out that people who are in a dissonant context may feel strange, different, peculiar, or that they do not belong. This may contribute both to stress and to a reduced belief in themselves, to lower self-efficacy and reduced self-esteem (Rosenberg, 1979). Moreover, it may also result in a lack of social support as experienced by Tim and Heidi. When Tim and Heidi were required to change their own practices, the combination of not believing that the practice would be adequate for student learning and low self-efficacy for managing it became very stressful.

The stories told by Tim and Heidi illustrate that the same stressor may affect both self-efficacy and emotional stress. Based on their stories our interpretation is that they had low mastery expectations for a student-centered practice but also that such a practice was stressful because it did not fit their value beliefs. We suggest that student misbehavior is another example of a stressor that affects both teacher self-efficacy and emotional stress. Because student misbehavior interferes with the instruction it likely affects teacher self-efficacy negatively. However, student misbehavior also threatens the teacher's self-esteem and thereby causes emotional stress.

We suggest that some stressors in the school environment may have their primary effect on teachers' self-efficacy, and that they through self-efficacy have a more indirect effect on emotional stress. Other stressors may have their primary effect on emotional stress, and through emotional stress have a more indirect effect on self-efficacy. For instance, a feeling that the teaching profession has low status in the society may be frustrating and stressful, but not necessarily affect self-efficacy for teaching directly. This reasoning is in accordance with a recent study of stressors among 523 teachers in senior high school in Norway (Skaalvik & Skaalvik, 2016). The results of SEM analysis indicated two main routes to teachers' motivation to leave the profession: (a) one route from time pressure via emotional stress and exhaustion to motivation to quit and (b) another route from lack of supervisory support, low student motivation and value conflicts via lower self-efficacy as measured by the NTSES and lower engagement to motivation to quit.

We may also speculate that the extremely high ambitions expressed by Tim and Heidi increased their stress responses when they were forced to change into an educational practice for which they had low mastery expectations. This explanation is

in accordance with the Effort-Reward imbalance model (Siegrist, 1996). According to this model a lack of balance between effort and reward may result in increased stress. Tim and Heidi may have increased their effort by extreme ambitions and tendencies to over-engage in their work.

The long term consequences of stress and low self-efficacy are clearly illustrated by Tim and Heidi. They both reported reduced engagement and job satisfaction during the last years of their teaching careers. They also reported physical symptoms, depression, and symptoms of burnout. These consequences bear witness to the devastating effect of stress and lack of self-efficacy on teacher well-being, which in turn may be expected to negatively influence the quality of teaching and student learning (see also Klassen & Chiu, 2010). However, the stories told by Tim and Heidi also imply that the consequences for the teachers' well-being may for some teachers outlast the period of life when they are teaching. Both Tim and Heidi elaborated on feelings of shame, pain, low self-esteem, and social anxiety that lasted even after they had retired from the teaching profession.

It is important to note that that present study was a limited case study. Therefore, we caution against drawing firm conclusions based on this study. However, this study indicates that research on teachers who leave the profession before they reach retirement age may add to our insight about stress and self-efficacy. It may particularly add to our understanding of the long-term consequences of teacher stress and lack of self-efficacy.

Several practical implications may be derived from the research review. These implications are also supported and illustrated by the case study. A large number of studies imply that measures to reduce teacher stress are overdue. In particular, both school politicians and school administrators should be concerned about the workload and the time pressure on teachers, because it seems to be the strongest source of teacher stress. However, there are multiple sources of teacher stress and reducing the workload may have limited effect on other sources of stress. Therefore, reducing teacher stress may require multiple measures. Reducing stressors that interfere with the actual teaching, for example disruptive student behavior, also seems to be important to increase teacher self-efficacy.

A number of studies also imply that teacher stress as well as teacher self-efficacy may be reduced by creating a collective and supportive collegial culture among the teachers. Emotional support is important to create a feeling of belonging and to reduce anxiety whereas skill development and mastery expectations may be facilitated through instrumental support. However, such a supportive collegial culture cannot replace administrative support or an organized professional development, for instance when implementing new teaching methods or new technology. Our case studies clearly indicate how vulnerable some teachers may be if they are not offered assistance or professional development when important changes in school affect their work.

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Chapter 6

Consequences of Educator Stress on Turnover: The Case of Charter Schools

Stephanie L. Cano, Belinda Bustos Flores, Lorena Claeys, and Daniel A. Sass

Abstract This chapter provides a brief review of the literature on educator stress and attrition, while focusing primarily on differences in attrition rates among Texas teachers who worked at a charter school between 1998 and 2009 compared to Traditional Public School (TPS) teachers. Survival analyses revealed that teachers who worked their entire career at a charter school were at the highest risk of attrition, whereas those who worked at TPS at any point in their career were at a much lower risk. This finding was relatively consistent across other teacher and school characteristic variables. In fact, this conclusion was reached across all the predictor variables, with the odds of leaving the profession typically being more than twice that of TPS. While research has documented various predictors of teacher attrition, our study extends the research specifically on charter teachers. Given the current political climate with continued support for charter schools, it is important to investigate this population of teachers. Recommendations for further research on stress and attrition as well implications for reducing teacher stress as a means to minimize attrition, are discussed.

Keywords Teacher attrition • Teacher migration (mover) • Charter schools • Traditional public schools • Educator stress

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6.1 Educator Stress and Attrition

Regardless of teacher status (i.e., charter vs. Traditional Public School, TPS), research suggests that teaching tends to be one of the most stressful jobs (Dworkin, Haney, Dworkin, & Telschow, 1990; Friedman, 2000; Howard & Johnson, 2004) with about 12% of teachers leaving every year (Boe, Cook, & Sunderland, 2008; Ingersoll, 2002). Numerous variables (e.g., stress due to administrators, workload, student misconduct, perceived role conflict) are associated with teacher stress (Friesen & Sarros, 1989; Seidman & Zager, 1986).

Based on our review, we concede that there is a paucity of studies that have directly explored teacher stress in relation to attrition. Attrition, a component of teacher turnover, occurs when teachers either voluntarily or involuntarily leave the profession. i.e., leavers (Boe et al., 2008). Another component of teacher turnover relevant to our research is teacher migration. Teacher migration is defined as a teacher moving from one school to another school, i.e., movers (Boe et al., 2008).

While limited, there appears to be consistent empirical support that teacher demographics (gender, ethnicity, salary, experience, etc.) play a significant role on teacher stress, job satisfaction, and eventual attrition. For example Claeys' (2011) survey study, of 175 novice teachers only 22% were considering leaving the field at the end of the third year. These teachers' primary reasons for leaving the field were job conditions and dissatisfaction. Whereas low salary contributed to their dissatisfaction, most teachers attributed any contemplation to leave teaching due to high stress in the work environment, student behavior, the long working hours, unrealistic paperwork, and assessment demands. Claeys (2011) surmised that teachers' attrition was due to personal job satisfaction, high stress, and the need for administrative support.

Likewise, Liu, and Ramsey (2008), using 31 items measuring job satisfaction from the Teacher Follow-up Survey (TFS) with a sample of 4952 all level teachers, found that teachers' job satisfaction varied as a function of gender, ethnicity, and years of teaching. While little differences were found for gender, minority teachers were less satisfied than their counterparts, and teachers with more years of experience expressed greater satisfaction. Teacher career status (i.e., stayers, movers, and leavers) was related to their level of satisfaction, with those teachers with less satisfaction leaving the field. Moreover, job satisfaction appeared to differ with working conditions (lack of planning and preparation time, large teaching load, large classes, and teaching out of specialty field) and low levels of compensation, thus implying that school conditions and policies are likely to affect attrition.

Using a structural model with a convenient sample of 1430 all level Canadian teachers with 69% women and 31% men, Klassen and Chiu (2010) findings supported that demographic (gender, teaching experience, teaching level) and teaching efficacy variables are related to teacher stress and job dissatisfaction. Teacher stress was measured using the Teacher Stress Inventory, plus an item on class size and an overall item about stress level as teachers. Two items addressing satisfaction with

work and feeling towards work were used to measure teacher satisfaction. Female teachers as compared to males reported more workload stress (e.g., working conditions, lack of planning time, class size, etc.) as well as greater classroom stress (e.g. student behavior and classroom discipline). They also had low efficacy on classroom management. In general, teachers with higher classroom stress had lower teaching efficacy, whereas teachers with higher workload stress had higher teaching efficacy. These findings show that teachers can experience satisfaction with teaching and teaching efficacy, yet workload stress may result in greater dissatisfaction. These findings are concerning given that dissatisfied teachers are at higher risk for attrition (Evans, 2001; Ingersoll, 2001).

Margolis and Nagel (2006) posited that while educational reform often appears to be innovative, as is the case of charter schools, it might also result in unintended consequences, such as educator stress. While engaging in an phenomenological research study to capture teachers' lived experiences in a newly formed charter school, Margolis and Nagel (2006) formed action research groups to explore "teachers' prior beliefs and experiences, communally discuss the struggles of change, and help teachers take ownership of the school's development" (p. 148). The charter school's student population was predominately African American (99%); however, the majority of teachers were White ($n = 9$) and African American ($n = 6$), two were Latino and one was Asian Canadian.

Three major themes emerged from the study: cumulative stress, the pace of change, and relationships and the administrations. For the purpose of this chapter, we will focus on the cumulative stress that built over time. Margolis and Nagel (2006) observed that the newly hired teachers were initially excited about working in the charter school and embraced the school's philosophy. However, shortly after, the demanding schooling context, change of focus on learning and assessment practices, and lack of administrative support and acknowledgment, teachers did not feel included in decision-making and felt that changes were imposed. Margolis and Nagel (2006) observed teacher resistance and strain as evidenced by an increased absence of teachers, more reporting of physical and emotional exhaustion, as well as a reduction of job performance and satisfaction. A source of additional stress was the administrators' lack of acknowledgment of stress levels among the teachers. Eventually absenteeism led to the high attrition rate of 57% in the first year and 61% in the second year. The attrition of teachers also demoralized remaining staff in that they questioned the philosophy of the school. Margolis and Nagel (2006) concluded: "In this way, teacher stress directly impacted students and threatened the efficacy of the school enterprise" (p. 152). This study lends support to the notion that teacher stress can contribute to teacher attrition.

While not directly explored in these aforementioned studies, it is argued that school characteristics (e.g., urban, low performing) also play a large role in teacher stress. With that said, no research was found related to whether teacher stress differs between charter and TPS teachers. However, previous research does suggest that attrition rates differ between charter and TPS schools (Sass, Flores, Claeys, & Pérez, 2012).

6.2 Charter Schools

Unlike TPS, the establishment of U.S. charter schools is driven by market theory, which assumes that competition for students among schooling systems will increase choice, innovation, and student outcomes (Frankenberg, Siegel-Hawley, & Wang, 2011; Lubienski, 2003). In 1995, with the revision of the Texas Education Code (TEC), charter schools were created as a “new type of public schools.” Although these charter schools are accredited and monitored by the state to ensure fiscal and academic accountability, charter schools are given greater flexibility on the implementation of instructional innovation and/or pedagogical methods. Thus, according to Texas Education Agency (TEA, 2014) the intent is for charter schools to:

- improve student learning;
- increase the choice of learning opportunities within the public school system;
- create professional opportunities that will attract new teachers to the public school system;
- establish a new form of accountability for public schools; and
- encourage different and innovative learning methods.

In Texas, there are two distinct types of charter schools: campus charters, which operate within a traditional public school system, and open-enrollment charters, which are independent from public school structures (Maloney, Sheehan, & Rainey, 2011). According to Cannata (2007), Texas open-enrollment charter schools often allow for greater flexibility with regard to budget, hiring practices, program development, teacher evaluations, and other institutional variables, which appears to increase school community. Similarly, Payne, and Knowels (2009) highlight the flexibility that charter schools have in regards to hiring practices where educational leaders are able to attract high quality teachers and remove ineffective teachers. Booker, Gilpatric, Gronberg, and Jansen (2008) confirmed that charter schools are not required to hire certified teachers or offer reasonable salaries. However, non-competitive salaries are considered a challenge in recruiting and retaining highly qualified teachers (Payne & Knowels, 2009).

An attractive feature of charter schools is the curricular and instructional flexibility that may increase teacher, parental, and student interests. Instructional innovation is considered a promising practice for academic achievement. However, innovation in charter schools may be elusive. As research has surmised (Lubienski, 2003; Payne & Knowels, 2009; Preston, Goldring, Berends, & Cannata 2012), charter school practices often replicate those of traditional public schools (TPS).

A RAND report on charter schools in eight states, including Texas, found that charter schools’ students’ academic performance fared compared to TPS’ student’s performance (Zimmer et al., 2009). A recent Center for Research on Educational Outcomes (CREDO) report (2013) also examined charter school student performance across 27 states, including Texas. They noted an upward trajectory of charter school performance including minority and low-income students’ academic achievement. However, a concern expressed is the uneven charter schools quality

across the states. López and Olsen's (2013) study on charter schools across five states (Texas, Louisiana, District of Columbia, Maine, Illinois, and Florida) revealed that minority students were not faring well academically on reading and mathematics. Consequently, it remains unclear whether these institutional flexibilities result in improved student achievement, reduced financial waste, and increased retention of qualified teachers. Nevertheless, families are choosing to enroll their children in charter schools (Toma & Zimmer, 2012), thereby, warranting further investigation into student, teacher, and school success.

Recent research has focused on comparing and contrasting teacher retention in charter and traditional schools (Cannata, 2010; Carruthers, 2012; Renzulli, Parrott, & Beattie, 2011; Stuit & Smith, 2012). Nevertheless, a paucity of research exists that solely focuses on teacher and school characteristics related to teacher attrition. The study presented in this chapter aims to fill this gap, while also estimating how long charter school teachers remain in the profession.

6.3 Teacher's Personal Characteristics and Attrition

Teacher attrition is a significant problem facing education, with numerous variables, such as age, ethnicity, gender and experience influencing teacher attrition statistics. Demographic and professional factors affecting teacher attrition are presented in the subsequent sections. When evidence exists contrast is made between charter and TPS.

Age Research reported that across grade levels and across teaching fields, younger teachers were more likely to leave the field than their older counterparts for TPS schools (Billingsley, 1993, 2004; Boe, Bobitt, & Cook, 1997; Boe, Bobitt, Cook, Whitener, & Weber, 1997; Borman & Dowling, 2008). The same trend has been found in charter schools (Miron & Applegate, 2007; Stuit & Smith, 2012).

Ethnicity Further research has indicated that ethnicity is a significant attributor, with Hispanics and African Americans having lower attrition rates than White non-Hispanics (Adams, 1996; Ingersoll, 2001; Kirby, Berends, & Naftel, 1999; Quartz et al., 2008). In charter schools with high enrollment of African American and Hispanic students, Renzulli, Parrott, and Beattie (2011) used the School and Staffing Survey (SASS) and the TFS to examine attrition among charter and TPS. They determined that there were higher attrition rates among White non-Hispanic teachers at charter schools.

Age and Ethnicity While Sass et al.' (2012) analysis of Texas teachers supported this aforementioned research on ethnicity and attrition, they also found that teacher's starting age moderated the survival functions across ethnic groups. Interestingly, older (age ≥ 30) White non-Hispanic starting teachers were the least likely to leave the teaching profession, whereas younger White non-Hispanic beginning teachers were the most likely to leave. Thus it is important to consider such interaction effects when examining charter schools.

Gender In general, females are more likely to remain in the teaching profession (Quartz et al., 2008; Sass et al., 2012), with this phenomenon being attributable to greater career opportunities for males (Quartz et al., 2008) and greater dissatisfaction among males with teaching (Ma & Macmillan, 1999). Yet, for charter teachers, no significant gender differences have been observed (Miron & Applegate, 2007). Other research indicates that attrition rate differences for gender were moderated by teacher's starting age, with females who started later having a significantly lower attrition rate than the other groups (Sass et al., 2012).

Teaching Experience Factors affecting teacher attrition include teacher experience and certification (Stuit & Smith, 2012; Vasquez Heilig, Williams, & Jez, 2010), which are higher within public schools (Fine, 2010; Fabricant & Fine, 2012; Maloney et al., 2011). As aforementioned, teachers with greater experience are more likely to be satisfied with the profession (Liu & Ramsey, 2008).

6.4 School Context and Teacher Attrition

In a previous article, we suggested that teacher attrition may be an interaction between the teacher's characteristics and the school's context; this context can include the school's accountability rating, student/community's socioeconomic status, school level, and school type (Sass et al., 2012). Moreover, it appears critical to identify whether the risk of teacher attrition and variables associated with it actually differ between charter and TPS schools.

For example, Boyd, Grossman, Lankford, Loeb, & Wyckoff (2009) used a multivariate analysis model to examine New York City public elementary and middle school teacher attrition (movers and leavers). Teacher effectiveness was determined using mathematics and English Language Arts students' scores and administrator ratings. Teachers considered being less effective in mathematics were more likely to leave the profession as compared to their counterparts. First year elementary (4th–6th grade) teachers had a greater attrition rate (33%) as compared to middle-school (11%) teacher attrition rate. This attrition rate was not consistent in subsequent years; that is as teachers gained greater experience, the less likely to leave the profession. However, less effective teachers with more than one experience tended to transfer to other schools. Transfer (movers) occurred among all teachers regardless of effectiveness; however, teachers classified as being highly effective were more likely to transfer to schools with less minority and low performing students.

Likewise Goldhaber, Gross, and Player's (2007) study in North Carolina with elementary teachers over a six year period further supported the notion that effective teachers are more likely to remain in the teaching profession. In this study, teacher effectiveness was determined using proxies (licensure, selectivity of undergraduate institution, and SAT scores) and teacher value-added scores. To estimate the risk of attrition, Goldhaber et al. (2007) used competing risk hazard models estimated with Cox regressions. In contrast to Boyd et al. (2009), Goldhaber and co-authors (2007) found that effective teachers are unlikely to leave demanding schools.

In sum, similar to Boyd et al. (2009) and Goldhaber and co-authors (2007), a significant amount of research on TPS attrition exists related to teacher's experience, credentials, specialization area, school organizational characteristics, resources, and student population (see Borman & Dowling, 2008; Kirby et al., 1999; Quartz et al., 2008, for a review). We now see an emergence of peer-reviewed research with greater focus on charter teacher attrition.

López and Olsen (as cited by Vasquez-Heilig, 2015) used the SASS to determine Louisiana teacher attrition. HLM findings revealed that in Louisiana, nearly 46% of teachers in charter schools were planning to leave the profession in comparison to teacher in TPS. This trend is evident in other similar studies. For example, Miron and Applegate's (2007) study of the Greater Lakes region charter schools (except for Michigan) confirmed a 20–25% attrition rate for novice teachers and an overall 40% attrition rate among all level and special education charter teachers ($n = 1764$) annually, which replicated the work of Ausbrooks, Barrett, and Daniel, (2005) indicating that 47% of Texas charter teachers left per year. They further noted that of the 159 charter schools examined the overall turnover rate was higher than the state average. When examining the charter and public school gap with a sample of schools across sixteen states, Stuit and Smith (2012) using the SASS and TFS data randomly selected 4500 TPS and 1000 charter school all level teachers and employed binomial logit model to estimate teacher turnover probability. They found a 24% turnover rate for charter teachers as compared to 11% of TPS teachers. Gross and DeArmond (2010) would likely argue that teacher attrition is not due to charter effect, but rather a result of prototypical teacher characteristics, such as age, experience, and school characteristics (e.g., urban, low performing). Using SASS and TFS data over a ten year period, Gross and DeArmond (2010) used multinomial logit models and survival analysis to examine the attrition patterns of Wisconsin new charter and traditional all level teachers. Their findings indicated parallel patterns of attrition for new teachers, whether charter or public, on issues such as administrative support, working conditions, and salaries. However, charter teachers had a greater rate of moving (40%) and exiting (52%) the profession as compared to their peers. In the case of Wisconsin first year charter teachers ($n = 956$) and TPS ($n = 19,695$), a specific concern of urban charter teachers was the lack of job security because of yearly contracts and dissatisfaction with work demands. Several researchers have validated that working conditions are the most important reason for teacher turnover (Cannata, 2010; Stuit & Smith, 2012). Even when controlling for school demographics, researchers have noted that charter teachers, especially novice teachers, are more likely to leave the profession than TPS teachers (Cannata, 2010; Sass et al. 2012). Nevertheless, Gross and DeArmond (2010) observed that Wisconsin charter teachers were more likely to remain in urban schools, which are more likely to be highly populated minority schools, as compared to traditional teachers. It is noteworthy that more African American teachers and less certified teachers were employed in these urban charter settings and this may account for their retention in charter schools.

In contrast, Harris' (2007) secondary analysis of Florida Department of Education's teacher data drawn from a six-year period (1998–2004) employed a

multinomial logistic regression model to examine attrition of elementary and middle school teachers. They observed that while Florida charter schools attracted a greater number of minority teachers with favorable characteristics (e.g. high SAT scores, selective undergraduate institution), the charter school student population was more likely to be White non-Hispanic, more affluent, and had a higher academic performance. Attrition patterns over a five-year period for charter and traditional teachers were similar when teachers left more demanding schools (more minority, low performing). When examining attrition differences over these five years with attention to English learners, it was interesting that traditional teacher turnover rate was greater than their charter counterparts. Harris (2007) posited that there was cultural match between charter teachers and English learners. It is noteworthy that teachers leaving the charter schools had lower grade point averages and passing scores on the state's teacher exam. Further, Harris (2007) noted a movement of traditional teachers to charter schools, which served mostly a White non-Hispanic affluent student population. As a result, charter schools attracted a higher quality teaching force.

It appears that personal and school characteristics may influence initial teacher attraction to charter schools and subsequent attrition, movement, or retention. Another consideration is the charter schools' age of operation. In comparison to Carruthers' study, the Texas evaluation report indicated that more established charter schools had higher teacher attrition rates than new open-enrollment charters (2012).

Other differences between TPS and charter schools that likely contribute to charter teacher attrition rates is the lack of access to mentors, teacher aids, and professional development seminars (Smith & Ingersoll, 2004). In response to charter school proponents who purport that higher attrition rates are due to the release of ineffective teachers (see Miron & Applegate, 2007), we contend that the findings are inconclusive based on our review of literature and may be context specific (see Boyd et al., 2009; Cannata, 2010; Goldhaber et al., 2007; Harris, 2007). In Texas, as determined in Sass et al. (2012), we suggest that attrition is voluntary due to teacher migration (moving) and likely reflects an inequitable system based on school contextual factors (accountability rating, student/community's socioeconomic status, school level, and school type). In fact, our survival analyses revealed that charter teachers were more than twice as likely to leave teaching when compared to TPS teachers (Sass et al., 2012). One could argue that teachers would prefer charter schools because of increased professionalism due to autonomy, decision-making, and supportive leadership (Bomoti, Ginsberg, & Cobb, 1999; Ndooy, Imig, & Parker, 2010; Renzulli et al., 2011), but it is perplexing that so many teachers leave the profession. The question remains whether teachers are more prone to attrition because of working conditions at charter schools, job insecurity, or being released due to ineffectiveness. Regardless of the reason, attrition (leaving), as conceded Kersaint, Lewis, Potter, and Meisels (2007), and Stuit and Smith (2012), does not allow for stability within the school and as such is likely to influence the quality of education.

Educational Representation and Equity While policy studies have explored the positive attributes of charter schools and public support for charter schools continues to surge, strong empirical evidence is limited for determining whether charter

schools are a worthwhile investment in ensuring educational equity. Charter school outcomes have come into question because of the lack of student diversity (Fine, 2010; Fabricant & Fine, 2012; Frankenberg et al., 2011). For example, Ni (2007) reported that while charter schools tend to be more diverse than other Michigan public schools, some charter schools are hyper-segregated. For example, Arizona college preparatory charter schools were more racially segregated in comparison to public or back to basics charter schools (Garcia, 2008). These trends were replicated in Texas (Ausbrooks, Barrett, & Daniel, 2005); Frankenberg et al. (2011) extensive literature review confirmed the hyper-segregation of charter schools across the country. This was especially true for Blacks and somewhat true for Latinos. Thus, researchers have concluded that this hyper-segregation resulted in greater inequities, which may be associated with differences and inconsistencies found in charter students' academic performance.

In contrast, Carruthers (2012) noted in North Carolina that student performance differences were due to charter school's maturity (time in operation) and teacher experience. North Carolina's charter school students' performance increased over-time, yet was comparable to TPS' student outcomes. In the case of Texas, charter schools' age of operation did not make a difference when comparing the academic results between new charter schools and charter schools that had been in existence for longer period of time (Maloney et al., 2011).

However, student academic performance may also be reflective of the curriculum and teacher expectations. Booker and colleagues (2010) recommended that there is a need to explore these factors to assess charter schools' success in graduating students and increasing college enrollment. Clearly, teachers play a critical role in designing curriculum and in setting expectations, but relatively little is known about charter teachers' experiences and qualifications. While additional research is certainly needed, Finch et al. (2009) implied that due to inexperienced teachers, which may reflect teacher quality, students may be leaving charter schools. Defining and measuring teacher quality has been difficult; nevertheless, teacher quality and retention is considered of utmost importance in determining student outcomes (Darling-Hammond, 2000; Finch et al., 2009; Wilson, 2009). Hence, we also need to consider experience and qualifications as possible proxies and value-added measures for determining teacher quality along with the charter school context when examining teacher attrition.

6.5 Empirical Study

6.5.1 *Research Purpose and Questions*

Using Texas Education Agency (TEA) data (1998–2008), this study investigated the association between charter teachers' personal characteristics (age, ethnicity, gender, salary and teaching career track), school variables (school accountability status and school level), and teacher attrition (leaving the profession). While TPS were

also included in this sample for comparison purposes, the primary focus was on charter school teachers. Personal and school contextual variables are often significant predictors of teacher attrition for TPS teachers (Adams, 1996; Boe, Bobitt, & Cook, 1997; Boe, Bobitt, Cook et al., 1997; Horng, 2009; Murnane & Olsen, 1990). Thus, we wish to address the question of whether these same relationships hold for charter teachers.

For schools to function efficiently and improve student performance, it is critical to identify effective and successful teachers who are prone to remain in the profession. Given the recent surge to increase student performance, while reducing administrative costs, the need for published empirical literature on charter teacher retention appears timely and critical. The present study aims to fill these gaps by addressing the following three research questions: (a) What is the overall survival function for teachers who entered the profession between 1998 and 2006? (b) What personal and school characteristic variables predict and/or moderate the survival functions?, and (c) Do survival functions differ based on teaching career track (i.e., only teaching at a TPS or charter school, teacher migration (movement) between charter and TPS schools)?

6.5.2 Methods

6.5.2.1 Inclusion Criteria

Using the aforementioned TEA database, this study evaluated personal and school contextual factors that have demonstrated (Sass et al., 2012) impact on teacher attrition. We also explored extensive teacher attrition differences based on teaching career track, which was defined as teaching for charter exclusively, teaching in a TPS (non-charter schools) exclusively, or migrating from one to the other. The following inclusion criteria were implemented: (1) started teaching between 1998 and 2006, (2) had at least a 70% teaching appointment between 1998 and 2009, (3) earned a typical teacher salary (defined as between 15 and 90 thousand per year), (4) started teaching before the age of 56, and (5) appeared to have valid data (see below).

The first inclusion criteria was selected to reduce the percent of right censored data (missing time of departure from the profession or teachers who remained in the profession at the studies end), as we wanted teachers to have sufficient time to leave the profession if desired to provide a better estimate of the survival function. Interested readers on the topic of censoring are referred to Allison (2010, pp. 9–15) and Willett and Singer (1991) for more information. The second inclusion criterion was selected given that our focus was on teacher (rather than administrator, coach, clerical, etc.) attrition, thus only teachers that maintained a minimum 70% teaching appointment were included in the study. Moreover, we were not interested in teachers that alternated between teaching and administrative appointments. Third, total

pay was used as we sought to represent a typical teacher. The total teacher pay variable had some questionable data (e.g., a salary of \$1,000), so our intent was to select a reasonable range of salaries that would not negatively affect the survival analysis coefficients. Fourth, a sizeable percent (about 4%) of teachers had a starting teacher age after 55, which is atypical. Given the rarity of this occurrence and the higher probability that these teachers moved to Texas from a different state (thus, being considered a new teacher by Texas data), these teachers were removed to represent a more typical starting teacher age. Lastly, if teacher data were inconsistent (e.g., the state years of experience variable indicated they taught for 15 years, but our data suggested only 3 years) or appeared to have invalid data (e.g., there were 99 year old teachers) the teacher records were omitted.

6.5.2.2 Sample Description

Data were analyzed for the 208,650 teachers (76.3% female) who entered the teaching profession between 1998 and 2006 and taught only at a TPS (99.6%, $n = 207,831$), only at a charter school (0.1%, $n = 279$), started at a charter school and switched to a TPS (0.1%, $n = 285$), or started at a TPS and switched to a charter school (0.1%, $n = 255$). Although the full sample description is provided in the text, a sample breakdown by career type is provided in Table 6.1. In terms of overall teacher demographics, teachers consisted of the following ethnic groups: White non-Hispanic (65.5%), African American (10.0%), Hispanic (21.0%), and those labeled as “Other” (3.5%), which included: Asian or Pacific Islander, American Indian or Alaska Native. The average teacher starting age was 32.56 years ($SD = 8.76$) and corresponded to following age categories: Young adult teachers (less than 25 years of age, 15.7%), mid-adult teachers (25 to 30 years of age, 39.3%), and older adult teachers (older than 30 years of age, 45.0%). While various age group categories could be created, we generated our groups based on previous teacher attrition research and adult learning theory to guide the different developmental ages in adulthood. Teacher’s average yearly total salary was \$42,238 ($SD = \$7,941$) and was correlated with their number of years in the profession, $r = .60$, $n = 208,650$, $p < .001$.

Most teachers taught at the elementary (47.1%), middle (21.1%), or high school (29.3%) level. However, a significant portion (2.6%) of teachers taught at schools that combined grade levels (i.e., some combination of elementary, middle, and high school) and where labeled by the State as *Special*. Using the school rating system in Texas, schools were placed in the follow categories: low-performing (3.2%), acceptable (39.0%), recognized (34.9%), and exemplary (19.3%). The remainder of schools (3.5%) did not participate in the regular accountability rating system for unknown reasons (new school, had exempt status, etc.). However, given that school ratings are not state mandated for many charter schools, this may explain the rather large percent of schools that did not receive an accountability rating. Note that the above breakdowns represent the schools where teachers were employed in their final teaching year (or for those with censored data, in 2009).

Table 6.1 Teacher or school demographics by career type

	Only TPS <i>n</i> = 207,831	Only charter <i>n</i> = 279	Only started at a charter <i>n</i> = 285	Only started at a TPS <i>n</i> = 255
Gender				
Female	76.3%	67.4%	69.8%	69.4%
Male	23.7%	32.6%	30.2%	30.6%
Ethnicity				
White non-Hispanic	65.6%	48.7%	48.1%	47.5%
African American	9.9%	25.8%	27.0%	27.5%
Hispanic	21.0%	22.2%	21.1%	22.0%
Other	3.5%	3.2%	3.9%	3.1%
Age category				
Less than 25 years of age	26.6%	15.4%	20.0%	21.6%
25 to 30 years of age	28.4%	24.7%	24.2%	23.9%
Greater than 30 years of age	45.0%	59.9%	55.8%	54.5%
Grade level taught				
Elementary	47.1%	24.7%	36.5%	22.0%
Middle	21.1%	15.1%	22.5%	13.3%
High	29.2%	60.2%	38.6%	64.7%
Special	2.6%	0.0%	2.5%	0.0%
School rating				
Non-participating	3.4%	38.7%	14.0%	41.2%
Low-performing	3.2%	8.6%	4.6%	0.8%
Acceptable	39.0%	24.4%	40.0%	15.7%
Recognized	35.0%	14.7%	25.6%	16.5%
Exemplary	19.3%	13.6%	15.8%	25.9%

Note. *Only started at a charter* is defined as those teachers who started at a charter school and left the profession while working at a TPS, whereas *Only started at a TPS* is defined as those who started at a TPS and left while working at a charter school. It is important to note that these variables only correspond to their start and stop date, thus teachers in these groups could have transferred back and forth between charter and TPS. For censored data, the end point corresponds to where they were teaching as of 2009

6.5.2.3 Predictor Variables

Teaching Career Track This variable was of primary interest and sought to determine whether teacher's career/teaching track influenced their eventual decision to leave the teaching profession. Given that TPS (i.e., the sample of teachers that only taught at traditional/state funded public schools) was the comparison and largest group of teachers, they were used as the reference group. Charter teachers represent those teachers that only taught at a charter school. The other two groups, labeled only started at a charter and only started at a TPS and defined above, were also of

interest to determine if teacher's choice to change school types (i.e., TPS vs. charter) impacted their decision to leave teaching. It is important to note that for these two groups the time spent at that school type was not a factor in the models. For some analyses only charter and TPS teachers were used and, therefore, this term/variable name *charter status* was used.

Beginning Teaching Age For comparison and interpretability reasons, teacher beginning age was included in the model as a categorical variable using the following groupings: Less than 25, 25 to 30, and greater than 30.

Gender For these analyses, males and females were included in the model.

Ethnicity While the data file indicated the specific ethnicity of each teacher, those ethnic groups with smaller sample sizes were categorized as "Other" to reduce model complexity (i.e., avoid estimating a coefficient for every unique ethnic group) and to avoid unstable estimates due to a small sample size. The ethnic groups used in this study are White non-Hispanic, African American, Hispanic, and Other.

Teacher Pay Similar to beginning teacher age, teacher pay was categorized to ease interpretation. To determine the optimal cut point, survival functions in increments of \$10,000 were estimated. These results displayed a clear separation between teachers with pay less than and greater than \$35,000.

School Level Grade levels taught were classified as elementary (1st – 5th), middle (6th – 8th), high (9th – 12th), and special schools. Recall, special schools are defined as those with an atypical combination of grades (e.g., the school might have grades first through eighth grade).

School Rating System School performance classifications were based on the standardized ratings proposed by the state of Texas, which included non-participating, low-performing, acceptable, recognized, and exemplary schools.

6.5.2.4 Statistical Analyses

Survival Analysis Model Willett and Singer (1991) indicated that survival analysis is a "more powerful and informative way" to address teacher retention rather than simply determining the percent of teachers who left the profession. Thus, survival analysis was utilized to estimate the probability of teachers leaving the profession after a given number of years and to identify those variables associated with attrition. For categorical variables, univariate Kaplan-Meier curves were estimated to understand the shape of the survival functions (estimated proportion of teachers in the profession by year) and to visually assess whether the proportional hazard assumption was met.

The Cox proportional hazard (PH) regression, which is a semi-parametric model, was then used to estimate the individual hazards and hazard ratios (HRs) for each predictor variable of interest (i.e., teaching career track, beginning teaching age, gender, ethnicity, teacher pay, school level, and school rating system). Specifically, survival analysis allows one to model the hazard rate, which describes the relative

likelihood of a teacher leaving the system at a specific point in time, conditional on the teacher having been in the system up to that time. The HR is the ratio of hazard rates corresponding to two specific levels of a predictor variable. For example, a HR of one indicates no difference between the two groups in terms of hazards, with a HR greater than one indicating a higher hazard of leaving for group 1 (e.g., charter teachers) over group 2 (e.g., TPS teachers). A HR less than one would indicate a higher hazard of leaving for group 2 compared to a group 1. A HR of three, for example, indicates that charter teachers are three times more likely to leave at any given time than TPS teachers.

It is important to recognize that HRs represent the entire study period and do not refer to a specific time point in the study. In fact, the Cox PH model assumption is that a difference between groups – the two groups for which hazards are being compared – is proportional (i.e., the curves are a constant distance apart), which can be verified visually by examining the Kaplan-Meier survival curves as well as statistically tested. To test whether the proportional hazards assumption holds, we add a predictor for group by time (years in the system) interaction, with a statistically significant effect ($p < .05$) suggesting non-proportional hazards. Recall, the HR cannot be interpreted when this assumption is violated, as it would vary depending on the time point in the study.

Statistical Process To reduce model complexity, ease model interpretation, and ensure the proportional hazard assumptions were met, the process below was followed. Rather than estimating a single large model with all the predictors, we elected to estimate models with only two predictor variables, along with the interaction between these variables. This modeling approach was selected for two reasons. First, while the survival model is capable of allowing for multiple predictors and interaction terms, a sample size concern emerged that impacts the hazard estimates. Because a HR is estimated at fixed levels of the predictor variables, the sample size within each of those subgroups was too small to provide reliable estimates. For example, out of the 279 charter teachers, only 35 were females younger than 25 when they began teaching, thus the hazard rate for that group (and consequently the HR) will likely produce unstable estimates.

The second reason relates to the PH assumption, as a proper interpretation of the HR requires that the proportionality assumption holds at each level of the specified predictor variable(s). In this way, we find that classifications based multiple categorical factors restricts our use of HRs. Moreover, the assumption of PHs was rarely met when all four levels of the teaching career track variable were used in the two-way models (i.e., teaching career track with another variable). As a result, the charter status (i.e., charter vs. TPS) variable was substituted for any two-way model with the teaching career track variable only utilized to compare the four teaching career track levels (see 6.5.3.2 Teaching career track).

In consideration of the above concerns, we first examined the overall survival functions and compared survival functions (and relevant HRs) for the various teaching career track groups (see 4.2.1 Teaching career track). Next, we systematically explored two-way models that included charter status (i.e., charter vs. TPS) at each of the predictor variable levels. This second step includes plotting survival functions, examining the significance of interaction between the predictor variables with

teaching career track, assessing the validity of the PHs assumption, and when appropriate, reporting and interpreting the HRs.

6.5.3 Results

6.5.3.1 Descriptive Summary of Attrition

Although this study sought to reduce censoring by not allowing new teachers into the study after 2006, a significant proportion (57.6%, $n = 120,102$) of the sample remained censored. For censored teachers, the average years in the profession as of 2009 was 7.14 ($SD = 2.51$, $Max. = 12$), whereas for non-censored (i.e., teachers who already left the profession) data the average was 3.46 ($SD = 2.33$, $Max. = 11$) years in the teaching profession. For the full sample, the average was 5.58 ($SD = 3.04$, $Max. = 12$) years in the profession. The survival function without any predictors is provided in Fig. 6.1 and indicates the estimated probability that a teacher will remain in the teaching profession within Texas.

6.5.3.2 Survival Analysis Models

Teaching Career Track To identify whether differences emerged based on the teacher’s career track, a survival analysis was conducted using this variable in isolation. Based on the survival plots (see Fig. 6.2), the probability of remaining in the

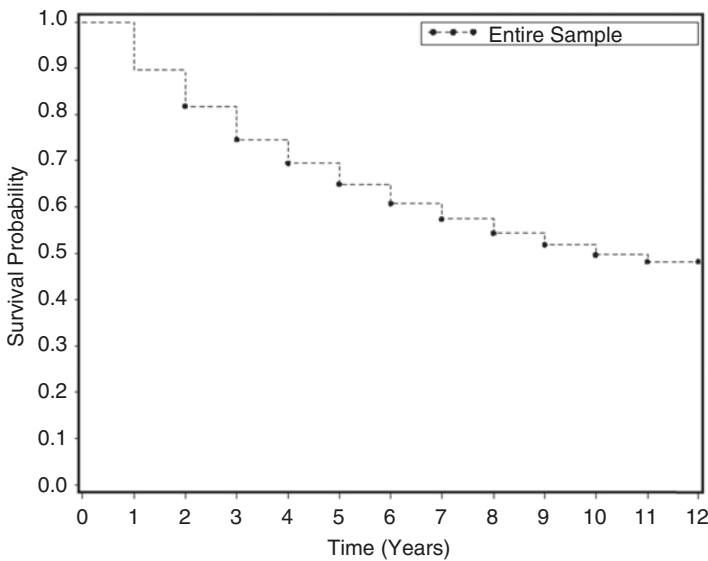


Fig. 6.1 Survival function for the entire sample

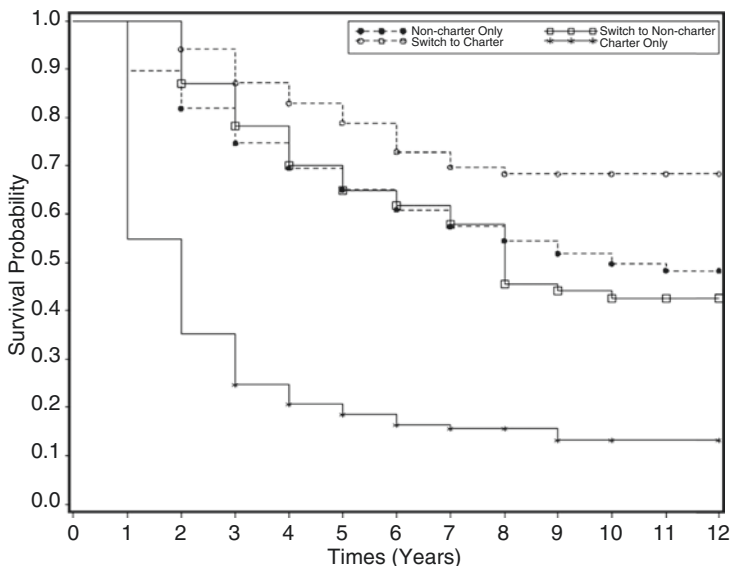


Fig. 6.2 Survival functions for each of the teaching career tracks

school system beyond 5 years was about 80% for the group of teachers that switched between charter and TPS schools and ended at a charter school. For teachers that taught exclusively at charter schools, there was only about a 20% probability of remaining in the school system beyond 5 years. This probability was approximately 64% for TPS teachers and for those teachers that switched between charter and TPS schools and ended at a TPS. These last two groups in particular show an interesting crossover in survival probability between five and 6 years (see Fig. 6.2). Up until year five, TPS teachers have a lower probability of survival compared to teachers who eventually switched to TPS; however, after 6 years, TPS teachers have a higher survival. The implication is that if a TPS teacher stays in the system at least 6 years, that teacher is more likely to stay at least another 6 years. With that said, this crossover suggests a potential problem with the proportional hazards assumption. However, the Wald χ^2 test was non-significant ($p = .619$), which indicates the assumption of PHs was met.

The Cox PH model with teaching career track as the sole predictor variable was used to estimate the HRs shown in the Table 6.2. Results indicated that the only non-significant HR (i.e., that did not include 1 in the 95% CI) was for TPS teachers and teachers that switched to a TPS school. Note that these were the same two groups mentioned earlier, with survival functions crossing between years five and six. HR estimates in Table 6.2 indicate that charter teachers were 3.7 times more likely to leave the school system than TPS teachers, and 6.5 times more likely to leave than teachers that switched from TPS to charter. TPS teachers were also almost twice as likely to leave as teachers that switched from TPS to charter schools.

Table 6.2 HR for each teaching career track comparison

HR comparison	HR	95% CI	
Charter (<i>n</i> = 279) vs. TPS (<i>n</i> = 207,831)	3.66	3.22	4.16
Charter (<i>n</i> = 279) vs. Switched, ended at charter (<i>n</i> = 255)	6.50	4.89	8.63
Charter (<i>n</i> = 279) vs. Switched, ended at TPS (<i>n</i> = 285)	3.54	2.85	4.40
TPS (<i>n</i> = 207,831) vs. Switched, ended at charter (<i>n</i> = 255)	1.78	1.38	2.29
TPS (<i>n</i> = 207,831) vs. Switched, ended at TPS (<i>n</i> = 285)	0.97	0.81	1.15
Switched, ended at charter (<i>n</i> = 255) vs. Switched, ended at TPS (<i>n</i> = 285)	0.55	0.40	0.74

Note. HR, Hazard Ratio, TPS Traditional Public School

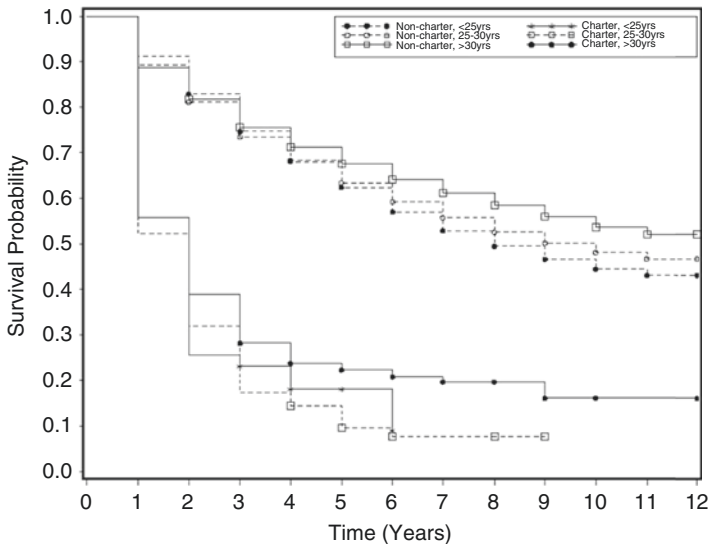


Fig. 6.3 Survival functions for each of the charter status by age grouping

It is interesting to note that teachers that switched to a charter school were the least likely to leave the profession, whereas teachers that only worked in charter schools were the most likely to leave the profession. The issue of teachers switching between charter and TPS schools is certainly a complex one that invariably affects the interpretation of results. Unfortunately, the reason teachers switched between charter and TPS cannot be answered with the current data and, therefore, we proceed with an exploration of covariates using only the charter status (i.e., exclusive TPS vs. exclusive charter teachers) variable.

Charter Status by Starting Age This analysis explored the impact of charter status and teacher starting age on a teacher’s time in the school system. The two distinct sets of survival functions in Fig. 6.3 represent charter teachers (with lower survival probabilities) and TPS teachers. In general, older starting age teachers were

Table 6.3 Comparison between charter and TPS teachers at each level of teacher beginning age, ethnicity, race, school rating, school level, and teacher salary

HR comparison	HR	95% CI		PH
<i>Starting age</i>				
Less than 25 years old ($n_{\text{charter}} = 43, n_{\text{TPC}} = 55,357$)	4.50	2.83	7.14	.116
25 to 30 years old ($n_{\text{charter}} = 69, n_{\text{TPC}} = 58,999$)	4.17	3.25	5.35	.161
Older than 30 years old ($n_{\text{charter}} = 167, n_{\text{TPC}} = 93,475$)	NA	NA	NA	.007
<i>Ethnicity</i>				
Black ($n_{\text{charter}} = 72, n_{\text{TPC}} = 20,564$)	NA	NA	NA	.031
Hispanic ($n_{\text{charter}} = 62, n_{\text{TPC}} = 43,612$)	4.01	2.88	5.59	.097
White non-Hispanic ($n_{\text{charter}} = 136, n_{\text{TPC}} = 136,294$)	3.52	2.85	4.34	.052
<i>Gender</i>				
Female ($n_{\text{charter}} = 188, n_{\text{TPC}} = 158,651$)	NA	NA	NA	.000
Male ($n_{\text{charter}} = 91, n_{\text{TPC}} = 49,180$)	4.04	3.18	5.12	.231
<i>School Rating</i>				
Low performing ($n_{\text{charter}} = 24, n_{\text{TPC}} = 6,553$)	8.66	5.46	13.76	.562
Acceptable ($n_{\text{charter}} = 68, n_{\text{TPC}} = 81,065$)	4.56	3.42	6.07	.805
Recognized ($n_{\text{charter}} = 41, n_{\text{TPC}} = 72,663$)	NA	NA	NA	.014
Exemplary ($n_{\text{charter}} = 38, n_{\text{TPC}} = 40,182$)	2.07	1.32	3.25	.110
Non-participating ($n_{\text{charter}} = 108, n_{\text{TPC}} = 7,048$)	2.35	1.90	2.90	.979
<i>School level</i>				
Elementary school ($n_{\text{charter}} = 69, n_{\text{TPC}} = 97,974$)	NA	NA	NA	.020
Middle school ($n_{\text{charter}} = 42, n_{\text{TPC}} = 43,781$)	3.70	2.71	5.06	.968
High school ($n_{\text{charter}} = 168, n_{\text{TPC}} = 60,680$)	NA	NA	NA	.003
<i>Starting salary</i>				
Less than \$35,000 ($n_{\text{charter}} = 194, n_{\text{TPC}} = 37,744$)	1.57	1.34	1.84	.108
Greater than or equal to \$35,000 ($n_{\text{charter}} = 85, n_{\text{TPC}} = 170,087$)	NA	NA	NA	.003

Note. NA indicates that the HR was not appropriate to interpret

associated with higher survival probability. The exception was charter teachers younger than 25 and charter teachers between 25 and 30 years of age, as the survival functions crossed over at year three where younger charter teachers started having a higher survival probability.

A test for PHs (for charter vs. TPS teachers) was conducted at each level of teacher age. The Wald χ^2 test rejected the PHs hypothesis for the teacher group older than 30 (see Table 6.3), thus HRs were only computed for the remaining groups. For both these age groups, charter teachers were more than four times more likely to leave the school system than TPS teachers (see Table 6.3). The HR was slightly higher (4.5 versus 4.2) for teachers that started teaching when they were younger than 25 years old, although the charter status groups were not significantly different in this respect.

Charter Status by Ethnicity This analysis explored the impact of charter status and ethnicity on a teacher's time in the school system. While ethnicity had four groups, the Other group was excluded due to the small sample size (only nine charter teachers were classified as Other). Based on the survival functions (see

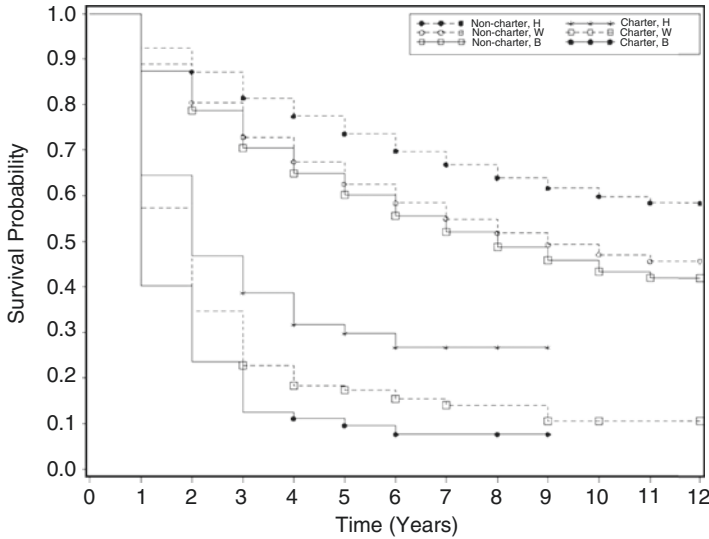


Fig. 6.4 Survival functions for each charter status by ethnic group

Fig. 6.4), it was clear that charter teachers consistently possessed higher attrition rates than TPS (regardless of ethnicity), with Hispanics staying longer than White non-Hispanics and White non-Hispanics remaining longer than African Americans.

The test for PHs for charter versus TPS teachers was conducted for each ethnic classification. The Wald χ^2 test rejected the PHs hypothesis for the African American, thus HRs were only computed for the Hispanic and White non-Hispanic groups (see Table 6.3). Among Hispanic teachers, charter teachers were four times more likely to leave the school system than TPS teachers, with White non-Hispanic charter teachers being 3.5 times more likely to leave than White non-Hispanic TPS teachers. However, the two HRs were not significantly different as indicated by the overlapping 95% CI.

Charter Status by Gender The two distinct sets of survival functions represent charter teachers (with lower survival probabilities) and TPS teachers (see Fig. 6.5). It is interesting to note that regardless of the type of school, female teachers tend to have a slightly higher survival probability than male teachers. When examining the tests for PH for charter status at each gender classification (see Table 6.3), the Wald χ^2 test rejected the PHs hypothesis for the females (i.e., the hazards were different between charter and TPS teachers); however, it was appropriate to compare the HR for males. Within males, charter teachers were four times more likely to leave the school system than TPS teachers (see Table 6.3).

Charter Status by School Rating Survival functions by school rating are shown in Fig. 6.6, with TPS teachers represented by the plot on the left (Fig. 6.6a) and charter teachers by the plot on the right (Fig. 6.6b). The two distinct sets of survival functions for charter teachers represent Exemplary and Recognized schools (with

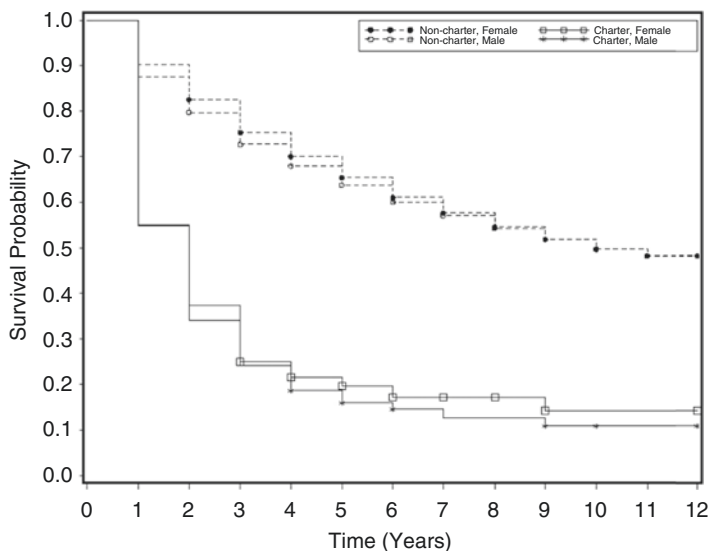


Fig. 6.5 Survival functions for each charter status by gender group

higher survival probabilities) and Acceptable, Low-Performing and Non-Participating schools. Survival functions for the latter group of charter teachers are much lower than TPS teachers in general. The Wald χ^2 test for PHs (Charter vs. TPS teachers) rejected the PHs hypothesis for non-participating and recognized schools. Consequently, the HRs were only computed for the remaining groups (see Table 6.3). For low performing schools, charter teachers were 8.7 times more likely to leave the school system than TPS teachers, whereas for schools classified as acceptable and exemplary charter teachers were 4.6 and 2 times more likely to leave compared to TPS teachers, respectively. The exemplary HR was significantly different from the other two HRs, thus suggesting that working at a low performing charter school only accelerates the likelihood of leaving the teaching profession.

Charter Status by School Level The two distinct sets of survival functions represent charter teachers (with lower survival probabilities) and TPS teachers (see Fig. 6.7). Of note, elementary charter teachers stand out because of their higher survival probabilities when compared to other charter teachers. Also of note is that all school levels of TPS teachers were very similar in their survival probabilities across the years. The PH (for Charter vs. TPS teachers) test was conducted for each school level, with the Wald χ^2 test rejecting the PHs hypothesis for the elementary and high school teacher groups (see Table 6.3). For middle school teachers, charter teachers were 3.7 times more likely to leave the school system than TPS teachers.

Charter Status by Starting Salary This analysis explored the impact of charter status and starting salary on a teacher's time in the school system. As seen in Fig. 6.8, the two distinct sets of survival functions represent teachers with starting

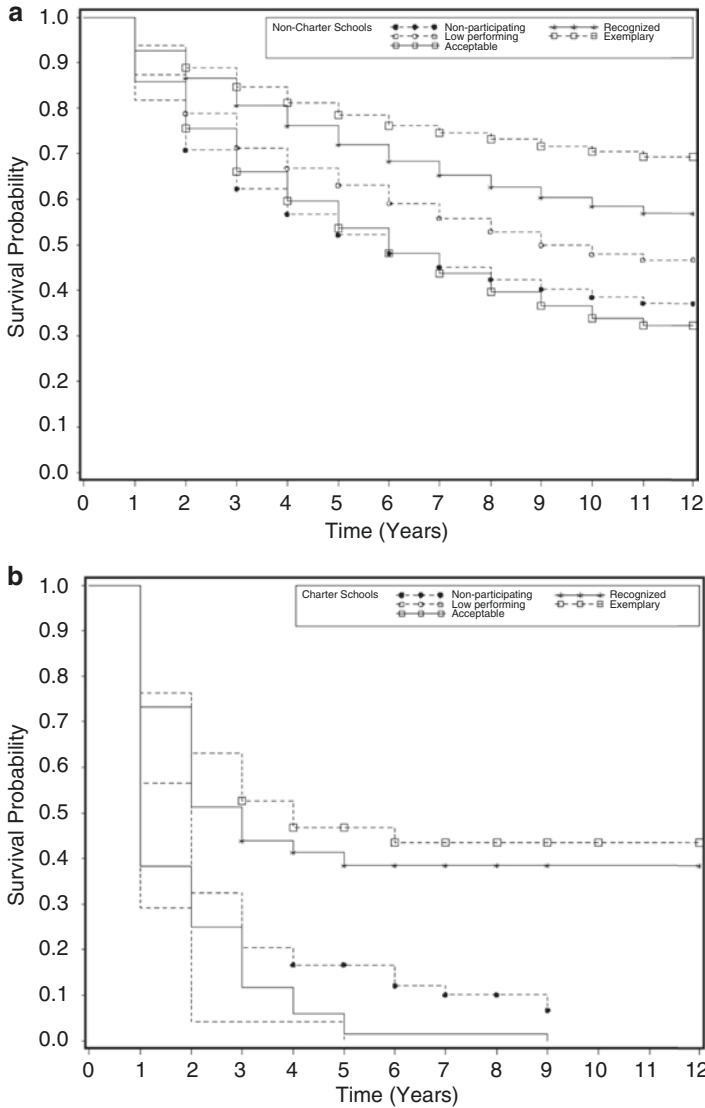


Fig. 6.6 (a) Survival functions for non-charter schools by school rating. (b) Survival functions for charter schools by school rating

salary greater than \$35,000 (with higher survival probabilities) and teachers with starting salary less than \$35,000. It is worth mentioning that after 5 or 6 years, the likelihood that a teacher with a lower starting salary remains teaching is negligible. For the higher paid teachers, survival probability after 6 years of teaching was almost 60% and 80% for charter and TPS teachers, respectively.

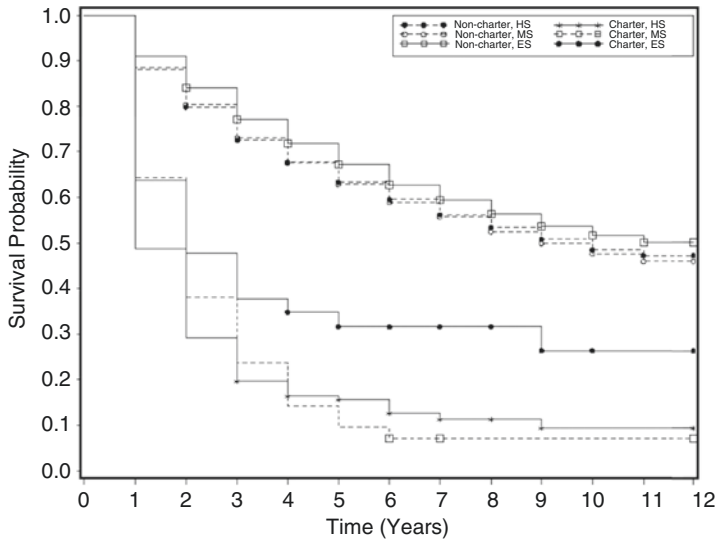


Fig. 6.7 Survival functions for each charter status by school level

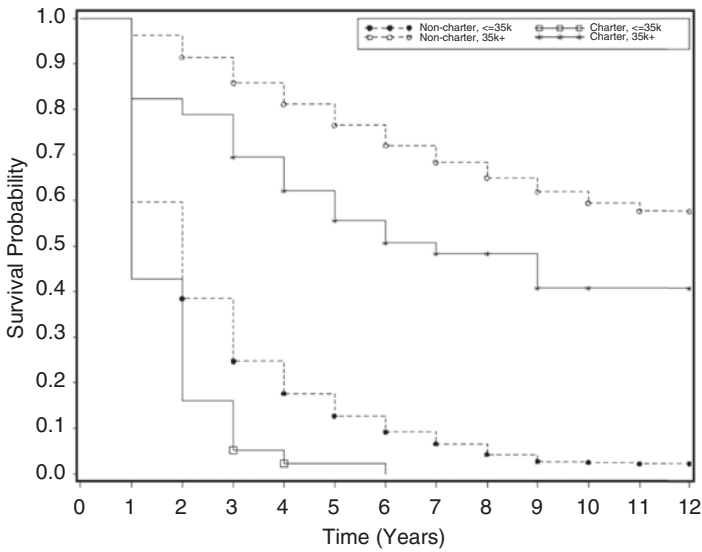


Fig. 6.8 Survival functions for each charter status by salary group

Based on the Wald χ^2 test at each level of starting salary, the PHs hypothesis was rejected for the starting salary greater than \$35,000 group (see Table 6.3). For the less than \$35,000 teacher group, the charter teachers were 1.6 times more likely to leave the school system than TPS teachers.

6.6 Discussion

Our analyses revealed that the prediction of charter teachers' attrition incorporates many of the same variables as TPS teachers (Ausbrooks et al., 2005; Maloney et al., 2011; Sass et al., 2012; Smith & Ingersoll, 2004) and consistently supported the notion that charter teachers possess considerably higher attrition rates. In fact, this conclusion was reached across all the predictor variables, with the odds of leaving the profession typically being more than twice that of TPS. The one exception was for the teachers' starting salary variable, where charter teachers with a lower starting salary (less than \$35,000) were only 1.57 times more likely to leave the profession compared to TPS teachers. Overall, it is clear from the results that certain teacher and school characteristics place teachers at considerably higher risk of attrition. Knowing this information is critical as administrators determine how to best utilize resources to retain and train teachers.

Knowing what variables are associated with higher attrition rates sheds some light on teacher and school functioning. While we cannot negate or argue against the notion that some teacher attrition may be due to ineffective teaching, our findings consistently revealed that TPS teachers tend to remain in the profession considerably longer. While the "cause" of these differences is not easily explained based on the data available, these findings may be related to poor hiring practices, school contextual factors (Booker et al., 2010), lower quality teacher mentoring and training (Smith & Ingersoll, 2004), lower salaries (Krop & Zimmer, 2005), and less qualified teachers being hired (Boyd et al., 2009; Maloney et al., 2011). The latter two factors are likely key contributors in Texas as many uncertified teachers are commonly hired in lower paying charter schools, which may not provide the same level of teacher training. It is also possible that uncertified charter teachers only remain in the teaching profession until a better paying non-teaching job emerges. We note that uncertified teachers cannot work in TPS in the state of Texas.

While these findings are certainly relevant for new teachers, these results also merit full consideration for policy makers, charter school administrators, and parents considering sending their child to a charter school. We cannot simply assume that charter schools are truly providing a viable alternative to public schools, or if indeed, issues of equity are being addressed without strong evidence of teacher and student success. Related to teachers, it appears that charter schools may not provide an atmosphere conducive to success given the high attrition rates, which likely carries over to the classroom and could explain the lower student success found in past research. For example, in Texas, open-enrollment charter schools are not performing

well academically and serve mostly Hispanic and African American minority students who are economically disadvantaged (Maloney et al., 2011). Clearly, placing a beginning teacher without adequate training and institutional support into such an environment will reduce their probability of success, as well as that of the students.

Martin, Sass, and Schmitt (2012) provided evidence for theoretical models that strongly predict teacher's intent to quit, which could be used to develop strategies to change factors associated with attrition. Their research suggested several variables (instructional management, emotional exhaustion, student behavior stressors, personal accomplishment, etc.) that programs could address to retain teachers and prepare them for the classroom. Based on their research, it appears clear that teachers leave the profession not only because they lack the teaching skills, but also due to stressors associated with the profession. Regardless, it seems imperative that proactive changes are made within charter schools and that these teachers receive the support and resources needed to be successful.

Research argues that a critical contributor to student outcome and educational equity is teacher quality (Akiba, LeTendre, & Scribner, 2007; Darling-Hammond, 2000); with teacher experience being a key attribute (Kersaint et al. 2007; Wilson, 2009). Teachers leaving the field, moving between systems, and moving to higher performing TPS all threaten the stability and the ultimate success of charter schools (Kersaint et al., 2007; Stuit & Smith, 2012). Based on our data, charter school students may not have the same opportunity to develop long-lasting teacher-student relationships that are crucial in student success (Duncan-Andrade, 2007; Martin et al., 2012; O'Conner & McCartney, 2007).

Charter school proponents argue that greater autonomy and decision-making freedom will attract and retain highly qualified teachers into charter schools (Lubienski, 2003) and increase teacher satisfaction (Bomotti et al., 1999). However, our findings counter this argument and support the need for additional research in this area. Unless measures are taken to increase teacher retention, charter school proponents cannot tout that their system is competitive. If policy makers are truly concerned with improving education for all students and promoting school choice, it is critical that factors associated with teacher attrition be addressed before moving towards the privatization of the schooling system and a greater proliferation of charter schools emerges.

6.7 Conclusion, Future Research, and Implications

While research continues to be explored on teacher turnover, specifically teacher attrition and migration, there appears to be consistency that personal and school contextual factors play a role in job satisfaction, stress, and retention in the profession. The value of having a stable teaching force is critical and should not be overlooked. Kersaint et al. (2007) proposed that having a stable teaching force greatly

influences student achievement. Other researchers (Boe, Bobbitt, & Cook, 1997; Stuit & Smith, 2012) suggested that teacher attrition is likely to destabilize and undercut the quality of the schooling system. These notions are supported with findings that demonstrate that when taught by effective teachers during a consecutive three-year period, low-income students' performance is compatible to their middle-class peers (Wilson, 2009). Contrastingly, Bifulco and Ladd (2005) reported poorer academic performance by charter school students and attributed it to higher rates of student mobility. With the interest in charter schools, it is critical to ensure students are taught by equally qualified and experienced teachers and identify those who are successful teachers, who are retained, in charter schools.

6.7.1 Future Research

In order to ensure educational equity for all schools, going beyond demographic (age, ethnicity, teaching experience, etc.) variables and contextual factors (setting, school level, school type etc.), we need to consider factors such as stress, which appears to be correlated to teacher satisfaction. Specifically, teacher stress needs to be explored both at the classroom (tasks related directly to teacher duties) and work-environment (administrative support, working conditions, etc.) levels. This research directly linking teacher stress and attrition needs further exploration in both charter and TPS. To better understand these phenomena, these types of investigations should employ mixed-methods in which survey, observation, and interview data are collected and analyzed.

6.7.2 Implications

In addition to exploring stress and attrition, we need to address teacher stress directly. To reduce classroom stress, teachers could be provided with mentoring, coaching, and relevant professional development. Mentoring support should address both the personal and professional needs of the teacher, which has shown to be effective in retaining teachers (Flores, Hernández, García, & Claeys, 2011). Professional learning communities can also support teachers through stress reducing activities (Guerra, Flores, & Claeys, 2009). In addition, since administrative support appears to impact work-environment stress that can lead to attrition, administrators can serve as mediators for minimizing stress (Brown & Nagel, 2004; Calabrese, 1987). Administrators should engage teachers in decision-making processes so that there is greater ownership, thereby reducing teacher stress from top-down policies. Policy makers and school districts should examine salary, class size, and accountability mandates such as excessive emphasis on testing.

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Chapter 7

The Role of Culture and Other Contextual Factors in Educator Stress

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Abstract International research examining teacher stress and contextual factors, such as culture, government policies, professional autonomy, and school level factors, are reviewed in this chapter, as well as their impact on teachers' occupational health. Research reviewed identifies important contextual and cultural factors impacting teacher stress and the occupational health factors of job satisfaction and workforce instability. While research examining teacher stress in different countries nation is robust, there is a dearth of research examining the role of culture within or between national borders. Further, while models of stress and occupational health are prevalent in existing research, theoretical models explaining the role of culture and other contextual factors in teacher stress are needed.

Keywords International • Cultural • School climate • Leadership • Job satisfaction • Teacher mobility

Teacher stress is a worldwide phenomenon associated with detrimental outcomes for teachers and schools (McCarthy, Lambert, & Ullrich, 2012; Yang, Ge, Hu, Chi, & Wang, 2009). Studies from countries around the globe consistently find that teaching is a stressful profession, including in Hong Kong (Pang & Tao, 2012), China (Yang et al., 2009), Turkey (Ertkin & Kisa, 2012), and Norway (Baran, 2012). Surveys of teachers' unions also indicate high levels of stress: the British Broadcasting Corporation reported that, in a survey of 3,500 teachers conducted by the National Association of Schoolmasters Union of Women Teachers (NASUWT)

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in England, 83% reported workplace stress, and over two-thirds of respondents reported they had considered quitting in the past year (Precey, 2015). A survey of 30,000 U.S. teachers conducted by the American Federation of Teachers revealed that 70% often found their jobs stressful; further, while 89% were strongly enthusiastic about teaching when they began their careers, only 15% reported feeling currently enthusiastic (Layton, 2015). Given that stress is increasingly recognized as a concern for the teaching workforce globally, this chapter examines the role of culture and other contextual factors in educator stress and occupational health. We will first define stress and review research examining its international prevalence.

7.1 What Is Teacher Stress and How Pervasive Is It Across Countries?

Kyriacou and Sutcliffe (1977) provided one of the earliest definitions of teacher stress as “a response by a teacher of negative affect... as a result of the demands made upon the teacher in his role as a teacher,” which includes “the degree to which the teacher perceives that he is unable to meet the demands made upon him” (p. 299). This definition is consistent with the transactional model of stress proposed by Lazarus and Folkman (1984), which is among the most well-accepted and commonly cited approaches to understanding stress (Hobfoll, Schwarzer, & Chon, 1998). Central to this theory is the role of cognitive appraisal, which is divided into two types: primary appraisals of demands (i.e., events that are relevant to our well-being and could have negative consequences) and secondary appraisals of resources (i.e., assets in one’s personal repertoire for dealing with life demands; Matheny, Aycock, Curlette, & Junker, 2003). When resources are appraised as insufficient vis-à-vis demands, the individual is presumed to be at risk for stress. Being at risk for stress in the context of teaching means that the educators view classroom demands as exceeding their ability to cope (McCarthy, Lambert, Lineback, Fitchett, & Baddouh, 2015), making it more likely they will experience stress.

The stress response itself is the cascade of physiological, cognitive, and emotional changes resulting from appraisals that demands exceed resources, which, in the context of occupational health, can be also be viewed as job strain. Stress symptoms can result from prolonged activation of the stress response, which includes emotional and behavioral consequences, such as feeling anxious or sleep disturbances. Once the stress response is triggered, coping ensues, which involves cognitive or behavioral strategies directed at the stress response and/or the stressor itself (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). When efforts at coping are unsuccessful, the teacher can be vulnerable to syndromes such as burnout (Friedman, 2006), which is described in Sect. 7.2.1.

Lazarus and Folkman’s (1984) transactional theory has been characterized as one of several “balance” models of stress (Meurs & Perrewé, 2011), which maintain that appraised imbalances in demands and resources are a key determinant of stress. Other balance models which have relevance for the occupational health of teachers

includes the job demand-control model (JDC; Karasek & Theorell, 1990), which suggests that work environments can be characterized by the balance between work demands and how much control the worker perceives over the work environment. The job demands-resources model (JD-R; Bakker & Demerouti, 2007) also posits that job stress results from high levels of demands and insufficient resources. The Effort-Reward Imbalance Model (ERI; Siegrist, 1996; Siegrist, Siegrist, & Weber, 1986) which is the focus of Chap. 10, emphasizes a reciprocal relationship between efforts (costs) and rewards (gain) at work. When an imbalance exists, work strain can result (van Vegchel, de Jonge, Bosma, & Schaufeli, 2005), a term that refers to unhealthy levels of workplace stress (Kuper & Marmot, 2003). Lastly, the Demand-Induced Strain Compensation model (DISC; de Jonge & Dormann, 2006) was introduced to combine principles common to both the JD-R and ERI models, and classifies demands, resources, and stress reactions into three categories: emotional, cognitive, or physical. According to DISC theory, successful coping takes place when demands in a given category (for example, emotional) are matched with corresponding resources from that same category (i.e., emotional support).

Research examining teacher stress using multiple different methods suggests that one fifth to one fourth of teachers experience stress at work. In Great Britain, Travers and Cooper (1996) conducted a nationwide survey of 1790 teachers across grade levels in Great Britain using the Teacher Stress Questionnaire (TSQ), which was based on the transactional model of stress. The questionnaire included items about teachers' coping styles, job satisfaction, and sources of occupational strain. Based on teacher responses to this survey, Travers and Cooper (1996) estimated that 25% of teachers across regions of Great Britain regarded their profession as stressful. Kyriacou (1998) also reviewed studies from the 1990s examining the incidence of teacher stress in Great Britain and reported that while most teachers experience stress from time to time, between a fifth and a quarter of teachers experienced stress frequently. Zurlo, Pes, and Capasso (2013) and Moy et al. (2014) cited secondary sources that suggested a stress prevalence of 25% among Italian school teachers and 20% among secondary school teachers in Malaysia, respectively. Unterbrink et al. (2007) surveyed 949 German teachers at both the grammar school and secondary school level using the Effort Reward Imbalance Inventory (ERI; J. Siegrist, 1996; K. Siegrist et al., 1986) which was designed to assess perceptions of high costs and low gain according to ERI theory. Using cut-offs suggested in the ERI manual, the authors found that imbalances in effort and reward were experienced by 21.6% of teachers in the sample.

Two recent studies using survey methods found a similar incidence of risk for stress in Australia and the U.S. First, Garrick et al. (2014) developed a measure called the Psychology Injury Risk Indicator (PIRI) to identify teachers exhibiting stress symptoms utilizing a sample of 960 teachers located in five different regions or territories. It was found that 26% of teachers exhibited stress symptoms such as chronic fatigue, reduced sleep quality, and post-traumatic stress symptoms. Among U.S. teachers, Lambert, McCarthy, Fitchett, Lineback, and Reiser (2015) utilized the Schools and Staffing Survey (SASS), which is administered by the National Center for Education Statistics and is the largest and most comprehensive data

source available on teachers in the U.S. (Ingersoll & Smith, 2003), to examine teachers' perceptions of demands and resources in their classrooms. The classroom demands and resources items were used to create scale scores which identified teachers who appraised demands as exceeding resources according to Lazarus and Folkman's (1984) theory. Lambert et al. (2015) found that approximately 25% of U.S. teachers reported classroom demands as exceeding classroom resources, which indicated they were at risk for stress.

While this review is by no means exhaustive, these studies suggest one fifth to one fourth of teachers in several countries find their jobs stressful. An important question is what role contextual factors play in the stress experienced by teachers and their occupational health. Research examining stress and occupational health is therefore reviewed next.

7.2 Cross-cultural and International Research Examining Teacher Stress and Occupational Health Outcomes

Global macro-economic forces are the highest systemic level impacting teacher stress, but one that is mediated by a number of sub-global contextual forces, including cultural, governmental, and the school (Wang & Fwu, 2014). Governmental and school factors associated with teacher stress will be defined and reviewed in Sect. 7.3, but at this point we note that culture, which can broadly be understood as deriving from the ecology, resources, and people that make up a community (Matsumoto & Juang, 2012), is embedded in many studies of teacher stress without being named as such. Leighton (1982) defined culture more concretely, as including the thoughts, customs, beliefs, and values of a particular group. Much of the cross-cultural teacher stress research however examines data across countries rather than cultures. Therefore, throughout this chapter, the terms culture and country are used interchangeably unless specifically differentiated by researchers.

Three occupational health outcomes frequently studied in teacher stress research are burnout, job satisfaction, and occupational commitment. While the majority of the research is correlational, teacher stress is conceptualized here, and in the literature, as a precursor or predictor of these occupational health outcomes. Burnout, job satisfaction, and occupational commitment are defined in the subsequent sections reviewing international research exploring the role of stress in these aspects of occupational health.

7.2.1 Teacher Burnout

Schaufeli, Leiter, and Maslach (2009) noted that burnout as a construct is inextricably connected to social and cultural context factors. Burnout was first described in the 1970s among American human service workers (Freudenberger, 1974),

including health care workers, psychotherapists, and teachers. Interest in the construct burgeoned during the closing decades of the 20th century, at a time when the U.S. was moving from an industrial society to a service economy society, a shift which meant increasing demands and fewer resources for many workers (Schaufeli et al., 2009). Teachers became the most frequently examined occupational group in burnout research during this time, comprising 22% of all samples as of the late 1990s (Schaufeli & Enzmann, 1998). Global interest in burnout has generally corresponded to economic development, starting first in the U.S. in the 1970s, moving to Western Europe in the 1980s, and then to rest of the world (Schaufeli et al., 2009).

Maslach, Schaufeli, and Leiter (2001) noted that burnout is defined by three components: (1) emotional exhaustion, which refers to feeling over overwhelmed and burned out by contact with others; (2) depersonalization, defined as a cynical attitude and emotional distancing from other people, and (3) reduced personal accomplishment, which refers to lessened feelings of competence and personal achievement (Maslach & Jackson, 1981). These three dimensions are considered to be discrete, but connected dimensions, although Maslach and Jackson (1981) described emotional exhaustion as the “key aspect of the burnout syndrome” (p. 99). The Maslach Burnout Inventory (MBI), or its more recent teacher-specific version, known as the MBI-Educators Survey (MBI-ES; Maslach, Jackson, & Schwab, 1996), is a self-report questionnaire measuring burnout along these three dimensions; the MBI has been translated into many languages and is commonly used to assess burnout across nations and cultures. Psychometric evaluations of the translated versions have generally lent support for their respective internal consistency reliabilities, and for factorial and construct validity that sufficiently match the original English version (Schaufeli, Martínez, Marques Pinto, Salanova, & Bakker, 2002).

Student misbehavior and classroom management challenges have been linked to teacher burnout symptoms in research with British (Covell, McNeil, & Howe, 2009), Dutch (Evers, Tomic, & Brouwers, 2004), and French teachers (Vercambre, Brosselin, Gilbert, Nerrière, & Kovess-Masféty, 2009). In a meta-analysis of 21 independent samples from the U.S. and nine from other countries, MBI scales were associated with student misbehavior in the predicted direction: the strongest relationship was between student misbehavior and emotional exhaustion, while a smaller effect was found for depersonalization, and the smallest with reduced sense of accomplishment (Aloe, Shisler, Norris, Nickerson, & Rinker, 2014). The relationship between student misbehavior and burnout symptoms was stronger at the secondary level compared to the elementary level of teaching. Student misbehavior was also associated with burnout symptoms in a primarily qualitative, mixed-methods study of 59 South African secondary teachers (van Tonder & Williams, 2009). The MBI was administered and semi-structured interviews were given to teachers in the sample with the highest burnout symptoms, although most did not meet the full criteria for burnout. Analysis of these teachers’ responses to the interviews suggested that student misbehavior and administrative demands were associated with burnout symptoms.

One of the most important protective factors for burnout identified across nations is that of social support, specifically from other school personnel. Greenglass, Fiksenbaum, and Burke (1996) found that social support from coworkers buffered emotional exhaustion (measured using the MBI) in a study of 833 Canadian primary and secondary teachers. Leung and Lee (2006) found an association between supervisor and peer support and lower emotional exhaustion scores with 379 elementary and secondary Chinese teachers. Both studies utilized a scale developed by Caplan, Cobb, French, Harrison and Pinneau (1975) that assesses support from supervisors and colleagues. Montgomery and Rupp (2005) conducted a meta-analysis of 65 studies on examining stress in primary and secondary teachers, including teachers in the U.S., several European nations, Japan, Hong Kong, and China, and also found that professional support was associated with lower levels of teacher burnout, although the three dimensions of burnout were not analyzed separately.

7.2.2 Teacher Stress and Job Satisfaction

Early researchers conceptualized job satisfaction as an employee's attitude toward his or her work (Brayfield & Rothe, 1951). Locke (1976) defined it as "a pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences" (p. 1300). In current research, job satisfaction is measured in multiple ways: as a single construct comprised of multiple components (Brayfield & Rothe, 1951; Koeske, Kirk, Koeske, & Rauktis, 1994; Liu & Ramsey, 2008; Skaalvik & Skaalvik, 2011) as overall job satisfaction asked in a single question (Markow & Pieters, 2012), as multiple facets without creating multiple components (Skaalvik & Skaalvik, 2011), and as general satisfaction measured in multiple questions (Ironson, Smith, Brannick, Gibson, & Paul, 1989).

Analysis of data from a large-scale, nationally representative survey of nearly 5,000 U.S. elementary and secondary school teachers examined seven aspects of job satisfaction (Liu & Ramsey, 2008). Results indicated that teachers were most satisfied with the physical safety of their jobs, and least satisfied with working conditions and compensation (Liu & Ramsey, 2008). Mirroring results from Millers and Travers' (2005) study of UK teachers, this United States study found that minority teachers were much less satisfied than non-minority teachers; specifically, minority teachers had lower ratings on six of the seven aspects of job satisfaction (Liu & Ramsey, 2008). An international survey called the Teaching and Learning International Survey (TALIS) examined professional status of teachers across countries. The TALIS was sponsored by the Organization for Economic Cooperation and Development (OECD) to examine teachers' working lives and school-based working conditions across 34 countries (OECD, 2014). Results found that challenging classroom circumstances play a major role in teachers' job satisfaction across almost all of the 34 countries examined: across 29 countries teachers reported lower job satisfaction in association with having a majority of behaviorally disruptive children within their classrooms (OECD, 2014).

While levels of teacher job satisfaction vary by country, research has consistently found a negative relationship between stress and job satisfaction (Kyriacou & Sutcliffe, 1977; McCarthy, Lambert, Lineback, Fitchett, & Baddouh, 2015). A study of 1,386 secondary teachers in Spain indicated that both stress and burnout were positively correlated with job dissatisfaction, measured with an 11-question scale of overall dissatisfaction (López, Bolaño, Mariño, & Pol, 2010). Studies in Canada (R. M. Klassen, Foster, Rajani, & Bowman, 2009), the United Kingdom (Miller & Travers, 2005), and the Dominican Republic (Gilbert, Adesope, & Schroeder, 2014) also support the association between stress and job dissatisfaction. A study in Ireland measured stress using the Fimian Teacher Stress Inventory (FTSI; Fimian, 1984) and compared it to teachers' scores on a measure of overall satisfaction (Reilly, Dhingra, & Boduszek, 2014). Researchers found that, after controlling for many other variables (including self-efficacy, self-esteem, age, teaching experience, and highest level of education), perceived stress was the only factor with a unique contribution to job satisfaction, though the authors did not report the variance accounted for by this variable alone (Reilly et al., 2014).

7.2.3 Teacher Stress and Workforce Stability

While teacher attrition/retention, occupational commitment, and intentions to remain in or quit teaching are all related, they are distinctly separate constructs (Gilbert, et al., 2014). Occupational commitment has been defined as “dedication and loyalty to the teaching profession” (Jepson & Forrest, 2006, p. 188), while intention of staying in and leaving the profession are assessed by examining an individual's likelihood of remaining in teaching or length of time an individual plans to remain in teaching (Hancock & Scherff, 2010) or as actions teachers take to leave the profession, such as searching for a new job and telling others they intend to leave (McCarthy, Lambert, Crowe, & McCarthy, 2010). Other similar constructs include teachers' withdrawal behavior, including tardiness and absences and decreased efficiency at work (Shapira-Lishchinsky & Tsemach, 2014), and their work engagement (work engagement is described in Chap. 11). This section will focus mainly on how stress affects occupational commitment and intentions to stay or leave the profession.

Despite evidence that teacher stress is pervasive and that stress contributes to teacher attrition (Gilbert et al., 2014), the most current research from the U.S. National Center for Educational Statistics suggests that only 17% of teachers leave the profession within five years, which is considerably lower than previous estimates of 40-50% from data in the late 1990s and early 2000s (Ingersoll, 2012). Australia and the United Kingdom have reported higher attrition rates for teachers within their first five years (between 20 and 50%), while the countries of Japan, Germany, South Korea, Finland, and Taiwan all have beginning teacher attrition rates at 7% or below, with Taiwan's rate falling lower than 2% (Wang & Fwu, 2014).

Studies researching the relationships among teacher stress, occupational commitment, and intentions of leaving consistently find significant associations among these constructs. A study of all levels of teachers in Canada (Klassen & Chiu, 2011) measured occupational commitment using the same scale as Klassen et al. (2013); intentions to quit teaching using three items, including the item “I intend to quit the teaching profession” (p. 117); and teacher stress both using an overall construct (i.e. “I find teaching to be stressful” p. 118) and using a measure of how stressful participants found certain aspects of teaching, such as maintaining discipline. Results indicated that teacher stress was negatively correlated with occupational commitment and positively correlated with intentions to quit teaching (Klassen & Chiu, 2011). A study of teachers in bilingual private schools (pre-kindergarten through high school) in the Dominican Republic measured intentions to quit teaching and occupational commitment using the same scales as the Klassen and Chiu (2011) study using a measure of sources of classroom stress (Gilbert et al., 2014). Their results indicated that stress was negatively correlated with occupational commitment and positively correlated with intentions to quit (Gilbert et al., 2014).

Finally, in a study of primary and secondary teachers in the UK, level of occupational commitment (measured using a six-item scale described above) was the strongest predictor of perceived stress, measured using the Perceived Stress Scale, a 14-item measure including items such as, “In the last month, how often have you felt nervous and stressed?” and “In the last month, how often have you dealt with irritating life hassles?” (Cohen, Kamarck, & Mermelstein, 1983; Jepson & Forrest, 2006).

7.2.4 Summary of Cross-cultural and International Research Examining Teacher Stress and Occupational Health Outcomes

Research reviewed here suggests that teacher stress is reliably associated with burnout, job satisfaction and workforce instability across many nations. The general flow of causality suggested by this research is that stress negatively impacts job satisfaction, puts teachers at greater risk for burnout, and can lead to higher levels of turnover (McCarthy et al., 2010). This general implication from the literature is tempered by the fact that most studies are cross-sectional in nature and rely on teachers’ self-reports, limiting any causal inferences about the relationship of these constructs.

The MBI is frequently used in international studies of teacher burnout and has allowed for several meta-analyses comparing burnout in different countries. However, reliance on the self-report format of the MBI is a possible limitation of this research, and studies measuring burnout in other ways, such as physical

outcomes, are lacking. Similar limitations exist for the research on job satisfaction and turnover, which is also typically examined through self-reports. Longitudinal studies would be particularly valuable in future research. Also, across the constructs reviewed here, few of the studies reviewed here examined cultural variables (such as respect for teachers) which could impact the experience of burnout (Schaufeli, Leiter, & Maslach, 2009).

The majority of teacher occupational health research has investigated samples from Western, developed countries; this is a notable limitation in light of growing support for the potential role of both culture and level of national economic development in occupational health processes and outcomes (Garrett, 1999; Glazer & Beehr, 2005; Zembylas & Papanastasiou, 2004). Furthermore, as most of the models and measures of teacher stress originated in Western countries, evidence for cross-national and cross-cultural validity of such models are necessary (Zembylas & Papanastasiou, 2004; Xie, Schaubroeck, & Lam, 2008). Furthermore, very few studies have treated culture as a multidimensional, complex construct; instead, cultural comparisons have been largely limited to collectivistic versus individualistic cultures (Machery, 2010)

While studies have been conducted outside of Europe and the U.S., there is a paucity of research examining multiple countries within the same study (Klassen, Usher, & Bong, 2010). Many studies exclusively examine occupational stress within the context of single countries, while studies that compare two countries have generally relied on mean comparisons (Carod-Artal & Vázquez-Cabrera, 2013). Following this review of occupational health outcomes, the next section examines evidence for contextual factors that could impact such associations: cultural values associated with respect for teachers, educational accountability and reform, teacher autonomy, and school leadership.

7.3 Cultural, Governmental, and School Factors in Teacher Stress

As was noted in Sect. 7.2, culture is a multidimensional construct which is typically examined in teacher stress research only through the lens of nationality. Research examining cultural attitudes about levels of respect afforded teachers is emerging, however, and is reviewed in the following section. Governmental contextual factors are policies and bureaucratic structures that influence teachers' work lives, such as through accountability and educational reform. Cultural attitudes and governmental factors can interact when it comes to social attitudes about the amount of respect and freedom given to teachers (Pearson & Hall, 1993). These factors also impact the contextual level of the school, where cultural and governmental factors may impact teacher autonomy and school leadership. Each of these factors is reviewed next in turn.

7.3.1 *Cultural Attitudes Involving Respect for Teachers*

Many cultures have traditionally extolled the role of the teacher, for example, in South Korea, teachers are viewed as “nation-builders,” while in Finland both men and women list teacher as one of the top three most desirable professions for their spouse (Goldstein, 2014, p. 4). In the U.S., being a teacher has become increasingly politicized, as teachers are both extolled as building future leaders, but are also labeled as incompetent and lazy when their students under-perform (Goldstein, 2014). Gaziel (1993) surveyed 224 Israeli Jewish and 149 Israeli Arab elementary teachers working in the Jerusalem school district about school factors associated with their occupational stress. Using a survey developed by the authors, it was found that Israeli Jewish teachers experienced more stress as a result of heavy involvement of parents, while Israeli Arab teachers experienced more stress resulting from living up to the higher status of teaching in Arab culture as compared to Jewish culture. This study was unique in the teacher stress literature since it examined two samples from the same country representing different cultures.

Results from the TALIS indicated that fewer than one third of teachers believed that teaching is considered to be a valued profession among members of society (OECD, 2014). In Croatia, France, the Slovak Republic, Spain, and Sweden, the case is more extreme, with only 10% of teachers believing that teaching is a respected profession (OECD, 2014). The Global Teacher Status Index report used a different metric for examining teacher status, asking how likely it is that respondents would encourage their children to enter the teaching profession; respondents in Brazil, Israel, Portugal, and Japan were the least likely to encourage children to become teachers, demonstrating lower status associated with the teaching profession (Dolton & Marcenaro-Gutierrez, 2013).

On the other hand, some countries have high levels of respect for teachers. Countries with the majority of teachers reporting that teaching is a valued profession include Korea, Malaysia, Singapore, and Abu Dhabi (OECD, 2014). The 2013 Global Teacher Status Index report indicates that in China, teaching is associated with high status and respect; teachers are considered to hold the same social status as doctors (Dolton & Marcenaro-Gutierrez, 2013). In Finland, teaching is the most respected profession; only about one quarter of the students who apply to teacher preparation programs are selected to join, and all teachers (aside from kindergarten) must obtain a master’s degree (Sahlberg, 2011). Taiwanese teachers also see teaching as a valued position: they receive a healthy salary and benefits, there is a culture of respect for teachers, and parents value education for their children (Wang & Fwu, 2014). Such cultural attitudes may impact the ways in which governments set policy for teachers, which is reviewed next.

7.3.2 *Educational Accountability and Reform*

Educational reform and accountability efforts are an international trend, founded on the purported need to prepare students for the reality of the global marketplace (Lambert & McCarthy, 2006). Tatto (2006) defined accountability thusly: “within the context of the global teacher reform, accountability is a term used to identify a number of actions (accreditation, standards development, curricular change, high stakes testing, credentials, career ladders, etc.) directed at identifying and enforcing ‘best practices’ in teacher education, development, and teaching” (p. 235). Accountability movements often coincide with educational reforms, and researchers in Sweden (Molin & Grubbström, 2013), Norway (Baran, 2012), China (Yang et al., 2009), and Turkey (Ertkin & Kisa, 2012) have noted that curriculum reform can add to teacher stress.

While teachers certainly have the capacity to adapt to change in their environments, the pace of reform in education is often “unrelenting and even repetitive” (Day & Smethem, 2009, p. 149). Teachers must sometimes adapt to new policies that are, in the next year, scrapped entirely, only to be replaced by new policies that teachers must learn to incorporate (Day & Smethem, 2009). Many times, teachers are not adequately trained on how to implement new policies, and some are arguing for groups to help educators sift through the policies, investigating which are helpful and unhelpful, rather than focusing on blind compliance (Day & Smethem, 2009). Thus, teachers’ capacity and strategies for dealing with stress might become overwhelmed in such an environment.

Berryhill, Linney, and Fromewick (2009) found that U.S. elementary school teachers perceived that accountability practices contributed to a range of negative consequences. For example, lack of time for imparting all educational standards in the daily schedule led teachers to experience role conflict. Teachers’ sense of efficacy was also undermined by a perception that test scores were influenced by factors outside their control, such as student home conditions that could impact learning. Likewise, Cruz and Brown (2010) found similar results. They studied 192 elementary teachers from 12 schools in South Texas, U.S. and found that participants experienced high levels of pressure to improve tests results and that the content of the test drove their curriculum.

However, research has not consistently linked accountability measures to teacher stress. Desimone (2013) used interview data from 32 schools in the U.S. and found that standards-based reform elicited positive change in teachers’ increased attention to struggling learners and drove needed changes in their curriculum. Research using the Schools and Staffing Survey (SASS), which is administered every few years to U.S. teachers, has shown little difference in teachers’ workload or self-reported levels of demands before and after implementation of the No Child Left Behind (NCLB) legislation enacted in 2002. Lambert et al. (2015) examined elementary teachers’ perceptions of the sufficiency of their classroom resources and demands using SASS 2000 and 2008 data, and noted few changes between the waves. Grissom et al. (2014) used four waves of SASS data from 1994 to 2008 and found

positive trends in job satisfaction and commitment reported by teachers, which they found unexpected since NCLB had been enacted in the intervening years.

The evidence reviewed here for the impact of accountability standards on job satisfaction and stress is equivocal. However, it seems clear that accountability movements are associated with the amount of autonomy afforded teachers (Goldstein, 2014). This topic is further examined as a source of stress in the next section.

7.3.3 *Teacher Autonomy*

Autonomy can be defined as teachers' freedom and power to engage in decision-making at work, which includes decisions about their teaching methods and ways of assessing students, about their school and its policies and administrators, and about routine and decisions at the school and classroom level (Friedman, 1999; Pearson & Hall, 1993). In the United States, teacher autonomy usually converges around two typologies: school influence (teachers' perception that they have an influence over school-wide policies and decisions) and classroom control (teachers' perception that they have control over their instructional practices) (Jackson, 2012; Lambert et al., 2015; Pearson & Hall, 1993).

Research studies indicate a consistent relationship between teacher autonomy and occupational stress. Teachers who perceive their workplace as full of burdensome procedures and bureaucracy are associated with greater risk for stress because they perceive a lack of autonomy as a threat to their professional control (Smylie, 1999). Incorporating the Teaching Autonomy Scale, Pearson and Moomaw (2005) analyzed a sample of U.S. teachers' perceptions of autonomy in association with various professional outcomes including stress, professionalism, job satisfaction and empowerment. In accordance with the literature, they found teacher autonomy to be multidimensional; coalescing around two constructs: curricular autonomy in their classroom, and general autonomy at the school level. Both dimensions of autonomy negatively correlated with teacher stress, while positively correlating with teacher professionalism and job satisfaction. Both small-scale and larger scale studies of U.S. school teachers have reported similar findings: risk for stress and stress-like symptoms such as burnout are associated with teachers' perceptions of professional autonomy (Farber, 1991; Lambert et al., 2015; Smylie, 1999).

The reviewed research suggests that increased autonomy can improve aspects of teachers' work lives and occupational health. Additionally, low autonomy or control for teachers can lead to a number of detrimental consequences, including stress and burnout. Karasek and Theorell's (1990) Job Demand-Control (JDC) model and its expanded version, the Job Demand-Control-Support (JDCS) model (Johnson & Hall, 1988) posit that when teachers are faced with low job control and high demands, they are most likely to suffer from ill mental and physical health. This model served as the foundation behind Verhoeven, Maes, Kraaij, and Joekes' (2003) EUROTEACH study, which applied the JDCS model across 13 European countries

to a sample of 2,182 secondary school teachers. The study found that the JDCA model applies cross-culturally, with demand and control serving as significant predictors of job satisfaction and emotional exhaustion across countries (Verhoeven et al., 2003, see also Chap. 9).

Globally, many countries do not afford teachers autonomy in their work roles. In the post WWII era, for example, teachers in England had a considerable amount of autonomy, but starting with the rise of the conservative movement in the 1980s, the British government prescribed the material teachers must teach, increasing the level of accountability for teachers (Whitty & Wisby, 2006). Swedish teachers have likewise become more restricted in their professional autonomy in recent years, with more control and decision-making coming from principals and superintendents (Wermke & Höstfält, 2014). In a comparative study of U.S. and Chinese science teachers, Chinese teachers reported even less autonomy over classroom and curriculum decisions than U.S. teachers (Robertson & Jones, 2013).

It is interesting to note apparent inconsistencies in cultural respect and the level of autonomy afforded teachers. While U.S. teachers have more autonomy than in China, the 2013 Global Teacher Status Index (Dolton & Marcenaro-Gutierrez, 2013), which collected data on citizens' perceptions of teacher's occupational status, compensation, and ability to provide educational services across 21 countries, found that China consistently ranked the highest among 21 countries, including the U.S., in terms of teacher status and respect (Dolton & Marcenaro-Gutierrez, 2013). In China, while teachers are regarded with high status and respect, they must abide by standardized goals, curriculum, and methodologies in their teaching practice, and thus are afforded lower autonomy (Richardson, Karabenick, & Watt, 2014). Teacher authority and the ways in which accountability mandates pervade school working conditions are largely influenced by school administrators, and this literature is reviewed next.

7.3.4 School Leadership

Principals in the United States serve as the “brokers” of educational policy and the most important caretakers of workplace climate (Johnson, 2004). The school administrators' leadership style is, in part, associated with their view of the workplace motivation and human nature (McGregor, 2006; Owens, 2004). Leadership can be organized around two orientations: transactional and transformative (Bass, 1990; Leithwood, 1994). Principals who ascribe to a transactional style believe that teachers dislike work in general and require micro-management are likely to adopt an authoritarian position. They make unilateral decisions and use rewards and sanctions to compel teachers.

On the other hand, principals adopting a transformative leadership respect the views of staff and approach decision-making more democratically. These more humanistic leaders recognize the opinions and perspectives of the faculty. They adopt a shared vision, distribute authority, communicate clearly, and recognize

success (Leithwood, 1994; Spillane, Halverson, & Diamond, 2001). Shields (2010) expands upon the concept of transformational leaders toward a transformative leadership style, contending that successful educational leaders also consider school context and make democratically-oriented decisions based upon the unique socio-cultural environment of the workplace. Research indicates that teachers tend to have a more favorable view of their administrators and higher overall job satisfaction when working within a climate of transformational/transformational leadership (Boyd et al., 2011; Johnson, 2004; Liu & Ramsey, 2008). Principals who are inclusive in their decision-making also foster supportive work environments that instill faculty esprit de corps, compliance, and reduce teacher mobility (Abbey & Esposito, 1985; Ingersoll, 2001; Johnson, 2004; Ladd, 2011).

International studies have likewise found a connection between stress and principal leadership style. Leadership style is operationalized in a number of ways in various studies. In a study of 128 elementary teachers in Pakistan, teachers experienced less stress under more democratic principals, and more stress under more autocratic principals (Tahseen, 2012). This study measured leadership style using the Principal Leadership Style Questionnaire (PLSQ), which has 30 items, 15 assessing an autocratic style and 15 assessing a democratic style, and measured stress using the Teacher Occupational Stress Questionnaire, which consists of 40 items measuring 8 different areas, including physical stress and teacher-student matters (Tahseen, 2012). In a study of 371 kindergarten teachers in Hong Kong, the more teachers perceived their school's principal as having a collaborative leadership style, the less likely they were to report mental health complaints (Wong & Zhang, 2014). Their study measured leadership style using the collaborative leadership subscale of a school culture measure and measured mental health complaints using a subscale of a larger general health questionnaire (Wong & Zhang, 2014). A study of 673 elementary teachers in Belgium found that principals who foster trusting relationships within their schools are more likely to prevent teachers' emotional exhaustion symptoms of burnout than those who fail to foster trust (Van Maele & Van Houtte, 2015). Burnout in this study was measured using the MBI and trust was measured using a seven-item scale asking teachers to answer specific questions about how much they trust their principal (Van Maele & Van Houtte, 2015).

7.3.5 Summary of Governmental and School Contextual Factors Associated with Teacher Stress

Tatto (2006) noted that trends towards accountability are spurred at least in part by the global marketplace in which nations seek to train workers to be competitive in a global economy, but research has yet to indicate that such systems actually achieve their intended goals. Research reviewed here suggests that in many countries, teachers perceive higher levels of stress due to such reforms, yet analyses of existing data set such as the SASS do not always reveal such differences. The research on autonomy afforded teachers seems to be clearer in nearly all of the research reviewed,

higher autonomy for teachers, particularly classroom/instructional autonomy, is associated with lower levels of stress for teachers. However, autonomy is not necessarily associated with levels of respect for teachers, and further investigation of this topic is warranted.

It is interesting to note that in both Western and Eastern contexts, democratic or collaborative leadership style tended to correlate with lower levels of stress, while more autocratic leadership styles were associated with higher levels of stress in teachers. It seems that even when more autocratic styles occur in cultures where an autocratic style is appreciated, it still is associated with higher teacher stress.

7.4 Conclusion

The literature reviewed in this chapter documents that teacher stress is an international phenomenon, with most studies focusing on nations with developed economies competing in a global marketplace. It is clear that many common threads connect teacher stress studies across nations: stress can reduce teacher job satisfaction, lead to higher levels of burnout symptoms, and ultimately impact teachers' decisions to leave the profession. While research in varying nations has documented the prevalence of teacher stress as affecting between one-fourth to one-fifth of teachers, there are fewer studies comparing the experiences of teachers in different nations and cultures. Further, much of the research conducted internationally focuses on the same few countries (the U.S., England, and other European countries, China, and Japan). The body of literature could benefit from more cross-country research, which could allow for a better understanding of the role of contextual factors in teacher stress, and which steps are most effective in combatting it. Further, a wellness perspective that focuses on teachers flourishing and the promotion of welfare is needed (Hepburn & Brown, 2001).

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Part II

Understanding Educator Stress from an Occupational Health Framework

Society tells us it must be our fault because the children are not accountable for anything, and if we can't hack it we should find another job. It isn't always that easy.

Teacher, personal communication, June 1st, 2014

The five chapters in Part II review the leading conceptual models in explaining educator stress, being novel in bringing together education and occupational health perspectives. The quote opening this section suggests that society tends to place the onus of responsibility of educator stress on educators, attributing educator stress and its sequelae to personal flaws such as a lack of competence or personal resilience. What is unique about the occupational health perspective is that it shifts the focus to the organization (e.g. work practices, organizational culture) and to worker health and well-being as being an organizational goal and responsibility rather than merely a personal endeavor. This shift has far-reaching implications in terms of intervention, moving goals from “managing” educator stress to “reducing” educator stress by addressing its causes, from remediation to primary prevention efforts directed at improving the education system of which educators are key players. Occupational Health Psychology (OHP) is a field of study that applies psychological theories and principles to improve worker health and well-being, being the conceptual-empirical reference for the three occupational stress models presented in this section and some of the intervention chapters in Part III. We believe that by bringing together educator-based and organizational-based models of work stress, the chapters in Part II will contribute to a more comprehensive understanding of educator stress, one that will inform more effective intervention development.

The opening chapter (Chap. 8) by Cameron Montgomery presents a theoretical-empirical model of teacher stress inspired by Lazarus’s general stress model (transactional model) and Kyriacou’s model of educator stress, which focus on the interaction of the educator with the work environment. The author summarizes results of a meta-analysis on educator stress that formed the basis for the model, and reviews a study on Canadian student teachers and another on university professors that provide empirical evidence for the proposed relations between stress, coping, and burnout. Chapters 9, 10, and 11 present organizational-based theories of work

stress and how they may be applied to a systemic understanding of educator stress, the leading conceptual framework in this book. The three models presented are the leading occupational stress theories, the sequence representing their chronological order in the history of occupational health research. The Job Demand-Control-Support (JDCS) model is the most widely used model of job stress and Chap. 9, by Margot van der Doef and Chris Verhoeven, reviews its empirical support, as well as evidence of its relevance, to explain educator stress internationally. Contributions of the Effort-Reward imbalance Model to educator stress and health are highlighted in Chap. 10 by its proponent, Johannes Siegrist. The model emphasizes social reciprocity, the chapter reviewing its implications for designing and implementing interventions in school settings. In Chap. 11, Toon Taris, Peter Leisink, and Wilmar Schaufeli describe the Job Demands-Resources Model (JDR) and its evolution since 2001, and present a focused literature review of its application to educator stress. This latest model has already generated a considerable amount of research in educators, seeming to integrate aspects of person and the work environment presented in the previous models. The last chapter (Chap. 12) by Teresa Mendonça McIntyre, Scott E. McIntyre, Christopher Barr, David Francis, and Angelia Durand presents a Dynamic Integrative Teacher Stress Model (DITS) that draws on education and occupational health perspectives, and is an attempt to account for the dynamic nature of educator stress. Teachers work in complex and ever-changing environments with important hourly, seasonal and yearly variations. The chapter describes the validation of the DITS model using momentary teacher stress data collected via an iPod-based diary (ecological momentary assessment). The model includes individual factors, those resulting from the interaction educator-environment and organizational aspects of the work environment. All models presented offer useful occupational health frameworks for understanding educator stress and its predictors, being able to inform intervention development efforts to address this problem, as illustrated in Part III.

Chapter 8

Development and Testing of a Theoretical-Empirical Model of Educator Stress, Coping and Burnout

Cameron Montgomery

Abstract An overarching Theoretical-Empirical Model of construct relationships of teacher stress is presented in this chapter. This model was validated by two studies, both published in French. The studies examined 245 francophone student teachers' stress, coping, and burnout, as well as 143 francophone university professors' stress, coping, locus of control, and burnout. The conclusions of these studies are now presented in English for the first time in this chapter. Conclusions and implications of the validation studies for future conceptualizations of educator stress are presented.

Keywords Stress • Coping • Educator stress • Theoretical-empirical model

8.1 Introduction

Conceptions of educator stress have evolved over the last 40 years. Lazarus and Folkman's (1984) frame of reference for stress and coping has led many researchers to empirically examine these constructs in educators composed of student teachers, teachers, and university professors. Lazarus and Folkman's conception of stress and coping has evolved into other related models and frames of reference (e.g. Kyriacou, 2001), including such constructs as burnout (Guglelmi & Tatrow, 1998). In this chapter, we will revisit the initial conceptions of stress, coping, and burnout. The first part will revisit, and highlight, results from Montgomery and Rupp's (2005) meta-analysis on stress, emotions, coping, and burnout. Next, we will examine and highlight results from Montgomery, Morin, and Demers' (2010a) empirical study of student teacher stress, coping, and burnout, followed by Montgomery, Morin, and

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Demers' (2010b) study on university professor stress, coping, locus of control, and burnout. Finally, based on the findings of these studies, implications will be drawn for the development of future conceptualizations of educator stress.

8.1.1 Conceptions and Definitions

The conceptions and definitions of educator stress, coping, and burnout, as defined at the time of the three original studies, (Montgomery & Rupp, 2005; Montgomery, et al., 2010a, 2010b) must first be outlined before revisiting and highlighting salient results from each study.

Stress Montgomery and Rupp's (2005) definition of stress stemmed from several different sources. They used Derogatis's (1987) definition of stress, which pertains to the conceptualization of stress as a response. They also incorporated Kyriacou's definition of teacher stress as an experience of unpleasant, negative emotions, such as anger, anxiety, tension, frustration or depression resulting from work. They further used Lazarus and Folkman's transactional model of stress and coping (1984), which considers stress as a transaction between the person and the environment. Within this transactional model a person first evaluates a potential threat which is named primary appraisal. Next, secondary appraisal is an assessment of the persons' coping resources and options. Finally, coping is the third stage whereby the individual makes efforts to regulate the problem or threat.

Coping Montgomery and Rupp (2005) also used several sources for the concept of coping. According to Kyriacou (2001), coping mechanisms, personality traits, and the environment interactively influence the degree to which stressful situations are perceived and a teacher's emotional and cognitive well-being. According to Chan (1998), stress reactions are not just dictated by external stressors, but are determined through coping mechanisms and strategies that act as moderators between stress and burnout. Moreover, active coping strategies were categorized by this author as rational problem solving and seeking support/ventilation, whereas passive coping strategies were categorized as resigned distancing and passive wishful thinking.

Daily events predict changes in stress level better than major life events, and individuals will use cognitive and behavioral strategies of adaptation to deal with a given stressful event (Lazarus & Folkman, 1984). According to Lazarus and Folkman's (1984) transactional model of stress and coping, the primary process in coping is the appraisal of the event, which determines whether it is stressful or benign. The secondary process is a cognitive evaluation of the personal and environmental resources available to the individual to address the stressful event. Coping may take the form of problem-focused coping or emotion-focused coping (Admiraal, Korthagen, & Wubbels, 2000). According to Admiraal et al., problem-focused coping is directed at managing or altering the problem that causes the distress, whereas emotion-focused coping aims to regulate the individual's emotional response to the problem, rather than alleviate the problem itself. Kyriacou (2001) further defined

teacher coping as direct-action or problem-solving techniques that a teacher may use to eliminate the source of stress, and mental or physical palliative techniques (emotion-focused) that a teacher may use to lessen feelings of stress. Montgomery et al. (2010a, 2010b) used Carver (1997) in their definition and operationalization of coping strategies that are functional, variable, or dysfunctional which encompass different theoretical models of coping (e.g. Admiraal et al., 2000; Carver, 1997; Kyriacou, 2001; Lazarus & Folkman, 1984).

Burnout Maslach and Jackson (1981) defined burnout as a psychological syndrome involving three components (emotional exhaustion, depersonalization, and a diminished sense of personal accomplishment) occurring among professionals who work with other people. For the purposes of all three studies (Montgomery & Rupp, 2005; Montgomery et al., 2010a, 2010b), burnout was measured by Maslach's Burnout Inventory for educators (Maslach & Jackson, 1981), which includes three dimensions: emotional exhaustion, depersonalization, and lack of personal accomplishment. Burnout may be experienced as a result of stress itself, moderating an individual's coping mechanisms, or the ineffectiveness of their coping mechanisms over a period of time as measured by the average of three scales (Guglielmi & Tatrow, 1998; Vandenberghe & Huberman, 1999).

8.2 Highlights from Three Articles

8.2.1 *A Meta-analysis for Exploring the Diverse Causes and Effects of Stress in Teachers*

Montgomery and Rupp (2005) developed a theoretical-empirical model of teacher stress based on a meta-analytic investigation and summary of the relationships between psychological stress and its related constructs, as identified in the scientific research literature on student teachers and teacher stress between 1998–2003. Montgomery and Rupp's (2005) findings allow researchers to understand the connections between stress and other constructs within the stress cycle by identifying relationships that merit closer investigation. Constructs of the stress cycle include: coping mechanisms, personality traits, emotional responses, environmental effects, and burnout. Through the meta-analysis, existing theoretical stress models were examined, discussed, and synthesized to map empirical relationships amongst the constructs, which were then represented in a finalized model of the stress cycle. In particular, the relationship between three key constructs of the stress cycle—stress, coping, and burnout—was highlighted.

A total of 65 independently written or published quantitative studies were selected out of 211 and examined through the meta-analysis leading to the construction of the Theoretical-Empirical Model of teacher-stress construct relationships. Articles were located through a computer search of international databases housed in North America such as PsychInfo, Eric, Sociofile, Canadian Periodical Index,

Index-Cpi.Q, Infotrac, Digital Dissertations, Current Contents, Ontario Scholars Portal, Francis, and Merlot as well Google, Metacrawler, and Yahoo. Articles were also selected in data banks housed in Germany and Repere in France. The selection criteria for the articles were that the population had to include either teachers or student teachers and the central concepts included either stress or coping or both.

8.2.1.1 Literature Review of Stress, Coping and Burnout

Kokkinos and Stravopoulos (2014) examined the link between practicum-related stressors, perceived general practicum stress, personal variables (general and teaching self-efficacy, epistemological beliefs, conceptions about teaching and learning, and trait anxiety) and burnout dimensions in 174 Greek student teachers. The study also sought to identify the best predictive combination of the studied variables for each burnout dimension. Participants who reported high general practicum stress indicated moderate levels of emotional exhaustion, low depersonalization, and high personal accomplishment. Results revealed that emotional exhaustion and personal accomplishment were predicted by practicum workload, whereas depersonalization was predicted by teachers' epistemological beliefs (i.e., learning process) and practicum-related stressors (i.e., meeting pupils' needs).

Martinez Ramon (2015) studied the way that 221 secondary school teachers in Spain dealt with stress by analyzing the relationship between burnout and coping strategies. He found that negative self-targeting strategies and open emotional expression are associated with more burnout, contrasted with a focus on solving the immediate problem and positive reappraisal, which are associated with greater personal fulfillment at work. Teachers most often used problem-focused strategies, positive reappraisal (i.e. seeing the positive side of adversity and putting the problem in perspective), and social support seeking. Open emotional expression (e.g. hostile acts such as irritation, physical violence, or moodiness) and social support seeking were more commonly employed by women. Social support seeking was used more by teachers under the age of 35, but use of this coping strategy decreased with age.

Gomes, Faria, and Gonçalves (2013) analyzed the mediating role of cognitive appraisal in the relationship between occupational stress and burnout in 333 academic teaching faculty at a university in Portugal. Structural equation modelling was used to test the relationship between appraisals, stress, and burnout in order to understand the factors that explain why some staff seemed to overcome difficulties with no apparent negative consequences, whereas others tended to react in a more dysfunctional way. The authors found that staff had perceptions of distinct sources of stress on their work activity. They also found a relationship between stress, cognitive appraisal, and burnout. Primary and secondary cognitive appraisals which measure how a person evaluates the personal significance of a situation and the extent to which an individual feels able to cope with the demands of a work activity partially mediated the relationship between stress and burnout at work, making the relationship between these variables a promising underlying mechanism to explain

responses to work-related stress. The main factors contributing to stress were work overload, a need to increase scientific productivity, and home-work interface. Stress was positively correlated with threat perception and negatively related to challenge perception. Stress was also negatively related to coping potential and control perception. In terms of the relationship between stress and coping, the authors found evidence that lower levels of occupational stress were related to the use of coping strategies that focus on problem solving, such as active coping and positive appraisals of work. In contrast, findings showed that feelings of distress were related to the use of less desirable coping strategies, such as avoiding problems. Threat perception was positively related to burnout, while challenge perception, coping potential, and control perception were negatively related to burnout.

Roeser et al. (2013) tested the feasibility and efficacy of a professional development program for 113 mostly female elementary and secondary school teachers from Canada and the United States that aimed at the reduction of job stress and symptoms of burnout through mindfulness training (MT) measured at baseline and 8 weeks later through a take home survey, blood pressure, and a journal. Eighty-seven percent of teachers completed the program and found it beneficial. Compared to the control group, teachers randomized to MT showed greater mindfulness, focused attention and working memory capacity, and occupational self-compassion, as well as lower levels of occupational stress and burnout at post-program and follow-up several weeks later. No statistically significant differences due to MT were found for physiological measures of stress. Mediation analyses showed that group differences in mindfulness and self-compassion at post-program mediated reductions in stress, burnout, and symptoms of anxiety and depression.

Klassen and Chiu (2011) examined occupational commitment and quitting intention of 434 practicing teachers attending a conference in Canada and 379 student teachers at a large public university in western Canada. These authors used a cross-sectional survey design to examine the impact of teachers' self-efficacy, job stress, and contextual factors on occupational commitment and quitting intentions. Similar factors—self-efficacy, job stress, and teaching context—influenced the occupational commitment and quitting intention of practicing and pre-service teachers. Pre-service teachers displayed higher levels of commitment and less overall stress than practicing teachers.

Parker, Martin, Colmar, and Liem (2012) examined 430 Australian teachers' workplace well-being through a process model of goal orientation, coping behavior, engagement, and burnout. A strong association was found between failure-avoidance/emotion-focused coping, greater burnout, and lower engagement. From a self-worth and goal theory perspective, these findings can be explained as a natural outcome of failure avoidance/emotion-focused coping patterns. These result in poorer well-being due to a greater likelihood of failure, poorer adaptation to achievement within the work environment, self-reinforcement of emotion-focused coping, and the inadequacy of coping strategies associated with failure avoidance in protecting self-worth over time. The authors presented pathways to well-being as a process where goal orientation predicted coping behaviours, which, in turn, predicted well-being.

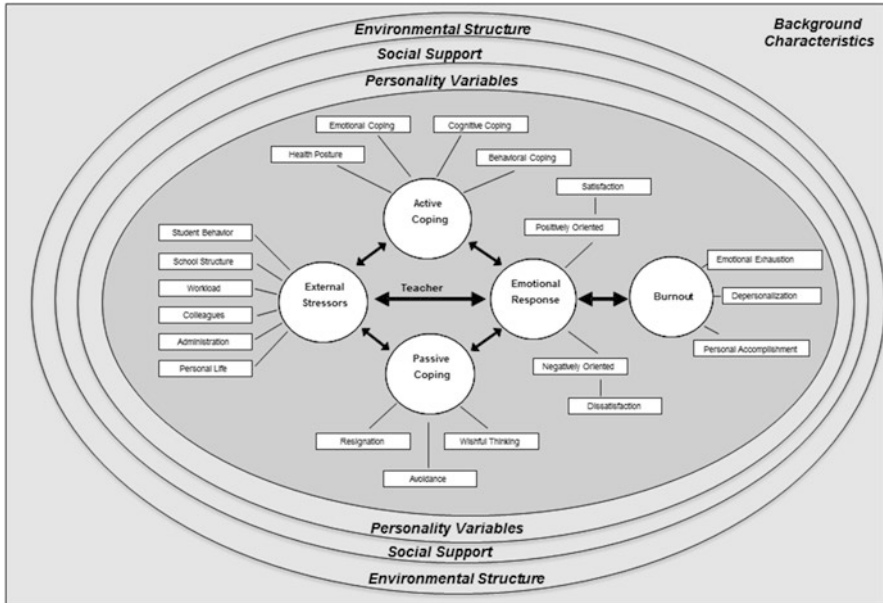
McCormick and Barnett (2011) examined 416 teachers' attributes for stress and their relationships with burnout in New South Wales, Australia. Their results suggest the view that stress and burnout were overwhelmingly psychological phenomena. Next, stress was related to student misbehavior and predicted each of the three dimensions of burnout: depersonalization, emotional exhaustion, and personal accomplishment. Occupational stress attributed to personal failing also negatively predicted personal accomplishment. The authors suggested that experiencing consistently high levels of stress due to an inability to manage student behavior is tantamount to failure and likely to be associated with depersonalizing students, experiencing a range of negative emotions, and a diminished sense of accomplishment. This research suggests that programs designed to assist teachers identified, as being at risk of burning out should focus on improving management of student behavior.

As one can see from the above studies, research on educator stress has included three main constructs interchangeably notably stress, coping and burnout. However, the sub-constructs and definitions of these three core concepts vary. In the following section, Montgomery and Rupp (2005) will conceptually capture and empirically measure these three core constructs.

8.2.1.2 The Model

Montgomery and Rupp (2005) developed a comprehensive model of key construct relationships (see Fig. 8.1). Within the model, the teacher or individual process is placed at the core in relation to personality variables, personal support, and environmental structure which are represented in the outside rings. Although the sources of teacher stress that constitute the external stressors will vary, the model portrays universally applicable relationships of the stress cycle that may be useful in research in other domains outside of education. The processes of the model are explained below.

As seen in Fig. 8.1, the teacher, at the core of the model, first experiences and appraises the external stressful events or "stressors" as either harmful or threatening in both their professional and personal life. External stressors might include student behavior, the school structure, workload, colleagues, administration, or events in the teacher's personal life. Secondly, the teacher engages in either active or passive coping mechanisms. Active coping involves: cognitive strategies, such as changing perspective or exerting self-control; behavioral strategies, such as seeking advice from others or engaging in relaxation exercises; or emotional strategies, such as staying calm or thinking positively. Passive coping strategies might include resignation, drinking alcohol, wishful thinking, or avoidance. The teacher may experience a response as the result of using, or not using, coping mechanisms to deal with the stressful event, or from the stressful event itself. This response may involve either a positive (e.g., hope, enjoyment, passion) or negative experience (e.g., anxiety, frustration, depression), leading to satisfaction or dissatisfaction. Montgomery and Rupp (2005) noted that while satisfaction or dissatisfaction may occur before or



Theoretical-empirical Model of Construct Relationships of Teacher Stress

Fig. 8.1 Theoretical-empirical model of construct relationships of teacher stress

after burnout, within the Theoretical-Empirical Model presented, this stage is placed prior to burnout. Burnout is at the final stage of the model and expresses itself via the three dimensions of emotional exhaustion, depersonalization, or personal accomplishment. The model differs from other theoretical models such as Lazarus and Folkman’s and Kyriacou’s in that it is bi-directional and holistic including stress, coping and burnout, outer rings, and a breakdown of the three core variables (i.e stress, coping and burnout).

The intra-individual relationships between the constructs within the stress cycle are strongly influenced by personality variables, social support, and environmental structure in the outer rings of the model. The process of primary and secondary appraisal may be influenced by personality variables such as negativity and neuroticism. Relationships between the external stressors, coping and burnout are influenced by the degree to which individuals feel socially supported with their boss and colleagues, and with their spouse, children (i.e family) and friends. The model also represents an environmental structure with characteristics of the individual’s environment, such as the teachers’ grade level, average class size, or type of school. As depicted in the model, background variables such as sex, educational qualifications, and years of experience comprise an individual’s stable characteristics that may influence the intra-individual process of dealing with stressful events.

The meta-analysis indicated that stress, personality variables, emotional responses, social support variables, and burnout are interrelated (for effect sizes, see Table 3 Montgomery & Rupp, 2005). Montgomery and Rupp (2005) also found that there is a correlation between negative emotional response variables and burnout. This meta-analysis and the resulting theoretical-empirical model achieved an important step towards examining the relationships between stress and other widely studied constructs, and may be applicable to other contexts or domains to understand stress and its relationship with other constructs. It is unique in that it provides evidence of the strength of certain conceptual relationships and the sub-concepts that are interconnected. For example, it suggests a novel path and direction for research in that teachers who are experiencing stress and use passive coping strategies are more prone to experience both negative emotions and dissatisfaction and ultimately experience some form of burnout.

The theoretical-empirical model developed through the meta-analysis (Montgomery & Rupp, 2005) was applied to two studies (Montgomery et al., 2010a, 2010b) to test its relevance. The first study was published in French and examined the relationship between stress, coping strategies, and burnout in 245 francophone student teachers in the primary and secondary teacher education program at the University of Ottawa (Montgomery et al., 2010a). The second study, also published in French, applied the model to examine the relationship between stress, coping strategies, locus of control, and burnout in 143 francophone university professors (Montgomery et al., 2010b). The French translations of three measures—the Teacher Stress Inventory (TSI), the Brief COPE, and the Maslach Burnout Inventory (MBI-Ed)—were used in both studies to identify sources of stress, the most frequently used coping strategies and feelings of burnout. The TSI (Fimian, 1984) examines sources of stress and how they manifest behaviorally and physiologically for educators. The Brief COPE (Carver, 1997) evaluates educators' coping responses to stress on a scale that ranges from functional to dysfunctional strategies. Finally, the MBI-Ed (Maslach, Jackson, & Leiter, 1996) assesses the degree to which evaluators experience symptoms of burnout and both the total scale and sub-scales were used. Structural equation models were used to test and validate the French translations of the TSI, Brief Cope and the MBI-Ed.

The validation results in the student teacher study showed that most of the scales and sub-scales were above .70 for all three questionnaires (i.e. Cronbach's Alpha). However, certain sub-scales were below .70 in the TSI and needed to be eliminated (i.e. Behavioral Manifestations and Manifestations of Fatigue). Also, 8 out of 14 sub-scales were below .70 in the Brief Cope questionnaire and were therefore eliminated from further analyses (i.e. distraction, active coping, denial, disengagement, expression of emotions, humor, blame and acceptance).

In the professor study, Cronbach's alpha was consistently high for all three questionnaires (i.e. above .70) except for the "Behavioral manifestations" and "Manifestations of fatigue" sub-scales of the TSI. Four of the Brief Cope's sub-scales were below .70 threshold and eliminated namely: distraction, active coping, expression of emotions and acceptance.

8.2.2 Francophone Elementary and Secondary Student Teacher Stress, Coping, and Burnout

In the first study, Montgomery et al. (2010a) confirmed that coping strategies act as moderators in relationships between stressors and burnout. These participants were 245 francophone student teachers in their first placement phase of the primary and secondary teacher-training program at the University of Ottawa in Ontario, Canada. Participants completed a four-part questionnaire comprised of the TSI, MBI-Ed, and Brief COPE in the fall term of 2005. The response rate was 65.7%. Contrary to other studies with student teachers who trained in Canadian institutions (Brember, Brown, & Ralph, 2002; Chan, 2003; Friedman, 2000; Greer & Greer, 1992; Murray-Harvey et al., 2000), the results of this study indicate that linguistic minority francophone student teachers's stressors score in the mid range when compared with the norms identified by the authors of the original testing instruments. Identified sources of stress were linked to the accelerated nature of the eight-month teacher education program at the University of Ottawa, which was perceived as limiting students teachers' abilities to accomplish their goals within the program. Otherwise, francophone student teachers appeared to be experiencing few sources of stress and score lower in terms of burnout than those identified in the previous studies listed above. Background characteristics, such as sex were also found to be factors associated with the student teacher's choice of coping mechanisms. For example, female student teachers used the following coping mechanisms more frequently than their male colleagues: distraction, emotional support, instrumental support, expression of emotions and acceptance. Male student teachers use the following coping mechanisms more frequently than females: active coping, denial, substance use, positive reinterpretation, humor and blame. Disengagement, planning and religion were used equally by both male and female student teachers. Religion was used more frequently as a coping mechanism by those having chosen teaching as a second or third career.

Consistent with trends identified in previous research, our results indicate that respondents' characteristics and environmental factors are contributing factors in the relationships amongst the stress cycle constructs. Sex was determined as a key factor in stressors, coping, emotions, and burnout. Female student teachers perceived more stressors than did male student teachers, but men were more likely to show signs of depersonalization (Byrne, 1999; Schwarzer, Schmitz, & Tang, 2000). The results of Montgomery et al. (2010a) also indicate that female student teachers make greater use than male student teachers of functional coping strategies, such as emotional support, instrumental support, and emotional expression. This confirms trends identified in the literature that suggest that women are more responsive to social support and relationships with colleagues, and so pursue more social supports than men (Brember et al. 2002; Meierjürgen & Paulus, 2002; Piko, 2001; Schonfeld, 2001; Van Emmerik, 2002; Wilson, Pritchard, & Revalle, 2005). Variables associated with environmental factors in the model (Montgomery & Rupp, 2005), such as teaching level, also demonstrated influence with respect to coping. For example, student teachers in the elementary stream were found to consume more alcohol than

those in secondary schools. The timing of the student-teacher training program also potentially influenced how “acceptance” was identified as a favorable coping mechanism for participants in the study. Stressors may indeed have been conditioned by the limited timeframe—i.e., the short-term internship format of the practicum—within which student teachers were expected to learn and teach.

The results of this study are limited to the self-report characteristic of its methodology. Self-report was used to assess levels of stress in the student-teacher participants. This approach is inherently limited, and could be improved in future studies through a multi-method approach that includes a more objective indicator for assessment, such as independent observers. Moreover, using physiological measures would be even more salient such as Cortisol and heart rate (see Chap. 4).

Nevertheless, the authors concluded that, although the results from this study suggest that student teachers in elementary and secondary education are not overly stressed, the fact remains that many preservice and early service teachers do experience high levels of stress. The study indicates that coping strategies differ by sex and teaching level, and may be examined in future studies to develop further understanding of the relationship between the three core concepts of stress, coping and burnout.

8.2.3 Francophone University Professors’ Stress, Coping, Locus of Control, and Burnout

The second study, Montgomery et al. (2010b) provides further empirical support for the Theoretical-Empirical Model of the stress cycle developed in Montgomery and Rupp (2005) through an inquiry into the stress, coping strategies, locus of control, and burnout symptoms of francophone university professors. Data for this study were collected through a questionnaire derived from the French translations of the Teacher Stress Inventory (TSI) (Fimian, 1984), the Brief COPE (Carver, 1997), and the Maslach Burnout Inventory (MBI-Ed) (Maslach et al., 1996), and the Work Locus of Control Scale (WLCS) (Spector, 1988), which had been used in previous similar studies (Leung, Siu, & Spector, 2000). One-hundred-and-forty-three Francophone professors from diverse departments at the University of Ottawa and Laurentian University in Ontario, Canada, completed these questionnaires with a 15% response rate for the first institution and a 10% response rate for the second. The results indicate that, contrary to previous research on the topic (Gillespie, Walsh, Winefield, Dua, & Stough, 2001; Hogan, Carlson, & Dua, 2002; Kinman, 2001; Leung, Siu, & Spector, 2000; Taris, Schreurs, & Van Iersel-Van Silfhout, 2001; Winefield et al., 2003; Winefield & Jarrett, 2001), levels of stress and burnout were no greater in francophone university professors than in teachers in the United States and Canada. Furthermore, the study found that background characteristics such as age and sex are also influential in the relationship between the stress, coping and burnout. More specifically, female professors use five coping strategies more frequently than their male counterparts: distraction, emotional support, instrumental support, self-blame, emotional venting. In terms of age differences, older professors use planning more than

their younger counterparts (i.e. those under 50 years old). Professors between 40 to 50 years old experience the highest amount of work stress than those under 40 and those older than 50. Finally, professors who are 50 years old and up experience fewer emotional manifestations compared to their younger colleagues.

According to the study, coping strategies labelled as “functional,” as opposed to those considered “dysfunctional,” were favored amongst francophone university professors. Participants reported frequently using functional coping strategies such as positive reframing, acceptance, active coping, and planning as mechanisms for dealing with stress. Dysfunctional coping strategies such as denial, substance abuse, and disengagement were rarely reported.

Background characteristics such as age and sex were found to be influential in the relationship between the constructs of the stress cycle for francophone university professors. Statistically significant differences were observed between male professors and female professors in regards to their use of coping strategies. More female than male respondents indicated that they use distraction, emotional support, instrumental support, self-directed blame, and emotional expression to deal with stressors. In terms of age, older professors were more likely than their younger colleagues to use planning and reframing strategies of coping with stress and less likely to use emotional expressions. The authors called for more research into how these background characteristics might impact the stress cycle.

As in the previous study, this study was limited by the self-report nature of the questionnaire. The authors suggested that professors who were less stressed might have been more likely to take the time to complete the questionnaire, which would therefore have biased the results. Furthermore, the multifaceted demands of the university professor’s profession—a combination of teaching, research, and perhaps management duties—is possibly inadequately captured through the quantitative research tools used in the study. Therefore, the authors called for future research integrating both quantitative and qualitative research methods to provide a more nuanced view of the stress cycle as it manifests in university level educators. However, the results of Montgomery et al. (2010b) suggest that coping strategies act as moderators between external stressors and symptoms of burnout in educators, and that background characteristics are also relevant to this process. This study supports some aspects of the Theoretical-Empirical Model of the stress cycle developed by Montgomery and Rupp (2005).

8.3 Discussion and Implications

This paper revisited three studies by Montgomery and colleagues (Montgomery & Rupp, 2005; Montgomery et al., 2010a, 2010b). It is important to highlight here what was learned from the original theoretical-empirical model and its empirical validation and how we see this model evolving in the future.

First of all, when reflecting upon our work one of the main strengths of the Theoretical-Empirical Model was that it was theoretically and conceptually

grounded. Moreover it had an international relevancy in that we used studies from all over the world. Next, the constructs were empirically measured and weighed thus giving the meta-analysis more specificity (i.e. the relationship between stress, dysfunctional coping strategies, negative emotions and burnout), which offers future research on educator stress a way to compare results. We then validated the empirical-theoretical model through two follow-up studies thus offering the scientific literature a snapshot into the phenomenon of teacher stress and paving the way for other empirical studies that wish to compare our results with their own.

Indeed, the theme of educator stress is rarely examined by itself through a meta-analysis because of its vast nature and varying methodologies found in the scientific literature. Moreover, educator stress comprises distinct populations such as student teachers, teachers, college professors and university professors. We attempted to confront this gap in the scientific literature through the initial meta-analysis on both student teacher and teacher stress, and then follow up with two empirical studies that validated the main constructs only (i.e stress, coping and burnout).

The model is limited in practical terms when conducting research in the field (i.e. through questionnaires, or open-ended interview, or both) because one can only measure certain constructs of the model (i.e one cannot measure constructs all of the time). For example, in our two follow up empirical validations we examined stress, coping and burnout in student teachers, but we examined stress, coping, locus of control and burnout in professors. It was indeed difficult to include other variables such as satisfaction, personality variables, social support, etc. because they would have made the questionnaire too long and arduous for our participants, thereby possibly leading to a lack of participation. A choice was made to validate these three core concepts of stress, coping and burnout, which were the core concepts of the original model. They were proven to correlate through the structural equation models, in both studies (Montgomery et al., 2010a, 2010b). Another lesson learned is that there is a plethora of research instruments in the scientific literature on all three themes (i.e. stress, coping and burnout) therefore making it complex, if not impossible, to generalize when compiling results.

It would be relevant to create an updated theoretical-empirical model of educator stress and measure the weight of each of the constructs and sub-constructs through a meta-analysis comprising student teachers, teachers, college professors and university professors over the past 11 years since the time of publication of the last meta-analysis. Moreover, a follow-up longitudinal study validating the main constructs with these four populations (i.e, student teachers, teachers, college professors and university professors) would be more salient when trying to include some of the sub-concepts of the original theoretical-empirical model of stress because one would have multiple opportunities to administer questionnaires and measure the results over time. Comparing different environments (i.e, rural and urban), gender and linguistic minority and majority populations (i.e Francophones and Anglophones in Canada, Hispanics and English speaking populations in the United States) would also be an important consideration when trying to implement the original theoretical-empirical model of stress, coping and burnout and test its validity across these different variables.

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Chapter 9

The Job Demand-Control (-Support) Model in the Teaching Context

Margot van der Doef and Chris Verhoeven

Abstract This chapter focuses on the Job Demand-Control (JDC) model and its expanded version, the Job Demand-Control-Support (JDCS) model, and stress in teachers. First, we elaborate on the JDC(S) model and its main hypotheses: the *(iso) strain hypothesis*, the *learning hypothesis* and the *buffer hypothesis*. In addition, two important issues in research on the model are discussed: the value of occupation-specific assessment and the so-called ‘matching hypothesis’. The majority of studies on teachers have examined the (iso)strain hypothesis and the buffer hypothesis in relation to a variety of stress outcomes, ranging from physiological stress responses to reduced physical and mental well-being indicators such as somatic complaints, low job satisfaction, and burnout. Overall, there is substantially more support for the (iso)strain hypothesis than for the buffer hypothesis. The learning hypothesis has only been examined in a few studies, yielding mixed results. More recent developments, such as the incorporation of individual characteristics (e.g., job tenure, time management behavior) and additional work aspects (e.g., emotion work) in the model are discussed. Finally, conclusions regarding the contribution of the model in the explanation of teachers’ stress are drawn taking methodological aspects into account, and suggestions for future research and practice are provided.

Keywords Job demand-control (-support) model • Teachers • Occupational stress • Burnout • Job satisfaction

Teaching is generally considered as a stressful occupation (see e.g., Gugliemi & Tatrow, 1998) and this recognition has triggered substantial research to illuminate which factors contribute to teachers’ stress. To explain and examine occupational stress various theoretical models have been developed. This chapter will review the research on teachers’ stress that has been conducted using one of the most prominent occupational stress models: the Job Demand-Control (JDC) model, and its expanded version, the Job Demand-Control-Support (JDCS) model. The original

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JDC model was developed by Karasek in 1979, and has since prompted numerous studies involving employees from diverse occupational groups, and examining a multitude of different outcomes.

In this chapter, we will start with a description of the JDC(S) model and its hypotheses. In addition, the main findings of research using this model will be summarized. Within this context, the focus will be on the operationalization and assessment of the constructs, and the value of occupational-specific measures will be discussed. Furthermore, the so-called ‘matching hypothesis’ will be introduced. Next, we will shift to research focusing on teachers, and provide an overview of the studies done in this occupational group based on the JDC(S) model. It will be indicated to which extent the JDC(S) model receives support in teachers’ samples, in relation to outcomes ranging from physiological measures, to burnout and mental disorders. The more recent studies extending the JDCS model with other job characteristics, and studies examining the role of potential moderators in the model will also be presented. General conclusions regarding the value of JDC(S) research for this specific occupational group will be drawn and issues for future research will be addressed.

9.1 Job Demand-Control (-Support) Model

In 1979, Karasek published a seminal article describing the Job Demand-Control model and providing the findings of a first test of this model on national survey data from Swedish and United States employees. Karasek developed this model to explain the contradictory findings reported in the literature regarding the impact of job demands. Whereas some studies indicated a positive relationship between job demands and negative outcomes, other studies failed to find this association. This led Karasek to believe that a moderator should be in place, which determined the impact of job demands. He put forward job control as a crucial factor at play, and developed the JDC model.

The key premise in the JDC model is that employee outcomes are considered to be a consequence of two job characteristics: the level of job demands and the amount of job control an employee has (see Fig. 9.1). Job demands refer to the workload,

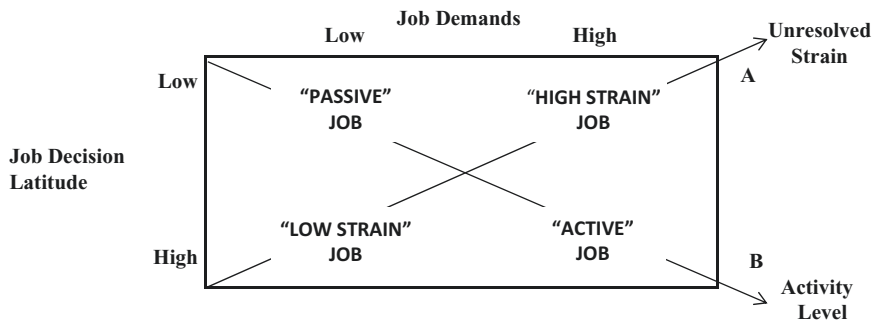


Fig 9.1 Job strain model (Reproduced from Karasek, 1979, p. 288)

and have been operationalized mainly in terms of time pressure and conflicting demands (Karasek, 1985). Job control, also labeled as decision latitude, refers to the opportunities an employee has to control his work activities. Decision latitude includes two elements: the breadth of skills used by the employee on the job (skill discretion) and the employee's authority to make decisions on the job (decision authority). Both elements are considered to enable the employee to influence his work, have been shown to co-occur in jobs, and were therefor initially often combined in one global measure of job control (Karasek & Theorell, 1990; van der Doef & Maes, 1998, 1999b).

It is important to highlight that the focus of the JDC model is exclusively on the work situation, i.e. the psychosocial job characteristics, as a determinant of employee outcomes. The two central assumptions of the model are represented by the diagonals in the figure. The first process (diagonal A) influences the (ill-)health of an employee, whereas the second process (diagonal B) influences the work motivation and learning behavior of an employee. On the basis of job demands and job control, four different job types can be described: the passive job, combining low demands with low control, the active job combining high demands with high control, the low strain job combining low demands with high control, and the high strain job, combining high demands with low control (see Fig. 9.1). On the one hand, this combination of demands and control predicts the employee's physical and mental health, with the highest risks for health endangerment in the high strain job. On the other hand, the combination of demands and control predicts to what extent a job fosters learning and the motivation to develop new behaviors, with the most positive outcomes being expected in the active job. As such, the active job is considered to be the most desirable job type, as it enables learning and stimulates motivation, without the drawback of ill health.

This simple model has been embraced by scientists, practitioners and employers, making this model the most widely applied model of occupational stress (De Lange, Taris, Kompier, Houtman, & Bongers, 2003). One of its charms is that it considers the possibility that high demands may be placed on employees (resulting in high productivity), as long as sufficient job control is provided, not only without detrimental effects on health, but even with positive effects when considering learning and motivation. One of the debates regarding the JDC model, revolves around the issue of interaction of demands and control. Karasek (1989) has indicated that the interaction refers to the assumption that the different combinations of these two job characteristics are able to predict two different sets of outcomes, i.e. strain and learning. As such, with this perspective, the testing of the model may consist of examining to what extent employees working in a high strain situation experience worse health than employees in a non-high strain or in a low strain situation. In contrast, other researchers (e.g., Kasl, 1996) consider the moderating effect of job control on the relationship between job demands and outcomes as being the crucial aspect of the model. In the latter, the model is supported when job control buffers the negative impact of high demands on employee health and well-being. The most common way to examine this buffering effect is by evaluating the effect of the multiplicative term of demands and control, after controlling for the main effects of

these job characteristics. In reviewing the research on the JDC model it is essential to discriminate between these different approaches, as they test somewhat different hypotheses and the practical implications might differ (e.g., van der Doef & Maes, 1998, 1999a).

On the basis of empirical research conducted by Johnson and colleagues (Johnson & Hall, 1988; Johnson, Hall, & Theorell, 1989) the JDC model was expanded with a second job resource: workplace social support. Social support refers to the existence of good relationships with coworkers and supervisor, which provide the employee with a positive social atmosphere, in which he, or she, can feel supported, experience emotional or practical support, and can count on others. A job lacking such a supportive environment has been labeled as “isolated”, resulting in the labeling of the most detrimental job type as an “iso-strain” job. The “iso-strain” job combines high demands, with low control and low support.

9.2 The Job Demand-Control-Support Model in Relation to Employee Health and Well-Being

In the 35 years of empirical research on the JDC(S) model, many studies examined cardiovascular disease (CVD) as an outcome. In epidemiological studies on large samples from the general working population, evidence was found for a higher prevalence and incidence of cardiovascular disease in employees working in high strain jobs (Schnall, Landsbergis, & Baker, 1994; van der Doef & Maes, 1998). As such, high job strain has been identified as a risk factor for CVD, beyond socio-demographic characteristics (e.g., SES) and standard risk factors such as health behaviors and high blood pressure (Kivimäki et al., 2012).

The “iso-strain” job (combining high demands, with low control and low support) has also been identified as being associated with the highest levels of ill-health. For instance, in their research on cardiovascular disease, Johnson and Hall (1988) showed that employees in the “iso-strain” job had more than twice the risk of a cardiovascular event, in comparison to employees working in a job characterized by low demands, high control and high social support. Studies on the JDC and the JDSCS models have covered a broad array of outcomes ranging from psychological outcomes such as job dissatisfaction, depressive complaints, and burnout to physical outcomes such as pregnancy outcomes and metabolic syndrome (for reviews, see De Lange et al., 2003; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; van der Doef & Maes, 1998, 1999a). Two main conclusions can be drawn. First, most of the JDC(S) model research focuses on the prediction of employees’ physical or psychological health and well-being. Only a few studies have addressed and found support for the learning hypothesis, focusing on outcomes such as learning and mastery (e.g., Taris, Kompier, De Lange, Schaufeli, & Scheurs, 2003). Second, although the (iso)strain hypothesis receives substantial support, much of the research fails to find the moderating effect of job control and social support on the demands – physical/psychological health association (e.g., De Lange et al., 2003; Häusser et al., 2010; Taris, 2006).

The inconsistency in the support for the moderating effect of control and support has generated debate, and researchers have tried to pinpoint the crucial issues that discriminate the studies that do find these moderating effects from the studies that do not (Häusser et al., 2010; van der Doef & Maes, 1998, 1999a;). Two of these issues will be addressed here: the generic versus occupation-specific assessment of the job characteristics, and the matching hypothesis, the notion that resources such as job control and support need to match the type of demand in order to exert a buffering effect.

9.2.1 Occupation-Specific Versus Generic Measurement

The most commonly used instrument to assess the psychosocial job characteristics of the JDCS model is the Job Content Questionnaire (JCQ; Karasek, 1985). The JCQ has been developed to measure the key components psychological demands, decision latitude, social support, complemented with scales assessing amongst others physical demands and job insecurity (Karasek et al., 1998). Research has shown that the JCQ scales provide a reliable assessment, and the instrument is cross-nationally valid (Karasek et al., 1998). The items in the questionnaire are formulated such that they are applicable to employees across occupational groups. For instance, items for the Psychological Demands scale refer to work pace (e.g., My job requires working very fast) and conflicting demands (e.g., I am free from conflicting demands that others make). Also the items concerning job control and social support are generic (e.g., My job allows me to make a lot of decisions on my own; My supervisor is helpful in getting the job done). One of the strengths of a generic assessment approach is that it is suitable for multi-occupational research, and allows for comparisons across occupational groups (Kasl, 1987). On the other hand, this approach has the drawback that it might be lacking specificity when it comes to the particular occupation-specific demands, control, and support aspects of jobs. It appears likely that these occupation-specific aspects are crucial in explaining differences in, for instance, burnout levels between various occupational groups. On this basis various scholars (e.g., Kasl, 1987; Schaefer & Moos, 1993) have called for the development of occupation-specific measures, to get a better representation of the work situation, and a more accurate view of the occupational stressors that have negative health and well-being consequences. Specifically with regard to the JDC(S) model, it has been suggested that the limited support for the buffer hypotheses of the model could be attributed to the use of generic scales to assess the JDCS dimensions (De Jonge, Van Vegchel, Shimazu, Schaufeli, & Dormann, 2010; De Lange et al., 2003). Occupation-specific measures, which are able to capture the relevant demands, control and support aspects of a job, might be required to adequately test the hypotheses postulated by the JDCS model.

This notion has led to the development of occupation-specific measures for various professional groups, often on the basis of the generic Job Content Questionnaire (Karasek, 1985). Such instruments have been used, for instance, in JDC(S) studies on nurses (Gelsema, van der Doef, Maes, Akerboom, & Verhoeven, 2005), and teachers (van der Doef & Maes, 2002). To illustrate this approach, the development

and value of such an occupation-specific measure for teachers is described in more detail. In 1993, Maes and colleagues developed a comprehensive instrument to assess quality of work: the Leiden Quality of Work Questionnaire (LQWQ; Maes, van der Doef, & Verhoeven, 1993; van der Doef & Maes, 1999b). This questionnaire was based on the JDC(S) model as assessed by the JCQ, the Michigan model (Caplan, Cobb, French, Van Harrison, & Pinneau, 1975) as assessed by the Questionnaire for Organizational Stress, version Doetinchem (Bergers, Marcelissen, & De Wolff, 1986), and the Wellness at Work approach developed to evaluate whether working conditions are in agreement with the Dutch Act on Working Conditions (Maes, Kittel, Scholten, & Verhoeven, 1989). The LQWQ is a generic questionnaire, assessing eleven job characteristics, Work and Time Pressure, Role Ambiguity, Skill Discretion, Decision Authority, Task Control, Social Support from Supervisor and Social Support from Coworkers, Physical Exertion, Hazardous Exposure, Job Insecurity, and Lack of Meaningfulness, and the outcome variable of Job Satisfaction in a reliable way (van der Doef & Maes, 1999b). On the basis of this generic instrument, Maes and van der Doef (1997) developed a teacher-specific instrument. To construct the item pool, the two authors and two experienced secondary school teachers formulated teacher-specific items for each job characteristic measured by the LQWQ. This resulted in an item pool of 111 items, which on the basis of confirmatory factor analysis and reliability analyses was reduced to a 74-item questionnaire covering fourteen job characteristics and two outcome variables (see Table 9.1). The LQWQ – teacher version has been translated in many languages (e.g., French, German, Italian) and has demonstrated good validity and reliability in a cross-national study on stress in secondary school teachers conducted in 13 European countries (Verhoeven, Maes, Kraaij, & Joekees, 2003). In Sect. 9.3 we will further elaborate on the results of this study.

To examine whether this teacher-specific assessment would indeed be a better predictor of teachers' health and well-being than the generic assessment, a study was set up in which 454 teachers in secondary vocational schools filled in both the general LQWQ and the teacher-specific LQWQ (van der Doef & Maes, 2002). Burnout, anxiety, depression, somatic complaints, and job satisfaction were included as indicators of teacher health and well-being. Analyses indicated that across all outcomes under study, the teacher-specific assessment outdid the generic assessment, explaining more variance in the outcomes. To illustrate, the job characteristics assessed by the general LQWQ explained 40% of the variance in emotional exhaustion, with high work and time pressure, high role ambiguity, low decision authority, high job insecurity and lack of meaningfulness being the strongest predictors. In comparison, the teacher-specific assessment yielded a 47% (in other words, +7%) explained variance in emotional exhaustion. Besides indicating partly the same job characteristics as playing a role in emotional exhaustion (work and time pressure, role ambiguity), the teacher-specific assessment highlighted the following teacher-specific predictors: student (mis)behavior (e.g. Students behave aggressively in this school), training (e.g. My job requires that I continuously refresh my knowledge on my teaching subject), lack of task variety (e.g. I have to teach the same courses year after year), and physical exertion (e.g. I often have to stand for long periods of time).

Table 9.1 The scales of the Leiden Quality of Work Questionnaire – teacher version (Maes & van der Doef, 1997; van der Doef & Maes, 2002)

Concept	Scale	Number of items	Cronbach alpha	Example items
Job demands	Work and time pressure	7	.83	I have limited time to prepare my courses; I lack the time to counsel individual students
	Role ambiguity	5	.81	In this school, it is not clear what is expected of a teacher; When I encounter problems with my students it is not clear what I may and may not do
	Interaction with students/ aggression	4	.81	During my courses, I constantly have to keep an eye on a number of difficult students; Students behave aggressively in this school
Decision latitude	Training	3	.84	My job requires that I continuously refresh my knowledge on my teaching subject; My job requires that I am familiar with educational innovations
	Task variety	3	.77	I have to teach the same courses year after year; My job involves a variety of tasks
	Decision authority	6	.70	I can choose the educational method I want to use in my courses; I get consulted when educational material for the courses I teach are purchased
Social support	Social support management	4	.84	The school management pays attention to what I say; I experience a lot of support from the school management
	Social support supervisor	5	.87	When in contact with others (parents, school management) my direct supervisor looks after my interests; I can ask my direct supervisor for help when I have problems at work
	Social support colleagues	5	.77	At my school, colleagues stick to what has been agreed upon; In the process of educational innovation, I experience a lot of support from my colleagues

(continued)

Table 9.1 (continued)

Concept	Scale	Number of items	Cronbach alpha	Example items
Additional job characteristics	Physical exertion	4	.79	Teaching is a physically tiring profession; I often have to stand for prolonged periods of time
	Physical work environment	5	.69	The climatological conditions (coldness, heat, lack of fresh air, humidity) in our school are bad; The building I teach in has annoying shortcomings
	Job insecurity	4	.81	It is questionable whether I will keep my current number of teaching classes in the future; Every school year it is uncertain how many teaching hours I will get
	Future prospects	6	.69	As a teacher one has limited prospects for career development and promotion; Being a teacher one can always find a job
	Lack of meaningfulness	5	.79	I think I do valuable work as a teacher; I get a lot in return from my students
Outcome: job satisfaction	Job satisfaction	4	.76	I enjoy my work as a teacher; Being a teacher is the best profession there is
Outcome: turnover intention	Turnover intention	4	.70	If the opportunity arose, I would quit the teaching profession; If the opportunity arises, I would like to work at an other school

Furthermore, in the context of the JDCS model, it was expected that “Training” would be an aspect related to skill discretion, and as such would be associated with positive outcomes, such as high job satisfaction and low emotional exhaustion. However, in this sample of teachers, “Training” emerged as an additional demand of the job, and was a significant predictor of emotional exhaustion. As such, this study shows that using a teacher-specific assessment does provide a more refined and complete picture of the job characteristics that play a role in teachers’ health and well-being. It highlights specific job characteristics such as student (mis)behavior and continuous training as demands that are important for teachers’ well-being, and therefore need to be considered in efforts to limit and reduce teachers’ stress.

This study also examined whether this more refined assessment of the JDCS dimensions would yield more support for the buffering hypotheses of this model. Contrary to expectations, only limited support was found for moderating effects of the various teacher-specific measures of control (Task Variety, Decision Authority) and support (Social Support from Management, Department Supervisor, and Colleagues) on the impact of the diverse demands (Work and Time Pressure, Role Ambiguity, Student Aggression) on the outcomes. More recently, Brough and Biggs

(2015) also examined whether an occupation specific assessment of job demands would explain a larger proportion of variance for both direct effects and job demands x job control/support interaction effects, in comparison to the examination of generic job demands. In a sample of 746 correctional workers, they did find support for the first notion: correctional specific job demands were more strongly associated with job satisfaction, work engagement, turnover intentions, and psychological strain, in comparison to generic job demands. However, an occupation-specific assessment of demands did not yield more support for moderating effects than a generic assessment did. Both studies underscore the value of examining job characteristics taking into account occupation-specific measures. Their findings however do not identify this tailored assessment as being the core issue for detecting the moderating role of control and support.

9.2.2 *The Matching Hypothesis*

A second issue that has been put forward as an explanation for the lack of support for the moderating effect of control and support in the demands – health/well-being association is the so-called “matching hypothesis” (Cohen & Wills, 1985). Already, in 1985, Cohen and Wills argued that social support should match the demands, or needs, in order to exert its moderating effect. For example, social stressors might be more strongly reduced by emotional social support, than high work demands. This “matching hypothesis” can be extended to job control, the other resource in the JDCA model. Wall, Jackson, Mullarkey, and Parker (1996) conducted a study to examine for which aspect of job control (e.g. task variety, skill use) the buffer hypothesis would be supported. In a sample of 1,451 manufacturing employees, they found support for the moderating effect of job control on the demands – strain relationship when using a job control scale including timing control and method control. In contrast, they found no support for the buffer hypothesis when analyzing a broader decision latitude scale, incorporating method control, skill use and task variety. Based on these results the authors argue that the measurement of job control should cover those aspects that adequately represent the control an employee can exert over the demands encountered.

More recently, De Jonge and Dormann (2003) have formulated a theory incorporating this notion: the so-called Demand-Induced Strain Compensation (DISC) Model. In this model, three types of demands and resources are defined: physical, cognitive, and emotional demands and resources. It is predicted that job resources will be more likely to counteract the negative impact of high job demands when they both relate to the same domain. However, the model does not focus solely on the match between demands and resources, but also expands this specificity hypothesis to the strain outcomes. The Triple Match Principle (TMP) proposes that the strongest, interactive relationships between demands and resources are observed when demands *and* resources *and* strains are based on the same dimension. For instance, emotional support provided by colleagues is most likely to moderate the relation-

ship between emotional demands (e.g. dealing with aggression of pupils) and emotional exhaustion. As such the TMP goes a step further than the matching hypothesis from Cohen & Wills (1985) in that not only stressors and resources should match, but that stressors are also expected to match the strains. For example, being confronted with emotionally demanding situations in dealing with pupils, is more likely to cause emotional exhaustion than physical complaints. This relatively recent model has been examined in a number of studies; however, to this point, only two studies have focused specifically on teachers (Feuerhahn, Bellingrath, & Kudielka, 2013; Van den Tooren, De Jonge, Vlerick, Daniels, & Van de Ven, 2011).

In their recent review incorporating DISC studies on diverse occupational groups, De Jonge, Dormann, and Van den Tooren (2008) found substantial support for the principles of the DISC model. Eight of the eleven studies showed evidence for the Triple Match Principle. The two studies on teachers found mixed results. One of these studies (Van den Tooren et al., 2011), examining the TMP in 317 Belgium primary and secondary school teachers in the beginning of their teaching career, did not find support for the matching hypothesis. In this longitudinal study, baseline demands and resources and their interaction were examined as predictors for cognitive strain, emotional exhaustion, and physical complaints one year later, controlling for initial levels of these outcomes. Support for moderating effects on these outcomes was found in only one out of nine tests on matching demands and resources, and in one out of 18 tests on non-matching demands and resources. Furthermore, there was virtually no support for main effects of demands and resources at baseline predicting the outcomes one year later. In contrast, the study of Feuerhahn et al. (2013), examining emotional exhaustion in 177 German teachers, found both cross-sectional and longitudinal support for the TMP. They studied emotional demands (parents' criticism, conflicts with colleagues, and emotional dissonance) and cognitive job demands (time pressure and classroom disruptions) in combination with the emotional resource emotional support, and the cognitive resource teacher self-efficacy. At baseline, high emotional demands and high cognitive demands were associated with higher emotional exhaustion. Furthermore, in cross-sectional analyses moderating effects of the emotional and cognitive resources were found in line with the TMP. A follow-up after 21 months in a subsample of 56 teachers showed that for teachers experiencing low emotional support, conflicts with colleagues and emotional dissonance at baseline predicted higher levels of emotional exhaustion at the later time point, controlling for baseline levels of emotional exhaustion. In line with the TMP, the impact of emotional demands on emotional exhaustion was moderated by the availability of emotional support. However, the data gathered in this study did not include a cognitive outcome, and as such could not test the TMP in full. Given the cross-sectional and longitudinal findings thus far, the matching principle seems relevant for occupational stress in various occupational groups, including teachers, and the DISC model seems a promising pathway for further research.

9.3 Review of Teachers' Stress Studies Based on the JDC(S) Model

The goal of this section is to provide an overview of the research based on the JDC(S) model in teachers. As such, our focus lies on highlighting the main themes and findings, instead of covering all JDC(S) studies conducted.

A review of the literature on the JDC(S) model in relation to stress outcomes in teachers indicates that this occupational group has been the subject of quite a number of studies. By far the majority of these studies have been conducted in Europe, e.g. the U.K., Finland, and the Netherlands (e.g., Verhoeven et al., 2003). More recently, studies have examined teachers' stress in other regions, including Australia (Bradley, 2007, 2010), Malaysia (Masilamani et al., 2012), Brazil (Porto et al., 2006), South Africa (Peltzer, Shisana, Zuma, Van Wyk, & Zungu-Dirwayi, 2009), Canada (Fernet, Guay, Sénécal, & Austin, 2012), and the U.S. (Fox & Stallworth, 2010; McIntyre et al., 2014).

The vast majority of studies focuses on the (iso-)strain or buffer hypothesis, and examines stress-related outcomes. As one might expect, given the nature of the profession, burnout is the most studied outcome. Furthermore, the JDC(S) model in teachers has been examined in relation to mental disorders, job (dis)satisfaction, and (psycho)somatic complaints. Research on more objective health indicators is rather limited, and is restricted to physiological stress indicators such as cortisol levels. In only a few instances has the learning hypothesis, focusing on positive outcomes that could result from working in an active job, such as mastery and work engagement, been addressed (e.g., Taris et al., 2003).

9.3.1 *The (Iso)-Strain Hypothesis and the Buffer Hypothesis*

Focusing on stress-related outcomes, the majority of studies have examined the (iso) strain hypothesis, and/or the buffer hypothesis. In a first section (9.3.1.1), we will present the studies testing the JDC(S) model in the prediction of various health and well-being outcomes (e.g., burnout, somatic complaints, job satisfaction), which is its largest body of research as applied to teachers. In a second section (9.3.1.2), we will address the few studies that have focused on the potential pathways through which working in a high (iso)strain situation could exhibit its effects on teachers' health and well-being. The studies reviewed here have either used physiological measures (e.g., Steptoe, Cropley, Griffith, & Kirschbaum, 2000), or a diary approach to examine the stress process (e.g., Cropley, Dijk, & Stanley, 2006). Whereas in large epidemiological studies the JDC(S) model has been examined in relation to disease endpoints such as cardiovascular disease and mortality (e.g., Johnson & Hall, 1988), this has not been the case in teachers. One underlying reason for this is that single occupation studies do not yield enough variance in the predictors, and heterogeneous multi-occupational samples are considered necessary to examine these types of outcomes.

9.3.1.1 Indicators of Health and Well-Being

Soon after the publication of the JDC model by Karasek in 1979, a test of the model was conducted in a sample of 148 secondary and middle school teachers in the UK (Payne & Fletcher, 1983). It is important to mention that the measures used to assess demands, supports, and constraints in this study, were quite different from the generic scales of Karasek. In this study the measures were specifically designed to differentiate within the professional group, and capture variation among teachers. This study failed to support the model, finding no significant additive or interactive effects of demands and control on depression, anxiety, obsession, somatic symptoms, and minor cognitive impairments (e.g., forgetting, indecisiveness). However, two more recent cross-sectional studies did find higher risk for mental disorders in high strain situations. In their study on psychiatric morbidity in 160 primary and secondary school teachers, Copley, Steptoe, and Joeke (1999) found that high strain teachers were 3.5 times more likely than low strain teachers to have a score on or above the cut-off for psychiatric complaints as assessed by the Revised Clinical Interview Schedule (CIS-R; Lewis & Pelosi, 1990). Similar findings were reported by Porto et al. (2006) for their sample of 1,024 public and private elementary school teachers in Brazil: the prevalence of self-reported mental disorders as assessed by the Self-Reporting Questionnaire was 1.5 times higher among the high strain teachers (prevalence: 53%) than among the low strain teachers (prevalence: 36%). However, the teachers in active work (high demands – high control) had a similar elevated prevalence (54%), suggesting that high demands might be the crucial factor. As such, some cross-sectional evidence has been found which identifies high strain work as a potential risk factor for mental disorders in teachers. Whether or not the crucial factor is the high level of demands, the lack of control, or their combination, remains an issue for further study. Furthermore, prospective studies are clearly needed to substantiate the causality involved.

As already mentioned, the majority of studies on the JDCS model in teachers have focused on indicators of reduced mental and physical well-being such as burnout, (psycho)somatic symptoms and job (dis)satisfaction. One of the largest studies on the JDCS model and teachers' stress was a cross-national study conducted in Europe, including 2,796 secondary school teachers in 13 European countries (Verhoeven et al., 2003). This project became known as EUROTEACH. The project was initiated in 1997 at an advanced postgraduate course in Health Psychology. A group of researchers started a European research project, focusing on quality of work and wellness/health outcomes in teachers. Using an analogous research protocol and questionnaire (see below), data were gathered from secondary school teachers in Belgium, England, Greece, Ireland, Italy, the Netherlands, Spain, Switzerland, Finland, France, Germany, the Czech Republic, and Slovakia. The survey included the Leiden Quality of Work Questionnaire – Teachers version (Maes & van der Doef, 1997; van der Doef & Maes, 2002), described earlier in this chapter. In all samples, both the (iso-)strain hypothesis and the buffer hypothesis of the Job Demand-Control-Support model were tested on the outcomes burnout, somatic complaints, and job satisfaction.

Besides testing the model in the different countries, the project also yielded an overall test of the model in the full sample of nearly 2,800 teachers (Verhoeven et al., 2003). Generally, the results supported the (iso-)strain hypothesis, yielding additive effects of demands, control and social support for emotional exhaustion and job satisfaction, and additive effects of demands and control on personal accomplishment and somatic complaints. In contrast, there was virtually no support for moderating effects of control and/or support on the demands – health/well-being relationship. This pattern was also reflected in the studies per nation: support for the additive effects of demands, control, and support was substantial, whereas support for moderating effects was virtually absent (e.g., Griva & Joeke, 2003). To further examine the cross-cultural validity of the JDCS model (Verhoeven et al., 2003), analyses were done separately for three European regions: West (including e.g. the Netherlands, Finland, Germany), South (including e.g. Italy, Spain, Greece), and East (including Czech Republic and Slovakia). The main finding was that the JDCS model predicts outcomes best in the West-European region, and worst in the East-European region, with the South-European region taking an intermediate position. To illustrate this, the main effects of demands, control, and support explained 33% of the variance in emotional exhaustion in the West-European region, 23% in the South European region, and only 17% in the East European region. These European findings highlight the relevance of further examining the validity of the JDCS model in a worldwide cross-cultural perspective.

In line with the results from the EUROTEACH study, the iso-strain hypothesis (high demands, low control, and low support being associated with higher levels of burnout, (psycho)somatic complaints, and dissatisfaction) has been confirmed in other cross-sectional studies (e.g., Kosir, Tement, Licardo, & Habe, 2015; Skaalvik & Skaalvik, 2009; Taris, Schreurs, & Van Iersel-Van Silfhout, 2001). However, the few studies that have examined this relationship in a longitudinal design are less supportive. For example, in a sample of 806 French-Canadian teachers in public elementary and high schools, Fernet et al. (2012) found that changes between the beginning (October) and the end of the school year (June) in demands (workload, students' disruptive behavior) and in social support (the school principal's leadership behaviors) were predictive of changes in burnout over this time period. Changes in self-efficacy and autonomous motivation seemed to play a mediating role. However, in this study, changes in job control were unrelated to changes in burnout, yielding no support for the strain hypothesis.

The buffering effects of control and support were less often investigated for these outcomes and studies have yielded inconsistent results. As was the case in the EUROTEACH project, several studies have failed to find support for the buffer hypothesis (e.g., McClenahan, Giles, & Mallett, 2007; Payne & Fletcher, 1983; Taris, Schreurs, & Schaufeli, 1999). Some studies however did find support for buffer effects (e.g., Fox & Stallworth, 2010; McIntyre et al., 2014; Näring, Briët, & Brouwers, 2006; Santavirta, Solovieva, & Theorell, 2007). McIntyre et al. (2014) examined the JDCS model in a sample of 186 middle school teachers, using paper-and-pencil measures as well as ecological momentary assessment (EMA). Teachers filled in an iPod-based diary with multiple assessments per day taking place at three

time points over one academic year during three consecutive days in the Fall, one day in the Winter, and two days in the Spring. The questionnaire data showed that cross-sectionally the JCQ measures of demands, control, and coworker support predicted psychological distress, and job control exerted a marginal buffer effect on the demands – distress association. In the EMA data, however, both the main and moderating effects of the JDCS variables were supported in the prediction of negative affect and subjective stress. Other studies have also found support for buffering effects of job control, although not consistently across outcomes. For instance, in the study of Näring et al. (2006) the buffer hypothesis was supported for depersonalization, but not for emotional exhaustion or personal accomplishment. Likewise, in the study of Santavirta et al. (2007) buffering effects of job control were found regarding emotional exhaustion, but not for vitality or emotional well-being. Not surprisingly, support for moderation is furthermore not always consistent across the various potential moderators under study. In the research of Fox and Stallworth (2010) the buffer effect was only found for one of the two potential buffers. In this latter study on U.S. teachers, specific emphasis was put on the matching hypothesis in the prediction of job satisfaction, job-related negative emotions, physical symptoms and burnout. Fox and Stallworth (2010) examined to what extent the impact of the stressors pervasive bullying (by co-worker(s), principal or students) and experienced acts of violence in/around school was buffered by satisfaction with the way the school administration handled acts of violence (considered as a specific form of control over the stressor under study), as well as social support from co-workers and the school principal. They found support for the moderating effect of this matching form of job control: Experiencing violent acts predicted strains (e.g. low job satisfaction, negative emotions, physical symptoms), but only when satisfaction with how violence was handled was low. Contrary to expectations, social support did not have similar buffering effects on the relationship between bullying/violence and strain.

Furthermore, it is interesting to note that some studies do find moderating effects, but only for subgroups of teachers. For example, in their study on burnout in 398 university staff members, Fernet, Guay, and Senécal (2004) found that job control did moderate the impact of demands on burnout, but only for teachers high on work self-determination, a measure reflecting the level of intrinsic work motivation. In this study, job control was assessed with a 3-item measure of opportunities for control and decision derived from the JCQ, and job demands were assessed in a comprehensive way including work overload, role ambiguity, role conflict and stress related to research activities. The study from Peeters and Rutte (2005) on burnout in 123 elementary teachers identified time management behavior as an important moderator. Engaging in time management behaviors (setting and prioritizing goals, planning tasks, and monitoring progress) seemed to compensate for low levels of autonomy, especially when demands were high. Bradley (2007) examined subjective stress, job dissatisfaction, and turnover intention in a sample of 422 experienced and 248 beginning schoolteachers in primary and secondary public schools in Australia. His results show that the moderating effect of control on the demands – strain relation was only present among new-start teachers. As such, these studies

suggest that individual characteristics, such as motivation, time management behavior, and tenure might determine whether a teacher profits from high levels of job control or whether a teacher is negatively affected by low levels of job control.

Interestingly, quite in contrast with the strict focus on the work environment as a determinant of health, these studies introduce individual characteristics to the JDC(S) model, promoting the perspective that teachers' outcomes are a consequence of job characteristics in combination and in interaction with personal characteristics. Along with this development, recent research has also expanded the JDC(S) model in another way. As mentioned, one of the criticisms on the JDCS model has been its focus on only three psychosocial job aspects. Various authors have labeled this focus as a strength of the model; however, others have indicated that the model fails to incorporate other relevant job aspects. Not surprisingly, a number of studies have broadened the job characteristics, as the EUROTEACH study did by incorporating characteristics such as lack of meaningfulness, physical exertion, and job insecurity. Incorporation of these job characteristics in the analyses increased the explained variance in the outcomes, and as such indicated that other job characteristics beyond the JDCS model play a role in health and well-being in teachers. For example, Näring et al. (2006) found that emotional labor contributed to teachers' stress in addition to the JDCS dimensions. In a similar vein, in other studies based on the JDCS model, the relationship to parents (Skaalvik & Skaalvik, 2009), and the relation to students (Van Droogenbroeck, Spruyt, & Vanroelen, 2014) were significant predictors of teachers' health and well-being, next to the JDCS dimensions. This acknowledgement of other relevant job characteristics for employee health and well-being beyond the dimensions of demands, control, and support, is also reflected in more recently developed occupational stress models, such as the Job Demands – Resources model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001, see Chap. 11).

9.3.1.2 Physiological Indicators of Stress and the Stress Process

Only a few studies have examined the JDC's hypotheses in the prediction of physiological indicators of stress in teachers and those show mixed results. Based on an assessment of job demands, job control and skill utilization derived from the JCQ, Steptoe et al. (2000) classified 105 junior and high school teachers as working in a high strain or low strain job based on the ratio between demands and the combined score of control and skill utilization. High strain jobs were those situations where high demands were coupled with low control and skill utilization. One year later, on one working day eight saliva samples were gathered at two-hour intervals to determine fluctuations in levels of the stress hormone cortisol. The first sample was taken in the morning, between 8:00–8:30 a.m., and the last sample of the day in the evening, between 10:00–10:30 p.m. One of the main findings was that the high strain teachers had elevated cortisol levels on the first measurement point early in the working day in comparison to low strain teachers, whereas there were no differences later in the working day or in the evening. The authors suggest that the elevated cortisol levels

early in the morning in the high strain teachers might reflect an anticipatory psychological response to the high demands – low control day they face at work. Interesting in this respect is the suggestion from Rystedt et al. (2008) that morning cortisol levels may be more sensitive to specific daily changes in job strain, whereas evening cortisol levels may be more reflective of chronic exposure.

In a more recent study, Serrano, Moya-Albiol, and Salvador (2014) assessed cortisol and testosterone levels in 34 full-time female school teachers of 4–14 year old pupils on public schools during two working days. Higher cortisol levels and lower testosterone levels are considered to reflect higher physiological stress. Contrary to expectations, both high strain and high demands proved unrelated to these indicators. Only high job control was associated with higher testosterone levels, hence lower physiological stress, before work. In a recent study in secondary school teachers in Malaysia the association between working in a high strain job and two biomarkers of chronic stress, salivary cortisol (indicator of activation of the hypothalamic-pituitary-adrenal (HPA) axis) and salivary IgA (indicator of depression of the immune function) was studied. In their sample of 302 teachers, both indicators proved to be unrelated to Karasek's job strain categories (Masilamani et al., 2012).

Although not focusing explicitly on the JDC model, the studies from Ritvanen, Louhevaara, Helin, Halonen, and Hänninen (2003) and Ritvanen, Louhevaara, Helin, Väisänen, and Hänninen (2006) are also interesting in this context. In their studies among teachers they examined psychophysiological stress indicators (e.g. blood pressure, static muscle tension, and neuroendocrine reactivity) over the school year. One of their main findings is that among teachers psychophysiological stress varies across the year, in line with the varying workload, and that recovery takes place during the summer holidays.

Focusing particularly on the process of recovery, Cropley et al. (2006) studied the relationship between job strain, rumination, and sleep quality. In this study, 143 primary and secondary school teachers completed an hourly record of their work-related thoughts over one workday evening between 5 p.m. and bedtime, and rated their sleep quality the following morning in a structured rumination and sleep diary. Using a 10-item scale for demands, job control and skill utilization based on the JCQ, job strain was based on the ratio job demand / (job control + skill utilization). Findings showed that high strain teachers, in comparison to low strain teachers, took longer to unwind after work and that they ruminated about work-related issues during the whole evening, including bedtime. Whereas total sleep time did not differ between these two groups, the high strain teachers did report a poorer sleep quality than their counterparts. Given the impact of rumination on physiological stress responses (Brosschot, Gerin, & Thayer, 2006) and the importance of sleep for the recovery process (Åkerstedt, Nilsson, & Kecklund, 2009), this study might pinpoint an important pathway through which high strain work could affect teachers' health and well-being.

Summarizing these studies on physiological indicators of stress and the stress process reveals some interesting issues. First of all, none of these studies have examined the full JDCS model incorporating the social support dimension. Secondly, the focus has been on the strain hypothesis, examining either additive

effects of demands and control, or using a categorization in high strain – low strain jobs on the basis of the ratio between demands and control. As such, the moderating role of job control on the demands – physiological strain relationship has thus far not been examined. Furthermore, given the discrepant results and the limited number of studies, it seems too early to draw any firm conclusions on the impact of demands and control on physiological stress and the stress process in teachers. However, there is substantial evidence linking the JDC(S) model to physiological stress indicators in other occupations (for a review, see Ganster & Rosen, 2013). This calls for a more thorough examination of the JDCS model in relation to physiological responses, including the process of stress reactions and recovery, in teachers. An interesting study design would be to combine ecological momentary assessment of demands, control, and support, with multiple assessments of physiological and subjective stress indicators over a number of days at various time points in the academic year. Such a study will enhance our understanding of how fluctuations in demands, control, support and their interactions affect the process of (physiological) stress and recovery in teachers.

9.3.2 The Learning Hypothesis

In line with the overall JDC(S) model research, the learning hypothesis, which highlights positive outcomes such as learning motivation and mastery, received limited attention in research on teachers. The cross-sectional study of Kwakman (2001) was one of the first studies to examine this hypothesis in a sample of teachers. In her study on 542 secondary school teachers, she assessed work pressure, emotional demands, and job variety as indicators of demands, autonomy and participation as indicators for job control, and social support from management and colleagues. Note that characterizing job variety as a demand seems at odds with the JDCS model, where job variety is considered as one of the elements of decision latitude. In terms of outcome, the teachers were asked to indicate to which extent they exhibited specific professional development activities, which were considered to provoke learning. The results showed limited support for additive effects of high demands, high control, and high support on the exertion of learning activities. Contributing positively to learning activities, job variety indeed seemed to act as a resource, and not as a demand. Further sub-analyses on teachers with high demands indicated that teachers combining high emotional demands with high control exerted more professional learning activities than teacher with low control; a result in line with the learning hypothesis. In addition to this cross-sectional study, the learning hypothesis was also examined in a longitudinal design by Taris et al. (2003). In their study on 876 primary and secondary Dutch school teachers, Taris et al. (2003) assessed demands (burden resulting from the interaction with students) and control (combining items based on the work of Warr (1990) with items that focused on specific aspects of the work situation of teachers) twice with a one-year interval. As outcomes they incorporated two indicators for learning: a measure of motivation for

learning new behavior patterns (based on the definition by Karasek & Theorell, 1990), and the personal accomplishment scale of the Maslach Burnout Inventory. After one year, the highest levels of learning were found in the low demands-high control (low strain) group, and not in the high demands-high control (active) group. Examining changes in job characteristics over a period of one year showed that the transition from a low demands-low control (passive) to a high demands-low control (high strain) was related to a strong deterioration in learning motivation and personal accomplishment. As such, the study failed to support the learning hypothesis, and mimics more the results one would expect on the basis of the strain hypothesis, highlighting the negative impact of high job demands and low job control on learning. In contrast, a longitudinal study examining active learning and mastery in 657 elementary and secondary teachers from Australian public schools found support for the learning hypothesis (Bradley, 2010). In this study, it was postulated that increased job demands and job control would increase active learning, and through this pathway enhance feelings of mastery. Active learning was assessed using the vigor-activity subscale from the profile of mood states, and teachers indicated to which extent they had experienced states such as feeling active, energetic, and lively during work in the previous week. Feelings of mastery were assessed by the Pearlin and Schooler's (1978) Mastery Scale, referring to the extent to which one regards one's life-chances as being under one's own control. The results indicated that, next to a small effect of demands, job control predicted change in feelings of mastery over an eight month period, and active learning seemed to play a mediating role. As such, the learning hypothesis was supported: under conditions of high control, increasing job demands were associated with an increase in mastery, whereas this was not the case in low control situations.

The assessment of job demands and job control in this study is noteworthy. An occupation-specific measure was used, constructed specifically for this study (see Bradley, 2010): for demands, teachers were asked to indicate the requirements of their job as objectively as possible on various facets of their job of as teachers, incorporating for instance quantitative workload, classroom management, relationships with superiors, colleagues and parents. For the job control scale, respondents were asked to indicate the extent to which they felt able to exert control over these aspects. As such, the operationalization is in line with the "matching hypothesis"; the measure of job control used in this study adequately reflects the control possibilities over the demands experienced. This was not the case in the study of Taris et al. (2003), which might explain their different findings. Another issue that is clearly visible in these studies, is that the operationalization of the concept "active learning" is not a straightforward matter. Taris et al. (2003) used two job-related conceptualizations, learning motivation and personal accomplishment. Kwakman (2001) focused on the job by examining professional development activities undertaken at work. Using in contrast two more general indicators of learning, the mood states vigor-activity and general feelings of mastery, Bradley (2010) was the single study finding longitudinal support for the learning hypothesis.

Another study focusing on positive outcomes in the context of the JDC(S) model is worth mentioning here. In their study on teachers based on the Job Demands-

Resources model (see Chap. 11) Bakker, Hakanen, Demerouti, and Xanthopoulou (2007) examined to what extent job control moderated the impact of job demands on work engagement. In a sample of 805 Finnish teachers working in elementary, secondary, and vocational schools, they found additive effects of their measure of demands (pupil misbehavior) and job control (a general measure assessing the influence one has over one's work, derived from the Finnish Healthy Organization Barometer). Lower levels of pupil misconduct and higher job control, hence the low strain situation, were associated with higher work engagement. As such the study does not provide support for the learning hypothesis. Furthermore, job control did not exert a moderating effect on the demands – work engagement relationship. As mentioned previously, in this study a global measure of the amount of influence one has over one's work and issues related to one's work might not have adequately matched the type of demands assessed. This is further substantiated by the finding that other more matching job resources, such as supervisory support and appreciation, did buffer the negative impact of this specific demand (Bakker et al., 2007).

Summarizing, it is evident that the research on the learning hypothesis in samples of teachers is rather limited and results are quite mixed. The longitudinal study from Bradley (2010) supported the learning hypothesis, which is clearly in contrast with the longitudinal study from Taris et al. (2003) that indicated that learning is highest in low strain situations. Given the differences in the studies regarding the conceptualization of on the one hand demands and control, and on the other hand the outcome representing learning, further research is required to determine what is the optimal job situation to enhance learning and motivation in teachers.

9.4 Conclusion

Overall, the research on teachers based on the JDC(S) model indicates that working in a high (iso)strain situation is associated with reduced health and well-being. High job demands, low job control, and lack of worksite support seem to contribute to teachers' mental and physical state, as indicated by outcomes such as mental disorders, somatic symptoms, burnout, and job dissatisfaction. Evidence for the moderating effects of job control and worksite social support on the demands – outcomes relationship is far more limited. A few studies do find the assumed moderating effects, and in some studies the moderating effect has only been found for subgroups of teachers. This encourages further research, taking the 'matching hypothesis' into account and looking at the role of individual characteristics in the JDC(S) model. Consistent with research in other occupational groups and the strong focus on employee strain, the learning hypothesis has received little attention in studies on teachers, and results thus far have been mixed. Given the importance of having up-to-date knowledge on both content and teaching methods, learning motivation seems a very relevant outcome for teachers. As such, dedicating further research to identify what characterizes a job that fosters learning seems worthwhile.

Another issue addressed in this chapter is the value of occupation-specific assessment of job characteristics. A comparison of a general and a teacher-specific measure of job characteristics has underlined the added value of occupation-specific assessment (van der Doef & Maes, 2002). Looking at the teachers studies in general, it is clear that relevant job demands for teachers go well beyond the across-occupational demands time pressure and role conflict indicated in the original JDC(S) model. The research findings stress the importance of occupation-specific demands, such as (mis)behavior of students, violence/bullying, conflicts with parents and/or colleagues, and the demand of continuous training, in explaining teachers' stress. It would be worthwhile to examine in future research whether, in line with the matching hypothesis and the DISC model (De Jonge et al., 2008), specific forms of job control and worksite support could limit the impact of these demands.

Furthermore, research indicates that besides demands, control, and support, other work aspects are relevant for teachers' stress, such as emotion work, physical exertion, and lack of meaningfulness. More recently, a new theoretical model has been developed, evolving from among others the JDC(S) model: the Job Demands-Resources model (Demerouti & Bakker, 2011; see also Chap. 11 in this book). This model encompasses a broader array of job demands and job resources, and as such integrates the perspectives of the JDCS model with other job characteristics that have been shown to have an impact on employee health and motivation.

Our overview also highlights a number of methodological limitations in the research applying the JDCS model to teachers' stress. First of all, a substantial part of the research is of a cross-sectional nature, which hampers the conclusions regarding the causality involved. In addition to that the majority of studies have relied on self-report measures for the assessment of the job characteristics as well as the outcomes, yielding associations that might be inflated by for instance common method bias, social desirability, and negative affectivity. This calls for a shift from mono-method cross-sectional research towards more multi-method longitudinal studies, and diary/ecological momentary assessment studies. Whereas the former can provide a better view on the causality involved in longer term outcomes, the latter studies will further clarify the stress process by illuminating the impact of temporal changes in demands, control, and support on stress responses (see e.g., McIntyre et al., 2016).

Keeping these methodological limitations in mind, some practical implications can be formulated based on the findings in this review and the broader literature on stress management in the workplace. An important feature of the JDC(S) model is that it focuses exclusively on the psychosocial working environment and as such aims at job (re)design to ameliorate jobs and improve employee health and well-being and enhance learning. As such, it clearly steers interventions to target the job characteristics, specifically towards enhancing job control and social support. Hence the focus is on reducing the negative impact of the stressors through enhancing buffering factors in the workplace, instead of focusing on the individual teacher and trying to improve his/her resistance to the work stressors. This organizational approach has a preventative nature, whereas the latter is often reactive and offered to employees who show initial stress reactions. Unfortunately, a recent overview of

stress management in the workplace indicates that individual interventions (e.g. relaxation training, cognitive behavioral interventions) are far more often implemented than organizational interventions including job redesign (Tetrick & Winslow, 2015). Some authors have stressed the ethical aspect involved indicating that we should refrain from teaching employees to deal with an unfavorable work situation if it is feasible to remove or reduce the stressor, reduce exposure to the stressor, and/or put into place effective buffers to limit its negative impact (see e.g., Heaney & Van Rijn, 1990). Reviews of interventions focusing on job redesign, more specifically aiming at enhancing job control in diverse employee populations, show it is possible to improve employee well-being through this type of organizational interventions (Bambra, Egan, Thomas, Tetticrew, & Whitehead, 2007; Egan et al., 2007). However, although it is clear that higher job control and stronger worksite support is associated with lower strain levels, there is less evidence both in research on teachers and in other occupational groups for their buffering effects on the demands-strain relationship. As such, focusing on these buffering job characteristics is likely to have positive effects on health and well-being, but might not be sufficient. Additional interventions and measures to limit the level of demands might be necessary as well to reduce teachers' stress.

Now is the time to put theory into practice in the teachers' work environment, and develop, implement and evaluate organizational interventions aiming at reducing job demands, and enhancing job control and worksite social support. A number of scholars have given concrete ideas in this regard. Teachers' control could be improved by providing them freedom, independence, and discretion in e.g. scheduling work, curriculum development, selection of textbooks, and selection of teaching and pedagogical methods (Rinehart, Short, Short, & Eckley, 1998; Sweetland & Hoy, 2000). Also at the team level, job control can be achieved by creating a team-oriented environment, which includes setting shared purposes and goals, enhancing collective decision-making, and developing professional learning communities (Sweetland & Hoy, 2000). This could also contribute to creating a more supportive work environment, with more opportunities to provide emotional and instrumental support among colleagues. Such measures might also help teachers deal with the emotional demands of the job, in terms of emotion work and pupil misbehavior. With regard to the quantitative demands, measures can be taken to reduce the overall workload, for instance by involving teaching assistants, reducing bureaucracy, and scheduling sufficient time for the different tasks the teaching job entails (e.g., preparation of lessons, grading of assignments). Furthermore, it might be worthwhile to target the distribution of work over the academic year, and try to minimize high peak workloads. On the basis of the current research findings regarding the JDC(S) model, one would expect these types of interventions to be effective in reducing teachers' stress levels and improving their health and well-being, as they have been able to do in other work settings.

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Chapter 10

Applying Occupational Health Theories to Educational Stress and Health: Evidence from the Effort-Reward Imbalance Model

Johannes Siegrist

Abstract *Effort-reward imbalance* is a theoretical model of a psychosocial work environment with adverse effects on health and well-being that focuses on a mismatch between high efforts spent and low rewards received in costly social transactions. As this constellation is often experienced among teachers, the model is expected to provide new explanations of stress-related health risks among teachers and to guide the development of preventive measures. The chapter starts by describing the model and its measurement. Importantly, the reward component covers three equally important dimensions of salary, promotion prospects and job security, and esteem or recognition. Moreover, an intrinsic component of effort is included, reflecting the personal pattern of coping with demanding situations termed ‘over-commitment’. Following this, empirical evidence from studies testing the model is reviewed, demonstrating a high prevalence of effort-reward imbalance at work and elevated risks of poor mental health, specifically depression and exhaustion. In the final part, implications of current knowledge for designing and implementing health-conducive school settings and employment conditions are discussed.

Keywords Effort-reward imbalance • Teachers’ stress • Depression • Preventive measures

10.1 Theoretical Background

Stressful working conditions are widely prevalent in modern societies. Yet, given a broad spectrum of different occupations and professions, and given a variety of job task profiles and employment conditions, research in this field is facing the challenge of identifying a common denominator to this diversity of work-related

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stressful experience. To this end, a theoretical model is needed. With the help of a set of theoretical assumptions, the complexity of phenomena under study can be reduced to a few principles underlying this complexity. These principles, rooted in general stress theory (see below), are delineated at a level of generalization that allows for their application in a wide range of different occupations. In addition to defining a common denominator, a theoretical model has the advantage of providing explanations of associations of phenomena under study. Importantly, in this area of research, health and well-being of people exposed to stressful work are particularly relevant consequences to be studied.. If successful, research findings can guide policies that aim at reducing stressful work and improving the health of people exposed to these conditions.

In social and behavioral sciences research several theoretical models of stressful work were developed during the past few decades (for review e.g. Cartwright & Cooper, 2009). However, only a few concepts were repeatedly and extensively tested with respect to health outcomes. *Effort-reward imbalance* is one such model. It is concerned with stressful features of the work contract, with a selective focus on the analytical notion of social reciprocity in costly transactions (Siegrist, 1996). Social reciprocity has been identified as a fundamental, evolutionary stable principle of collaborative human exchange (Gouldner, 1960). According to this principle, any costly transaction provided by person A to person B that has some utility to B is expected to be returned by person B to A. Return expectancy does not implicate full identity of the service in return, but it is essential that this activity meets some agreed-upon standard of equivalence. Failed reciprocity results from situations where service in return is either denied or does not meet the agreed-upon level of equivalence. To secure equivalence of return in crucial types of costly transactions, social contracts have been established as a universal societal institution. The work contract (or contract of employment) is one such type where efforts are expected to be delivered by employees in exchange for rewards provided by the employer. Three basic types of rewards are transmitted in this case: salary or wage (financial reward), career promotion or job security (status-related reward), and esteem or recognition (socio-emotional reward). Importantly, contracts of employment do not specify efforts and rewards in all details, but provide some room for flexibility and adaptation.

The model of *effort-reward imbalance* at work asserts that experiencing a lack of reciprocity in terms of high cost spent and low gain received in turn elicits negative emotions of anger and frustration, and associated bodily stress reactions, with adverse long-term consequences for health and well-being. Effort-reward imbalance at work occurs frequently under specific conditions. *Dependency* is one such condition, defined by situations where workers have no alternative choice in the labor market. For instance, unskilled or semi-skilled workers, elderly employees, or those with restricted mobility or reduced work ability may be susceptible to unfair contractual transaction. *Strategic choice* defines a second condition of failed reciprocity at work. Here, people accept the experience of *high cost/low gain* in their employment for a certain time, often without being forced to do so, because they tend to improve their chances of career promotion in a highly competitive job market.

The notion of effort at work implies both an extrinsic demand to which the working person responds as well as a subjective motivation to match the demand. In most instances, matching the demands is part of the control structures established in organizations, thus leaving little room for variations of subjective motivation. Yet, demands are likely to be exceeded in situations of strong informal pressure exerted by a competing work team. Similarly, demands are likely to be exceeded if people are characterized by a motivational pattern of excessive work-related *over-commitment*. Consciously or unconsciously, they may strive towards continuously high achievement because of their underlying need for approval and esteem at work. This motivation contributes to *high cost/low gain* experience at work even in the absence of extrinsic pressure. To summarize, the model of *effort-reward imbalance* at work maintains that failed contractual reciprocity in terms of high cost and low gain is often experienced by people who have no alternative choice in the labor market, by those exposed to heavy job competition, and by those who are overcommitted to their work.

To link this model to general stress theory, emphasis is put on the notion of threat or loss of reward related to a person's core social role, the work role. Successful maintenance of this role is crucial because it provides continued employment and associated material and non-material benefits. Among these latter benefits, the social valuation of one's job and related social identity as well as the satisfaction of people's need for favorable experiences of self-efficacy and self-esteem, matters most. If achievement-related rewards are denied and expectations of reciprocity are violated, strong negative emotions of anger, anxiety, and disappointment are aroused. These negative emotions were shown to activate distinct areas in the brain reward circuits, suppressing the production of neurotransmitters associated with pleasurable emotions and stress-buffering properties (Schultz, 2006). It is conceivable that the brain's reward circuitry is sensitive to the experience of disadvantageous inequality in social exchange (Tricomi, Rangel, Camerer, & O'Doherty, 2010), thus lending some indirect support to the stress-theoretical assumption inherent in the effort-reward imbalance model.

Threat, or loss of reward related to a person's core social role, is associated with an extensive activation of the main stress axes within the organism, specifically the hypothalamic-pituitary-adrenocortical stress axis and the locus coeruleus-norepinephrine-autonomic system-adrenal medullary stress axis (Chrousos, 2009). Sustained activation of these stress axes in the organism may trigger states of allostatic load within several regulating systems of the body, and these states of allostatic load contribute to the onset of stress-related physical and mental disorders, such as coronary heart disease or depression (McEwen, 1998; Steptoe & Kivimaki, 2012).

In conclusion, the effort-reward imbalance model offers a common denominator of identifying stressful features in a variety of occupations and professions. Moreover, as it is firmly rooted in psychobiological stress theory, it contributes towards explaining associations of exposure to adverse work with elevated risks of stress-related mental and physical disorders. At this point, three questions are of interest: To what extent does this model shed light on the specific adversities related

to teachers' jobs? What is the evidence of associations between stressful work and reduced health among teachers? And what are the practical consequences to be derived from such evidence? The next paragraphs provide some answers to these questions.

10.2 Applying the Effort-Reward Imbalance Model to Teachers

Teachers are usually not suffering from heavy physical workload, nor are they exposed to toxic substances that are often experienced by blue-collar workers in industry. The majority of teachers are not facing precarious employment, and job loss is not a frequent threat. Nevertheless, teachers report high levels of work-related stress, and the prevalence of burnout symptoms, depression, different longstanding illnesses and disability pensions is remarkably high among them (Kyriacou, 2001). How can the model of effort-reward imbalance account for these observations? First, there is some evidence that selection into the profession of teachers is often associated with a strong intrinsic motivation, thus predisposing them to spend high efforts at work, even in the absence of external demand. Yet, most of the time, the results of these educational efforts in terms of students' learning successes, are not immediately visible because they largely depend on the students' capabilities and motivations (Kyriacou & Coulthard, 2000). Furthermore, the teachers' accomplishments are not visible to significant others who could evaluate and recognize them, such as colleagues, parents or the wider public. Therefore, teachers may experience a state of reward deficiency more often than employees in several other occupations and professions. This state of reward deficiency is not adequately compensated by students' feedback as this latter is often determined by factors unrelated to the teachers' achievements, such as personal attributes or compliance with students' demands. To the contrary, students may more often display negative rather than positive reactions towards their teachers, such as signs of disobedience, disregard or even hidden, or overt, hostility (van Dick & Wagner, 2001). Restricted job promotion opportunities and dependency on school administrator's prescriptions and leadership styles, as well as predefined teaching programs and informal pressure from parents, may be additional work-related stressors with relevance to the model's assumptions (Bauer et al., 2007). Yet, are these stressors strong enough to override teachers' coping capacities and to harm their health in the long run?

Before answering this question, the measurement of the model needs to be briefly described. Applying a psychometrically validated questionnaire has become the most convenient and most prevalent procedure of measuring a theoretical construct. In case of the *Effort-Reward Imbalance* (ERI) model, a questionnaire containing the following three scales with Likert –scaled items was developed: *effort* (6 items), *reward* (11 items) and *over-commitment* (OC) (6 items). Given the three theoretical dimensions of the reward construct, the 11 items were assumed to represent the

three factors *job promotion*, *job security*, and *esteem*. By applying confirmatory factor analysis, a satisfactory fit between the theoretical model and the factorial structure of the scales was repeatedly observed, both in the original version of the questionnaire containing 23 items as well as in a short version containing 16 items that was developed subsequently (Leineweber et al., 2010; Siegrist et al., 2004). To provide accurate data, the scales have to meet defined quality criteria, such as a high degree of internal consistency (with Cronbach's alpha > .70), of sensitivity to change, of discriminant validity, and of criterion validity. These criteria were tested in many studies, and extensive information on the psychometric properties of the questionnaire is documented on the Effort-Reward Imbalance Website at the University of Düsseldorf (see References). To provide a quantitative estimate of the imbalance between effort and reward at the individual level, a ratio of the two scales *effort* and *reward* can be constructed, using an algorithm that adjusts for unequal number of items. Accordingly, scoring high on this ratio indicates a state of reward frustration (Siegrist et al., 2004).

Although the questionnaire is now available in a number of languages, the original scales were not uniformly applied in all empirical studies testing the model with reference to teachers. Nevertheless, there is sufficient coherence across these investigations, as can be seen from the following section of this chapter.

10.3 Teachers' Stressful Work and Their Health: Empirical Evidence

The following paragraphs do not provide a systematic review or meta-analysis of studies dealing with this topic, but present the findings of a substantial number of recent studies with the intention of giving a fair account of major scientific evidence. The presentation is divided into two parts, with a first part containing epidemiological investigations and a second part displaying results from experimental and naturalistic studies on potential pathways linking the experience of adverse working conditions with the development of stress-related disorders.

10.3.1 Results of Epidemiologic Studies

We briefly reviewed 10 studies that were published within the past 10 years in peer-reviewed international journals. Concerning the study design, two reports are prospective and nine are cross-sectional, where four reports are case-control studies, comparing either teachers with other professions or comparing teachers with and without disease. More than half of the studies analyze mental health, whereas the remaining reports focus on sickness absence or on indicators of stress-related physical disorders. So far, research on this topic prevails in modern Western societies,

mostly in Europe, but four studies were conducted in China and one study in South Africa.

Lehr, Hiller, and Keller (2009) provide probably the most convincing evidence of an association of effort-reward imbalance (ERI) at work with depression among teachers. In a matched case-control study with 122 teachers treated for affective disorder in a rehabilitation clinic and 122 healthy teachers, they observed a quadrupled relative risk of being depressed among teachers scoring high on ERI compared to those scoring low. Importantly, it was the imbalance between effort and esteem-reward that mattered most. The respective relative risk is six times higher, whereas an imbalance between effort and salary or job insecurity is associated with a 3-fold risk elevation. These findings were confirmed in an additional study with a larger sample, where an optimal cut point of defining the ratio of effort and reward with regard to sensitivity and specificity was also analyzed (Lehr, Koch, & Hillert, 2010).

A further study conducted in Germany is in line with this result. Hinz et al. (2014) report higher mean work stress levels in terms of this model as well as higher mean scores of impaired mental health among teachers compared to the general population. A correlation of .43 was observed between the effort-reward ratio and mental health problems, as measured by the General Health Questionnaire (GHQ-12). In a large sample of 949 teachers, Unterbrink et al. (2007) reported a significantly elevated mean score of emotional exhaustion, measured by the Maslach Burnout Inventory (MBI-D), compared to means observed in an US sample of professionals working in psychosocial fields (Maslach, Jackson, & Leiter, 1996). They also observed that every fifth teacher was highly stressed, as defined by a critical ER-ratio >1.0 . Full-time teachers were more often highly stressed than part-time teachers, and older teachers more often than younger ones (Unterbrink et al., 2007).

In a rigorous study of 673 Italian teachers, those men and women who reported serious physical pain during the past 12 months before the survey exhibited significantly higher means on three main components of the model: effort, job insecurity or lack of promotion prospects, and lack of esteem (Zurlo, Pes, & Siegrist, 2010). An additional analysis concerned the association of ERI at work with anxiety, depression, and total psychological strain, as measured by subscales of the Crown-Crisp Experiential Index (Crown & Crisp, 1979). In multiple regression analysis of the ERI components all coefficients were statistically significant. It is of interest to observe that in the analysis of total psychological strain the highest multiple R square was related to low esteem reward. As a third validation criterion the authors tested an association of ERI at work with the teachers' reported intention to leave their job. About 20 percent expressed this intention. Compared to the remaining group, mean levels of effort, over-commitment, lack of esteem, and lack of job security or promotion prospects were significantly elevated (Zurlo et al., 2010).

A cross-sectional study of 425 primary school teachers in the Chinese city of Wuhan found a two-fold elevated risk of burnout, measured by the Maslach Burnout Inventory, among those scoring in the highest tertile of the ER ratio compared to those in the lowest tertile. This effect was adjusted for relevant confounders such as health-adverse behavior, age, gender, education, marital status, professional rank as

well as a complementary model of stressful work, organizational injustice (Loerbroeks et al., 2014). In this study, data on the intention to leave the teaching profession were also collected. It turned out that the odds ratio of this intention was more than twice as high among those with ER ratio scores in the upper tertile compared to those in the lowest tertile, a finding that is in line with the previously reported study.

Few studies dealing with this topic were conducted in the frame of cross-country comparison. Tang, Leka, and MacLennan (2013) provide one such study by comparing the mental health of teachers in Hong Kong (H.K.) and in the United Kingdom (U.K.). Two hypotheses were tested. First, less work-related stress was expected in U.K. teachers than in HK teachers. Second, similar associations of work stress and mental health, an indicator derived from the widely used SF-36 questionnaire, were expected in both samples. Work stress was assessed by two complementary measures, ERI at work and the Perceived Stress Scale PSS (Cohen, Kamarck, & Mermelstein, 1983). While the first hypothesis was confirmed, only limited support was found for the second hypothesis. However, when a multiple regression analysis on mental health was performed for PSS, the ER-ratio, and over-commitment, 22 percent of the variance of the mental health score was explained by these three variables in the U.K. sample and 44 percent in the H.K. sample. Taken together, teachers in Hong Kong seem to be more affected by their professional stress, and work stress provides a stronger contribution to their reduced mental health than is the case in U.K. teachers. The authors interpret these differences in the light of far-reaching recent educational reforms in China, and in Hong Kong in particular, and with reference to role conflicts between collectivist attitudes prevailing in China versus individualistic attitudes prevailing in the UK, where collectivist norms prevent teachers from overtly coping with their emotional problems (Tang et al., 2013).

In South Africa, a sample of over 20,000 teachers was recruited to explore work stress-related health problems. While the large sample size is considered a particular strength of this study, the assessment of work stress was restricted to two measures of career advancement and recognition, and of job security (as proxies of two subscales of 'reward'). Additional aspects covered peer support, working hours, discipline and respect, and community enhancement (Peltzer, Shisana, Zuma, Van Wyk, & Zungu-Dirwayi, 2009). In this cross-sectional study, information on self-reported illness during the past five years was used as health measure, without controlling for potential systematic reporting bias. Some significant associations of work stress components with illness reports were observed, but given the limited methodological quality of the study results are not discussed in more detail.

As the strongest evidence is derived from prospective studies, the two reports using this design are of special interest. In a Belgian cohort study of 776 teachers, scores of ERI at baseline were linked to prospective sickness absence during a 12 month follow-up period (Derycke, Vlerick, Van de Ven, Rots, & Clays, 2013). Sickness absence was measured objectively by calculating total number of administrative sick leave days as well as their frequency (total number of sick leave episodes). Teachers with scores of the ER ratio in the upper tertile had a significantly elevated odds ratio of sickness absence duration of more than 3 days in comparison

with teachers scoring in the low tertile (OR 1.87; 95% Confidence Interval (CI) 1.06–3.30). The same was true for a higher sickness absence frequency (>1 time), where the odds ratio (OR) was 2.04 (95% CI 1.19–3.49) (Derycke et al., 2013). In this investigation, an interesting additional analysis was performed testing the moderation effect of teachers' learning motivation on these associations. No significant interaction term resulted from this analysis although low levels of learning motivation were also related to increased sickness absence.

A second, still ongoing prospective study comes from China and is interested in effects of professional stress among Chinese university staff on somatic health, specifically on the risk of developing a metabolic disorder (Loerbroks, Shang, Angerer, & Li, 2015). To this end, the ER ratio assessed at baseline was related to the relative risk of developing a metabolic syndrome (a sub-clinical state of metabolic disorder defined by overweight, high blood pressure, and high fasting glucose, among others) during a 2 year follow-up period. The respective regression analysis was based on a sample of 785 university staff members in a city of Southwestern China. Although many teachers were included this sample was additionally composed by administrative and technical support staff. A high effort-reward imbalance ratio (>1.0) was associated with a 20 percent excess risk of developing a metabolic syndrome in this cohort. The respective effect was adjusted for a number of relevant confounding factors.

In conclusion, a majority of recent studies found an association of failed reciprocity in terms of high effort spent and low reward received in turn among teachers with reduced health. Lack of esteem and recognition seems to matter more than material rewards. As most studies explored indicators of mental health we are left with some uncertainty to what extent stress-related physical disorders are related to this type of stressful experience as well. Thus, additional research on this topic is needed, where prospective research designs are preferred and where objective measures of health are included. Moreover, information on pathways mediating the observed statistical associations is required. As the next section demonstrates, innovative insights result from this latter approach.

10.3.2 Results from Experimental and Naturalistic Studies

This review identified several papers dealing with psychobiological markers of teachers' stressful work in terms of this model. They all originated from a distinct research team and a target population of female and male teachers in Germany. As a more detailed account of this research is presented in Chap. 4, these studies are only briefly reviewed here. The first investigation was a naturalistic study where saliva cortisol samples were collected from 135 teachers during two working days, a weekend day and an additional day when participants were instructed to take a small dose of dexamethasone. This was done in order to test the responsiveness of the hypothalamic-pituitary-adrenal (HPA) axis to stress. According to this hypothesis, a blunted cortisol awakening response is expected under conditions of stress as

dexamethasone suppresses the release of cortisol. This hypothesis was confirmed for three of the measures of stressful experience included in this study, vital exhaustion, burnout, and low reward at work, but not the effort-reward ratio (Bellingrath, Weigl, & Kudielka, 2008). To explore whether this slight dysregulation of the HPA axis under stress is of any significance to the health of teachers, a second study was carried out, restricted to a sample of 104 healthy female teachers with a mean age of 45 years. In this cross-sectional study, data on two indicators of chronic stress, ERI at work and vital exhaustion, were collected in addition to a broad range of physiological parameters integrated into a summary index termed *allostatic load* (McEwen, 1998; see Bellingrath, Weigl, & Kudielka, 2009). Findings confirmed the hypothesis that the summary index of allostatic load is significantly elevated in the high stress versus low stress group, as defined by ERI at work and exhaustion.

In order to identify the biological processes implicated in the reported associations, an experimental study was conducted with the Trier Social Stress Test (TSST), which is a laboratory mental and socio-emotional stress test associated with marked elevations of a range of physiological parameters (Kirschbaum, Pirke, & Hellhammer, 1993). This study was based on data from a sample of 52 healthy male and female teachers who previously participated in the above mentioned naturalistic study with saliva cortisol samples and who were invited after about two years to participate in the experiment (Känel, Bellingrath, & Kudielka, 2009). It was the aim to explore whether work stress in terms of the ER ratio and over-commitment moderated the activation of fibrinogen during this laboratory test and whether it had an additional impact on the recovery process. Fibrinogen is an indicator of blood coagulation which is enhanced by stressful experience. Findings confirmed this assumption with respect to over-commitment, but not with respect to the ER ratio. However, results should be interpreted with caution in view of the small sample of this study.

This same data set was used for further analyses as the blood samples collected before and after the TSST experiment were also used to assess immune responses, specifically T cells, B cells, T-helper cells, T-suppressor/cytotoxic cells, and natural killer (NK) cells (Bellingrath, Rohleder, & Kudielka, 2010). The main results, not reviewed in detail here, point to a dampened immune defense and an increased pro-inflammatory activity of cytokines in the group of teachers with a high level of work stress according to the ERI model. This conclusion is supported by a more recent study where high levels of effort-reward imbalance were associated with an increased pro-inflammatory potential as measured by IL-6 production after exposure to bacterial products *in vitro* before and after acute stress induced by TSST (Bellingrath, Rohleder, & Kudielka, 2013).

In summary, there is preliminary evidence from experimental and naturalistic studies of teachers that stressful experience at work in terms of the ERI model is associated with enhanced pro-inflammatory activity, reduced immune functioning, increased blood coagulation, and a higher amount of physiological strain, measured by allostatic load. These findings complement the results of epidemiological studies mentioned earlier as they suggest a potential link mediating the exposure to stressful work with adverse health outcomes.

10.4 Practical Implications of Current Knowledge

How can teachers' health and well-being be improved by investments into health-conducive working conditions? The ERI model offers three entry points to tackle this challenge. First, at the personal level, improving individual skills and capabilities of coping with stressful work defines a primary goal of intervention. In addition to more general techniques of relaxation, meditation, stress inoculation, anger management, and self-assertiveness, a specific cognitive-motivational intervention has been proposed that aims at modifying the work-related coping pattern of over-commitment described in this chapter. To this end, over-committed people are trained to re-appraise their work demands and related motivations for excessive engagement. They learn to decline inappropriate demands, to observe some mental distance from their professional involvement, to improve their pro-social behavior, and to experience self-esteem from sources other than work and achievement.

So far, two intervention studies document favorable effects of this cognitive-behavioral approach. The first investigation was conducted in a group of urban bus drivers who were trained during twelve sessions to change their work-related attitudes and behaviors. Three months later, their mean score of over-commitment was significantly reduced, and most of the participants practiced regularly relaxation during their working day (Aust, Peter, & Siegrist, 1997). In a second trial 174 lower or middle management employees were randomly assigned to an intervention or a waiting control group (Limm et al., 2011). A stress prevention program based on the ERI model and targeting specifically over-commitment at work, was conducted, and after 12 months changes in the ERI scales as well as in the primary outcome of this study, a stress reactivity score, were analyzed. It turned out that stress reactivity was significantly reduced in the intervention group, as evidenced by a significant time x group effect, and that reductions of work stress, as measured by the ERI scales, were larger as well in the intervention group (Limm et al., 2011). While this specific stress prevention program was successfully applied in two rather difficult work environments, an urban bus enterprise and a large manufactory plant, it is likely that it could be realized even more easily in the work setting of teachers.

A second entry point of theory-based interventions concerns the interpersonal or group level. Here, a number of programs of primary and secondary prevention are available that aim at improving interpersonal skills of communication and cooperation. According to the ERI model, strengthening recognition and esteem is a core aim of this approach. Clearly, appropriate leadership behavior plays an important role in this regard. Many school systems are organized in a hierarchical way where directors supervise and control the teachers' performance. To develop a culture of fairness, trust, and respect within the school system interventions should broaden their program beyond the training of communication skills by confronting leaders with those moral values that foster productive and creative organizational behavior. In an impressive intervention study in Sweden, this aim was realized in a group of 48 managers and 183 subordinates. Small groups were assigned to either conventional leadership training or to an innovative program that was designed to raise

awareness of moral values, empathy, and solidarity by means of discussing video-based scenarios illustrating related problems. After six months, outcomes in the two groups were evaluated, participants of the innovative program displaying significantly better mental health (Romanowska et al., 2011). Although this approach was realized in a private company dealing with insurance a respective modification could render it feasible for school organizations.

A third level of interventions towards stress reduction and health promotion in schools is devoted to the implementation of measures of organizational and personnel development that strengthen the justice of exchange at work. There are many ways of balancing efforts with equitable rewards both in public and private school environments, where increased autonomy of work time control, fair division of work, appropriate promotion prospects including opportunities of further qualification, performance-related remuneration, and strengthening of participation, collaboration and social support define some of the measure to be developed. Along these lines, an intervention study was conducted in a Canadian hospital, where distinct organizational changes were instructed mainly by the ERI model. As a result, compared to respective professional groups of a control hospital, the nurses and doctors of this hospital exhibited significantly reduced levels of organizational strain and work-related burnout after one year, and this effect persisted even after three years (Bourbonnais, Brisson, & Vézina, 2011). Hospitals are service organizations dealing with clients, and schools are service organizations dealing with pupils or students. There is no reason why such interventions could not be implemented in the school context, addressing the specific stressors of the teaching profession.

In the long run, organizational changes will not be sustainable without receiving the support required from local, regional, and national political decision-makers to provide appropriate human resources, fair salaries, and decent infrastructural environments. It is, therefore, important to link efforts of improving teachers' working conditions to more general attempts in societies to develop health-conducive work and employment policies and, by doing so, to reduce the burden of disease that is attributable to stressful work.

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Chapter 11

Applying Occupational Health Theories to Educator Stress: Contribution of the Job Demands-Resources Model

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Abstract The first part of this chapter discusses the Job Demands-Resources (JD-R) model in general terms. We address several variations of the model, including the JD-R model of burnout and the revised JD-R model. Moreover, we discuss several extensions of the model (engagement, performance and personal characteristics). The evidence for these models is presented and discussed. The second part of the chapter focuses on the application of the model in the context of educator stress. Based on a literature search and the JD-R framework, we provide an overview of the most important findings on the task-specific, organizational and personal antecedents and consequences of educator stress. We conclude that in spite of its considerable promise as a heuristic tool in research on educator stress, as yet the potential of the JD-R model has not fully been exploited.

Keywords Educators • Stress • Job demands-resources model • Burnout • Review • Engagement

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11.1 The Job Demands-Resources Model

One of the most popular models in occupational health psychology is the Job Demands-Resources (JD-R) model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). The current version of the model describes the relations among work characteristics (job demands and job resources) and work outcomes (especially health, well-being, motivation and work performance), taking personal characteristics (e.g., self-efficacy, resilience and personality characteristics) into account (Taris & Schaufeli, 2016, for an overview). At the heart of the model lie three basic assumptions. Firstly, the presence of high levels of job resources is presumed to lead to high job performance through high levels of motivation (this is the *motivational process*). Secondly, the presence of high levels of job demands is expected to lead to negative health outcomes through high levels of strain (the *health impairment process*). Thirdly, job demands and job resources are presumed to interact. On the one hand, the adverse effects of high levels of demands on strain and health should be mitigated by the presence of high levels of resources. On the other hand, the combination of high levels of resources and high levels of demands should result in challenge and even higher levels of motivation than would be expected on the basis of the main effects of demands and resources (the *interaction hypothesis*).

Since its publication in 2001 by Demerouti et al., the JD-R model has been amended and extended several times. In its earliest version, the model focused exclusively on the dimensions of burnout as its main outcomes, but later incarnations also focused on work engagement, employed more diverse outcome variables, and included personal characteristics as well. In this chapter, we first discuss the original JD-R model and its subsequent modifications in greater detail. We then focus on the application of the model in the educator context.

11.1.1 The Job Demands-Resources Model of Burnout

The Job Demands-Resources model was initially developed to account for the work-related antecedents of burnout. In their (2001) publication, Demerouti and colleagues started from Lee and Ashforth's (1996) distinction between job demands and job resources, combined with the *structural model of burnout* that had earlier been proposed by Maslach, Jackson, and Leiter (1996, p. 36). Following previous theorizing on the core dimensions of burnout, Demerouti and colleagues focused on exhaustion/fatigue as a form of strain/ill-health, and cynicism/withdrawal as a form of lack of motivation (e.g., Schaufeli & Taris, 2005).

Demands and Resources Demerouti et al. (2001) proposed that job demands were “those physical, social, or organizational aspects of the job that require sustained physical or mental effort and are therefore associated with certain physiological and psychological costs” (p. 501). A similar definition was given for job resources: these refer to “those physical, social or organizational aspects of the job that may do any

of the following: (a) be functional in achieving work goals; (b) reduce job demands and the associated physiological and psychological costs; (c) stimulate personal growth and development” (p. 501). Interestingly, according to these definitions, demands and resources must be distinguished in terms of their effects. Whereas demands are associated with increased “physiological and psychological costs” and have adverse effects in general, resources have generally positive effects. However, these definitions of demands and resources are not mutually exclusive. For example, whereas dealing with certain demands may well require mental effort, this could also result in personal growth and development (Frese & Zapf, 1994).

Further, the effect of a particular demand or resource may be contingent upon its quantity in a particular job. For instance, autonomy is usually considered an important resource that facilitates both task performance and well-being. However, having too much of this resource is associated with negative outcomes (Warr, 2007), suggesting that at (very) high levels autonomy may work as a job demand. Similarly, whereas social support is usually conceived of as a valuable job resource, high levels of support may have adverse effects on health and well-being (Semmer & Beehr, 2014). Indeed, even within the cluster of job demands a distinction between “challenge” and “hindrance” demands may be made, with the latter type of demands corresponding with the conceptualization of demands as having adverse outcomes and the first type of demands resembling a job resource (Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010). Summarizing, based on their effects on worker health and motivation, it may not always be possible to unequivocally label a job characteristic as either a demand or a resource. Although in practice this conceptual ambiguity usually yields no major problems, the conceptual distinction between demands and resources is not as clear-cut as it initially appeared.

Underlying Processes According to the JD-R model of burnout, two different paths related the two burnout components to the two sets of work characteristics. On the one hand, the model proposed that the need of meeting high job demands would require high levels of effort (Hockey, 1997). Continuous high effort expenditure would lead to psychological and physiological costs, such as high levels of fatigue and a low motivation to continue one’s activities. Recovery from fatigue is possible by applying recovery-promoting strategies, such as taking breaks, switching to other tasks, or working more slowly. However, when such strategies cannot be applied (e.g., because performance standards are high in combination with high levels of supervisor control), workers may enter a state of *sustained activation* (Knardahl & Ursin, 1985). Ultimately, this could lead to a state of physiological and psychological exhaustion, which is the energetic component of burnout.

On the other hand, the presence of high levels of job resources may assist workers in dealing with the possibly adverse effects of a high-demand work environment, and they could be conducive in meeting the work goals. Conversely, the *absence* of sufficient resources will trigger a self-protective process in which reduced work motivation and withdrawal from the job (in the form of depersonalization and cynicism) will prevent the occurrence of possible negative effects resulting from the future exhaustion and frustration of being unable to achieve one’s work goals, which is the motivational component of burnout. Seen from this perspective, psychological withdrawal serves as a self-protective strategy.

Although this reasoning suggests that the interaction of demands and resources is central to the development of burnout, Demerouti and colleagues (p. 501) argued that such interactions would rarely occur. That is, previous research on interactions between job characteristics (chiefly following Karasek's, 1979, Job Demands-Control model) had already shown that such interactions tend to be statistically insignificant and practically irrelevant (Taris, 2006). Therefore, Demerouti and co-authors (2001) refrained from including this interaction in the model. The JD-R model of burnout therefore proposed that exhaustion would primarily result from high job demands, and that withdrawal/disengagement would be the result of a lack of resources.

Evaluation of the Job Demands-Resources Model of Burnout The JD-R model of burnout has frequently constituted the basis for empirical research on the antecedents of burnout. Most of these studies provided support for the main effects of job resources and job demands on burnout, showing that whereas high levels of demands were usually associated with high levels of exhaustion, high levels of resources were negatively associated with low levels of cynicism/withdrawal (Alarcon, 2011, for a review). Interestingly, whereas in Demerouti et al.' (2001) seminal publication on the JD-R model the possible interaction between job demands and job resources was largely ignored, research on the JD-R model of burnout has frequently tested this interaction. For example, Bakker, Demerouti, Taris, Schaufeli and Schreurs (2003) found that the adverse effect of high levels of demands on exhaustion was mitigated by high levels of resources. Similarly, the positive effects of high levels of resources on withdrawal/cynicism were weaker in the presence of high job demands. These findings were later confirmed in follow-up research (e.g., Bakker, Demerouti, & Euwema, 2005; Hansen, Sverke, & Näswall, 2009), adding some credence to the idea that job demands and job resources interact in affecting levels of burnout.

Although the empirical evidence for the assumptions of the Job Demands-Resources model of burnout seems impressive, it should be noted that most studies testing this framework employed cross-sectional designs using self-report data. Thus, although the findings of these studies are consistent with the causal predictions of the JD-R model, strictly speaking they do not provide strong evidence for these assumptions. This is aggravated by the fact that longitudinal studies using the JD-R model of burnout have not unequivocally supported these assumptions. For example, using a two-wave longitudinal design, Diestel and Schmidt (2012) failed to confirm the notion that demands and resources predicted burnout over time.

Further, the evidence for the main effects of demands and resources on burnout is considerably stronger than that for demands \times resources interactions, but this is a common finding in the area of job stress research (Taris, 2006). Taris and Schaufeli (2016) argue that this could be due to the fact that interactions are especially likely to occur when the type of demands, resources and outcomes refer to qualitatively similar concepts, e.g., the adverse effects of high *emotional* demands on *emotional* exhaustion may be mitigated by high *emotional* support (De Jonge & Dormann, 2006). What is interesting about this reasoning is that it goes against Demerouti

et al.’ (2001) implicit assumption that the qualitative differences among different demands, resources and outcomes can be neglected, since they would all be subject to the same underlying process.

11.1.2 The Revised Job Demands-Resources Model

In 2004, Schaufeli and Bakker revised and extended the Job Demands-Resources model of burnout. The revised model included not only burnout (representing strain), but also job engagement (as a motivational concept). The two main dimensions of engagement are vigor (i.e., high levels of energy and resilience) and dedication (a sense of significance, pride and challenge), respectively (Schaufeli & Bakker, 2010). Further, absorption (being fully concentrated and engrossed in one’s work) is the third dimension of engagement. Figure 11.1 presents the revised model graphically.

Two Processes Basically, the revised model consists of two largely independent processes. The *energetic* or *health impairment process* holds that the relation between job demands and outcomes (especially health) is mediated by strain. That is, similar to the JD-R model of burnout, the revised model argues that high job demands will result in strain. However, the revised JD-R model argues that *both*

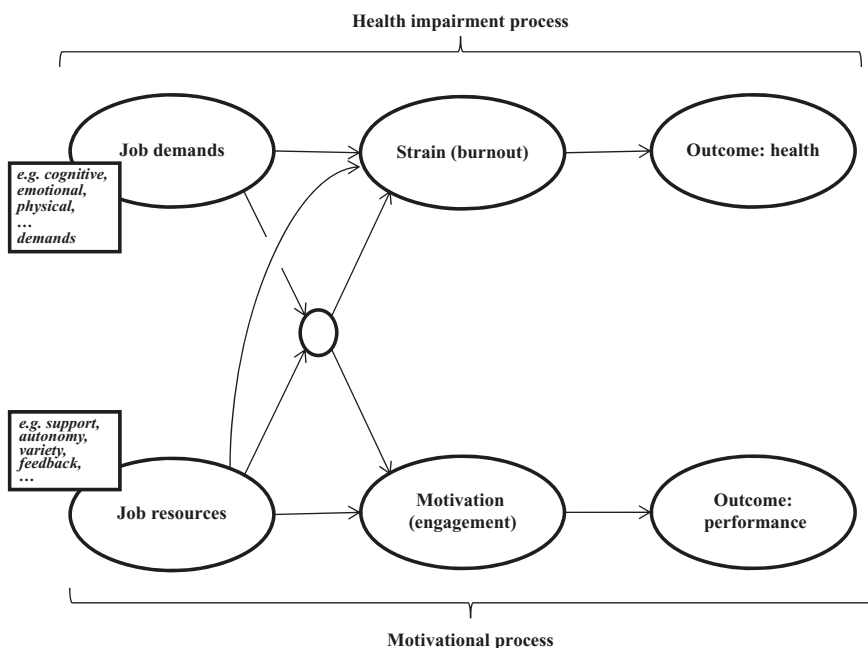


Fig. 11.1 The revised Job Demands-Resources model (based on Schaufeli & Bakker, 2004, and Bakker & Demerouti, 2007). For clarity, personal resources are not included

burnout indicators (exhaustion and withdrawal) tap aspects of strain, whereas the JD-R model of burnout proposed that exhaustion and withdrawal were qualitatively different concepts that were primarily related to demands and resources, respectively. To account for the fact that research on the JD-R model of burnout had found that resources were often associated with withdrawal/cynicism, the revised JD-R model included a direct path from resources to strain. Since the two burnout components (exhaustion/fatigue and withdrawal/cynicism) are usually strongly related (e.g., Taris, Le Blanc, Schaufeli, & Schreurs, 2005), this modification would seem reasonable, but also one that primarily rests on empirical arguments. Furthermore, similar to the JD-R model of burnout, the revised model proposed that strain would be related to negative outcomes in general, and ill-health in particular (e.g., Melamed, Shirom, Toker, Berliner, & Shapira, 2006), such as depression, cardiovascular complaints, and psychosomatic complaints. All in all, the health impairment process proposes that high levels of demands and low levels of resources lead to a gradual decrease of mental energy (reflected in terms of the two key components of burnout), which in turn will lead to the development of health-related issues.

The second process links job resources to positive outcomes (especially performance), proposing that this relation is mediated through work engagement. This *motivational process* starts from the assumption that resources have inherent motivational qualities (Hackman & Oldham, 1980). The presence of these resources triggers workers' motivation to devote their efforts and abilities to their work tasks. For example, high levels of autonomy, support and feedback (three important resources) are assumed to satisfy workers' basic needs for autonomy, affiliation and competence, respectively, in turn leading to high levels of intrinsic motivation for the tasks at hand (Deci & Ryan, 2000; Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008). Ultimately, this will increase levels of work engagement. In turn, high levels of engagement are presumed to lead to positive work outcomes, such as high levels of performance (Demerouti & Cropanzano, 2010).

The Demands × Resources Interaction The possible interaction between demands and resources was formally included in the revised JD-R model in 2007, when Bakker and Demerouti explicitly acknowledged that job demands and job resources could interact in affecting worker strain and motivation (Fig.11.1). Referring to Karasek's (1979) Job Demand-Control model, they argued that "the interaction between job demands and job resources is important for the development of job strain and motivation" (2007, p. 217).

Inclusion of Personal Characteristics Probably the most important innovation of the revised JD-R model that has occurred since 2007 is the inclusion of personal characteristics in the model. Initially, neither the JD-R model of burnout nor the revised JD-R model considered factors other than characteristics of the job or the work environment. Since psychological theories on human behavior across various contexts usually emphasize that behavior is a function of the interaction of the environmental context and individual characteristics such as personality, it is not surprising that personal factors were included in the JD-R model. In the model, such factors are considered "personal resources", defined as "positive self-evaluations

that are linked to resiliency and refer to individuals' sense of their ability to control and impact upon their environment successfully (...) [and] (a) are functional in achieving goals, (b) protect from threats and the associated physiological and psychological costs, and (c) stimulate personal growth and development" (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009, p. 236). In spite of the clear resemblance between this definition of personal resources and the definition of job resources, these two types of resources do not take a similar place in the JD-R model. Although job resources are usually considered as antecedents of strain and motivation (cf. Fig. 11.1), personal resources have been included in several, theoretically and empirically distinct, ways in the model. Schaufeli and Taris (2014) discuss four ways in which personal resources have been integrated into the JD-R model.

The most straightforward way of including such personal characteristics is to consider these as *antecedents of strain and motivation*. Like job resources, personal resources are defined in terms of positive outcomes, so that – conceptually speaking – they should lead to lower levels of strain/burnout and higher levels of engagement/motivation. Two longitudinal studies have tested this reasoning (Lorente, Salanova, Martinez, & Schaufeli, 2008, for “mental and emotional competency”, and Xanthopoulou et al., 2009, focusing on optimism, self-efficacy, and self-esteem). Both studies supported the assumption that higher levels of personal resources lead to higher levels of well-being (i.e., lower burnout and higher work engagement).

Furthermore, personal resources have been conceptualized as *moderators of the associations between job characteristics and outcomes*. If personal resources do indeed “protect from threats and the associated physiological and psychological costs”, (Xanthopoulou et al., 2009, p. 236), the magnitude of the associations between job characteristics (demands and resources) and outcomes could be dependent on the degree to which workers have access to such personal resources. Specifically, high levels of resources should mitigate the adverse effects of high demands and promote the positive effects of high resources on work outcomes. In line with this reasoning, Brenninkmeijer, Demerouti, Le Blanc, and Van Emmerik (2010) reported that the unfavourable effects of high demands and high levels of interpersonal conflict on exhaustion were stronger for prevention-oriented workers (who focused on safety obligations and avoidance of loss) than for promotion-oriented workers (who focused on opportunities and advancement). Similarly, Van den Broeck, Van Ruyseveldt, Smulders, and De Witte (2011) found that the positive effect of high job control on work engagement was relatively strong for intrinsically oriented workers. Thus, both studies suggest that personal resources may moderate the associations between job characteristics and work outcomes.

Additionally, personal resources have been included in the JD-R model as *mediators of the relations between job characteristics and outcomes*. Job characteristics, especially job resources, could affect workers' personal resources (e.g., their competency, self-efficacy and optimism). In turn, such personal resources could promote work engagement. Several studies have confirmed this idea (Bakker & Xanthopoulou, 2013; Llorens, Salanova, Schaufeli & Bakker, 2007; Simbula, Guglielmi, & Schaufeli, 2011; Van den Broeck et al., 2008; Xanthopoulou, Bakker,

Demerouti, & Schaufeli, 2007), adding credence to the notion that personal resources can mediate the associations between work characteristics (especially resources) and work outcomes.

Finally, personal resources could be *antecedents of work characteristics*. That is, certain personal resources (such as perceived competence, Bandura, 1997) could impinge on workers' (perceptions of their) work environment (both demands and resources), which, in turn, could change work outcomes, such as job satisfaction and performance. In their cross-sectional study on the relations among job resources, personal resources and engagement, Xanthopoulou et al. (2007) found that whereas personal resources (optimism, self-efficacy and self-esteem) mediated the relationship between job resources and engagement, the model with personal resources as an *antecedent* of job resources fitted the data about equally well. Thus, this study suggests that personal resources may be considered a consequence of job resources, or an antecedent of job resources, or both (i.e. there may be a reciprocal relationship between job and personal resources).

In sum, this short overview shows that (a) personal resources can easily be included in the Job Demands-Resources model; and (b) that personal resources can fulfill different roles in the model: it can be a mediator or a moderator of the relationship between job characteristics and outcomes, an antecedent of strain and motivation, an antecedent of work characteristics, and/or an outcome of work characteristics. The available evidence suggests that relatively stable personal resources (e.g. personality characteristics) are more likely to function as antecedents of work characteristics or outcomes or as moderators of the association between work characteristics and outcomes than relatively malleable characteristics such as self-efficacy, which may be better taken as mediators or even outcomes. However, it is clear that more, preferably longitudinal, research on the role and effects of personal characteristics in the JD-R model, is badly needed.

Evaluation of the Revised Job Demands-Resources Model Since 2004, the revised JD-R model has been applied and tested in a large body of research. Most of this research has provided support for the main effects of job demands on strain and ill-health (the health impairment process) and of job resources on motivation/engagement and performance (among others, Bakker, Demerouti, De Boer, & Schaufeli, 2003; Hanssez & Chmiel, 2010; Lewig, Xanthopoulou, Bakker, Dollard, & Metzger, 2007). As regards the magnitude of these main effects, these tend to depend on both the type of job demands/job resources considered as well as the type of outcome. For example, in a cross-sectional study among 12,000 Dutch workers, Bakker, Van Veldhoven, and Xanthopoulou (2010) estimated the effects of 16 combinations of job demands (emotional demands and work load) and job resources (skill utilization, learning possibilities, colleague and leader support, feedback, career opportunities, participation in decision making, and job autonomy) on two outcomes (task enjoyment and commitment). They found that the main effects of these combinations of job characteristics jointly accounted for 6% to 33% of the variance in the study outcomes (median 15%, mean 15%), with the average amount of variance accounted for in task enjoyment being higher (17.9%) than that in commitment (12.4%).

Moreover, the findings of these cross-sectional studies were also replicated longitudinally (Akkermans, Brenninkmeijer, Van den Bossche, Blonk, & Schaufeli, 2013; Hakanen, Schaufeli, & Ahola, 2008). However, other longitudinal studies failed to support the assumptions of the revised JD-R model (Brauchli, Schaufeli, Jenny, Füllemann, & Bauer, 2013; Ouweneel, Le Blanc, & Schaufeli, 2012; Seppälä et al., 2014), perhaps because engagement and burnout tend to be relatively stable across time, leaving little variance to be accounted for across time (see Mäkikangas, Kinnunen, Feldt, & Schaufeli, 2016, for a discussion).

Apart from these main effects, the demands \times resources interaction has also frequently been tested, both cross-sectionally and longitudinally. However, this interaction has proved to be a fickle phenomenon. Whereas some studies revealed the expected interaction effects (Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Bakker, Van Veldhoven, & Xanthopoulou, 2010), other studies provided only limited evidence (e.g., Brough et al., 2013). Moreover, even if statistically significant, demand \times resource interactions tend to be of relatively little practical relevance. For instance, although 28 out of the 32 demand \times resource interactions tested in Bakker, Van Veldhoven, and Xanthopoulou's (2010) study among 12,000 Dutch workers were statistically significant, these accounted on average for only an additional 0.5% of the variance in the outcome variables beyond what was already accounted for by the main effects of the demands and resources involved.

Summarizing, the evidence discussed above shows strong cross-sectional evidence for main effects of demands and resources on strain (especially burnout) and motivation (engagement), respectively. The longitudinal evidence is somewhat less convincing. Moreover, demands \times resources interaction effects tend to be unreliable for small to moderately-sized samples and are usually of small magnitude. However, although not all predictions of the JD-R model have unequivocally been confirmed, it is fair to conclude that the model can successfully be applied as a framework for research on the work-related antecedents of stress and well-being.

11.2 Job Demands, Job Resources, and Teacher Stress and Well-Being

Both the Job Demands-Resources model of burnout and the revised JD-R model were developed for use in a general context, across a wide range of occupations. Indeed, the fact that they are relatively independent from the specific job context in which they are applied is one of the main attractions of these models. In the past, these models have also frequently been used to examine job stress (burnout) and motivation (engagement) among educators. In this section, we present a focused literature review, aiming to identify the most important results obtained with these models on the task-specific, organizational and personal antecedents and consequences of teacher stress and motivation.

11.2.1 Approach

Previous reviews on the JD-R model (Bakker & Demerouti, 2007; Schaufeli & Taris, 2014; Taris & Schaufeli, 2016) were screened for possibly relevant studies. Moreover, a literature search in the PsycInfo and ERIC databases was conducted to identify additional studies, using “job demands”, “job resources”, “school”, “university”, and “educator” and “teacher”, as search terms. In order to be eligible, studies were required to present an empirical study (a) in which either the JDR-model of burnout or the revised JD-R model was used as the theoretical framework; (b) in which both job demands and job resources were included; (c) in which at least some of the outcomes studied could be classified as motivational and/or health-related outcomes; (d) where participants educated students at either the primary, secondary or tertiary level; (e) that was written in English; and (f) that was published in 2014 or earlier. Relevant studies were screened and the following information was recorded: (1) the nature of the sample (design, sample size, type of participants); (2) the job demands and job/personal resources included in the study; (3) the outcomes studied; and (4) the study findings (main effects and interaction effects).

11.2.2 Results

In total, 10 studies were retrieved. Table 11.1 presents a detailed overview of the main characteristics of these studies and Table 11.2 summarizes their main findings. As Table 11.1 shows, the studies in this review were published between 2005 and 2012. The samples were collected in several countries, including Australia, South Africa, Finland, Spain, Italy and the Netherlands. Three studies (2, 6, and 7) contained a relatively heterogeneous group of educators, including teachers from the primary, secondary and tertiary (college/university) levels. Six studies focused on one specific group of teachers (teachers at either the secondary or the tertiary level). One study (5) focused on school principals: although these participants were teachers, it is unclear to which degree they were actually involved in classroom teaching. Sample sizes ranged from 146 to 3,753, with half of the samples not exceeding 300 participants. Moreover, only three studies (8–10) employed a longitudinal design (note that study 9 and 10 focused on different variables measured in the same sample); in these cases only two waves of data were collected.

Job Demands and Job Resources Table 11.1 also presents the job demands and job resources that were included in these studies. Regarding demands, most studies included a measure of quantitative job demands (also termed “*overload*” or “*work pressure*”) (studies 1, 3–4, 6–10). Studies 1, 7 and 9 also included qualitative job demands such as *mental, emotional and/or physical job demands*. Although *work-home conflict* is often considered an outcome of high job demands, it was included as a job demand in studies 1, 3 and 5. *Role conflict/ambiguity* was measured in two studies (9 and 10 – note that this is the same sample), and *inequity* and *interpersonal*

Table 11.1 Description of 10 studies on the Job Demands-Resources model of Burnout and the revised Job Demands-Resources model

Study	Sample	Job demands	Job resources	Personal resources	Outcomes
<i>Cross-sectional studies</i>					
1. ^a	Bakker et al. (2005)	1012 employees of a Dutch institute for higher professional education	Overload Emotional demands Physical demands WHI	Autonomy Social support Quality rel. superv. Performance Feedback Control	<i>n.a.</i> <i>Strain/health imp.:</i> Exhaustion <i>Withdrawal/motivation:</i> Cynicism <i>Strain/health imp.:</i>
2. ^a	Bakker et al. (2007)	805 Finnish primary, secondary and tertiary education teachers	Pupil misbehavior	Supervisor support Information Social climate Innovative climate Appreciation	<i>n.a.</i> Vigor <i>Withdrawal/motivation:</i> Dedication
3.	Bakker et al. (2010)	3,753 Australian academics	Work overload WHI	Autonomy Fairness Job security Trust in dept. head Trust in senior management	Extraversion Neuroticism <i>Strain/health imp.:</i> Health impairment <i>Withdrawal/motivation:</i> Organizational commitment

(continued)

Table 11.1 (continued)

Study	Sample	Job demands	Job resources	Personal resources	Outcomes
4.	Brenninkmeijer et al. (2010)	Interpers. conflict Work load	Autonomy Colleague support	Regulatory focus	Strain/health imp.: Exhaustion Withdrawal/motivation: Work engagement Commitment Job satisfaction
5.	Guglielmi et al. (2012)	WHI Inequity	Learning opport. Influence and participation	Self-efficacy Workaholism	Strain/health imp.: Burnout Withdrawal/motivation: Engagement
6. ^a	Jackson and Rothmann (2005)	Overload	Organizational support Opportunities for growth Job insecurity social support Rewards Control	n.a.	Strain/health imp.: Exhaustion Physical health Mental well-being Withdrawal/motivation: Cynicism

7.	Hakanen et al. (2006)	2,038 Finnish primary, secondary and tertiary education teachers	Pupil misbehavior Overload Unfavorable physical work env.	Control Supervisor support Information Social climate Innovative climate	n.a.	Strain/health imp.: Burnout Self-rated ill-health Withdrawal/motivation: Work engagement Commitment
<i>Longitudinal studies (all two-wave designs)</i>						
8.	Boyd et al. (2011)	296 Australian academics	Work pressure Academic work load	Autonomy Fairness	n.a.	Strain/health imp.: Strain Withdrawal/motivation: Organisational commitment
9. ^b	Lorente et al. (2008)	274 Spanish secondary school teachers	Quant. demands Emotional demands Role ambiguity Role conflict	Autonomy Social support	Mental competency Emotional competency	Strain/health imp.: Burnout Withdrawal/motivation: Engagement
10. ^b	Vera et al. (2012)	274 Spanish Secondary school teachers	Overload Role conflict	Autonomy Organizat. climate	Self-efficacy	Strain/health imp.: Burnout Withdrawal/motivation: Engagement

Note. WHI work-home interference, n.a. Not available, ^aThese studies tested the Job Demands-Resources model of burnout. ^bStudies 9 and 10 draw on the same sample

Table 11.2 Main findings of 10 studies on the Job Demands-Resources model of Burnout and the revised Job Demands-Resources model

Study	Main findings
<i>Cross-sectional studies</i>	
1. ^a	Adverse effects of demands on strain/health (and withdrawal/motivation) Favorable effects of all resources on withdrawal/motivation (and strain/health) 18 out of 32 possible demands × resources interactions significant (7 involving autonomy) <i>Conclusion: motivational and health impairment processes supported; no evidence for separate processes; moderate support for demand × resource interaction</i>
2. ^a	Adverse effects of demands on strain/health (and withdrawal/motivation) Favorable effects of resources on withdrawal/motivation (and strain/health) 13 out of 18 possible demands × resources interactions significant; no interactions with control, other interactions with resources generally significant (adverse effects of high demands are stronger for low resources) <i>Conclusion: motivational and health impairment processes supported; no evidence for separate processes; moderate support for demand × resource interaction</i>
3.	Adverse effects of demands on strain/health Favorable effects of resources on strain/health Favorable effects of resources on withdrawal/motivation Neuroticism affects demands and impairment (i.e., is an antecedent of demands) Extraversion affects resources and commitment (i.e., is an antecedent of resources) <i>Conclusion: motivational and health impairment processes supported; personal resources are antecedents of demands and resources</i>
4.	Adverse effects of demands on strain/health; these effects are stronger for participants with a prevention focus Favorable effects of high resources on motivation/withdrawal are stronger for participants with a low promotion focus <i>Conclusion: motivational and health impairment processes supported; personal resources moderate effects of job characteristics on outcomes</i>
5.	Adverse effects of demands on strain/health Adverse effects of workaholism on strain/health are partially mediated by demands Favorable effects of job resources on motivation/withdrawal Favorable effects of self-efficacy on motivation/withdrawal are partially mediated by job resources Favorable effects of job resources on strain/health <i>Conclusion: motivational and health impairment processes supported; personal resources are antecedents of demands and resources</i>
6. ^a	Adverse effects of demands on strain/health Favorable effects of job resources on strain/health Adverse effects of demands on motivation/withdrawal Favorable effects of job resources on motivation/withdrawal <i>Conclusion: motivational and health impairment processes supported; no evidence for separate processes</i>

(continued)

Table 11.2 (continued)

Study	Main findings
7.	Adverse effects of job demands on strain/health
	Favorable effects of job resources on strain/health
	Favorable effects of job resources on motivation/withdrawal
	<i>Conclusion: motivational and health impairment processes supported</i>
<i>Longitudinal studies (two-wave designs)</i>	
8.	Favorable effects of job resources on later strain/health
	Favorable effects of job resources on later motivation/withdrawal
	<i>Conclusion: motivational process supported; no support for health impairment process</i>
9. ^b	After controlling for relevant time 1 indicators of strain/health or motivation/withdrawal:
	Adverse effects of job demands on later strain/health (and later motivation/withdrawal)
	Favorable effect of job demands (overload) on later motivation/withdrawal (dedication)
	<i>Conclusion: health impairment process supported; no support for motivational process</i>
10. ^b	Cross-sectional adverse effects of job demands on strain/health
	Favorable effect of self-efficacy on later burnout is mediated by job demands
	Cross-sectional favorable effects of job resources on motivation/withdrawal
	Favorable effect of self-efficacy on later motivation/withdrawal is mediated by job resources
	<i>Conclusion: health impairment and motivational processes are supported cross-sectionally; self-efficacy is a precursor of later demands and resources</i>

Note. ^aThese studies tested the Job Demands-Resources model of burnout. ^bThese studies draw on the same sample

conflict were included in one study each (study 5 and 4, respectively). Finally, two studies (2 and 7,) included a job demand that can be considered characteristic for the teaching profession, namely *pupil misbehavior*.

Regarding the job resources, virtually all studies (except 5) tapped *job autonomy/control*. Various forms of *social support* were also frequently measured (study 1, 2, 4, 6, 7, 9–10). All other resources were included only once or twice. Interestingly, many of these resources refer to aspects of interpersonal relationships at work, such as *social climate* (which overlaps to some degree, but not entirely, with social support), *appreciation*, *fairness*, and *trust*. Other resources were *performance feedback*, *information*, *innovative climate*, *opportunities for growth/learning*, *rewards*, and *influence/participation in decision making*.

It is interesting to see that although the JD-R model in its various guises assumes that relevant job characteristics may vary across jobs (Bakker & Demerouti, 2007), virtually all demands and resources studied in the teaching context could equally well have been studied in other occupations. Indeed, the three most “popular” job characteristics studied in the educator context (job control, various types of demands, and social support) are also the key factors in Karasek’s much older Demand-Control-Support model (Karasek & Theorell, 1990). This might be taken to mean that either a teacher’s job is fairly standard (having few specific demands/resources) or that, so far, researchers have not felt the need to take full advantage of the model’s

flexibility in terms of examining demands/resources relevant and specific to the teaching context.¹

Personal Resources Five studies (3–5, 9–10, all published in 2008 or later) included measures of personal resources, with studies 5 and 10 focusing on self-efficacy and the remaining studies examining personality characteristics such as extraversion and neuroticism (3) and regulatory focus (4), or skills/behavior-like concepts, such as mental and emotional competencies (9) or workaholism (5). The position of these concepts in the JD-R model varies. Personal resources are considered antecedents of demands and resources (3, 5, 9–10) or moderators of the associations between demands/resources and outcomes (4). However, since most of these studies employed cross-sectional designs (with the exception of studies 9–10), ideas concerning the causal order of the concepts must necessarily rest on theoretical grounds.

Outcomes Consistent with the various versions of the JD-R model, Table 11.1 focuses on two sets of outcome variables: strain/health-related outcomes on the one hand, and motivation/withdrawal-related outcomes on the other. Therefore, the outcomes presented in Table 11.1 were assigned to either of these two clusters. Because the JD-R model of burnout and the revised JD-R model differ in their classification of the cynicism/depersonalization dimension of the burnout concept (respectively considering cynicism as an indicator of withdrawal/lack of motivation or as an indicator of strain/ill-health), the classification of the burnout dimensions in Table 11.1 was contingent upon the theoretical framework that was tested in a particular study.

As Table 11.1 shows, seven studies included (at least one dimension of) burnout (1, 4–7, 9–10). Studies 1 and 6 tested the JD-R model of burnout, taking exhaustion as an indicator of strain/health impairment and cynicism as a measure of withdrawal/motivation. The other studies considered burnout as a measure of strain/ill-health. Interestingly, study 2 also employed the JD-R model of burnout, but included vigor and dedication (two dimensions of the engagement concept) as indicators of strain and withdrawal, respectively. The remaining studies employed measures of physical and mental health, self-rated ill-health, and stress-related and psychosomatic complaints as indicators of strain/health impairment. Regarding the indicators of *withdrawal/motivation*, studies 4, 5, 7 and 9–10 focused on work engagement. Organizational commitment was employed in studies 3, 4, 7–8. No other indicators of withdrawal/motivation were studied.

Main Findings Table 11.2 presents the main findings of the 10 identified studies and discusses these in terms of “demands” and “resources” in general, since the findings obtained for specific demands (resources) tended to be similar across demands (resources). Thus, study findings can meaningfully be discussed for

¹Note that although the three most frequently studied job characteristics in the teacher context using the JD-R model have also been studied in other models such as Karasek and Theorell’s (1990) Demand-Control(-Support) model, the items used to tap these concepts could well be specifically tailored towards the educator context. However, this does not affect our general conclusion that the basic concepts studied in the JD-R model have also been studied in other approaches.

demands and resources in general, rather than separately for each specific demand or resource. Further, consistent with the various versions of the JD-R model, Table 11.2 focuses on two sets of outcome variables: health and well-being on the one hand, and motivation/withdrawal-related concepts on the other. In this way the two central processes in the JD-R model (the health impairment process and the motivational process) can conveniently be examined. Finally, attention is given to both possible demands \times resource interactions, and the role of personal characteristics.

The JD-R Model of Burnout It is important to note that three of the four oldest studies in this table (studies 1, 2 and 6) tested the Job Demands-Resources model of burnout, not the revised JD-R model. All these studies found that high demands were associated with high levels of strain and ill-health, and that high resources were associated with lower levels of withdrawal/motivation. Although this is consistent with the health impairment and motivational processes proposed in the JD-R model, it should be noted that the model also proposes that these processes are more or less independent from each other. However, all three studies show that high resources and low demands were also associated with low levels of strain and high levels of motivation, respectively, which goes against the assumptions of the JD-R model of burnout. Apparently, the indicators of strain/ill-health and motivation/withdrawal relate in a very similar way to the demands and resources included in these studies, up to the point where they cannot be distinguished in terms of their correlates. Since these outcomes are both part of the overall burnout concept, these findings suggest that exhaustion and cynicism are actually indicators of the same underlying concept (i.e., burnout). This is in line with the assumptions of the revised JD-R model; the JD-R model of burnout thus received only limited support in these studies.

Demand \times Resource Interactions Interestingly, although studies 1, 2 and 6 set out to test the JD-R model of burnout (in which the demands \times resources interaction was considered unimportant, cf. Demerouti et al., 2001), studies 1 and 2 did test for interaction effects. In conjunction, these two studies tested 50 interactions, 31 of which (61%) reached significance.² Overall, these interactions showed that the adverse effects of high demands on the outcomes were weaker in the presence of high resources. Focusing on specific demands \times resources interactions, it is noteworthy that 7 of the 18 significant interactions in study 1 involved job control, suggesting that control – as proposed earlier in Karasek's (1979) Demand-Control model – is an important buffer of the adverse effects of high demands. However, the only resource in study 2 that was *not* involved in any significant interactions also involved control. Apparently the findings for interactions involving control are

²The Bakker et al. (2005, 2007) studies did not correct for the effect of multiple testing (e.g., using Bonferroni correction). Moreover, these tests were not statistically independent since the interactions within a particular study were all based on the same set of observations and involved the same – sometimes highly correlated – variables. Consequently, the number of statistically significant interactions (61%) is likely to have been estimated optimistically.

inconsistent in this research. As none of the other studies included in this review reported tests of demand \times resource interaction effects, overall the evidence for interactions in the context of educator stress is moderately strong at best.

The Revised JD-R Model: The Health Impairment and Motivational Processes The *health impairment process* implies that adverse strain/health-related outcomes are primarily associated with high job demands and, possibly, also by low levels of resources. This assumption is fully supported in studies 3–5, 7, 9 and 10 (with study 9 offering longitudinal evidence, and with only study 8 offering no support for this process). The *motivational process* holds that motivation/withdrawal is primarily related to job resources (but not to job demands). This assumption is fully supported in studies 3–5, 7–8 and 10, with study 8 offering longitudinal support. Overall, it can be concluded that the support for both processes among educators is strong, although it should be noted that only study 8 and 9 offered longitudinal support.

The Revised JD-R Model: Personal Resources Studies 3–5 and 9–10 also included personal resources. These studies (especially 3, 5, and 10) showed that personal resources (neuroticism, extraversion, workaholism and self-efficacy) may be considered antecedents of job demands and job resources (with study 10 offering longitudinal evidence). Study 4 showed that regulatory focus – examining whether participants attempt to avoid loss or to maximize gains – moderated the effects of demands/resources on the outcomes, such that favorable effects of particular job characteristics were most likely to occur for those seeking to maximize their gains. Study 9 provided no evidence for any significant role of personal resources (mental and emotional competencies). Overall, these studies provide some support for personal resources as antecedents or moderators in the revised JD-R model, but the evidence is piecemeal and in need of replication, preferably using longitudinal designs.

11.3 Discussion

In this chapter, we have discussed the origins and different versions of the Job Demands-Resources model. Further, we provided an overview of the findings obtained with this model in the context of educator stress, health and motivation. The current version of the JD-R model holds that ill-health (e.g., exhaustion) is primarily related to high demands (the health impairment process), whereas motivation and withdrawal is primarily related to low resources (the motivational process). Further, there should be an interaction between demands and resources. Personal resources have been incorporated in the JD-R model as antecedents, moderators, mediators and/or outcomes.

Our review of 10 studies published between 2005 and 2012 that were conducted in the educator context provided weak support for the oldest version of the model, the JD-R model of burnout. Although exhaustion was indeed related to demands and

cynicism/withdrawal to resources as predicted by the JD-R model, these outcomes were also affected by resources and demands, respectively. This suggests that the health impairment and motivational processes cannot be distinguished, at least not for burnout in the teaching context. Rather, these findings provided strong support for the current revised version of the JD-R model, supporting both the health impairment and motivational processes. Although two early studies which tested the JD-R model of burnout revealed a substantial number of demand \times resource interactions, the findings of these studies were in some respects inconsistent and were not replicated in later research in the educator context. Finally, the review provided some support for personal characteristics as antecedents of demands and resources and weak support for moderator effects of personal resources. All in all, it can be concluded that the evidence collected in the educator context was largely consistent with the assumptions of the revised JD-R model.

This does not necessarily mean that there is strong support for the JD-R model or that it has contributed significantly to understanding educator stress, motivation and well-being. Firstly, methodological limitations impose limits to the strength of the evidence for the JD-R model. The large majority of studies uses cross-sectional, self-report data, making it impossible to draw strong conclusions on the causal directions of the associations in the JD-R model. This not only applies to research in the educator context, but also to research using the JD-R model in other occupational contexts (Schaufeli & Taris, 2014; Taris & Schaufeli, 2016). However, taking all available evidence into account, it seems fair to say that the model's two central assumptions concerning the health impairment and motivational processes have received strong support, also among educators.

Secondly, one may wonder whether the JD-R model has yielded insights on the antecedents of teacher stress and well-being that could not have been obtained using earlier models, such as Karasek and Theorell's (1990) Job Demand-Control-Support model or Siegrist's (1996) Effort-Reward Imbalance model. Looking at the job characteristics that have been studied as antecedents of teacher stress and motivation using the JD-R model, it is noteworthy that the large majority of demands and resources that have been examined in the context of educator stress are factors (such as quantitative work load, autonomy, support) that take a central place in other approaches as well. In this sense, application of the JD-R model has generated no major new insights into the antecedents of educator stress. However, this is perhaps less due to the model itself than to the researchers using the model who have focused on job characteristics of general importance rather than on educator-specific job characteristics. Looking at the outcomes studied, the two main outcomes examined in the model are burnout and work engagement. Burnout has been studied using other approaches as well, but it is interesting to see that work engagement – as a relatively novel concept – is often studied in the context of the JD-R model. Indeed, it might be argued that the JD-R model derives part of its popularity from the fact that it is the model of choice to study work engagement – a concept that has had strong appeal to those working in the area of work and organizational psychology (Schaufeli, 2014).

However, the JD-R model does contribute to understanding educator stress and motivation as a heuristic integrative framework *par excellence*. It allows researchers to conveniently classify, combine, integrate and extend different theories, processes, concepts and findings, spurring research on traditional issues such as the role of personal resources in health and well-being as well as on novel topics such as job crafting as an antecedent (and perhaps consequence) of job characteristics, stress and performance (e.g., Tims & Bakker, 2010). In this respect, the heuristic potential of the JD-R model has not fully been exploited as yet. If researchers are to complement the generic variables with educator-specific job characteristics (e.g., pupil misbehavior, stressful interactions with parents and “red tape”), the flexibility of the JD-R model will most likely facilitate a fuller understanding of the antecedents of educator stress.

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Chapter 12

Towards a Dynamic Integrative Theory of Educator Stress

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Abstract This chapter addresses two recent trends in the conceptualization of work stress: recognizing the temporal dynamics of work stress and combining existing theoretical models to increase predictive power and broaden understanding. The chapter illustrates these developments in educator stress research by presenting the results of testing a Dynamic Integrative Teacher Stress (DITS) model. The DITS model combines elements of the Job Demand-Control-Support, Effort-Reward Imbalance and Kyriacou's models (coping resources) while accounting for the dynamic nature of work stress (temporal changes), personal and contextual factors. It is based on a real-time longitudinal study of teacher stress over two academic years. The study examines whether the model's predicted independent and moderator effects on teacher strain are confirmed using Ecological Momentary Assessment

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(EMA) measures, testing effects at the between- and within-person levels. Longitudinal data generated using EMA via the *Teacher Stress Diary* over 2 years, supports the unique value of the model's key concepts to predict teachers' emotional stress responses (negative affect). Higher demand and over-commitment, and lower control, coping and reward, predicted higher emotional strain. The DITS model explained considerable unique variance in emotional strain and, as expected, the integrative model explained more variance than each component alone, suggesting that combined models may be a useful framework for future research and theory development. The model explained both between- and within-person changes in emotional strain. These results provide a more comprehensive and dynamic understanding of occupational stress in teachers than traditional survey studies, potentially benefitting intervention development to reduce teacher stress and promote educator and school sustainability.

Keywords Educator stress • Dynamic Integrative Teacher Stress model • Ecological momentary assessment • Job Demand-Control-Support model • Effort-Reward Imbalance model • Coping

Self-discovery of my emotions throughout the day was awesome. I see where I am tired and when I'm most frustrated. Teacher, personal communication, October, 2011

12.1 Introduction

The problem of educator stress has been amply addressed in Part I and Part II of this book, in terms of the prevalence and sources of educator stress (Chap. 2), consequences of educators' stress for their psychological well-being (Chap. 3), relation of educator stress to teaching self-efficacy (Chap. 5), and consequences for teacher turnover (Chap. 6). The literature reviewed in these chapters offers strong support for the conclusion that teacher stress negatively impacts teachers' health (Pisanti, Gagliardi, Razzino, & Bertini, 2003), work attitudes (Collie, Shapka, & Perry, 2012), and student achievement (Dorman, 2003). Furthermore, the widespread implications of educator stress threaten the sustainability of educators and schools. Therefore, developing effective intervention strategies to reduce educator stress and promote educator well-being is essential to address this problem.

Addressing the problem of educator stress requires validated theories (Campbell et al., 2000; Sass, Seal, & Martin, 2011) that can guide intervention. Chapters 9, 10, and 11 of this book reviewed the leading models of occupational stress and their application to educators. One of the limitations of existing models is their static nature, i.e., the models do well in explaining summative experiences of work stress as captured by survey methods, but do not take into consideration the temporal or dynamic aspects of stress (de Lange, Taris, Kompier, Houtman, & Bongers, 2003; Garst, Frese, & Molenaar, 2000). Dynamic changes in work conditions and stress

responses are particularly relevant in education contexts, which are complex and rapidly changing, and developing predictive models of these time-dependent contingencies (stressors-strain) can be very valuable to developing interventions that are effective in the real-world.

Another limitation pertains to the relatively independent testing of the leading occupational stress models rather than looking for complementarities among models that could lead to broader understanding of work stress processes (e.g. Peter et al., 2002). Furthermore, educator stress theories have generally reflected a split between the disciplines of education and occupational health. We argue that this split may be limiting effective intervention development to address educator stress, and that a bridging effort could be beneficial in terms of theory and practice.

This chapter addresses two recent developments in the conceptualization of work stress that address the limitations described above: (a) recognizing the temporal dynamics of work stress and (b) combining existing theoretical models to increase predictive power and broaden understanding. To illustrate these developments, the authors present the results of testing a Dynamic Integrative Teacher Stress (DITS) model using ecological momentary assessment (EMA). The chapter is organized in two parts. The first part presents current thinking on the dynamics of work stress and combinative model approaches. The second part focuses on the results of the validation of the DITS model in the prediction of real-time emotional strain in teachers. The chapter concludes with a reflection on the implications of a dynamic integrative approach to educator stress theory and intervention development.

12.2 A Case for Dynamic Integrative Approaches to Educator Stress

12.2.1 A Dynamic Perspective

There has been an increasing recognition among occupational stress researchers that work stress is a dynamic process which changes over time and context (Beal & Weiss, 2003; Carson, Weiss, & Templin, 2010). This is especially true for teachers whose work context has many changes during the work day in terms of classes, different student cohorts, activity (e.g. teaching, conference, planning), and seasonal changes (semester or quarterly), each with specific challenges (e.g. assessment schedules). Educator stress theories need to account for these stress processes in order to better identify “how” and “when” to intervene. For instance, knowing when teachers experience most stress during the day, and for how long, can help direct interventions to address risk time periods and curb potentially harmful stress spikes, or interrupt continued high stress.

The leading educator and occupational stress models have generally failed to account for these temporal factors, especially among teachers. As has been described in this book (Part II), model validation studies having been usually carried out using

cross-sectional designs and retrospective measures, which carry several biases, such as recall limitations (Smyth & Stone, 2003) and appraisal biases (Kihlstrom, Eich, Sandbrand, & Tobias, 2000). Cross-sectional designs only allow testing for between-person effects (e.g. factors that explain differences across teachers). The dynamic nature of educator stress is reflected in within-person changes over time and context. Longitudinal designs have overcome some limitations (Ford et al., 2014; Salo, 2002), allowing the testing of within-person effects, but have failed to capture stressors/strain on shorter time-scales (e.g. hourly), which is relevant in teaching contexts. Other authors have acknowledged that emotions at work (e.g. happiness), and motivational aspects such as work engagement, vary considerably over time, and that these short-term within-person fluctuations may have a stronger predictive value for work outcomes (e.g. performance) than between-person differences (e.g. Bakker & Daniels, 2013; Johnston, Jones, Charles, McCann, & McKee, 2013).

Novel methodologies have emerged to measure stress in real-time that capture the momentary changes in work stress at micro (e.g. min or hour) and macro (day or season) time scales and contingencies between stressors and strain. These have been labeled “ecological momentary assessment” or EMA (Stone, Shiffman, Atienza, & Nebeling, 2007) and can take advantage of the emerging technologies such as PDA devices. There is growing research using EMA to capture daily fluctuations in job stress and its antecedents (e.g. Johnston, Beedie, & Jones, 2006), but its use in teacher stress studies is relatively rare. For example, Schonfeld and Feinman (2012) studied exposures to work stressors (e.g. student learning problems, upset students) and classroom management problems among 252 novice teachers using an online daily diary over two weeks. Daniels, Hartley, and Travers (2006) used personal digital assistants (PDAs) for five days (three times a day), to study the extent to which beliefs about the impact of pre-defined stressors on negative affect moderated the relation between momentary stressors and negative affect, in a small sample of teachers ($n = 36$). Carson, Weiss, and Templin (2010) conducted a more extensive EMA study using a PDA diary four times a day for a period of 10 days with middle school teachers. They studied the relation between daily work events and emotions, and found that teachers were able to provide meaningful momentary data in a convenient manner. However, they noted some drawbacks with EMA implementation related to technical PDA issues and participant burden. We conducted a comprehensive feasibility study of EMA via the Teacher Stress Diary (McIntyre & McIntyre, 2011; McIntyre et al., 2016) using an iPod-based system over two academic years (12 days over six waves). Feasibility was assessed via objective compliance data and a self-reported feasibility survey, results showing high compliance (diary entry completion) and high user-friendliness of the diary contents and device. The study results indicated that EMA is a feasible method of recording teacher demands, stress responses and resources over time. Real-time measures, such as the Teacher Stress Diary, can provide more detailed information on stressor-strain contingencies in teachers’ daily lives, which helps to identify demands and resources that can be targeted at different times and with differing work conditions, thus refining intervention development.

In terms of explaining dynamic stress processes, there are many questions left unanswered by current evidence on occupational stress model testing. For instance, are model predictions (e.g. Job Demand-Control - JDC strain hypothesis) supported by cross-sectional research also supported in natural settings and in real-time? Are different processes involved in the prediction of general stress responses (summative reports) and momentary changes in stress response? Few studies have examined whether the key occupational stress model predictions are valid for dynamic stress processes, especially among teachers. Simbula (2010) examined daily fluctuations in 61 Italian teachers' well-being using the framework of the Job Demands-Resources Model (See Chap. 11 for a detailed description of the model). Although monitoring only occurred over five days via traditional survey, she found support for key model predictions in terms of mediated effects of daily fluctuations in co-worker support and job demands, on teachers' day-level mental health and job satisfaction. The study is also limited by the low response rate (only 26% of 236 teachers invited to participate actually returned the diaries), which may reflect the potential burden of conducting EMA studies.

There is increasing recognition that studying job stress dynamically and using multi-method approaches can further understanding of the causes and processes leading to worker well-being, work attitudes and performance (e.g. Beal & Weiss, 2003; Sonnentag, 2005), which is key in effective intervention development. This especially applies to teacher stress, a profession where job complexity, unpredictability and the relational nature of teaching carry a strong temporal element. Testing occupational stress models among teachers in real-time such as via ecological momentary assessment, appears to be a promising strategy to capture this time-dependent complexity and learn more about how to help school organizations and teachers improve health and well-being.

12.2.2 An Integrative Approach

Teacher stress theories have focused on stressors specific to teaching and on teachers' characteristics (e.g. coping) as antecedents of strain (Kyriacou, 2001; Montgomery & Rupp, 2005). General occupational stress theories focus on characteristics of the work environment and on the balance between work demands and available resources (e.g. personal, social, organizational).

Two of the most widely used balance models are the Job Demand-Control-Support Model-JDCS (Johnson & Hall, 1988; Karasek, 1979) and the Effort-Reward Imbalance Model-ERI (Siegrist, 1996). A detailed description of these models is presented in Chap. 9 (JDCS model) and Chap. 10 (ERI model) of this book as well as evidence of their applicability to educator stress. Chapter 11 describes the Job Demands-Resources Model (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001), which expands on the previous two models and has also received empirical support in teachers as indicated in the literature review presented in Chap. 11 (e.g. Hakanen, Demerouti, & Xanthopoulou, 2007; Hakanen, Bakker, & Schaufeli, 2006).

Research using either an educational or occupational stress approach has proceeded independently, rarely bridging these perspectives to broaden understanding on educator stress. Among the occupational stress theories, there have also been independent paths in testing these models as described in Chaps. 8, 9, 10 and 11. However, the original authors of the models (e.g. Karasek for the JDCS model and Siegrist for the ERI model) have made some effort at identifying conceptual similarities and differences (e.g. Karasek, Siegrist, & Theorell, 1998), suggesting that there may be value in combining models in future research (see Sect. 12.3.3).

Very few studies have tested combined models, especially among educators. For example, a combination of the JDCS model and the ERI model was used to predict acute myocardial infarction among a large sample of men and women as part of the Stockholm Heart Epidemiology (SHEEP) case-control study (Peter et al., 2002), with the results indicating that combining information from the two models improved the risk estimation of acute myocardial infarction. The complementarity of the JDCS and ERI models in the prediction of depression among Japanese workers was also highlighted by Tsutumi and colleagues (2001) as was their predictive value for risk of cardiovascular mortality among Finnish industrial workers (Kivimaki et al., 2002). Ota et al. (2009) examined the combinative effects of JDCS and ERI elements on insomnia among 1,022 middle-aged Japanese workers. They found that effort-reward balance and social support were related to recovery from insomnia whereas overcommitment and job strain were associated with future insomnia onset.

There are a few studies of combined models among service professions. Johnston et al. (2006) and Johnston et al. (2013) tested a combination of the JDC and ERI models using equivalent survey and EMA measures of model constructs. The second and larger study, conducted among 254 nurses over three shifts (see section on EMA), focused on testing within-person effects of demand, control and reward on negative and positive affect. As predicted, high demand/effort, low control and low reward were associated with increased negative affect variations within nurses, indicating that the same work characteristics operate within and between nurses. Positive affect was predicted by high D/effort, control and reward. Moderator effects of control and reward on the impact of demand/effort were present for negative affect, but not for positive affect. The authors concluded that the JDC model fit the data more consistently than the ERI model, and was more in accordance with predictions, for negative rather than positive affect. Among educators, one study (Shyman, 2011) combined elements of the Job Demand-Control and the ERI models to predict emotional exhaustion (measured by the MBI-Ed, Maslach & Jackson, 1981) among 100 special education staff in the U.S. The study found that elements of both the JDC and the ERI model were predictive of burnout. The author concluded that this combinative approach is promising in terms of providing a deeper and broader understanding of occupational stress and increasing predictive value for important health outcomes.

12.2.3 Conclusion

In summary, teacher stress model validation can benefit from development in three areas: (1) bridging educational and occupational stress theories, (2) testing combined or integrative models that can provide a more comprehensive understanding of educator stress, and (3) adding a temporal dimension to educator stress models that accounts for its dynamic nature. This chapter describes an attempt to address these three aspects as part of a larger study funded by the Institute of Education Sciences (McIntyre et al., 2011, Grant R305A110080 to the University of Houston). The study examined the link of teacher stress to teaching effectiveness, and student outcomes using a multi-method approach that included EMA. This research tested a Dynamic Integrative Teacher Stress (DITS) model that combines constructs of the JDCS and ERI models, and Coping (Kyriacou’s model), and examined stressor-strain relations over time via EMA (see Fig. 12.1), which is novel in teacher stress model testing. The model also accounts for individual (e.g. gender, ethnicity), professional (e.g. seniority) and school factors (e.g. class size and school enrollment), which have been noted as relevant in understanding educator stress in various chapters in this book (e.g. Chap. 1, Chaps. 7 and 8) and in previous research (e.g. Lau, Yuen, & Chan, 2005; Verhofstadt, Baillien, Verhaest, & De Witte, 2015).

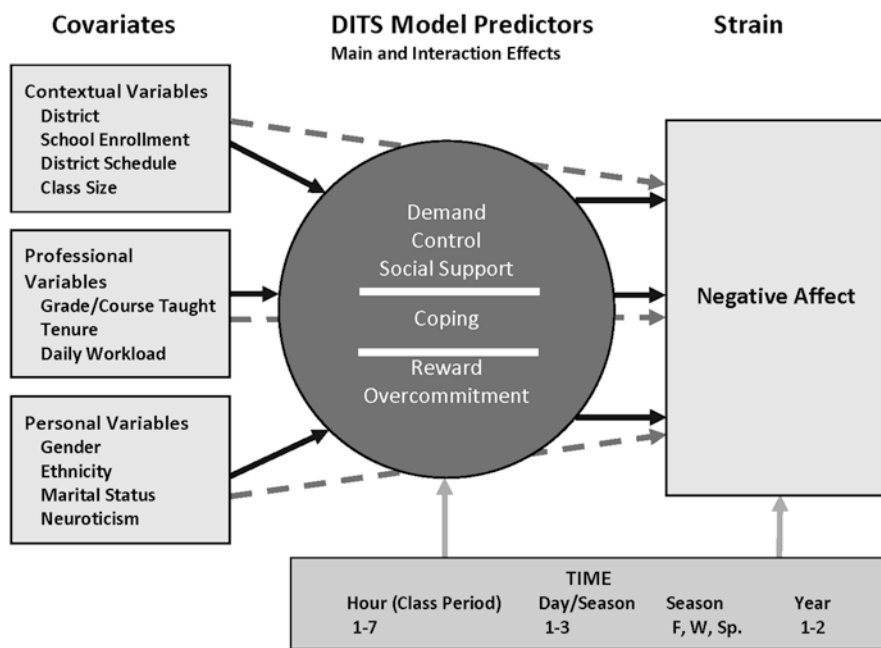


Fig. 12.1 The Dynamic Integrative Teacher Stress (DITS) model (F Fall, W Winter, Sp Spring)

The DITS model validation, which is presented in this chapter, is meant to illustrate the value of integrative and dynamic approaches in conceptualizing educator stress. Dynamic integrative approaches can support evidence-based interventions that will address different levels of the education system (from the teacher to the organization) and the changing nature of educator stress. The chapter also exemplifies the use of EMA in model validation in teachers, the rich longitudinal data that can be obtained via this methodology, as well as its potential application in intervention development. The data analytic challenges involved in EMA data analysis are further examined in Chap. 18 of this book, which uses a partial data set from this study to illustrate the complex data analytic approaches needed to address the temporal and multilevel nature of EMA stress data.

12.3 The DITS Model Components

The *Dynamic Integrative Teacher Stress* (DITS) model combines the core components of two leading occupational stress models, the JDCS model (Job Demand, Job Control and Social Support) and the ERI model (Reward and Overcommitment), and Coping, a key concept in the most cited teacher stress model of Kyriacou and Sutcliffe (1978), the latter being largely influenced by Lazarus' transactional model of stress (Lazarus & Folkman, 1984). Since all three models have already been reviewed in other chapters in this book, we will briefly summarize the aspects that are included in the DITS formulation, and will note model overlaps and differences.

12.3.1 The Job Demand-Control-Support Model

The original JDC model focuses on two job characteristics: *psychological job demands* (*D*); i.e. work volume and pace, and conflicting demands, and *control or job decision latitude* (*C*). Control is defined as a composite of two empirically related but theoretically independent constructs (Karasek & Theorell, 1990), decision authority or latitude (worker's authority to make decisions on the job), and skill discretion (breadth of skills used by the worker). Jobs may be classified according to these two dimensions as being high strain (high *D* and low *C*), low strain (low *D* and high *C*), active (high *D* and high *C*) and passive (low *D* and low *C*). The *iso-strain* hypothesis postulates that high demand and low control lead to occupational stress (van der Doef & Maes, 1998). The corollary *buffer hypothesis* proposes that control moderates the relation between job demands and stress outcomes (e.g. physical health). Payne (1979), and Johnson and Hall (1988) added the workplace *social support* dimension to yield the JDCS model. The model also includes a *learning hypothesis*, which postulates that the condition of high demands and high control

(active job) would be the most desirable, leading to increased motivation and learning on the part of the worker.

Research generally supports the role of control and support on job stress, and to a lesser extent, the buffer hypothesis (Mausener-Dorsch & Eaton, 2000; Weidner, Boughal, Connor, Pieper, & Mendell, 1997). Social support also buffers the effects of job demands on health and job satisfaction (Landsbergis, Schnall, Dietz, Friedman, & Pickering, 1992). van der Doef and Maes (1998, 1999) identified support for the iso-strain hypothesis regarding all-cause mortality, cardiovascular disease and musculoskeletal symptoms, and the buffer hypothesis for psychosomatic complaints. Several reviews of research on the JDCS model have been published (e.g. Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010) which conclude that there is strong support for the iso-strain hypothesis in cross-sectional studies, lesser support in longitudinal research, and weak support for its buffer effects. Chap. 9 outlines some of the reasons for the inconsistency of the buffer effects of Control and Social Support, such as lack of matching between demands and resources (e.g. instrumental support when a teacher is facing a social stressor may be less important than emotional support), and the generic nature of the measures of job characteristics, which do not reflect specificities of the profession (e.g. student misbehavior as a job demand specific to teaching; team teaching as a means of social support).

The learning hypothesis has been less researched, but has also received inconsistent support, including with teachers. For instance, Kwakman (2001) tested the learning hypothesis among 542 Dutch secondary teachers and found that those with low-moderate demands and high control experienced the most learning. The author concluded that Karasek's model is better suited to explain stress outcomes than learning ones.

12.3.2 The Effort-Reward Imbalance Model

The Effort Reward Imbalance model (ERI) was developed by Siegrist and is presented in detail in Chap. 10 of this book. It is based on medical sociology and builds on Equity theory and distributive justice (Cox & Griffiths, 2010; Marmot, Siegrist, Theorell, & Feeney, 1999). The model views work as a type of psychological contract based on social reciprocity where the employee compares his/her effort at work to the rewards offered by the organization for the same effort. If the individual perceives an imbalance, lack of reciprocity, between the effort expended and the rewards received, there is a higher risk to the employee's health and associated behaviors. Occupational efforts are the job demands placed upon the employee by the organization. Rewards that may be distributed by the organization include money, esteem, job security and career opportunities (Siegrist, 1996). The model also includes a personal factor, overcommitment, which is a motivational and coping pattern characterized by excessive striving related to an underlying need for approval and esteem.

Siegrist (Cox & Griffiths, 2010, p. 43) suggests three conditions where an imbalance between effort and reward can occur:

1. There is a poorly defined work contract or where the employee has few choices regarding alternative employment opportunities;
2. The employee is willing to accept an imbalance for a short period of time in order to gain something in the future, such as better work opportunities;
3. The employee uses overcommitment to cope with work demands.

Chapter 10 reviews evidence supporting the validity of the model's hypothesis among teachers internationally. Cross-sectional (e.g. Unterbrink et al., 2007) and prospective studies (e.g. Derycke, Vlerick, van de Ven, Rots, & Clays, 2013) indicated that the condition of failed reciprocity (high effort and low reward) was associated with deleterious outcomes for teachers in terms of mental health, burnout, and organizational outcomes such as absenteeism and intention to leave the profession. The ERI model has also been used as a framework to understand the biological pathways to disease vulnerability in teachers (see Chap. 4 by Bellingrath & Kudielka). This body of research has supported an association between effort-reward imbalance and physiological processes typically associated with increased stress such as pro-inflammatory activity, reduced immune functioning, increased blood coagulation, and allostatic load, a cumulative measure of physiological wear-and-tear associated with chronic stress (e.g. Bellingrath, Weigl, & Kudielka, 2009).

12.3.3 *Similarities and Differences Between the JDCS and ERI Models*

The authors of the JDC and ERI models have presented brief overviews of similarities and differences between the two models in an effort to guide future research. We highlight some points from Karasek, Siegrist, and Theorell's (1998) joint statement and Siegrist's (2003) presentation, which are pertinent to the DITS model testing:

- The JDC model adopts a *control paradigm of stress*, i.e. job control over one's work is the core dimension of the model. The ERI model adopts a *reward paradigm of stress*, i.e. non-reciprocity of efforts and rewards (e.g. esteem, status) is the core component of the model.
- The JDC model focuses on the *job task*; the ERI model focuses on *work contract* (social reciprocity).
- The JDC model focuses on the *situational* (psychosocial) characteristics of the work environment. The ERI model includes both *extrinsic* (situational) and *intrinsic* (personal) characteristics. Personal aspects refer to the specific coping style of "overcommitment", although the authors acknowledge that coping takes place within a situational context and thus personal and situational factors interact.

- Substantial overlap exists between *demand and effort* concepts and measures. However, the JDC model concentrates on psychological demands whereas the ERI model includes physical demands and total workload.
- The JDC model's policy implication is to increase democracy and participation; the ERI model's is to promote distributive justice and contractual fairness.

The comparison above does highlight that these two models have unique elements in the conceptualization of job strain and its antecedents. The DITS model builds on this uniqueness by combining the JDC, and the situational (esteem reward) and personal (overcommitment) elements of the ERI model. It also uses the expanded version of the JDC model, by adding the social support dimension (JDCS model), which represents another aspect of the situational environment that has been found to be particularly relevant for teachers (see Chaps. 1 and 2). Similarly to other researchers that have tested a combined model (e.g. Johnston et al., 2013), the DITS model uses the JDC conceptualization of demand for the ERI's effort component. Although, we are aware of differences in this regard between the models, we focused on the overlap in terms of the psychosocial aspects of the work (work overload and time pressure), which seem particularly relevant in the teaching profession, and used the same measure for effort and demand. There is also potential overlap between the social support dimension of the JDCS model and the reward (esteem) component of the ERI model. We included both in the DITS model because our measure of social support was broader than emotional support (included instrumental support).

12.3.4 *The Teacher Stress Model (Kyriacou & Sutcliffe, 1978)*

The most cited model of teacher stress is that of Kyriacou and colleagues (Kyriacou & Sutcliffe, 1978), which emphasizes the teachers' perceptions of their work conditions in explaining their emotional and behavioral reactions to these stressors. Kyriacou and Sutcliffe's model is largely inspired by Lazarus and Folkman's (1984) transactional theory of stress, which is the most widely recognized general stress theory (Cooper & Dewe, 2004). Both models have been briefly described in Chap. 8 of this book. The transactional model is a cognitive relational stress theory, which defines stress as a specific kind of transaction between the person and the environment. It postulates two processes determining the stress response (Lazarus, 1999): primary appraisal (of the significance of the event as a stressor or threat, or as benign) and secondary appraisal (of the individual and environmental resources available to face the stressor). This active reflexive transaction in which the person weighs perceived demands and coping resources, results in strain when demands exceed the resources available to deal with them. Kyriacou's (2001, p. 28) definition of teacher stress reflects this process: "a negative emotional experience being triggered by the teacher's perception that their work situation constituted a threat to their self-esteem or well-being".

Coping is a central construct in Transactional Theory and refers to cognitive and behavioural strategies that are used to manage a stressor or excessive demand as well as the emotional consequences of the demand (Lazarus & Folkman, 1984). According to Lazarus (1998), coping is a process that goes hand in hand with the appraisal processes already described, and changes in coping may trigger changes in the appraisal of stressors or resources. There have been several typologies of coping formulated such as problem-focused coping, which is directed at managing or altering the problem that causes the distress, and emotion-focused coping which aims to regulate the individual's emotional response to the problem, rather than alleviate the problem altogether (Lazarus & Folkman, 1984). Kyriacou (1980) also considered coping a key construct in understanding teacher stress and described teachers' coping strategies as being direct action (similar to problem-focused such as seeking a deadline extension when time-pressured) and palliative (similar to emotion-focused such as engaging in relaxation to calm down).

The role of coping in educator stress has been widely researched in the educational literature (e.g. Griffith, Steptoe, & Cropley, 1999; Schonfeld, 1990) and is noted in Chap. 8 by Montgomery, in his conceptualization of educator stress, which is inspired by Kyriacou's model. He studied novice teachers in Canada ($n = 245$) and university teachers ($n = 143$), using traditional surveys such as the Brief COPE (Carver, 1997), and found that coping strategies acted as moderators in the relation between stressors and burnout, and that background characteristics (age and gender) were significant factors in the type of coping strategies used. Other studies in teachers found that positive coping strategies such as problem-solving and planning are associated with reduced stress symptoms, whereas negative coping strategies such as avoidance and disengagement, are linked to increased stress (e.g. Gomes, Faria, & Gonçalves, 2013; Parker, Martin, Colmar, & Liem, 2012).

We are not aware of any studies which have combined the JDCS, ERI and Coping in the prediction of teacher stress. Coping has been one of the most researched variables in teacher stress research (e.g. Griva & Joekes, 2003) and is a key component of general stress theories (transactional model). Its inclusion in the DITS model brings together key education and occupational stress models. Overcommitment is also considered a form of coping and is included in the DITS model as noted in Sect. 12.4. However, it is a very specific coping style and thus we did not expect that there would be much overlap with our general coping measure (see measures below). Therefore, the DITS model includes four components that can be considered situational (Demand, Control, Support and Reward) and two that are personal (coping and overcommitment).

12.4 DITS Model Testing

The study presented here will test the additive effects of DITS model components, including the role of job demand, job control and workplace social support, as well as the D*C and D*S interaction effects as included in the DITS *buffer hypothesis*.

The two main hypotheses of the DITS model are inspired by the JDCS hypotheses: (a) *Additive hypothesis* states that increased Demand (D), reduced Control (C), Social Support (S), Reward (R) and Coping (Cop), and increased Overcommitment (OC) will be associated with greater stress response, and (b) *Buffer hypothesis* postulates that C, S, R, Cop and OC will moderate the effect of Demand on stress outcomes. The use of multi-method longitudinal design also allowed us to test within-teacher/temporal effects in addition to conventional between-teacher effects, providing validation of the DITS model components over multiple time points (see also Chap. 18). The DITS model focuses only on job strain, which has also been the focus of the other models combined in the DITS (e.g. JDCS). However, as noted in Chaps. 9 and 11, it is also important to understand the antecedents of positive work outcomes for teachers such work engagement and performance.

The DITS model study examines (a) whether the model predicted independent (*additive hypothesis*) and moderator effects (*buffer hypothesis*) are confirmed using EMA measures, and (b) whether model predictions hold to explain between- and within-person variability in strain. This is part of a larger study which followed teacher stress over three years (McIntyre et al., 2011, Grant R305A110080 to the University of Houston).

12.4.1 Methodology

Participants Study participants were 202 middle school 6th–8th grade core course teachers from two urban school districts in the southern United States. 77% were female, mean age was 40.8 years ($SD = 11.2$) and mean teacher seniority was 12.5 years ($SD = 9.1$). In terms of ethnicity, 49.5% were Caucasian, 33.2% African-American, 10.4% Hispanic, and 7% of other ethnicities. Teachers had worked an average 13 years as an educator, mean daily work load was 9.3 hr/day, and average class size was 25 students. Study-related attrition was low ($n = 14$, 6.9%). Teachers received \$175 in gift cards over the two years of assessments.

Design, Measures and Procedure The study design is prospective and longitudinal (two years and six waves). Survey and EMA data were collected in fall (three consecutive days, normally from September–December), in winter (1-day, January–March), and at end of the year - spring (two consecutive days, normally April–May). The duration of assessments reflected schedule constraints placed by school districts, although assessment duration was not found to affect measures' reliability coefficients. The school year lasted from late August to early June.

Questionnaire measures of demographic, professional and school characteristics (McIntyre, McIntyre, & Durand, 2010) were used to generate covariates for model testing. These included gender, ethnicity (Caucasian/non-Caucasian), marital status (married or other), district, grade (6th–8th, multiple grades) and course taught (Language Arts, Math, Science, Social Studies and multiple courses), tenure, class size, daily workload (in hours) and school enrollment. Neuroticism was a covariate measured by the *EPQ-R/s* (Eysenck & Eysenck, 1991), the scale scores' reliability

Table 12.1 Teacher Stress Diary – TSD job conditions, stress responses and resources (McIntyre & McIntyre, 2011): measures, scales, and reliability coefficients

Content areas	Scales ^a	Item examples (Abbreviated)	Response format	no. of Items	α^b
Stress responses					
Negative affect		“Sad.”	0–100	5	.92
Job conditions	Demand	“Working hard.”	0–100	3	.91
	Control	“Had control ...work.”	0–100	1	NA
	Reward	“Work ...appreciated.”	0–100	1	NA
	OC	“...liked...more control.”	0–100	1	NA
Resources	Coping	“Felt helpless.”	0–100	3	.85
Social support ^c	Source	(e.g. superior, colleague)	MC	1	NA
Emotional	Type	“...confidence in you?”	Yes, No	3	.97
Instrumental	Source	(e.g. superior, parent)	MC	1	NA
	Type	“...did you a favor?”	Yes, No	3	.95

Note. NA Non-applicable, for single-item measures. MC Multiple Choice. OC Overcommitment

^aOnly TSD measures relevant to the current report are listed

^bItems were averaged within-person over 84 time points (12 days X 7 entries/day) prior to calculating reliabilities

^cSocial Support scale score = Sum of emotional and instrumental support scale scores

(Cronbach Alpha) in our sample being .79. Neuroticism reflects a tendency to respond to stressors with negative emotional responses, also labeled negative affectivity (McCrae, 1990), which has been considered a source of bias in self-report of stress and its outcomes (e.g. Lahey, 2009). Contextual and individual covariates were also studied as variables of interest in model testing.

Work stress was measured via EMA using a validated (iPod touch 4[®]) iPod-based *Teacher Stress Diary* (TSD, McIntyre, & McIntyre, 2011). The TSD consists of 61 short items with visual analogue (0–100, “Not at all” to “Very”) or dichotomous format (Table 12.1). Teachers slid their finger on a bar (0–100) or tapped “Yes” or “No”. Teachers were prompted to answer the diary by and alarm at the end of class (bell time) in order to avoid interference with teaching, and the alarm times were individualized according to the teacher’s schedule. The TSD was found to be highly feasible over the six assessments and teachers’ objective compliance data was excellent, with 10,501 entries collected over the 12 days of monitoring (see McIntyre et al., 2016 for detailed data on the TSD’s feasibility and compliance).

TSD items are brief questions displayed on the iPod screen (e.g. How are you feeling? Sad, angry, etc.) under a brief title describing the timeframe of the diary entry (e.g. “Rate last 10 minutes.”). Items assessed momentary job conditions and resources that mapped into the three theoretical models: JDACS (demand/effort, control, and social support), ERI (reward, over-commitment) and Teacher Stress (coping). Stress response items assessed Negative Affect, a factor-derived scale comprising five adjectives as in Johnston et al. (2013): stressed, angry, sad, frustrated and nervous. Item scores ranged from 0 to 100 and scale scores were computed by averaging the respective items. To calculate reliability coefficients for the

scale scores (Cronbach alpha), items were first averaged within-person over the 84 time points (12 days * 7 entries/day). Mean internal consistency reliabilities for TSD stress scale scores were very good (.92 for Negative Affect) as well as for the job condition and resource scales (ranging from .85 for Coping to .97 for S). See Table 12.1 for item examples and reliability coefficients.

Teachers attended an information session and a 10–15 min training session on iPod Touch use. They picked up devices prior to classes and returned them at the end of the day. Diaries were password protected, had a snooze function, and entries were “time stamped”.

12.4.2 Results

Diary data were modeled using PROC MIXED in SAS 9.3. The study yielded longitudinal EMA data, allowing us to study stress on many time-scales (hour, day, season, year). Stress may be non-linear: (a) a function of momentary classroom events (hourly), (b) have a daily/seasonal trend, or (c) may be cumulative. Stress and stress response are also expected to vary across teachers. Traditionally, repeated measures data have been analyzed using polynomial growth curve models, but EMA data require specialized models to account for potential non-linearity and different time-scales (see Chap. 18). We used multivariate/semi-parametric mixed-effects models (Durban, Harezlak, Wand, & Carroll, 2005) for modeling within/between-teacher variability in EMA data to accommodate various time-scales and avoid aggregation bias. For *additive effects*, stress responses were predicted by covariates, time scales (year/season/day/hourly), and all DITS variables simultaneously. Note that all DITS variables are time-varying predictors, such that the predictor occurred at the same time point as the outcome, and we examined the significance of β associated with each DITS predictor (*Model 1*). For the *buffer hypothesis*, the interaction of D with C, S, R, Cop, and OC were added to Model 1 as time-varying interactions, and we examined the significance of β associated with each interaction. *Model 1* tested the independent effects of DITS components (e.g Demand for JDCS) whereas *Model 2* tested the predicted moderator effects (e.g. Demand * Control * Support for JDCS) in addition to independent effects. Both Model 1 and Model 2 effects are considered at the between- and within-person levels.

To estimate variance accounted for by the models (between, within, and total), we first fit an intercept only model, and obtained the between- and within-person variance components. These variance components served as the total variance, total between-person variance, and total within-person variance. Next, we fit the models described in Table 12.2 and extracted the between, within, and total variance components. These variance components served as the full model variance components. Finally, we subtracted the full model variance component for our models from the total variance components obtained from the intercepts only model, and then divided by the total variance. This gave us an estimate of the variance accounted for by each model relative to the total variance associated with the intercept only model (see Table 12.3).

Table 12.2 Longitudinal DITS model testing of independent and interaction effects on negative affect

Model	Model 1			Model 2		
	Main effects (Additive hypothesis)			Interaction effects (Buffer hypothesis)		
Variables	Est.	SE	t	Est.	SE	t
Intercept	16.655	3.610	4.61***	17.578	3.577	4.91***
Demand	2.825	0.178	15.85***	2.952	0.188	15.71***
Control	-1.595	0.192	-8.30***	-1.872	0.196	-9.58***
Support	-.074	0.175	-0.42	-0.054	0.176	-0.31
Coping	-7.361	0.211	-34.98***	-7.316	0.210	-34.79***
Reward	-2.329	0.187	-12.48***	-2.397	0.194	-12.35***
Overcommitment	2.888	0.205	14.12***	2.642	0.207	12.75***
Demand*Coping				-0.620	0.179	-3.47***
Demand*Control				-0.920	0.157	-5.85***
Demand*Support				-0.127	0.157	-0.81
Control*Support				0.278	0.152	1.83 [‡]
Demand*Control*Support				-0.167	0.132	-1.27
Demand*Reward				-0.334	0.168	-2.00*
Demand*Overcommitment				-0.374	0.152	-2.47*
Reward*Overcommitment				-0.070	0.151	-0.46
Demand*Reward*Overcommitment				0.240	0.125	1.92 [‡]
<i>df (Numerator/Denominator)</i>	34, 8,895			43, 8,886		

Note. Est Estimate; estimates are partially standardized regression coefficients. Covariate effects are not presented. Covariates in the models are neuroticism, teacher ethnicity, gender, marital status, district schedule, grade taught, course taught, tenure, class size, daily workload, school enrollment, and time (year, season/year, day/season and period).

[‡] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

For the purpose of this chapter, we will focus on the DITS model effects that reflect the three combined models (JDCS, ERI and Coping). We will also present briefly the dynamic and covariate results.

12.4.2.1 Time and Covariate Effects

In terms of the dynamic component, there was significant (all $p < .001$) daily/season (over 3-day period) and hourly (over the seven class periods) variability in Negative Affect (NA), and some tendency to yearly changes in NA ($p = .080$). No significant seasonal changes were observed (NA: $p = .536$). Figure 12.2 illustrates time variations over two years of EMA for NA: Although emotional strain is fairly stable seasonal and yearly, it varies considerably on an hourly basis (class period), showing a steady sharp increase as the day progresses. Although not shown in Fig. 12.2, EMA data also showed daily variations, with strain increasing mid-week.

Table 12.3 Between-person, within-person and total variance accounted for by DITS model components, and final DITS model

Model/Variance (%)	Outcome	Within-person	Between-person	Total
Time (Model 1)	Negative Affect	.01	.00	.01
Time + Covariates (Model 2)		.01	.11	.06
Model 2 + DCS		.14	.33	.22
Model 2 + DCS + Coping		.27	.53	.38
Model 2 + DCS + Coping + Reward		.28	.52	.38
DITS Model (Time + Covariates + DCS + Coping + Reward + OC)		.29	.53	.40
Time (Model 1)	Negative Affect	.01	.00	.01
Time + Covariates (Model 2)		.01	.11	.06
Model 2 + DCS + Int.		.15	.35	.24
Model 2 + DCS + Coping + Int.		.28	.54	.39
Model 2 + DCS + Coping + Reward + Int.		.29	.53	.39
DITS Model (Time + Covariates + DCS + Coping + Reward + OC + Int.)		.30	.54	.41

Note. Model 1 = year + season/year + day/season + class period. Covariates in the models are neuroticism, teacher ethnicity, gender, marital status, district schedule, grade taught, course taught, tenure, class size, daily workload, school enrollment. *DCS* Job Demand + Job Control + Social Support, *DITS* Dynamic Integrative Teacher Stress Model, *OC* Overcommitment, *Int* Interaction terms (e.g. Demand * Control) as indicated in Table 12.2. Total effects are in bold face.

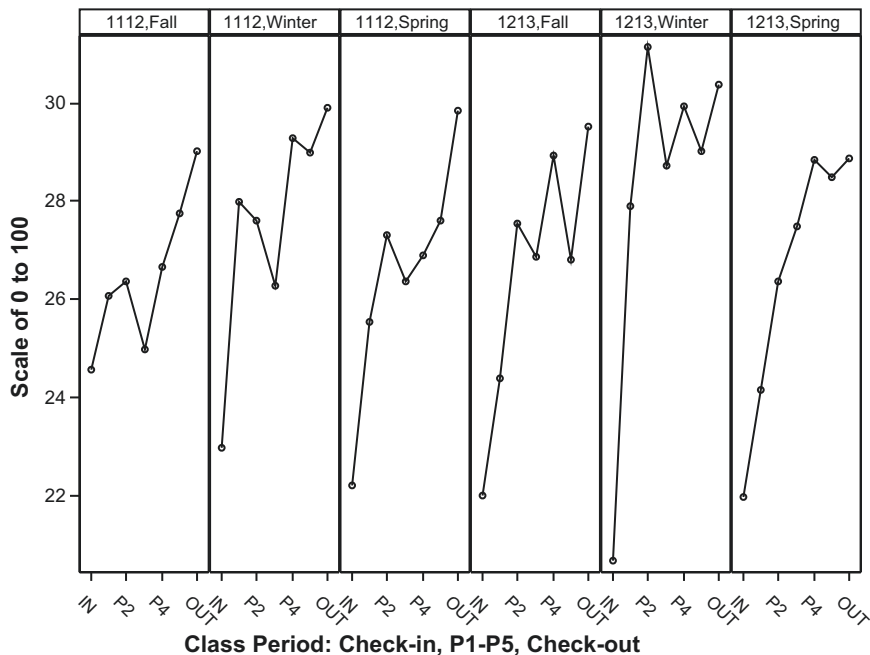


Fig. 12.2 Time variations (Year, Season, Class Period) in Negative Affect over two years (6 waves) (*IN* Check-in time, *P1–P5* Class periods 1–5, *OUT* Check-out time)

The DITS model included individual factors (e.g. neuroticism, gender and ethnicity) and contextual/professional factors (e.g. school enrolment, class size, grade and class taught) as covariates, but also as potential variables of interest. Significant factors for NA were: marital status (married/other; $p < .001$), personality (neuroticism; $p < .001$), course taught (Language Arts, Math, Science, Social Studies or multiple courses; $p = .001$), and class size ($p = .010$). Unmarried teachers (e.g. divorced, single), those with higher neuroticism, those teaching Language Arts, Math or multiple courses, and larger classes, experienced higher average emotional strain over the two years than their colleagues. Gender, ethnicity, district, grade taught, tenure and school enrolment were not significant factors in NA.

12.4.2.2 Additive Hypothesis Results

Table 12.2 presents the results of the DITS Model testing of independent and interaction effects on Negative Affect (NA).

Regarding the *Additive Hypothesis* (independent effects), all DITS predictors on NA were supported using EMA data, except for social support ($p = .672$). Higher demand and over-commitment, and lower control, coping and reward, predicted higher NA ($p < .001$). In order to control for potential covariance issues between social support - S (emotional support) and reward, we ran an alternative model with just the instrumental support component of the social support scale; however, the independent effect of S on NA was still nonsignificant ($p = .999$). Additionally, we ran a model without the ERI variables (Reward and Overcommitment). In this latter model (time + covariates + demand, control, social support and coping), the independent effects of social support were significant ($t(8,914) = -4.23, p < .001$), with higher social support being associated with lower strain.

One of the benefits of using EMA data for model testing is to be able to separate between- and within-person effects, and also determine total effects. Whereas between-teacher effects indicate the effect of the predictor in terms of individual differences in stress response (e.g. variability in strain), within-teacher effects indicate how job conditions relate to NA and stress over time (day, season) for a given teacher. We will present the results of the variance accounted for by these effects.

Table 12.3 presents the between-person, within-person and total variance accounted for by the various components of the DITS model and the final DITS model, at the three levels of effect. The final DITS model accounts for considerable variance in NA (40%). Further, the DITS Model explains more variance than the incremental models. For example, the DITS model explains 34% more variance in NA than time and covariates (Model 2), whereas the DCS component only adds 16% of explained variance to Model 2. Reward does not seem to add incrementally to Model 2 + DCS + Coping, but Overcommitment adds 2% of explained variance in NA. This may reflect the shared variance between Reward and Social Support, as previously noted.

The DITS model explains a large portion of between-person variance in NA (53%) being promising in terms of accounting for average differences between teachers in emotional strain over time. In terms of the model's components, DCS

and Coping contribute 42% of unique variance beyond covariates to NA. The DITS model also explains variations in stress within-teachers. Its predictors accounted for 29% of within-person variance in NA, most of the variance being accounted for by psychosocial factors (e.g. JDCS and Coping).

12.4.2.3 Buffer Hypothesis Results

The buffer hypothesis was only partially supported (Table 12.2). Job Control and Coping had significant moderator effects on the relations between job Demand and NA. As expected, teachers with higher average reported coping and job control (over two years), showed lesser increase in strain with increased demand, than those with low-average C and Coping (see Figs. 12.3 and 12.4). Moderator effects were also significant for D*Reward, although not supporting a buffer effect; teachers reporting both lower and higher reward, presented a lesser increase in NA with job demand, than those reporting medium reward (mid-tercile). Regarding moderator effects of overcommitment, as expected, teachers reporting average moderate to high overcommitment (mid and upper terciles) showed higher average NA than those in the low range. However, whereas teachers reporting high and low overcommitment tended to increase NA with increased demand, teachers in the moderate range reported decreased NA, although still at higher levels than those in the low range. Thus moderate overcommitment seems to buffer the effects of demand on strain.

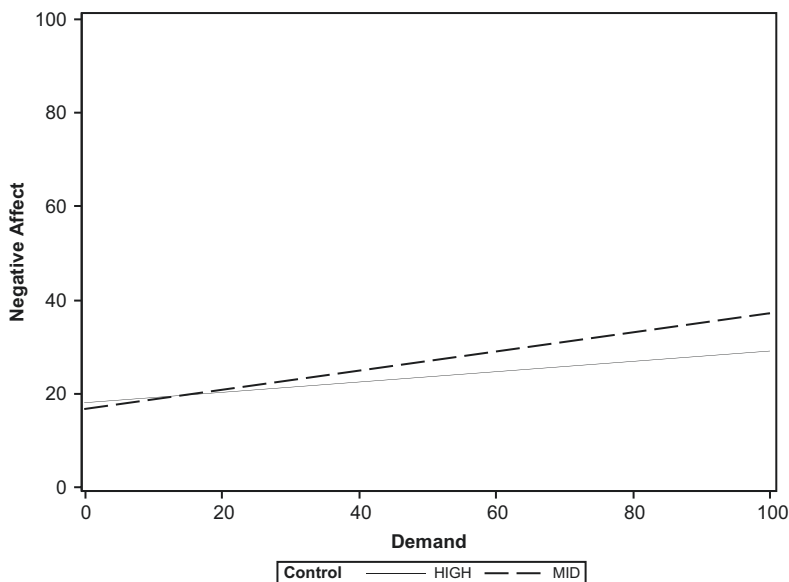


Fig. 12.3 Plot illustrating the buffer effects of job control on the relation between job demand and negative affect (*High* Upper tercile, *Mid* Middle tercile. There were no teachers with average Control scores in the lower tercile)

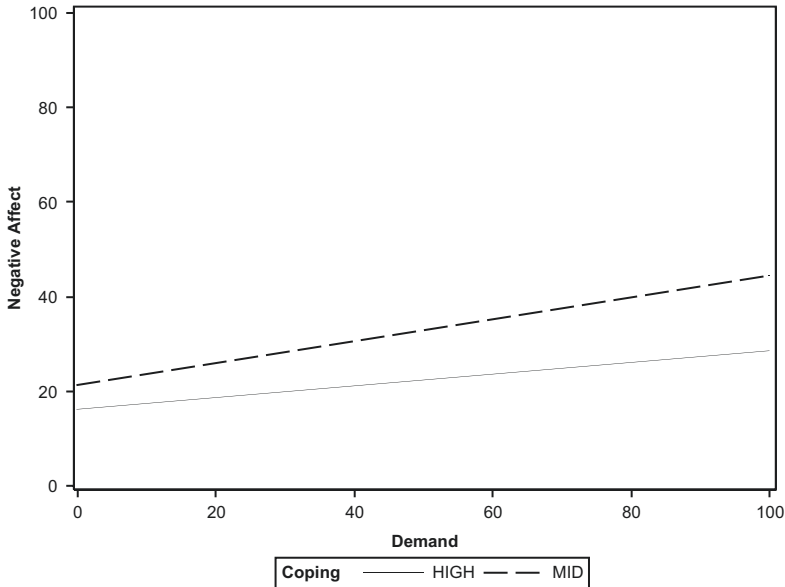


Fig. 12.4 Plot illustrating the buffer effects of coping on the relation between job demand and negative affect (*High* Upper tercile, *Mid* Middle tercile; there were no teachers with average Coping scores in the lower tercile)

In terms of variance accounted for in NA, the interaction effects only added an additional 1% of explained variance to the independent effects DITS model (See Table 12.3). The independent effects and interaction effects model together explained 41% of total variance in NA. Similarly, the interaction models added 1% of explained variance to the independent effects models for between-teacher differences and within-teacher changes in NA.

12.4.3 Discussion

The DITS model testing results illustrate the value of using a theoretical integrative and dynamic framework to understand teacher stress. The model includes a dynamic component which accounts for changes in teacher stress experience over time as well as individual and contextual factors that may shape that experience (e.g. teacher's gender, seniority and class size). The integrative aspect combined elements of the JDCS and ERI models and Coping. The DITS model was tested on real-time data collected over six waves over two years, which allowed the determination of the model's explanatory power in terms of between-teacher and within-teacher changes in strain. Overall, the results are promising in terms of the value of the DITS model in explaining real-time teacher stress. The DITS model accounted for considerable variance in strain, and the constructs of the JDCS, ERI and Coping

were relevant to stress outcomes measured via EMA (additive hypothesis), although moderator effects were only partially supported. Bringing together individual and organizational-level constructs generated a model that was able to predict across teacher differences in strain as well as dynamic changes in strain over time, the DITS model being a potentially useful framework for future research and intervention development.

The DITS model's *time effects* support the dynamic nature of job strain, in this case of NA, as suggested by several authors (e.g. Johnston et al. 2006). These dynamics over an extended period of time, and micro and macro time-scales, have not been previously demonstrated in teachers. The data suggests that teachers experience continued stress over the school year, without significant seasonal changes, this chronic stress being potentially problematic in terms of its cumulative biophysiological load, as suggested in Chap. 4 (Bellingrath & Kudielka). There seem to be yearly variations in strain (no pattern identified), which are probably related to different student cohorts and class responsibilities (see contextual factors). The class period variations show a consistent daily upward spiral of strain, sometimes dipping at lunch time, which is likely to be problematic in terms of several aspects of teacher performance (as well as daily physical and emotional wear and tear). There are many implications of these data for better understanding and reducing teacher stress such as providing more precise information on when to intervene to reduce strain. However, in terms of the focus of this chapter (model testing), the data strongly supports the dynamic component of the DITS model and the need to study teacher stress longitudinally, via methods such as EMA that can capture variability with time at various scales (McIntyre et al., 2016).

The DITS model also included *individual and contextual variables* that could potentially influence teacher stress experience. Although these factors have been studied independently (e.g. Lau et al., 2005), they have not typically been integrated in model testing, especially in terms of variables of interest in real-time teacher stress. Our data indicates that real-time job strain in teachers is a pretty universal experience in terms of several demographic (e.g. gender), professional (e.g. seniority) and school variables (e.g. school enrolment), meriting attention as an occupational and school problem that needs to be dealt with for all teachers. However, in line with what has been recognized in other theoretical models (see Chap. 8, Montgomery) and by other authors (see Chaps. 2 and 7; and Kokkinos, 2007; Lau et al., 2005; Verhofstadt et al., 2015), there are individual and contextual specificities in the degree to which strain is experienced that can guide intervention both at the individual and school levels (e.g. teaching certain courses may carry more stress load than others, or teaching larger classes). It is noteworthy that very few studies have looked at the impact of individual and contextual variables on real-time strain, especially in teachers. Demographic and contextual predictors of real-time strain may differ from those associated with cross-sectional or summative measures. For instance, Simbula (2010) found that most demographic variables did not impact daily fluctuations in teacher exhaustion or work engagement, but type of school did (elementary, lower and upper secondary levels). Our data supports the inclusion of individual and contextual variables in future models of teacher stress. We note that

whereas there may be general factors that may be at work across different levels of teaching and types of teachers and schools (e.g. gender, seniority), the type and relative weight of demographic and or contextual/school variables to be considered are likely to vary geographically, and culturally. Additionally, for the sake of brevity, we did not present results of the interaction of psychosocial predictors with the individual and contextual variables. However, it is equally important to understand the moderator role of these variables on the relation between work environment and personal factors, and strain.

In terms of the DITS model's hypotheses, the EMA data supported the *additive hypothesis* and some of the predicted *buffer effects*. Job Demand, Control, Reward, Coping and Overcommitment are all model components with significant impact on teacher strain; increased D and OC were related to increased NA, and increased Reward and Coping to decreased strain. Further, the results indicated that the model explained considerable variance in real-time strain in teachers, showing that its components are associated with teacher strain at each of the multiple time points reported. This consistent association between psychosocial predictors and strain at multiple time points is impressive and a novel finding, supporting the relevance of these psychosocial constructs in understanding the daily experience of stress in teachers.

The moderator effects predicted in the DITS' *buffer hypothesis* were partially supported, which is in line with findings from model testing of the JDCS and ERI models (see Chaps. 9 and 10; see also Hausser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Verhoeven, Maes, Kraaij, & Joekes, 2003). As expected, Job Control and Coping buffered the effect of Demand on real-time emotional strain, with teachers that felt that they had more control over their work and were able to cope with work challenges, experiencing a lesser impact of their job demands on negative emotions such as feeling sad, angry or stressed. The role of being appreciated on the job (Reward) or adopting a coping style of overcommitment to one's job, was not as clear in our data, although having moderate overcommitment seemed to be a buffer of the negative impact of job demands. The role of Job Control as a buffer in terms of daily work strain has been documented in other service professions (e.g. Johnston et al., 2013). The role of Coping as a buffer in real-time teachers' strain has not been investigated and our data suggests that this personal variable is a powerful moderator of stress experience in teachers. Together, these data suggests that giving teachers more control over their jobs (job autonomy and decision latitude in the sense of Karasek's model) such as via increased input on curriculum and assessment choices in the classroom, discipline management procedures, pace of teaching, and input in decision-making, can curve the negative impact of their high job demands on their emotional well-being. Other research has found benefits in increasing teacher autonomy in a number of outcomes, such as in job satisfaction (Liu & Ramsey, 2008), teaching quality (Blömeke & Klein, 2013), and turnover (Ladd, 2011). Real-time coping perceptions were also important moderators, increased coping being associated with lesser impact of increased demands on strain. Individual approaches aimed at boosting coping resources in teachers, such as the recently tested CARE for teachers program (see Chap. 14, Jennings & DeMauro), have been proven to improve emotional regulation and physical symptoms. However, no study has

investigated the impact of these types of intervention on real-time strain, a topic for future research. An in-depth analysis of these contingencies over time (e.g. how these moderator effects play out at different time scales) has the potential to guide interventions to increase job control or coping in a more effective manner than blanket approaches that do not account for the dynamics of teacher stress. For instance, Fig. 12.3 suggests that increased control is most beneficial at higher levels of job demand, but the real-time data presented in Fig. 12.2 suggests further that those high risk times in terms of NA are in the afternoon classes, indicating *when* it would be most beneficial to intervene. In our larger study, we examined time moderation effects that allowed us to dig deeper into these nuances in real-time contingencies, which are potentially helpful in intervention design.

The DITS model testing is also innovative in that it isolates between and within-teacher effects on teacher strain. The model has a strong predictive value in accounting for differences among teachers in strain and for within-teacher changes in NA over time. To our knowledge, this is novel data in terms of both (1) supporting the validity of individual model components (JDCS, ERI, Coping), which have traditionally been found to explain differences between teachers, to also be valid in explaining variations in strain within teachers, and (2) supporting the value of an integrative model in explaining teacher stress dynamics at an individual level. These results suggest that psychosocial processes (work context and personal) that explain differences in strain between teachers also apply to the dynamics of teacher stress over the working day, week, and years. Similar results have been found for other service professions, such as nurses (Johnston et al., 2013). Interventions directed at changing characteristics of the work environment, such as those described in Chap. 15 (Randall & Travers) and Chap. 16 (Landsbergis et al.), that include changing the way jobs are done (job redesign) or policies and procedures (work practices), ultimately aim to produce changes within individuals in terms of work strain, job satisfaction, work engagement, and other outcomes. Real-time data and models such as the DITS model that help in understanding these relations over time, are key to developing organizational-level interventions that produce effective and lasting changes at the individual level.

We do not claim that the tested DITS model is a definitive model of teacher stress. Probably due to shared variance between Social Support and Reward, S did not yield significant independent effects in the combined model. The alternative models tested and previously described (Sect. 12.4.2.2) suggest that there may be an advantage of a combinative model that includes the JDCS, which is focused on job conditions, and Coping, which reflects personal resources. The original JDCS model focuses on job conditions as factors in strain, and has been criticized by overlooking individual variables such as coping or self-efficacy (see Chap. 9, van der Doef & Verhoeven). The data also suggests that eliminating the S component in the current DITS model would be a valid combinative approach, this model including DC, ERI and Coping. Other authors have also called attention to being too restrictive in the work and individual factors considered in theories of job stress (see Chap. 11; also see Bakker & Demerouti, 2007), which tend to be too simplistic. Teachers' work environments are very complex and many sources of demand exist

(e.g. student aggression, role ambiguity) as well as varied resources (e.g. supervisor support, training, and support from parents). Combinative models can be explored which integrate these factors that are more specific to the teaching profession.

12.5 Conclusion

Despite their applicability in education contexts and their promise in supporting interventions to reduce or manage stress in other professions, general occupational stress theories have had limited use in intervention development to address teacher stress, especially at the organizational level (see Part III) i.e. interventions that address the organization of work such as job redesign, or work practices (e.g. managerial, collegial relations). In this chapter, we argued for an integrative model of teacher stress that would combine aspects of well-known tested models, and would potentially explain more variance in strain than a single model. We also argued for the integration of personal and job characteristics in integrative models that would capture individual and organizational factors in work stress. Further, the dynamic aspects of work strain have not been accounted for in most job stress research, in particular among teachers, or among the most well-known job stress models. Therefore, we proposed to include this temporal dimension in teacher stress modelling. Finally, the role of demographic and contextual variables in teacher stress, although generally recognized, has not been systematically studied, especially as components in model testing.

To illustrate this dynamic integrative approach, we presented partial results of testing the Dynamic Integrative Teacher Stress model using real-time data on work characteristics, personal resources and emotional strain collected from teachers over multiple time points. The results of DITS model testing were promising, supporting the validity of the model in explaining the dynamics of teacher stress, and the value of the model's predictors consistently over time. The model explained far more variance than its single components, which supports an integrative or combinative approach to model testing. The DITS model explained both differences in emotional strain across teachers, helping to identify subgroups of teachers at risk for increased emotional strain as well as personal and work environment characteristics associated with different emotional strain outcomes. In particular, the DITS model showed that job demand, job control, coping, reward and overcommitment are critical factors in shaping teacher stress experience, illustrating work-specific and personal factors in this process. Further the model also showed that these factors are associated with how each teacher experiences stress over time, which is critical in intervention development.

The combination of the dynamic and integrative components of the model holds promise in terms of intervention development. Part III of this book presents three levels of intervention *to reduce teacher stress: individual, individual-organizational interface, and organizational level* interventions. Virtually no interventions are described that take into consideration the dynamic component of teacher stress.

Dynamic models, such as the DITS model, can inform better intervention development at all these levels because they will indicate *which* personal and work factors are at play in the immediate experience of teacher stress (e.g. when a student incident occurs, when a teacher feels most stressed or frustrated) and *when* change in those moderators can produce changes at the individual level. The integrative approach is in line with a systemic multi-level intervention approach, which targets changes in the teacher (e.g. increased coping skills) and the work environment (e.g. reducing demand, increasing job control and appreciation). There is increasing recognition that although single-level interventions may carry benefits in terms of teacher stress, these effects are likely to be short-lived or even deleterious in terms of work culture (by placing the responsibility on the teacher to reduce their stress), if they are not supported by changes in the work environment that create a culture that promotes worker well-being (see Chap. 13, Sinclair, Cheung, & Cox), a healthy school culture.

We hope that the DITS model testing results will encourage teacher stress researchers to explore dynamic and integrative theories that will support broader and more effective interventions to address teacher stress. We recognize that testing dynamic integrative models is more complex in terms of methods, data management, data analytic procedures, and data interpretation. However, we believe that the potential contribution to theory and intervention development is worth the effort. The combination of well-tested occupational stress models and general stress theories, the latter having been the most used in teacher stress research, holds promise in terms of increasing knowledge on the factors that drive teacher stress experience. Our research indicates that testing these models dynamically such as via ecological momentary assessment methods, is feasible in school context and can produce more meaningful data than traditional survey methods. Further, these methods have face validity, being embraced by teachers as capable of capturing their struggles and daily plight.

I appreciate that this study could provide data on the experiences that teachers have daily.
Teacher, personal communication, October 2011

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Part III

Managing and Reducing Stress in Education Systems

I would like to receive more: support, instructional leadership, positive reinforcement, praise, communication, resources, time!

Teacher, personal communication, February 5, 2013

There has been much more research and literature on describing educator stress and examining its antecedents and consequences (see Parts I and II of this book), than on intervention development, implementation and validation. This part provides an overview of interventions directed at managing or reducing educator stress. It encompasses three levels of intervention: individual, those focused on the relation educator-environment, and organizationally-focused strategies. The types of interventions described in the five chapters that comprise Part III, run the spectrum from those directed at managing stress (e.g. by teaching relaxation or meditation) to those aimed at reducing the causes of stress from the organization (e.g. by increasing educator autonomy/participation, changing leadership practices, changing school policies). As suggested by the quote above, addressing the problem of educator stress often involves multi-level systemic approaches that include various actors in the education system (e.g. educators, school administrators, school counselors, parents, students, and policy makers).

Chapter 13 by Robert Sinclair, Janelle Cheung, and Adam Cox places educator stress in an Occupational Health Psychology framework, which applies behavioral science to improve work organization, and in doing so improve worker safety, health and well-being. It advances the notion that healthy educators stem from a healthy school organization and climate, placing the focus of intervention at the organizational level in terms of both removing workplace hazards, and building/supporting positive work practices. This chapter creates the backdrop for the remaining chapters. Individual-level approaches to address educator stress and improve teaching are reviewed by Patricia Jennings and Anthony DeMauro in Chap. 14. It reviews classical stress reduction approaches, such as stress management programs, as well as more recent interventions focused on reducing stress symptoms and increasing educator socio-emotional competence, such the SMART and the CARE for Teachers program. The authors present empirical evidence supporting these types of intervention. Chapter 15 by Raymond Randall and Cheryl Travers focuses on Individual-organizational Interface (IOI) interventions, which aim to improve the interface between the educators' resources and their work demands. Interventions surveyed include collaborative problem-solving, mentoring support and induction programs,

teamwork, and classroom management interventions. IOI interventions have been relatively rare in education settings, especially in terms of intentionally addressing educator stress or evaluating their potential as stress reducing approaches. Paul Landsbergis and co-authors (Chap. 16) present a review of organizational level interventions directed at reducing the sources of educator stress. A unique feature of this chapter is a systematic review of papers on organizational interventions in education context (1990–2015), the authors concluding that there is limited empirical evidence of their impact on educator stress. Landsbergis and colleagues also present a useful compilation of policy-based interventions (e.g. union and legislative) that have supported education programs such as Peer Assistance and Review (PAR), team teaching, and bullying prevention, although the lack of empirical validation of these initiatives is highlighted. Lastly, Chap. 17 addresses new directions in intervention related to one of the most challenging problems facing students and educators today, the proliferation of cyber-bullying via the negative use of social media in school contexts. Tom Cox, Magda Marczak, Kevin Teoh, and Juliet Hassard present an international perspective on the issue, reviewing legal and policy contexts in the U.K. and the U.S., for action at the school level. The chapter presents definitions and prevalence of cyber-bullying, its effects for students and teachers, concluding with recommendations for a general strategy to manage and prevent cyber-bullying in schools.

Together, the five chapters in Part III provide a unique review of the state of the art in terms of interventions to address educator stress. All chapters remark that there is a lot to be done in terms of empirically validating educator stress interventions, and translating the existing research into practices and policies that are likely to support educators and quality education.

Chapter 13

Defining Healthy Schools: An Occupational Health Psychology Perspective on Healthy School Climates

Robert R. Sinclair, Janelle H. Cheung, and Adam Cox

Abstract Occupational Health Psychology (OHP) uses models and methods of behavioral science to understand the nature of work organization and in doing so inform organizational policies and practices that improve worker safety, health and well-being. From an OHP perspective, healthy schools have work environments that lessen employees' exposure to health threats in order to increase workplace safety and enhance worker well-being. Many occupational health hazards reflect the organization of work – which refers to the way jobs are designed and the organizational practices that influence job design. The goal of this chapter is to provide readers with an overview of OHP, both in terms of broad dimensions of employee health and the organizational influences on health that may be modifiable through changes to work practices. Key themes in the chapter include the conceptualization of healthy schools as a set of policies and practices that define the work environment, the need to consider both physical and psychological aspects of health, the importance of not only removing hazards but also taking steps to enhance the positive aspects of work, and best practices in implementing healthy workplace programs as exemplified through the Total Worker Health Initiative of the National Institute for Occupational Safety and Health and the American Psychological Association's Psychologically Healthy Workplace program.

Keywords Occupation health psychology • Organizational climate • Workplace safety • Total worker health • Work organization • Psychologically healthy workplace

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13.1 Introduction

The other chapters in this volume make a persuasive case for focusing on teachers' health and well-being, presenting ample evidence that teachers' jobs are stressful and the established clear links between these stressors and health outcomes. Teachers' health and well-being is an important concern in-and-of itself, as teachers comprise a large workforce with an obviously important role to play in society and worker health is closely tied to the health of families and communities (Chen, Huang, & DeArmond, 2005). However, protecting and promoting teachers' health and well-being also may be viewed as an important goal for schools, given the literature supporting the importance of teacher health and well-being for student achievement (e.g., Klusmann, Richter, & Lüdtke, 2016), as well as the larger occupational health literature establishing links between work stress and employee performance (cf. Jex, 1998). Given the well-established need to focus on teachers' occupational health, the question remains, what can educational institutions do to improve teachers' safety, health, and well-being?

A great deal of evidence supports the important role that stress management plays in how teachers contend with occupational stressors (LaMontagne, Keegel, Louie, Ostry, & Landsbergis, 2007; Richardson & Rothstein, 2008). However, one concern with this literature is that much of it focuses on helping employees cope with workplace stressors by providing them with training that emphasizes new coping skills, different ways to appraise stressors, access to coping resources, etc. Evidence suggests that these programs can be effective in helping employees cope. An important problem with many of these programs, however, is that they focus solely on changes to the employee (i.e., knowledge, skills, motivation) rather than changes to the work environment that represents the proximate cause of the stressors. That approach may be viewed as roughly akin to treating the symptoms of a disease (i.e., difficulty in coping) rather than treating the underlying cause of the disease (i.e., stressful working conditions). A more comprehensive view is clearly needed.

In this chapter, we draw from the field of occupational health psychology to articulate an integrated perspective. We will provide a brief definitional overview of occupational health psychology including its emphasis on work organization as a primary (and actionable) influence on occupational health. We will then review empirical literature on health-related aspects of organizational climate as a central organizing theme in literature related to managing occupational health. Although climate is not inclusive of all aspects of creating a healthy workplace, the climate literature provides a reasonably strong foundation for conceptualizing occupational health as a management/leadership-related problem. Next, we will discuss the National Institute for Occupational Safety and Health (NIOSH)'s Total Worker Health program as highlighting the need to integrate organizational responses to various safety and health concerns. Finally, we will discuss the American Psychological Association's Psychologically Healthy Workplace Award program as a source of models for best practice in actually creating healthier workplaces, including some examples of schools that have won this award.

13.2 An Overview of Occupational Health Psychology

Occupational Health Psychology (OHP) emerged in response to several interrelated trends, including: the rise of the labor movement in the twentieth century; increasing recognition among scholars in various fields of the scope of occupational health concerns as well as the impact of working conditions on worker health and productivity; and the large body of evidence linking stress in general, and work stress in particular, to serious health outcomes such as cardiovascular disease.¹ NIOSH (2010) defines OHP as “the application of psychological principles to improving the quality of work-life, and to protecting and promoting the safety, health, and well-being of workers.” Four important characteristics of OHP as a field include: (1) its general focus on worker safety, health and well-being, (2) its interdisciplinary orientation, as OHP scholarship draws on many fields, including public health, preventive medicine, nursing, industrial engineering, law, epidemiology, sociology, gerontology, and psychology, (3) a focus on science that leads to intervention, and (4) an emphasis on intervention that targets both the work environment and the individual to create healthier workplaces (Ballard, Krauss, & Sinclair, 2016).

Table 13.1 provides an overview of topics typically examined in OHP literature with regard to four broad research goals: (1) developing and testing theories of occupational health-related processes, (2) surveillance of occupational health hazards, diseases, etc., (3) designing and implementing interventions, and (4) improving OHP-related research methodology. Sinclair and Cheung (2015) outlined four broad types of health outcomes that may be viewed as the targets of OHP-related research and intervention. *Physical injury prevention* involves reducing physical harm from causes such as workplace violence, workplace disease, and accidents. *Physical health promotion* concerns the role of the workplace in encouraging desirable health behaviors such as diet and exercise, as well as helping employees refrain from unhealthy behaviors such as smoking and substance abuse. *Psychological disorder prevention* refers to minimizing work-related mental health problems such as Post-traumatic Stress Disorder, burnout, and depression. Finally, *psychological health promotion* involves the role of work in promoting positive aspects of mental health such as affective well-being, competence, autonomy, and aspiration (cf. Warr, 1987). Of course, organizational outcomes such as indicators of retention, employee engagement, job performance, and organizational functioning are relevant to OHP, but, as compared with related disciplines such as industrial psychology and human resource management, OHP adopts a stronger focus on employee safety, health, and well-being.

¹Space constraints prevent a full discussion of the history of occupational health psychology, but we refer interested readers to multiple excellent resources, including Sauter & Hurrell (1999); Barling & Griffiths (2011); Macik-Frey, Quick, & Nelson (2007) as well as web pages by the Society for Occupational Health Psychology (www.sohp-online.org/history.htm) and the Occupational Health Psychology Wikipedia page (en.wikipedia.org/wiki/Occupational_health_psychology). Table 13.4 also provides a variety of resources for individuals interested in learning more about the field.

Table 13.1 Typical research topics addressed in Occupational Health Psychology

	Theory: building, testing, and extending occupational health theories	Surveillance: documenting work-related health hazards and outcomes	Intervention: designing, and evaluating programs, policies, and practices	Methodology: improving design, analysis, measurement measures, etc.
Work-family interface				
Accidents, injuries, and safety training				
Violence and aggression				
Work stress and resilience				
Group conflict and discrimination				
Workplace health promotion/wellness				
Positive aspects of work; well-being				
Non-standard work schedules				
Job/organizational design				
The employment relationship				
Organizational climate				
Individual factors (gender, age, etc.)				
Disease/disability management				

Note. Source, adapted from Ballard, Krauss, and Sinclair (2016) based on key topic areas for the journal *Occupational Health Science* and for the APA/NIOSH Work, Stress and Health conference. Topics listed are meant to be illustrative, rather than all inclusive

Another distinguishing feature of OHP, adapted from the public health literature, is its focus on primary prevention of occupational health concerns, especially through changes to work organization, rather than simply treating problems after they occur. Public health literature often distinguishes three modes of prevention, referred to as primary, secondary, and tertiary prevention (Tetrick & Quick, 2011). *Primary prevention* involves public health campaigns targeted at a general population, without regard to whether individuals targeted are currently at risk for problems. *Secondary prevention* involves health promotion efforts focused on individuals/groups currently at risk and/or with a focus on early detection of problems. Once some level of harm has occurred, *tertiary prevention* programs attempt to either stop further harm and restore the individual to health. We have illustrated this distinction in Table 13.2 showing how multiple modes of prevention can be applied to occupational health problems at three distinct levels of analysis: efforts to change individu-

Table 13.2 Prevention orientation of Occupational Health Psychology

	Individual level focus	Unit/organizational level focus	Systems level focus
Primary prevention (prevent harm in general workforce)	Wellness programs	Participative management	Paid leave legislation
Secondary prevention (address concerns for at risk workers)	Safety training & stress management programs	Job design	Health promotion incentives included in affordable care act
Tertiary prevention (prevent further harm; restore health)	Counseling/treatment	Reassignment	Mental health parity laws

Note. Source, adapted from Ballard, Krauss, and Sinclair (2016) based on key topic areas for the journal *Occupational Health Science* and for the APA/NIOSH Work, Stress and Health conference. Topics listed are meant to be illustrative, rather than all inclusive

als by helping them improve their health or increase their ability to prevent, adapt to, or cope with occupational hazards. Prevention efforts at the work unit/organizational level involve changes to organizational policies, practices, and procedures so as to minimize exposure to occupational hazards. Systems level prevention efforts involve change at the community or society level, such as through occupational health-related legislation. Although all of the cells of this matrix are pertinent to OHP, in general the field emphasizes a focus on primary prevention as opposed to secondary/tertiary prevention and an emphasis on changes to units/organizations/systems, which we refer to as the organization of work, as opposed to efforts focused solely on changes to individual workers.

13.3 Work Organization and Organizational Health Climate

Work organization has received considerable attention from OHP researchers because of its far-reaching implications for occupational health, safety and well-being. Work organization broadly refers to the way in which work processes are designed, performed, and managed, and how organizational practices and characteristics (e.g., managerial strategies and policies) influence job designs (NIOSH, 2009). “Healthy work organization” is an extension of the general concept of work organization, which highlights the notion that a distinction can be made between healthy and unhealthy work processes and practices, and their implications for worker safety and health can vary substantially (DeJoy, Wilson, Vandenberg, McGrath-Higgins, & Griffin-Blake, 2010; Landsbergis, 2003; Wilson, DeJoy,

Vandenberg, Richardson, & McGrath, 2004). Multiple conceptual models of healthy work organization have been proposed (e.g., Danna & Griffin, 1999; NIOSH, 2002; Sauter, Lim, & Murphy, 1996; Wilson et al., 2004). These models vary to some degree in their dimensions and theoretical propositions, but a consistent theme across these models is the importance of organizational climate (as part of the larger organizational context) to employee health, safety and well-being. Although organizational climate does not define the entire scope of OHP, it provides a solid foundation for examining how work organization contributes to employee health and safety outcomes.

13.3.1 *Organizational Health Climate*

Organizational climate is generally defined as “the shared perceptions of and the meaning attached to the policies, practices, and procedures employees experience and the behaviors they observe getting rewarded and that are supported and expected” (Schneider, Ehrhart, & Macey, 2013, p. 362). In this definition, policies refer to broad strategic priorities of the organization, procedures refer to formal processes guiding goal accomplishment, and practices refer to how policies and procedures are implemented in practice. Climate may be viewed as perceptions about the relative priority of various courses of action or organizational goals, such that organizational health climate can be viewed as employees’ perceptions about the priority for health in the organization. Climate scholars also study non-health related issues such as innovation or service quality, but our focus in the present chapter is on climate as it pertains to healthy work organization.

Organizational health climate can be viewed as a broad construct composed of a variety of more specific strategic priorities related to employee health such as safety, mental health, and physical wellness to name just a few (we review several below). Each of these strategic priorities may itself be viewed as a higher-order factor comprising of specific first-order factors reflecting individuals’ assessment of workplace attributes (Griffin & Neal, 2000). Examples of common climate components include management values and commitment (i.e., to health), presence of sufficient training, provision of physical and psychosocial resources, quality and frequency of communication, and relative priorities when competing demands/goals are present (Neal, Griffin, & Hart, 2000). Employee perceptions regarding these features of their organizational environment contribute to their overall organizational climate perceptions.

Scholars differ on whether it is appropriate to equate individual perceptions about the work environment with shared perceptions of workers as a whole. The term *psychological climate* is often used to denote individual perceptions, whereas *organizational climate* would refer to the aggregated perceptions of some natural social group (cf. Jones & James, 1979). However, in either case, the critical distinction pertaining to the organization of work is that climate refers to individual/shared *perceptions* of organizational factors that may be distinguished from the objective level of hazards present in a work environment. For example, teachers might per-

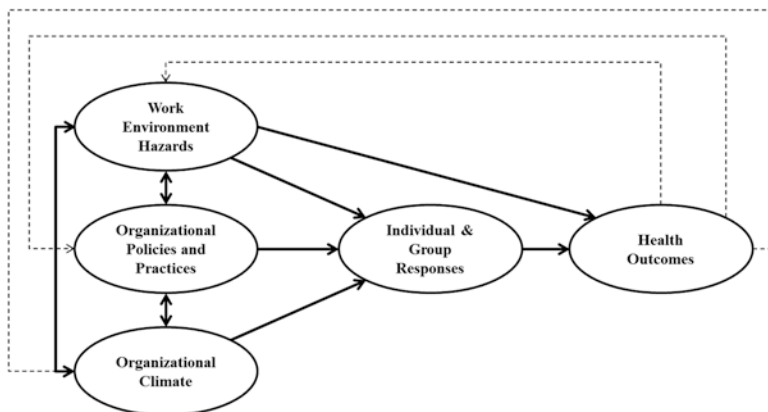


Fig. 13.1 A general model linking organization, work environments, and organizational climate to employee outcomes

ceive that their school places a high priority on teacher safety, when in fact there are serious hazards present in the work environment. This distinction, as shown in Fig. 13.1, highlights two broad and inter-related pathways through which the organization of work influence safety, health, and well-being: (1) through its influence on employees’ perceptions about the relative priority of safety, health and well-being outcomes (i.e., climate), and (2) through objective differences in the level of hazards present in the work environment (e.g., as a direct result of organizational policies, practices and procedures governing workplace safety, health, and well-being). The dashed arrows in the model depict feedback loops reflecting possible influences of health outcomes on subsequent climate perceptions, policies and practices, and hazards.

In school settings, school climate has been a topic of interest for more than a century; it is referred to as “patterns of people’s experiences of school life and reflects norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures” (Thapa, Cohen, Guffey, & Higgins-D’Alessandro, 2013, p. 358). Some common school climate dimensions are safety (e.g., rules and norms), relationships (e.g., leadership), teaching and learning (e.g., support for academic learning), institutional environment (e.g., physical surrounding), and the school improvement process (Thapa et al., 2013). Organizational health climate and school climate are similar in that they capture perceptions and experiences of organizational/school policies, procedures and practices, but each focuses on a different strategic priority. Organizational health climate concerns organizational factors contributing to employee stress and health outcomes, school climate focuses on improving student engagement, learning, and development (National School Climate Council, 2007). That said, school climate factors have been linked with teachers’ health outcomes (e.g., Grayson & Alvarez, 2008), and some sources characterize the goal of a positive school climate is to include norms, values and expectations in making people feel physically, emotionally, and socially safe (National School Climate Council, 2007).

Within a workgroup, employees' regular interactions and similarity in experience enable collective sense-making, which in turn shapes their collective experience and interpretations of the work environment (Martin, Karanika-Murray, Biron, & Sanderson, 2014). Through these perceptions that employees become informed about the kinds of behaviors expected, supported and rewarded by their organization. For example, if an organization has a strong safety climate, and safety is often favored over productivity, it implies a *relative* priority of safety and employees will more likely align their safety behaviors accordingly to preserve safety. It is noteworthy that employee perceptions of the climate components are largely driven by leadership commitment and/or management involvement, and thus leaders and managers are often viewed as a leverage point for organizational-level climate interventions (e.g., Zohar, 2010; Zohar & Polachek, 2014). Without support from their leaders, teachers may lack the necessary resources needed to maintain a positive and healthy organizational climate.

Some studies have examined the psychological processes linking organizational climate and occupational health outcomes. For example, multiple studies (e.g., Christian, Bradley, Wallace, & Burke, 2009; Griffin & Neal, 2000; Neal & Griffin, 2006) have established employee knowledge and motivation as mediators of the relationship between safety climate and safety performance outcomes. Specifically, organizational safety climate predicts employees' knowledge about safety and motivation to engage in safety activities, and they in turn lead to more positive safety outcomes. Similarly, drawing on the Job Demands-Resources model, Nahrgang, Morgeson, and Hofmann (2011) conceptualized organizational safety climate as a resource, proposing that safety climate enables employees to achieve work goals more safely and motivates them to develop greater safety awareness. Consistent with this view, they found that safety climate was associated with higher safety engagement and lower levels of adverse events (e.g., near misses).

Arnetz, Lucas, and Arnetz (2011) examined social support and cohesion, employee influence and involvement, goal clarity, and performance feedback as indicators of organizational climate. Employees' perceptions of how well work processes function at their workplace (conceptualized as organizational efficiency) and their occupational stress explained the pathway between organizational climate and employee mental health. These findings highlight yet another process explaining the relationship between the psychosocial work environment and occupational health outcomes.

Climate researchers are frequently encouraged to adopt a multi-level perspective, because what happens in the larger organization can differ to a great extent from what happens in employees' subunits (e.g., departments; Schneider et al., 2013; Zohar, 2008; Zohar & Hofmann, 2012). Different workgroups may develop different climate perceptions and interpretations with regard to workplace events and practices (Martin et al., 2014). For example, Zohar and Luria (2005) found meaningful between-group variations in a single organization because of supervisory discretion in policy implementation. Huang and colleagues (Huang, Zohar, Robertson, Garabet, Lee, & Murphy, 2013; Huang, Zohar, Robertson, Garabet, Murphy, & Lee, 2013) developed and validated separate scales for organization- and group-level

safety climate, representing distinct climate components specific to top management and direct supervisors, in both trucking and utility industries.

In schools, the most relevant levels of analysis for climate research and intervention are the local school, which typically has its own distinct leaders (e.g., principals) and the larger school system in which the school resides (e.g., as led by superintendents). In some cases, there may be other pertinent subunits related to the age of the children involved or the topics covered (e.g., athletics versus arts). A multi-level view of climate enables detection of internal inconsistencies between organization-wide policies and local practices and may therefore inform organizations of how climate interventions can be targeted.

13.3.2 Safety Climate

Safety climate is the most heavily studied topic within the larger literature on organizational health climate with most tests of the broad theoretical propositions about climate effects focusing on safety climate. Safety climate refers to employees' shared perceptions of the extent to which their organization values and prioritizes safety-specific policies, procedures and practices. Multiple meta-analytic reviews have established robust associations between both shared and individual perceptions of safety climate and objective and subjective safety outcomes (e.g., workplace accidents and safety compliance; Christian et al., 2009; Clarke, 2006; Leitão & Greiner, 2015; Nahrgang et al., 2011).

Even though, in conceptual terms, safety climate is often examined as an indicator/predictor of safety outcomes, the causal direction is still unclear (Leitão & Greiner, 2015). While a lagged relationship among safety climate, safety motivation and accidents has been established (e.g., Neal & Griffin, 2006), Beus, Payne, Bergman, and Arthur (2010) found that the relationship is bi-directional, and in some instances, injuries predicted safety climate more strongly than safety climate predicted injuries. This suggests a feedback loop between safety climate and safety outcomes, especially when safety climate is conceptualized as shared perceptions rather than individual perceptions (or psychological climate). Specifically, injuries that occur within a workgroup probably exert a stronger influence on the group-level shared safety climate than do individual injuries on the injured worker's psychological safety climate (Beus et al., 2010). This suggests that the direction of the safety climate-outcome relationship may depend on whether shared safety climate or psychological safety climate is in question.

Although a great deal of evidence supports the importance of safety climate, there is continued need for safety climate intervention studies (Leitão & Greiner, 2015; Zohar & Polachek, 2014). The few existing safety climate intervention studies focused primarily on modifying supervisory safety-related practices to improve safety climate perceptions and safety behaviors (e.g., Stuewe, Zohar, Tate, & Samson, 2006; Zohar, 2002; Zohar & Luria, 2003; Zohar & Polachek, 2014). These results support the use of leadership-based intervention strategies because supervi-

sors serve as a gatekeeper between organizational safety policies and the execution of safety practices. For example, supervisors' decisions in situations where they have to choose between safety and other competing demands can be indicative of safety priorities, and thus influence employees' perceptions of safety and subsequent safety behaviors. Although more intervention studies are needed, preliminary evidence suggests that leadership-focused interventions are practically feasible and effective in addressing occupational safety concerns.

13.3.3 Extensions to Safety Climate Literature

Safety climate literature clearly establishes the role of organizational climate in reducing workplace accidents and injuries. However, other literature has extended the general concept of organizational climate to a variety of other health-related outcomes. Schneider (2000) noted that these facets and their measures should be narrowly defined and specific to their anticipated outcomes (injuries, illness, mental health). For the purpose of this chapter, we will briefly describe several climate concepts that are relevant to healthy schools. In most cases, there is little research focusing specifically on teachers, although the existing research supports the importance of these topics to the strategic goal of creating healthier schools.

Dollard and Bakker (2010, p. 580) defined *psychosocial safety climate* (PSC) as a collection of "policies, practices, and procedures for the protection of worker psychological health and safety." PSC is related to, but distinct from, safety climate (Idris, Dollard, Coward, & Dormann, 2012) and is viewed as causal antecedent to the formation of workplace stressors (i.e., the competition between job demands and resources). PSC theory posits that work stress is a top-down process emanating at the organizational level (Dollard & Bakker, 2010; Law, Dollard, Tuckey, & Dormann, 2011). Thus, the existence of a positive PSC entails an organizational commitment to prioritizing employee psychological health and safety that is influenced by the participation of and communication between its members. PSC has been shown to be negatively related to job demands, and significantly positively related to job resources, various employee health outcomes, and productivity levels (Dollard, 2012). A longitudinal study conducted by Dollard and Bakker (2010) on Australian teachers and administrators found PSC to be predictive of higher levels of employee psychological health, higher levels of employee engagement, and a reduction in absence rates due to sickness. Specifically, the study provided initial evidence for a top-down effect of PSC, such that lower levels of commitment to employee psychological health from administration were indicative of higher levels of perceived job demands on behalf of the teachers and lower levels of psychological health.

Health climate is specific to the organizational support for and the perception of value placed on employee's physical and psychological health and well-being (Zweber, Henning, Magley, & Faghri, 2015). Specifically, health climate is the result of organizational practices and policies which influence employees' attitudes, beliefs, and behaviors concerning health and weight management. While research

on this facet has received far less attention over the past 30 years than has safety climate, some recent studies have established its place as an important facet of organizational climate models. For example, Sliter (2013) provided evidence showing that health climate reflects organizational support for weight management, diet and exercise norms, and social support. Employees who perceived a more positive health climate also had lower body mass index, better health knowledge, stronger health motivation, and higher physical activity levels. Similarly, Zweber et al. found health climate to be linked to a number of important outcomes such as job stress, performance, employee engagement and burnout, and psychological and physical health.

Diversity can be defined as the understanding, acceptance, and acknowledgment of the differences among individuals (e.g., race, age, gender, physical or mental ability) (Mor Barak, Cherin, & Berkman, 1998; Cox & Black, 1991) as well as the degree of representation people of culturally significant group affiliations in the workplace (Cox, 1994). *Diversity climate*, then, concerns employees' shared perceptions of an organization's adoption of policies and procedures that integrate these differences into the organizational environment (Kossek & Zonia, 1993; McKay, Avery, & Morris, 2008). Inclusive diversity policies and practices are linked to improvements in innovation, productivity, retention, and recruitment (Saloman & Schork, 2003) and positive diversity climates produce positive effects in the workplace, even when organizations exist in communities where negative diversity attitudes are common (Pugh, Dietz, Brief, & Wiley (2008). Positive diversity climate perceptions influence a wide variety of positive employee and organization outcomes, including increased well-being (Sliter, Boyd, Sinclair, Cheung, & McFadden, 2013), reduced turnover intentions (McKay et al., 2007; Stewart, Volpone, Avery, & McKay, 2010), competitive recruiting advantages (Avery et al., 2013), organizational commitment and job satisfaction (Hicks-Clarke & Iles, 2000), and various other employee (Mor Barak, Cherin, & Berkman, 1998) and organizational performance indicators (McKay et al., 2008).

Ageism climate expands shared perceptions of diversity climate indicators to the fair and nondiscriminatory treatment of employees of all age groups, including organizational policies, practices, procedures, and reward systems (Kunze, Boehm, & Bruch, 2013). Moreover, Kunze, Raes, and Bruch (2015) found age-diversity (ageism) to be related to collective perceptions of positive social exchange, and that it was predictive of higher performance and lower turnover intentions. Other studies have found age diversity to have positive influences aside from well-being and organizational performance (e.g., Kearney & Gebert, 2009; Kunze et al., 2013).

Family-supportive organizational perceptions (FSOP) can be defined as overall employee perceptions that their organization supports their family roles and responsibilities (Allen, 2001). While not explicitly a climate construct, given that its measurement and outcomes concern the perceptions of the employees regarding the policies, practices, and procedures of the organization, it is logical to expect such perceptions to be shared by multiple employees within an organization unit. Furthermore, Allen's original measure was fundamentally based on work-family 'culture,' a concept that closely related to climate. Since Allen's initial study a large body of research has examined FSOP correlates. A meta-analytic review by Kossek,

Picher, Bodner and Hammer (2011) conducted that organizational support for work family concerns was related to work-family conflict and other literature has directly linked FSOP to physical and mental health outcomes (e.g., Jennings, Sinclair, & Mohr, 2016). Thus, FSOP should be given further attention in research on teachers' occupational health, as well as in efforts to create policies that support healthy schools.

Verbal and physical violence are of on-going concern in public schools, although some scholars have argued that there is insufficient attention to violence experienced by teachers, as compared with concerns about violence experienced by children (Wittmer, Sinclair, Martin, Tucker, & Lange, 2012). Beyond schools, however, researchers have investigated a variety of different climate-related concepts related to violence. First, *sexual harassment climate* is associated with tolerance of sexual harassment, the availability, accessibility, and effectiveness of harassment policies and procedures within an organization, and the belief that reported claims will be taken seriously (Estrada, Olsom, Harbke, & Berggren, 2011; Fitzgerald, Drasgow, Hulin, Gelfand, & Magley, 1997; Hulin, Fitzgerald, Drasgow, 1996). Sexual harassment climate can influence the health and well-being of employees, inside and outside of the workplace, and across various organizational settings (Chan, Lam, Chow & Cheung, 2008; O'Leary-Kelly, Bowes-Sperry, Bates, & Lean, 2009). The occurrence of such actions may be more frequent in certain organizations, as sexual harassment incidents occur more often in settings that are perceived to be more tolerant of harassment and harassing behaviors (e.g., Chan et al., 2008; Willness, Steel, & Lee, 2007).

Second, *violence prevention climate* is conceptualized as employee perceptions of the organizational practices, policies, and procedures surrounding the control and elimination of workplace violence and verbal aggression (Kessler, Spector, Chang, & Parr, 2008; Spector, Coulter, Stockwell, & Matz, 2007). Violence prevention climate is three dimensional, including policies and procedures, practices and responses, and pressure for unsafe practices. Like sexual harassment climate, perceptions are formed based on whether or not these policies, practices, and procedures are actively enforced and are easily accessible.

Third, Yang, Caughlin, Gazica, Truxillo, and Spector (2014) described the notion of *workplace mistreatment climate* as encompassing climate research related to workplace aggression, incivility, and bullying. They conducted a meta-analytic review of the literature on these concepts and showed that mistreatment climate was associated with a variety of negative outcomes, including job attitudes, turnover intentions, emotional and physical strains, and actual exposure to mistreatment. Interestingly, their review of the literature included only one unpublished dissertation on teachers, highlighting the lack of attention to such concerns among school employees. In related research, however, Sinclair, Martin, and Croll (2002) found that teachers (as compared with non-teaching public school employees) reported greater concerns about antisocial behavior at school and that their concerns about antisocial behavior influenced their job satisfaction, above and beyond their actual reports of exposure to antisocial behavior. In a follow-up study of the same data at the school level of analysis, Wittmer and colleagues (2012) found that schools

where employees had greater shared concerns about aggression also had poorer educational outcomes and that the effects were stronger in schools with *more* resources, a finding they interpreted as related to violence being a more salient concern in schools that have high levels of resources.

Justice climate, the final climate covered, is a reflection of shared perceptions of employees regarding fairness in treatment and outcomes that result from organizational practices, policies, and procedures (Colquitt, Noe, & Jackson, 2002; Liao & Rupp, 2005; Rupp, Bانشur, Liao, 2007). Justice climate is further divided into three subtypes of justice: distributive justice (i.e., the allocation of resources), procedural justice (i.e., decision-making processes and procedures), and interactional justice (i.e., interpersonal treatment received by others handling organizational business). Though these forms of justice represent distinct constructs, they often interact with one another (see Colquitt, Conlon, Wesson, Porter, & Ng, 2001, for a review of the interrelationships).

A recent meta-analysis examined the relationship between organizational justice climate and work effectiveness (Whitman, Caleo, Carpenter, Horner, & Bernerth, 2012). Work effectiveness, as outlined in Colquitt, Greenberg, and Zapata-Phelan (2005), includes, attitudes (e.g., job satisfaction and commitment), processes (e.g., organizational citizenship behavior), withdrawal behaviors (e.g., absenteeism and isolation), and performance (e.g., classroom management, client/student satisfaction). Although each of the three types of justice climate had significant relationships with work effectiveness, distributive justice climate was more strongly related to performance and interactional justice climate was most strongly related to processes. Interestingly, due to the lack of studies considering the other climate variables, procedural justice climate was the only climate tested in relation to withdrawal. While positive procedural justice climate was associated with less withdrawal, future research is needed to examine the relationship with other climate measures. However, the results from the meta-analyses warrant the inclusion of a collective justice climate in organizational health models.

13.3.4 Conclusions About Climate Models

Occupational health psychology emphasizes the role of work organization in creating hazards for workers, including both physical and psychosocial hazards. The literature on organizational climate focuses on employees' perceptions about the relative priority of various occupational health concerns and emphasizes the role of both leaders' support for healthy practices and formal policies, practices, and procedures as important influences on occupational health. We used the climate literature to discuss multiple facets of healthy work environments that are related to desirable outcomes for both employees and employing organizations. It is important to note that the organizational climate literature does not encompass all possible perspectives on creating healthier workplaces. Indeed, other chapters in this volume will offer some of these other perspectives. It is also important to note the lack of

Table 13.3 Targets for creating a healthy school climate

	Top management commitment	Local leader support and commitment	Training programs	Communication	Policies, practices, and procedures
Physical safety					
Psychosocial safety					
Health/wellness					
Age discrimination					
Sexual harassment					
Violence prevention					
Workplace mistreatment					
Justice					
Diversity					
Family support					

Note. Source, adapted from Ballard, Krauss, and Sinclair (2016) based on key topic areas for the journal *Occupational Health Science* and for the APA/NIOSH Work, Stress and Health conference. Topics listed are meant to be illustrative, rather than all inclusive

research directly testing the distinctiveness of many of these concepts. For example, it is not clear whether employees form distinct perceptions of all of these different types of occupational health related issues, as opposed to forming general perceptions about the extent to which their organization is concerned about them as individuals. Despite these concerns, we see the climate literature as particularly useful in addressing the challenge of creating healthy schools. As shown in Table 13.3, each of the various climate facets (the rows in the table) can be addressed through informal support from local and top school leadership, training programs, good communication systems, and having established policies, practices, and procedures to address each issue. Thus Table 13.3 provides a template through which the current health status of a school can be analyzed. Schools can gather data on each of these (and other) aspects of a healthy school climate to identify relative priorities among various climate-related concerns and evaluating the extent to which the school has appropriate supports, policies, etc. in place to address health concerns. The central theme across all of this literature, as well as other bodies of literature that we have not reviewed, is that school leaders play a critical role in establishing a healthy school climate, by establishing health-related goals as targets, by establishing policies and procedures that support employee health, by communicating with employees about the importance of addressing health concerns and providing information about health-related opportunities and resources, and by providing support to employees who are contending with occupational health challenges.

13.4 Total Worker Health™

Organizations have adopted many programs focused occupational health and safety (OSH) and/or on worksite health and wellness promotion (WHP). WHP programs primarily target the individual worker's risk-related behaviors, and focus on promoting health-related lifestyle decisions and activities (e.g., smoking cessation, physical activity) that impact the individual beyond the worksite (LaMontagne, 2004). Conversely, OSH programs are concerned with minimizing employee exposure to occupational hazards (e.g., physical, chemical, psychological hazards), and are implemented at organizational level via policies, procedures, and other risk-management controls (Levy & Wegman, 2000). Although considerable overlap exists in respect to their overall mission, each program is the product of a different field of study and they frequently operate independent of one another. This leads to a competition for resources that is neither economically nor practically efficient for organizations.

In fact, for nearly 30 years, multidisciplinary professionals (Chu, Driscoll, & Dwyer, 1997; DeJoy & Southern, 1993; McLeroy, Bibea, Steckler, & Glanz, 1988; Schulte, Pandalai, Wulsin, & Chun, 2012; Walsh, Jennings, Mangione, & Merrigan, 1991) and international organizations (European Network for Workplace Health Promotion, 1997; World Health Organization [WHO], 1986, 1997) have called for an integrated, systems approach to workplace health programs. Today, recent trends toward the integration of worker health and safety programs are the result of research conducted by NIOSH, as part of their Total Worker Health™ program; formerly known as the Work Life initiative (Schill & Chosewood, 2013). According to Schill and Chosewood (2013), Total Worker Health™ (TWH™) is defined as a “strategy integrating occupational safety and health protection with health promotion to prevent worker injury and illness and to advance worker health and well-being” (p. S8). The key concept of TWH™ program lies in the holistic focus on a unified, systematic approach from all organizational functions concerning the protection and promotion of the *total* health, safety, and well-being of employees. Sorensen and Barbeau (2004) describe the evidence-based rationale for this approach as follows:

- The risk of disease is increased by exposure to occupational hazards and risk-related behaviors alike.
- Occupational and personal risk factors have a high degree of interrelation and may have synergistic effects.
- Those at highest risk for exposure to hazardous conditions in the workplace are likewise those most likely engage in risk-related health behavior(s)
- Integrating OSH and WHP may also benefit the general work environment and reach broader across the organization
- Integrating of OSH and WHP may increase the participation and effectiveness of interventions and programs, especially for high-risk workers.

A NIOSH Research Compendium (Goetzel, 2012) offers a practical guide for implementing such a program, including a four-phase model consisting of diagnosis, strategic and tactical planning, intervention, and measurement. When we use the term ‘intervention programs,’ we refer to any collection of integrated activities,

programs, or strategies implemented by the organization and used by its members to improve total health, safety, and well-being of the organization's members. Though these intervention packages can take different forms of varying complexity, and target various workplace challenges, the key is consistency with the TWH™ program's initiative. For example, following an increase in musculoskeletal injury, an intervention in a school might provide ergonomic redesign of the teacher workspace and simultaneously promote physical activity aimed at improving overall health. While the research compendium does well in explaining how and why such programs are to be implemented, we believe it is important to also report on recent findings on the effectiveness of Total Worker Health™ intervention programs.

Evidence supporting the Total Worker Health™ program's initiative is limited due to the modernity of the concept itself. However, since the idea first appeared in the literature (e.g., NIOSH, 1984), interest in incorporating such programs has grown markedly (Goetzel, 2012; Hymel et al., 2011; WHO, 1986, 1997). Anger et al. (2015) reviewed the literature and found seventeen studies that met the criteria to be classified as a TWH™ intervention program. They noted that only Hunt et al.'s (2005) Wellworks-2 program specifically addressed the enhanced value and effectiveness of an integrated approach. However, Anger and colleagues (2015) concluded that sixteen of the seventeen studies meeting the TWH™ criteria improved outcomes considered risk factors for injury and chronic disease, with four showing improvement on ten of more of the risk factors. Thus, these findings are in line with the notion that comprehensive TWH™ programs and/or interventions may be considered more effective than programs employing a narrower focus.

Fabius et al. (2013) posited that holistic approaches to safeguard and promote employee health and wellness might provide organizations with a considerable competitive advantage by reducing costs, and boosting organizational performance and productivity. Put more simply, healthy individuals are more likely to be high-performing individuals, and the relationship between health and productivity and/or performance at the individual level will aggregate to higher productivity and better performance at the organizational level. While this evidence does not provide a causal link between these programs and organizational outcomes, it reinforces the case for organizations consider investing in the health and safety of their workforce in the same way they would for skill development and training.

13.5 Creating the Psychologically Healthy Workplace

One of the most important challenges in creating healthier schools concerns translating research concepts, tools, and findings into cost-effective practices that lead to demonstrable benefits to worker health. The American Psychological Association's (APA) Center for Organizational Excellence has created a Psychologically Healthy Workplace Award (PHWA) program to reward organizations that accomplish this goal (American Psychological Association, ND; Grawitch & Ballard, 2016). The PHWA program is driven by a conceptual framework that focuses on five aspects of

a psychological healthy workplace (cf. Grawitch & Ballard, 2016, pp. 5–6). *Employee involvement* “focuses on providing employees with a greater level of autonomy in their work.” *Work-life balance* “focuses on providing employees with greater flexibility in when, where or how often they work as well as benefits to assist them in managing non-work demands.” *Employee growth and development* “focuses on issues related to improving employee competencies and career development.” *Employee recognition* “focuses on demonstrating appreciation for employee contributions and includes both monetary and nonmonetary rewards.” Finally, *health and safety* “focuses on prevention, assessment, and treatment of potential health risks and problems and encouraging and supporting healthy lifestyle and behavior choices.” Organizations self-nominate for the awards and are reviewed according to their performance on these five criteria for both local and national awards. Comparisons of data from PHWA winners to national averages show that winners outperform national averages on a variety of organizationally desired indicators such as employee retention, employee satisfaction, and participation in wellness programs (Ballard, Krauss, & Sinclair, 2016)

Two examples of schools that have received PHWA awards demonstrate that it is possible for schools to create healthy work environments for their employees. Sandia Preparatory School in Albuquerque, New Mexico was recognized in 2009 for its efforts to create a healthy and collaborative team environment. Specific initiatives include numerous efforts to create a culture where participation and involvement is actively encouraged and valued, employee fitness, health and wellness programs, employee continuous development programs, family related programs and policies such as the ability to bring children to work and tuition remission for children, and a student government program to recognize high performing teachers. Green Chimneys School in New York received an award in 2006. Examples of initiatives at this school include active employee involvement in numerous school programs and initiatives, opportunities to visit a working farm on school groups, the ability for employees to contribute unused sick time to a bank for coworkers with serious illnesses, tuition assistance for employees, onsite daycare, and an employee recognition program at Thanksgiving. Both organizations attribute desirable outcomes such as low turnover, high employee morale, and low absenteeism to their efforts to create a psychologically healthy workplace. These are just two examples of many public and private employers that have won PHWA awards and much more detail about the award program and the winners is available at the Center for Organizational Excellence website.

13.6 General Conclusions

We would define a healthy school as a school that recognizes the strategic benefits of focusing on employee safety, health, and well-being and responds accordingly through organizational policies, practices, and programs targeting important employee health concerns caused by the organization of work. Healthy schools have

work environments that minimize exposure to health hazards and create a sense among employees that safety, health, and wellbeing are truly valued by both front line supervisors such as principals and by top school system leaders. When organizations engage in these efforts, both the schools and the employees, and by extension, students will benefit. Occupational Health Psychology offers a rich scientific base to support the benefits of efforts to create healthy schools and identifies best practices through which schools can address work organization factors that contribute to healthy schools. NIOSH's Total Worker Health™ initiative highlights the importance of integrative efforts to address multiple occupational health concerns and the APA Psychologically Healthy Workplace Award program identifies organizations, including schools that have successfully implemented programs to improve worker health and have shown considerable benefits as a result. However, at present systematic intervention programs specifically designed to change school work environments with the goal of improving employee health remain rare, despite their likely benefits for teachers and students. We hope that future school leaders will draw upon both the existing OHP literature and best practices to strengthen their focus on healthy schools (Table 13.4).

Table 13.4 Occupational Health Psychology resources

Professional Organizations

Society for Occupational Health Psychology

www.sohp-online.org/

European Academy of Occupational Health Psychology

<http://www.eaohp.org/>

Society for Industrial-Organizational Psychology Health, Safety, and Wellbeing Registry

<http://my.siop.org/registry/hswb>

Selected Journals that Publish Occupational Health Research

Accident Analysis & Prevention

European Journal of Work & Organizational Psychology

International Journal of Stress Management

Journal of Applied Psychology

Journal of Occupational Health Psychology

Journal of Occupational & Organizational Psychology

Journal of Occupational and Environmental Medicine

Journal of Organizational Behavior

Journal of Vocational Behavior

Occupational Health Science

Scandinavian Journal of Work, Environment & Health

Stress and Health

Occupational Health Psychology Books

Barling, J., & Frone, M. R. (2004). *The psychology of workplace safety*. Washington DC, American Psychological Association. ISBN: 978-1-59147-068-7

(continued)

Table 13.4 (continued)

Barling, J., Kelloway, E. K., & Frone, M. E. (2005). *Handbook of work stress*. Thousand Oaks, CA: Sage. ISBN: 9780761929499

Grawitch, M. J., & Ballard, D. W. (2016). *The psychologically healthy workplace: Building a win-win environment for organizations and employees*. Washington, DC: American Psychological Association. ISBN: 978-1-4338-2052-6

Houdmont, J., & Leka, S. (2010). *Contemporary occupational health psychology: global perspectives on research and practice* (Vol. 1). Malden, MA: Wiley-Blackwell. ISBN: 978-0-470-68265-4

Houdmont, J., & Leka, S. (Eds.) (2008). *Occupational health psychology: European perspectives on research, practice and education* (Vol. 3). Nottingham, UK: Nottingham University Press. ISBN: 978-1-904761-82-2

Houdmont, J., Leka, S., & Sinclair, R. R. (Eds.) (2012). *Contemporary occupational health psychology: Global perspectives on research and practice* (Volume 2). Chichester: Wiley-Blackwell. ISBN: 978-0-470-68265-4

Houdmont, J. & McIntyre, S. E. (2006). *Occupational health psychology: European Perspectives on Research, Education and Practice* (Vol. 2). Maia, Portugal: PubISMAI. ISBN: 978-972-9048-24-1

Kelloway, E. K., Barling, J., & Hurrell, J. J., Jr. (Eds.) (2006). *Handbook of workplace violence*. Thousand Oaks, CA: Sage Publications. ISBN-13: 9780761930624

Leka, S., & Houdmont, J. (2010). *Occupational health psychology*. Malden, MA: Wiley-Blackwell. ISBN: 978-1-4051-9115-9

Leka, S., & Sinclair, R. R. (Eds.) (2014). *Contemporary occupational health psychology: Global perspectives on research and practice* (Volume 3). Chichester: Wiley-Blackwell. ISBN: 978-1-118-71390-7

McIntyre, S. E., & Houdmont, J. (2004). *Occupational health psychology: European perspectives on research, education and practice* (Vol. 1). Maia, Portugal: PubISMAI. ISBN: 972-9048-20-7.

Quick, J. C., & Tetrick, L. E. (Eds.). (2010). *Handbook of occupational health psychology (2nd ed.)*. Washington, DC: American Psychological Association. ISBN: 978-1-4338-0776-3

Quick, J. C., Wright, T. A., Adkins, J. A., Nelson, D. L., & Quick, J. D. (2013). *Preventative stress management in organizations (2nd Ed.)*. Washington DC: American Psychological Association. ISBN: 978-1-4338-1185-2

Sinclair, R. R., Wang, M., & Tetrick, L. E. (2013). *Research methods in occupational health psychology: Measurement, design, and data analysis*. New York: Routledge ISBN-13: 978-0415879323

Web sites (each includes links to many other resources)

History of Occupational Health Psychology en.wikipedia.org/wiki/Occupational_health_psychology

American Psychological Association Center for Organizational Excellence www.apaexcellence.org/

Society for Occupational Health Psychology Resource Page www.sohp-online.org/research.htm#

National Institute for Occupational Safety and Health <http://www.cdc.gov/niosh/topics/ohp>

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Chapter 14

Individual-Level Interventions: Mindfulness-Based Approaches to Reducing Stress and Improving Performance Among Teachers

Patricia A. Jennings and Anthony A. DeMauro

Abstract This chapter reviews the extant literature on mindfulness-based interventions applied to reducing teachers' occupational stress and improving job performance, demonstrating the evolution of the field over the past 20 years from very small pilot studies to a recently conducted large cluster randomized controlled trial. The term "mindfulness" refers to a particular kind of attention characterized by intentionally focusing on the present moment with a non-judgmental attitude and is cultivated by engaging in mindful awareness practices. Research on the effects of mindfulness training with adults has shown numerous positive effects including reduced stress and increased self-awareness, empathy, and emotion regulation. The chapter reviews the research on mindfulness-based interventions more broadly, focusing on research involving non-clinical samples and work-related outcomes. The chapter provides an overview of early research on mindfulness-based interventions for teachers and an in-depth discussion and review of the associated research of two widely used mindfulness-based programs for teachers, Stress Management and Relaxation Techniques in Education (SMART) and Cultivating Awareness and Resilience in Education (CARE for Teachers). The chapter concludes with a discussion of the limitations of the reviewed research and recommendations for future research that will address gaps in the literature.

Keywords Teacher stress • Occupational stress • Burnout • Mindfulness • Emotion regulation • Intervention

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14.1 Stress and Burnout

There is no shortage of empirical evidence that teaching is a stressful occupation (see Guglielmi & Tatrow, 1998; Montgomery & Rupp, 2005 for reviews). Recent statistics indicate job satisfaction among teachers in the United States is at its lowest point in more than 20 years (MetLife, 2013), and reports on teacher attrition show more than 40% of U. S. K-12 teachers leave the profession within their first five years of teaching (Ingersoll, Merrill, & Stuckey, 2014). Teacher stress and the resulting teacher attrition are now recognized as critical problems that threaten the quality of education (Alliance for Excellent Education, 2014).

Researchers have related the trends of low job satisfaction and high attrition to the intense feelings of stress and burnout experienced by many teachers (e.g., Fisher, 2011; Schaefer, Long, & Clandinin, 2012). Teaching is an emotionally demanding profession, and teachers who do not regulate and cope well with their emotional experiences may suffer from considerable stress and burnout. Current pressures from standardized testing and accountability policies further exacerbate the stress experienced by teachers (Dworkin & Tobe, 2014). However, no conclusive evidence exists to identify a single source of teacher stress, which suggests the phenomenon is complex and multifaceted.

Teacher stress likely develops from a number of sources related to both a teacher's dispositional characteristics and contextual factors (Chang, 2009). Dispositional sources of occupational stress and burnout include career dedication, neuroticism, and type-A personality traits, where higher levels of these traits are related to more stress and burnout (Maslach, Schaufeli, & Leiter, 2001). The term "career dedication" is similar to the construct of "overcommitment as described in Siegrist's (1996) Effort-Reward Imbalance (ERI) Model (see Chap. 10).

There also exist environmental sources of stress that have been found to elevate teacher stress such as student misbehavior (Bibou-Nakou, Stogiannidou, & Kiosseoglou, 1999), poor administrative support (Seidman & Zager, 1986), and accountability policies (Dworkin & Tobe, 2014). However, not all teachers with type-A personality traits experience the same level of stress, nor do all teachers experience symptoms of burnout as a result of dealing with student misbehavior. Teachers deal with occupational challenges differently, and school contexts vary in the number of challenges teachers face and the degree to which teachers find them emotionally demanding.

Chang (2009) argued that teachers' experience of stress and burnout result from an interplay between individual and environmental factors. Applying Lazarus' (1993) transactional theory of appraisal and emotion, Chang explained how stress and burnout are a result of teachers' appraisals about their environment. Appraisals are judgments about events and circumstances that trigger emotional experiences. For example, a teacher might judge a student's misbehavior as a personal attack or a result of the student struggling to maintain focus through a long lesson. A personal attack appraisal will lead to an emotional response such as anger or frustration. In contrast, an appraisal that recognizes the student's limited attentional capacities is

more likely to evoke emotions such as empathy and understanding (Ekman, 2007). In Chang's (2009) model, teachers do not inevitably experience stress from student misbehavior or administrative pressures. Rather, a teacher's appraisals of specific occupational events trigger healthy or maladaptive emotional responses. The kind of appraisal a teacher makes about a situation determines the emotion and the intensity of the emotion experienced. Repeatedly experiencing more unpleasant emotions, such as frustration and anger, would lead to feelings of stress and burnout. Chang further argued that since it is not usually considered appropriate for teachers to express their emotions in the classroom, they would tend to use suppression to self-regulate. However, suppressing emotions is not a healthy coping strategy, except in very extreme cases (Bonanno & Keltner, 1997). Suppression decreases behavioral expression, but does not decrease emotion experience, which can have negative health consequences (Gross, 2002) and may lead to increased burnout (Erickson & Ritter, 2001).

To examine Chang's (2009) model, Chang (2013) conducted a series of studies exploring teachers' appraisals of disruptive classroom behavior situations and the adaptive coping and emotion regulation strategies that prevent teacher burnout. Examining data collected from 492 teachers the study found evidence supporting a hypothesized pathway between teachers' antecedent judgments and their emotional experience. It also provided evidence for how this emotional experience may contribute to burnout. The study confirmed the hypothesized relationships between teachers' appraisals about an incident involving challenging student behavior and the intensity of the emotional response. Chang (2013) concludes that in order to manage stress and protect against burnout, teachers should first become aware of their thought or attribution patterns, helping them to proactively regulate their emotions or find ways to appropriately express them, depending on the situation. In this way teachers can develop effective coping strategies to overcome unavoidable negative emotions and to express them in ways that promote desired student behavioral and learning outcomes, rather than suppressing them (Chang, 2013). One way to build these skills is through training in mindfulness (Weinstein, Brown, & Ryan, 2009). In the following sections we review the research on mindfulness-based interventions (MBIs) in general and then focus on MBIs developed specifically to address teacher occupational stress and performance.

14.2 Mindfulness-Based Interventions

In recent years, MBIs have been recognized as effective approaches for reducing stress and promoting emotional awareness and self-regulation. Mindful awareness practices (MAPs) that are currently being studied in the West, were adapted from Buddhist spiritual practices (Hanh, 1976) and were popularized in the form of secular stress reduction interventions through the work of Jon Kabat-Zinn's (1982) Mindfulness Based Stress Reduction (MBSR).

Kabat-Zinn (2003) defined mindfulness as “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment” (p. 144). Others have further refined the definition as a metacognitive process of regulating attention to develop curiosity, openness, and acceptance of one’s thoughts and experiences (Bishop et al., 2004). Mindfulness can be cultivated through mindful awareness practices such as meditation, yoga, and tai chi and one can practice mindfulness informally while engaging in routine daily activities such as walking, eating, and interacting with others (Williams & Kabat-Zinn, 2011).

Before the current wave of popularity there was a history in occupational stress literature exploring the efficacy of meditation- or mindfulness-based interventions for reducing the stress response and promoting self-regulation. For example, Stress Management Training (SMT; Monroy, Jonas, Mathey, & Murphy, 1997) was developed to support employees at Corning Inc. Building upon work by Benson (1975), the program was designed to build the individual’s capacity to cope proactively by using reappraisal and self-regulation in the context of stressful situations. The intervention involved instruction in a variety of stress management skills including muscle relaxation, biofeedback, meditation, and cognitive restructuring (Murphy, Hurrell, Sauter, & Keita, 1995). Similar approaches were applied to helping teachers deal with stress as well (Bamford, Grange, & Jones, 1990; Jesus & Conboy, 2001).

Research on MBIs has grown dramatically over the past 15 years. While much of the research has focused on promoting specific psychological and physiological improvements in clinical adult populations such as reduced anxiety, depression, and symptoms of chronic pain (Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004; Khoury et al., 2013; Strauss, Cavanagh, Oliver, & Pettman, 2014), there are a growing number of studies examining applications of mindfulness for stress reduction in general adult populations. Reviews of research focused on stress management with non-clinical adult populations suggest positive effects of MBIs (Eberth & Sedlmeier, 2012; Sharma & Rush, 2014), however, authors note the paucity of rigorous studies.

More relevant to the occupational stress literature, Good et al. (2015) completed a systematic review of the mindfulness literature and found evidence suggesting that the construct of mindfulness is associated with important dimensions of optimal occupational functioning. In reviewing the research on the effects of MAPs, they presented a theoretical framework explaining how MAPs build attentional stability, control and efficiency. They propose that these improvements in attentional functioning mediate improvements in cognitive, emotional, behavioral and physiological functioning that are associated with improved work performance. This suggests support for mindfulness as a possible intervention approach to address the specific emotional stressors teachers face, as presented by Chang (2009, 2013) above.

While the extant research shows promise, there are a number of gaps in the research literature. Davidson and Kaszniak (2015) noted that interpretation of the results of research on MBIs has been challenging due to the unique conceptual and methodological issues posed by this research such as how best to study first-person

experience, problems developing valid control conditions, lack of clear descriptions of the specific activities that compose the training, and over-reliance on self-report measures. Furthermore, Dimidjian and Segal (2015) identified the need to more carefully anchor clinical research in basic science, extend research on MBIs to include more active control conditions to address questions of specific efficacy, and develop studies to examine effectiveness and quality of implementation at scale.

Another concern is whether or not the effects of MBIs extend past the end of intervention. There is evidence that suggests that the positive effects of mindfulness-based interventions may endure, especially if individuals are provided maintenance support. A meta-analysis was conducted to examine the effectiveness of mindfulness-based interventions for reducing personal distress (Hofmann, Sawyer, Witt, & Oh, 2010). The study identified 39 studies totaling 1,140 participants engaging in a mindfulness-based intervention for a range of conditions. The effect size estimates suggest that these interventions were moderately effective for improving anxiety and mood symptoms more generally. For participants with diagnosed anxiety and mood disorders the interventions were associated with robust effect sizes for improving anxiety and mood symptoms and effects were maintained over follow-up periods averaging 27 weeks.

More relevant to the occupational stress literature, Amutio, Martinez-Taboada, Delgado, Hermosilla, and Mozaz (2015) conducted a longitudinal study to examine the effectiveness of mindfulness-based stress reduction program involving an 8-week initial program plus a 10-month maintenance program in alleviating work stress-related symptoms in a sample of 42 physicians, 21 randomly assigned to receive the program and 21 assigned to the wait-list control group. Results showed significant reductions in emotional exhaustion, heart rate (HR) and blood pressure (BP) and increases in mindfulness. Over the 10-month maintenance period effect sizes significantly increased, especially for mindfulness and systolic BP. However, the small sample size limits the reliability of these findings.

The growing body of research demonstrating the benefits of mindfulness has sparked an emergent interest in its application to the field of education (Greenberg & Harris, 2011; MLERN, 2012; Meiklejohn et al., 2012). Currently, MBIs can be found in educational settings spanning preschool to post-secondary including programs for students, teachers, and principals. However, despite its proliferation, the research on the effectiveness of MBI's in this context has been limited. There have been very few rigorous randomized controlled trials and none that examine long-term effects. Nevertheless, results from a number of empirical studies on mindfulness-based interventions are beginning to show promise for helping teachers manage occupational stress. Because the teaching profession is characterized as one of high emotional labor, stress, and burnout (Chang, 2009, 2013; Guglielmi & Tatrow, 1998), mindfulness may be especially helpful for teachers. Teachers may benefit from MAPs by improving their emotional awareness, developing techniques for regulating and responding to their own emotions, and coping with inevitable negative emotional experiences (Roeser et al., 2013).

14.3 Mindfulness-Based Interventions for Teachers

Over the past 15 years, the body of research on MBIs for teachers has shown steady growth in both prevalence and rigor. The following review tracks the evolution of MBIs for teachers from exploratory pilot studies to cluster randomized controlled trials. The review also discusses MBIs' growing reception in the public eye as an effective and feasible approach to reducing teacher stress and burnout.

14.3.1 Preliminary Research

In the late 1990s, before the term “mindfulness” became popular, a number of researchers investigated the effects of meditation practices on teachers' stress and well-being. Like many nascent fields, the reliability of these early studies was limited by small samples and less than rigorous designs. As is the case for research on mindfulness-based interventions in general, there was a lack of specificity in the descriptions of the actual practices included in the intervention. Nevertheless, these studies provided evidence that MBIs are feasible and acceptable to teachers and might be useful for reducing occupational stress (Anderson, Levinson, Barker, & Kiewra, 1999; Winzelberg & Luskin, 1999).

In the early 2000s, the term “mindfulness” began to emerge as a way of describing the enhanced awareness and stress management skills resulting from secularized meditation practices (Davidson & Kaszniak, 2015; Williams & Kabat-Zinn, 2011). The term “mindful awareness practices” or MAPs emerged as a way to describe a continuum of practices involving states and processes engaged in to promote a particular stance or orientation towards one's experience. These practices involve various forms of directed attention including mindfulness meditation, yoga, tai chi and other contemplative practices (Kabat-Zinn, 2014; Lutz, Jha, Dunne, & Saron, 2015).

Research on the impact of meditation techniques on teachers' occupational stress continued, but the programs began to be identified with the “mindfulness” label (Franco, 2007, 2009; Franco, Mañas, Cangas, Moreno, & Gallego, 2010; Napoli, 2004). While these studies lacked rigor they provided insight into how to adapt ancient Eastern spiritual practices to fit the secular demands of the U.S. educational landscape. Leaders in education and teacher training also began to recognize that meditation and other mindfulness practices might be particularly useful for the unique challenges of teaching (Roeser et al., 2013). The preliminary studies served as a foundation for the proliferation of future programs and investigations of MBIs for teachers. The following sections describe the more widely used MBIs with standardized curriculums and reviews the empirical studies of their effectiveness.

14.3.2 Standardized MBIs for Teachers

14.3.2.1 Mindfulness-based Stress Reduction (MBSR)

One of the best known and frequently studied MBI is Mindfulness-Based Stress Reduction (MBSR). Developed by Jon Kabat-Zinn, the program uses meditation and yoga practices to cultivate greater well-being and mind-body awareness. MBSR programs are typically 8-weeks long, meeting for 2 ½-hr sessions once weekly and one day of complete silence. MBSR courses involve training in formal mindful awareness techniques such as meditation, bodily relaxation, and basic yoga postures, as well as instruction in understanding physiological, behavioral, and emotional responses to stress (Center for Mindfulness, 2014). MBSR also helps individuals develop an understanding of the mind-body connection in order to take a more holistic approach to health and healing (Kabat-Zinn & Hanh, 2009).

While research was demonstrating that MBSR is effective for stress reduction and the promotion of well being more generally, it was unclear whether it would be useful for supporting teachers' occupational health and well-being. Several preliminary studies examined the efficacy of MBSR for reducing teacher occupational stress (Flook, Goldberg, Pinger, Bonus, & Davidson, 2013; Gold et al., 2010). While these studies lacked rigor, they demonstrated that MBSR is a feasible and acceptable program for teachers and may reduce stress and promote well-being.

14.3.2.2 Cultivating Emotional Balance in Challenging Times

In 2000, the Mind and Life Institute (2015) gathered many of the world's leading emotion researchers to meet with prominent figures from meditation traditions, including the Dalai Lama, to discuss the topic of human emotion (for a report on these meetings see: Goleman, 2008). Following the meeting, a team of experts led by emotion researcher Paul Ekman and Buddhist scholar B. Alan Wallace developed "Cultivating Emotional Balance in Challenging Times" (CEB), an intervention which combines meditation practices with emotion skills training (Cultivating Emotional Balance, 2015). The 8-week program introduces MAPs such as mindful movement, listening practices and compassion practices such as lovingkindness, or *metta* practice, to help individuals better understand and regulate their emotional experiences. The training aims to reduce individuals' maladaptive emotional responses to difficult situations while fostering experiences of more positive emotions such as compassion and empathy.

Although CEB was not specifically designed to address teachers' occupational stress per se, the first evaluation of the program was conducted on a sample of 82 female school teachers. Females were chosen because the physiological measures the study employed to examine the stress response have gender-related differences and it was not feasible to recruit an equal number of men and women due to the large gender disproportions among teachers. The teachers were randomly assigned

to a CEB group or a wait-list control group, and assessed at three time points (pre-intervention, immediately post-intervention and 5 months after training completion (Kemeny et al., 2012).

Using a battery of self-report measures and a series of experimental tasks, the researchers examined CEB's effect on emotional experience and behavior. Self-report measures included the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), the Trait Anxiety Inventory (TAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1977), the Negative Affect and Positive Affect Scales (PANAS ; Watson, Clark, & Tellegen, 1988), Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the *ruminat*ion subscale from the Rumination and Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999), and the short version of the Marlowe Crowne (Reynolds, 1982) Social Desirability scale (baseline only).

Four tasks were administered during a 3-h laboratory assessment session. These included the Micro-Expression Training Tool (METT; Ekman, 2004), a computerized task that assesses emotion recognition, the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993), a protocol designed to induce psychological stress and to evaluate its effects on physiological responses, the Marital Interaction Task (MIT; Gottman, 1995), used to assess compassionate and hostile behavior (pre- and post-intervention) and a computerized lexical decision procedure (e.g., Mikulincer, Gillath, & Shaver, 2002) aimed at assessing compassionate responding to emotionally provocative stimuli (administered at follow-up only). After the TSST was completed, participants were asked to complete a questionnaire to assess ruminative thoughts induced by the task (Nolen-Hoeksema, 1991; Trapnell & Campbell, 1999). The MIT task requires a participant and her spouse or intimate partner to resolve a conflict while being video recorded. The participants' behavior during the session was then coded for specific affect from the video using the Specific Affect Coding System (SPAFF; Gottman, 1995; Gottman & Levenson, 1999; Giese-Davis, Piemme, Dillon, & Twirbutt, 2005). Biological data was collected during the laboratory assessment at several time points to assess the stress response. During the TSST, blood pressure (BP) readings were used as indices of cardiovascular reactivity during the stress task and respiratory sinus arrhythmia (RSA) was used as an index of parasympathetic activity. Data was collected from participants assigned to the training via weekly online logs to assess how much they were practicing meditation during the 8-week training period.

Results from the study showed that teachers receiving CEB demonstrated reduced depression, negative affect, anxiety and repetitive negative thoughts (rumination) and increased positive affect and mindfulness compared to the control group. Furthermore, compared to controls, teachers assigned to CEB were better able to identify subtle facial expressions of emotions (METT), recovered more quickly from physiological stress responses induced during the TSST, were less likely to exhibit hostile behaviors in conflictual situations during the MIT and were more likely to exhibit compassion during the lexical decision procedure. All of these effects except for positive affect, TSST, and rumination were maintained for 5 months. Kemeny et al. (2012) also showed that participants assigned to the training who engaged in mindful awareness practices more frequently on their own during

the 8-week training period had greater reductions in physiological arousal to the TSST, greater reductions in anxiety, and greater increases in mindfulness at post.

CEB and the seminal discussions at the Mind and Life meeting in 2000 initiated a greater understanding of human beings' emotional health and led experts in emotion, meditation, and education to apply principles of mindfulness and emotion more specifically to addressing teachers' occupational stress. While CEB shows promise, some elements of the intervention are not completely secular and are therefore not appropriate for use in public schools in the United States (see Jennings, 2015). For example, the training includes introductions to Buddhist terminology such as the *four brahmaviharas* (*four immeasurables*) (see Wallace, 2004).

To better address the unique occupational stressors teachers face and to create a program that was completely secular, several investigators developed new interventions for teachers drawing from CEB's approach of combining mindfulness-based practices and emotion skills training. As a result, two of the most widely used and empirically supported MIBs were developed: Stress Management and Relaxation Techniques (SMART) in Education and Cultivating Awareness and Resilience in Education (CARE for Teachers). More thorough descriptions of the two programs and a review of related research follow.

14.3.2.3 Stress Management and Relaxation Techniques (SMART) in Education

In 2007, Margaret Cullen, Linda Wallace, and Betsy Hedberg of "The Impact Foundation" applied principles of MBSR to the teaching context to create a more targeted MBI for teachers, Stress Management and Relaxation Techniques (SMART) in Education (Cullen & Wallace, 2010; PassageWorks, 2015). Currently, SMART is offered in two consecutive programs. SMART in Education 1 involves eight weeks of two-hour meetings occurring once per week, along with a four-hour weekend retreat (20 hours total). SMART in Education 2 is an advanced training that builds upon prior learning and involves six weeks of two-hour meetings occurring once per week and a six-hour weekend retreat (18 hours total). The trainings utilize many components of MBSR such as sitting and walking meditation and mindful movement. SMART adds emotion skills training similar to CEB and links curriculum to teachers' work experiences so participants can begin to incorporate mindfulness into their daily teaching practice. The curriculum also includes lessons related to forgiveness, kindness, compassion, and conflict management. In addition to the trainings, SMART offers a number of optional added resources such as an online learning and networking community, courses for introducing mindfulness to students, and additional retreats for teachers and administrators.

The SMART program has been evaluated in two empirical trials. Benn, Akiva, Arel, and Roeser (2012) examined the effectiveness of SMART in a sample of parents ($n = 32$) and teachers ($n = 38$) of children with special needs. Participants were randomly assigned to a SMART group (16 parents and 19 educators) or a wait-list control group (16 parents and 19 educators), and assessed at three time points

Table 14.1 Constructs and measures used in Benn et al. (2012)

Construct	Measure
Mindfulness	Five Facet Mindfulness Questionnaire (FFMQ), Baer, Smith, Hopkins, Krietemeyer, & Toney (2006)
Stress	Perceived Stress Scale (PSS), Cohen, Kamarck, & Mermelstein (1983)
Anxiety	State–Trait Anxiety Inventory for Adults (STAI), Kendall, Finch, Auerbach, Hooke, & Mikulka (1976)
Depression	Center for Epidemiological Studies Depression (CES-D), Radloff (1977)
Affect	Positive and Negative Affect Schedule (PANAS), Watson, Clark, & Tellegen (1988)
Well-being	Psychological Well-Being Scale (PWB), Ryff & Keyes (1995)
Self-compassion	Self-Compassion Scale (SCS), Neff (2003)
Forgiveness	Tendency to Forgive Scale (TFS), Brown & Phillips (2005)
Empathy	empathic concern subscale from Interpersonal Reactivity Index (IRI), Davis (1983)
Teaching self-efficacy	Teaching self-efficacy, Midgley et al. (2000)
Emotion Regulation	Emotion Regulation at Work Self-Efficacy Scale, Roeser et al. (2011)
Parenting self-efficacy	parenting self-efficacy Everyday Parenting Scale, Dunst & Masiello (2002)
Parenting stress	Parenting Stress Index, Abidin (1990)

(pre-intervention, 1 week post-intervention and 2 months after training completion). Participants completed a battery of self-report measures to assess mindfulness, stress, anxiety, depression, affect, well-being, self-compassion, forgiveness, empathy, teaching self-efficacy (teachers only), emotion regulation at work (teachers only), parenting self-efficacy (parents only), parenting stress (parents only) (refer to Table 14.1 for specific measures). The SMART program delivered for this study was longer than either of the programs currently offered, involving nine 2.5-hr sessions and 2 full days (36 hr total) (see Table 14.2 for training schedule and topics). Researchers also tracked how often participants engaged in mindfulness practices independently during the training period.

Investigators examined the effects of SMART with a series of analyses of covariance and then computed effect sizes, using Cohen's *d* with covariate adjusted means. Results indicated those in the treatment group experienced decreased stress and anxiety, as well as increased self-compassion, personal growth, empathy, and forgiveness compared to the control group. Mindfulness measured at post-intervention mediated the treatment effect on stress, anxiety, negative affect, and personal growth at 2 month follow-up, suggesting that mindfulness played a key role in how participants experienced benefits of the program.

Roeser et al. (2013) conducted a wait list-control study involving two samples of teachers, one in the United States and one in Canada. Researchers randomly assigned 113 elementary and secondary public school teachers to receive SMART or to a wait-list control group. Teachers were assessed at three time points

Table 14.2 SMART program: summary of sessions, topics, and activities in mindfulness training curriculum

Session	Topic	Activities
1	Introduction	Mindfulness introduction; guided visualization; written reflection; raisin exercise.
2	Perceptions	Setting intentions, moods and thoughts exercise; stress didactic and discussion; body scan; silent eating; emotions didactic; mindful stretching; breath awareness.
3	Responding versus reacting	Mindful stretching; body scan; stress reaction cycle and coping didactic and discussion.
4	Pleasant, unpleasant, and neutral affect	Breath awareness and awareness of sound; events calendar charting and discussion.
5	Exploring forgiveness	Mindful stretching; awareness of breath, sounds, and physical sensations; forgiveness didactic and dyad exercise; guided visualization.
6	Working with conflict	Mindful stretching; awareness of breath and thoughts; aikido of communication; role play.
7	Compassion and kindness	Mindful stretching; awareness of breath, sounds, sensations, thoughts, emotions and mental states; kindness and compassion discussion; eyes on exercise; kindness meditation.
8	Working with anger	Choiceless awareness meditation; anger didactic; relived anger exercise; anger triggers/dyads and discussion, anger profiles.
9	Silent retreat	Awareness of the breath and choiceless awareness; mindful stretching; body scan; walking meditation; guided visualization; mindful eating; mindful movement to music; sitting meditation; walking meditation; kindness meditation; walking meditation with kindness on the go.
10	Working with fear	Mindful stretching; breath awareness and choiceless awareness; working with fear didactic and discussion; relived fear exercise; fear dyads.
11	Beginnings and endings	Body scan; guided visualization; mindful stretching; community resources and discussion of continuation of practice; personal reflections.

Note. All sessions were 2.5 hr long, except for Sessions 2 and 9, which were 6 hr long
Source: Benn, Akiva, Arel, and Roeser (2012)

(pre-intervention, post-intervention and 3 months after training completion). Of the 113 teachers, 55 were located in the United States (28 assigned to SMART and 27 to the control group) and 58 were in Canada (26 assigned to SMART and 32 to the control group).

Participants completed a battery of self-report measures to assess mindfulness (FFMQ; Baer et al., 2008), occupational self-compassion (modified SCS; Neff, 2003), occupational stress (items drawn from Lambert, McCarthy, & Abbott-Shim, 2001; Roeser & Midgely, 1997) and occupational burnout (Maslach Burnout Inventory; Maslach et al., 2001). Teachers in the U.S. subsample only completed measures of anxiety (STAI; Kendall, Finch, Auerbach, Hooke, & Mikulka, 1976), and depression (Beck Depression Inventory; Beck, Steer, & Brown, 1996).

Biological measures were collected in person at baseline and post-intervention and included systolic blood pressure, diastolic blood pressure and resting heart rate. In Canada only, cortisol was measured from teachers' saliva collected with oral cotton rolls on a regular workday upon awakening, 30 minutes after waking, and at bedtime. To assess focused attention and working memory capacity (WMC), Canadian teachers completed the Operation Span Task (Ospan, Turner, & Engle, 1989) at baseline and post-intervention. Finally, teachers assigned to the SMART program were asked to complete a program evaluation survey and a daily mindfulness practice journal that were collected post-intervention.

Since researchers found few differences between the two subsamples (U.S. and Canada) on demographic characteristics and baseline outcome measures they decided to combine the intervention and control groups across sites. They then ran a series of analyses of covariance to examine direct effects of SMART on the outcome variables then computed effect sizes, using Cohen's *d* with covariate adjusted means.

Teachers who received SMART reported significant increases in mindfulness and occupational self-compassion and significant reductions in occupational stress and burnout at post-intervention and follow-up compared to controls after controlling for baseline measures. Teachers in the U. S. subsample showed slightly higher levels of improvement than the Canadian teachers. In addition, U.S. teachers showed reductions in anxiety and depression at post-intervention and follow-up compared to controls after controlling for baseline measures. Canadian teachers assigned to the SMART group demonstrated significantly higher Ospan (WMC) total scores at post-intervention, controlling for baseline scores, than controls. However there were no significant treatment effects on Canadian teachers' cortisol and no significant treatment effects on HR or BP in either subsample.

Results of mediation analyses similar to those conducted for the Benn and colleagues' (2012) study demonstrated that changes in teachers' mindfulness and self-compassion at post-intervention mediated reductions in occupational stress and burnout at 3-month follow-up. The same analyses were conducted with the U.S. subsample only and found the same mediated effect of mindfulness and self-compassion at post-intervention on depression, and anxiety at 3-month follow-up.

Approximately 60% of the teachers assigned to SMART completed and returned the home practice logs, and they reported an average of 15 min of daily home practice during the 8-week program. Higher levels of independent mindfulness practice during the intervention period consistently led to greater benefits once the treatment was removed. In other words, those who practiced on their own more during the intervention period showed greater improvements in outcome variables at follow-up.

While the research on SMART has been limited by small sample sizes and only short-term follow-ups, the studies suggest that the program is feasible, acceptable and may reduce teacher occupational stress and promote well-being. It is also notable in that mediation analyses suggest that it may be through developing mindfulness and self-compassion that teachers are more able to manage job stress. Since this research was conducted, one of the developers of SMART created a very similar program called Mindfulness-based Emotional Balance (Cullen, 2015), however no research on the program has yet been conducted.

14.3.2.4 Cultivating Awareness and Resilience in Education (CARE) for Teachers

Another MBI that adapted elements of CEB to be more specifically directed towards reducing teachers’ occupational stress is “Cultivating Awareness and Resilience in Education,” also called “CARE for Teachers.” Patricia Jennings worked as a researcher on the CEB trial and in 2007 invited colleagues Richard Brown and Christa Turksma to develop CARE for the Garrison Institute (CARE for Teachers, 2015; Jennings, 2011).

The program is typically delivered over four day long trainings spread across four to five weeks (typically in the fall) with a follow-up booster session occurring months later (typically in the spring). Additionally, trainers provide periodic coaching by phone between sessions to help teachers develop a regular self-care practice and apply CARE skills to their actual experiences in the classroom.

CARE is similar to both CEB and SMART in that its core elements are mindful awareness practices, emotion knowledge and skills training, and compassion practices (see Table 14.3 for details). CARE is unique it that it was designed not only

Table 14.3 CARE program components

Emotion skills instruction Approximately 40%	Mindful awareness practices Approximately 40%	Compassion practices Approximately 20%
1. Introduction to emotions, purpose, universal expressions, relevant brain research	1. Body awareness reflection	1. “Caring practice” – a series of guided reflections focused on caring for self, loved one, colleague, challenging person 2. Mindful listening partner practices, one person reads a poem or talks about a problem, partner listens mindfully practicing presence and acceptance
2. How emotions affect teaching and learning	2. Basic breath awareness practice	
3. Didactic information about “uncomfortable” or negative emotions (anger, fear, sadness) including physiology, cognitive and behavioral responses	3. Mindfulness of thoughts and emotion practice	
4. Didactic information about “comfortable” or positive emotions (joy, appreciation) including physiology, cognitive and behavioral responses	4. Mindful movement practices (standing, walking, stretching, centering)	
5. Exploring bodily awareness of emotions	9. Practice maintaining mindful awareness in front of a group	
6. Exploring individual differences in emotional experiences (emotional profile, triggers & scripts)	10. Role plays to practice mindfulness in the context of a strong emotion related to a challenging classroom situation	
8. Practice using mindful awareness and reflection to recognize and manage strong emotions		

reduce teachers' occupational stress but to also improve teachers' work performance. This aim is based upon the assumption that teachers' stress, and emotional reactivity in particular, interfere with their functioning, especially with regard to their ability to create an emotionally supportive environment and manage student behavior effectively (Jennings & Greenberg, 2009).

To further this aim, CARE includes activities that ask teachers to explore their emotional reactivity in response to particular past events by first re-experiencing them using reflective writing and somatic experiencing activities, sharing them in a mindful listening exercise and ultimately reenacting them in a "mindful" role play activity when they have the opportunity to apply the skills they have learned to the situation. The intention of these activities is to help teachers bring greater awareness to the physical sensations and mental processes associated with the triggering events and resulting emotions and to learn strategies to regulate them so they can respond to provocative situations thoughtfully, rather than reacting automatically. It also is intended to help teachers recognize habitual thought patterns or "scripts" that tend to reinforce reactivity. These are often inaccurate appraisals of student behavior that trigger anger and frustration. For example, teachers have a common tendency to assume a student's behavior is intentionally directed towards interfering with the teacher's instructional goals (e.g. disrespectful), rather than normal dysregulated behavior resulting from immaturity (Chang, 2009, 2013). The tendency to react in anger to such behavior tends to exacerbate the behavior, because students may feel unfairly attacked by the teacher and become defensive, reinforcing coercive cycles or power struggles and thus increasing teachers' stress and reducing their sense of teaching efficacy (for an extensive review article on this topic see Jennings & Greenberg, 2009).

Positive effects of CARE have been demonstrated in a number of empirical trials. Jennings, Snowberg, Coccia, and Greenberg (2011) first conducted two pilot studies to explore the effectiveness of the newly developed program. The first pre-post study (no control group), involving 31 elementary teachers from a low-performing urban school with high rates of poverty, showed teachers receiving the CARE training demonstrated greater mindfulness, as measured by the FFMQ, and the interpersonal mindfulness factor of the Mindfulness in Teaching Scale (MTS; Frank, Jennings, & Greenberg, 2015) and reported a reduction in the task-related hurry subscale of the Time Urgency Scale (TUS; Landy, Rastegary, Thayer, & Colvin, 1991) at posttest.

The second study was a pilot randomized controlled trial with educators working in suburban and semi-rural elementary schools. Investigators randomly assigned 43 participants (32 student teachers and 11 mentor teachers) to receive CARE (16 student teachers and 5 mentors) or a waitlist control group (16 student teachers and 6 mentors). The results of an ANCOVA suggested a significant treatment effect on Problems in Schools (PIS; Deci, Schwartz, Sheinman, & Ryan, 1981) motivating total score, suggesting that student teachers and mentors showed a more autonomy supportive orientation at post-test compared to those in the control group. This measure is based upon Ryan and Deci's (2000) self-determination theory that proposes that teachers' autonomy supportiveness promotes their students' intrinsic motiva-

Table 14.4 Constructs and measures used in Jennings et al. (2013)

Construct	Measure
General well-being	Positive and Negative Affect Schedule (PANAS), Watson, Clark, & Tellegen (1988)
	Emotion Regulation Questionnaire (ERQ), Gross & John (2003)
	Center for Epidemiological Studies Depression (CES-D), Radloff (1977)
	Daily Physical Symptoms (DPS), Larsen & Kasimatis (1991)
Efficacy	Teachers' Sense of Efficacy Questionnaire (TSES) Tschannen-Moran & Woolfolk Hoy (2001)
Burnout/Time pressure	Maslach Burnout Inventory (Educators' Survey) (MBI), Maslach, Jackson, & Leiter (1997)
	Time Urgency Scale (TUS) Landy, Rastegary, Thayer, & Colvin (1991)
Mindfulness	Five Facet Mindfulness Questionnaire (FFMQ), Baer, Smith, Hopkins, Krietemeyer, & Toney (2006)

tion. However, results from the study did not show significant differences between the treatment and control groups on the other outcome measures (e.g. FFMQ, MTS, TUS).

These studies were methodologically limited by the small sample sizes and the lack of random assignment in Study 1. However, the results suggest that CARE may be more useful for in-service teachers (rather than pre-service student teachers who have not yet been exposed to the stresses of the classroom alone) and for teachers in high-risk settings who face more occupational and personal stress.

CARE was evaluated more thoroughly in a randomized controlled trial with 50 public school teachers from urban and suburban settings (Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013). Elementary and secondary teachers were randomly assigned to CARE or a wait-list control group and assessed pre- and post-intervention on a battery of self-report measures to assess their general well-being, burnout, mindfulness and efficacy (see Table 14.4 for specific measures). Analyses of covariance were computed between the CARE intervention group and comparison group for each outcome, controlling for baseline scores, and effect sizes were calculated from unadjusted means as Cohen's *d* (Cohen, 1988).

Significant intervention effects were found on well-being, burnout, mindfulness and efficacy. More specifically for well-being, compared to controls, teachers who received CARE demonstrated an improvement in emotion regulation as measured by the ERQ. According to Gross and John (2003) optimal emotion regulation involves higher levels of reappraisal and lower levels of suppression. CARE teachers showed a significant increase in the *reappraisal* subscale of the ERQ. There was also a reduction in the *suppression* subscale score among CARE teachers, compared to controls; however it was only marginally significant. Also related to well-being, CARE teachers showed significant improvements in physical symptoms (DPS) associated with stress such as gastro-intestinal upset and aches and pains.

For efficacy, significant effects were found for TSSE total score, *efficacy in student engagement*, and *efficacy in instruction*. Regarding burnout/time pressure, significant intervention effects were found on the *general hurry* subscale of the TUS and the *personal accomplishment* subscale of the MBT. Finally, regarding mindfulness, significant intervention effects were found for the total mindfulness score on the FFMQ as well as the *observing* and *nonreacting* subscales. Reports from teachers assigned to receive CARE also suggested CARE was generally well received by them, and they felt it would be valuable for both teachers-in-training and in-service teachers.

While the results of this study suggest that CARE may promote various dimensions of well-being, emotional regulation via reappraisal, efficacy and mindfulness, and may reduce burnout and time pressure, there is no way to assess whether these effects would continue over time because data was collected at only two time points.

Most recently, researchers received a multi-million dollar grant from the Institute of Education Sciences (IES) to conduct a clustered randomized controlled trial on CARE (Jennings et al., 2017). The study involved 226 racially diverse teachers working in 36 different elementary schools in a high poverty areas (Bronx and Upper Manhattan) of New York City. It was the largest and most rigorous study on MIBs for teachers to date. It was the first to use advanced statistical analyses such as hierarchical linear modeling, which accounts for teachers nested within schools and students nested within classrooms (i.e. controlling for teachers and students in the same school/classroom having similar positive outcomes, not because of CARE but because of their school context). Furthermore, teachers' classrooms were observed and rated by research staff blind to the study aims and participants' group assignments, the study examined teacher outcomes at three time points over the course of 12 months and collected data on student outcomes (teacher reports pre-and post-intervention and school records for the intervention year and one year before and after the intervention).

A battery of self-report measures was administered immediately pre-intervention in the fall, immediately post-intervention in the spring and at a follow up period during the fall of the following year, approximately one year after the pre-intervention measurement. Teachers were randomized within schools to receive CARE or be in the wait list control group. Researchers conducted a series of factor analyses to reduce the number of assessments analyzed to those most theoretically and empirically relevant to the study. The resulting factors were *Mindfulness*, *Psychological Distress*, *Time Pressure* and *Teacher Efficacy* (see Table 14.5 for measures associated with these factors). The factor analyses found that the ERQ and two subscales of the MBI did not load well on any of these factors so these were analyzed by themselves.

Each teacher's classroom was observed two times at pre- and post-intervention by trained research staff blind to the study aims and participants' group assignment. Observers coded each classroom using the *Classroom Assessment Scoring System* (CLASS; Pianta, La Paro, & Hamre, 2008), which assesses the quality of interactions between teachers and students. The measure assesses these interactions based upon three domains each comprised of several dimensions: *Emotional Support* (positive climate, negative climate, teacher sensitivity, and regard for student perspective), *Classroom Organization* (behavior management, productivity, and

Table 14.5 Constructs and measures used for Jennings et al. (2017)

Constructs	Measures
<i>Mindfulness</i>	
Describing	Five Facet Mindfulness Questionnaire (FFMQ), Baer, Smith, Hopkins, Krietemeyer, & Toney (2006)
Non-judging	FFMQ subscale
Awareness	FFMQ subscale
Observing	FFMQ subscale
Non-reactive	FFMQ subscale
Interpersonal mindfulness	Mindfulness in Teaching Scale (MTS), Frank, Jennings, & Greenberg (2015)
PANAS – Positive	Positive and Negative Affect Schedule (PANAS), Watson, Clark, & Tellegen (1988)
<i>Psychological Distress</i>	
Depression	Patient Health Questionnaire 8-item Depression Scale (PHQ-8), Kroenke, et al. (2009)
Anxiety	Generalized Anxiety Disorder 7-item Scale (GAD-7), Spitzer, et al. (2006)
PANAS – Negative	Positive and Negative Affect Schedule (PANAS), Watson, Clark, & Tellegen (1988)
Sleep	PROMIS Sleep Disturbance Questionnaire, (Buysse, et al. (2010)
Emotional exhaustion	Maslach Burnout Inventory (Educators' Survey)(MBI), Maslach, Jackson, & Leiter (1997)
Perceived stress	Perceived Stress Scale (PSS), Cohen, Kamarck & Mermelstein (1983)
<i>Time pressure</i>	
Eating	Time Urgency Scale (TUS) Landy, Rastegary, Thayer, & Colvin (1991)
Speech	TUS subscale
General hurry	TUS subscale
Task-related	TUS subscale
Competitiveness	TUS subscale
<i>Efficacy</i>	Teachers' Sense of Efficacy Questionnaire(TSES) Tschannen-Moran & Woolfolk Hoy (2001)
<i>Emotion regulation</i>	Emotion Regulation Questionnaire (ERQ), Gross & John (2003)
<i>Physical symptoms</i>	Daily Physical Symptoms (DPS), Larsen & Kasimatis (1991)

instructional learning formats), and *Instructional Support* (concept development, quality of feedback, and language modeling).

Primary study outcomes at post-intervention were analyzed using 2-level Hierarchical Linear Models for continuous outcomes or 2-level Hierarchical Generalized Linear Models for count outcomes to account for the nesting of teachers within schools. Longitudinal analyses to examine the long-term effects of CARE and analyses of student data were preliminary and papers reporting the results were underway at the time of this writing and will not be reported here. Further analyses are also being conducted to examine potential mediators and moderators of the direct effects of CARE and will be reported in later publications.

The results showed that teachers receiving CARE reported increased mindfulness and improved adaptive emotion regulation (based upon the average of the two subscales of the ERQ, *reappraisal* and *suppression*, reverse scored) compared to the control group. Treatment group teachers also reported less time pressure and less psychological distress than control group teachers. Lastly, results showed that teachers receiving CARE scored significantly higher on CLASS observational ratings of dimensions of *Emotional Support* than control teachers (Jennings, et al., 2017). More specifically for the domain of *Emotional Support*, teachers were observed to be more sensitive to their students needs and perspectives (*teacher sensitivity*) and have classrooms where there were more emotionally positive interactions (*positive climate*) than controls. For the domain of *Classroom Organization*, teachers were observed to encourage greater *productivity* than controls. These results are particularly important because they show that CARE not only improved teachers' personal well-being and functioning, but also improved the overall quality of the classroom interactions associated with an optimal learning environment.

This study was the first rigorous investigation to show effects at the classroom level for a mindfulness-based program. The findings are particularly intriguing because the CARE curriculum does not include any content that specifically addresses pedagogy or classroom management. The program assumes teachers have teaching skills, but lack the ability to manage their emotion reactivity, which impairs their teaching efficacy. CARE activities focus on helping teachers self-regulate in the midst of challenging situations, but do not provide instruction on specific classroom management or instructional strategies.

The study also marked the field's most empirically rigorous design and analyses to date, and it greatly strengthened the confidence in MIBs as worthwhile interventions for addressing teachers' occupational stress and performance. An examination of the longitudinal outcomes, student outcomes, and possible moderators and mediators will provide additional confidence in CARE as an effective intervention to reduce teacher occupational stress and improve performance. These analyses will also help us better understand the mechanisms that underlie the main effects providing information on how CARE and other MBIs might be refined to improve feasibility and effectiveness.

The studies reviewed here all included an evaluation component to assess the CARE's acceptability and the training and facilitator quality and training fidelity. In every case, teachers reported high levels of satisfaction with the training and the trainings were delivered with high degrees of fidelity. Furthermore, during the most recent study, teachers' home practice throughout the training period was assessed and their participation, attendance, and level of engagement in each program session were evaluated. Data was also collected at each of the three time points on what practices the teachers were engaging in that might be similar to CARE. Future analyses of these data will explore how these variables relate to CARE's direct effects on teachers, classrooms, and students.

14.3.3 Summary

Early investigations of MBIs for teachers explored how training teachers in meditation practices led to changes in stress and well-being through pilot studies, pretest-posttest, and quasi-experimental designs. These studies were also interested in examining the feasibility and acceptability of MBIs to determine if teachers would be motivated to continue using mindful awareness practices on their own outside of the formal training sessions. These preliminary studies showed that MBIs were feasible for use in educational settings and were acceptable to teachers.

With the development of MBIs designed especially for teachers came a trend toward more empirical rigor in their evaluation and the studies began to employ more experimental designs and advanced statistical procedures such as hierarchical linear modeling. The results of these studies continued to show positive effects of MBIs for teachers, although the research lacked evidence of lasting effects. Most recently, a large cluster randomized controlled trial of a large sample of teachers has demonstrated CARE's promise for reducing teachers' occupational stress and improving classroom environments. Future analyses of these data have the potential to fill gaps in the current literature by examining long-term effects and potential mechanisms that underlie these effects.

14.4 Limitations and Future Directions

The limitations of the current body of work on mindfulness programs for teachers are worth noting. As is the case for the mindfulness research field in general, there are a number of gaps in the research literature (Davidson & Kaszniak, 2015; Dimidjian & Segal, 2015). Most of the studies reviewed here relied on small samples and did not examine the long-term effects of the MBIs on teachers' occupational stress. Generally studies employed a limited range of outcomes measured and only the recent CARE study examined outcomes associated with teacher job performance. None of the studies reviewed here examined the effects of intervention with teachers on student outcomes, although the CARE research to examine this is underway. A critical limitation is the lack of examination of potential moderators and mediators of effects. Understanding for whom and under what conditions intervention efforts are most successful and understanding the mechanisms of change are critical to refining MBIs for teachers to become viable professional development programs for the prevention and reduction of occupational stress.

Most of the aforementioned studies relied primarily on self-reported measures of stress and well-being. Social desirability, reliance on recall, and the influence of other biases may have played a role in teachers' reports of their own psychological improvements. This is particularly an issue with measures of mindfulness for assessing the effects of a MBI. Since participants are instructed in new language for

describing their experience, this may affect how they respond to such questionnaires (Davidson & Kaszniak, 2015).

While measurement limitations were consistently an issue in the research reviewed above, several studies applied multi-method approaches to address the limitations of self-report including measuring physiological indicators of stress, task-based laboratory measures of behavior, and observational measures of teachers' performance. Measuring physiological changes such as cortisol levels or blood pressure may provide a more objective assessment of teacher stress and well-being. Roeser et al. (2013) examined physiological indicators of stress, but significant intervention effects were not found. This could be due to the small sample size and/or frequency of measurement, since cortisol collection was limited to only one day, which may have impaired the reliability of this measure.

The CEB evaluation used behavioral tasks to measure emotional awareness, hostility and compassion in the context of real time interpersonal interactions, which were targets of the intervention (Kemeny et al., 2012). The most recent CARE study examined the observed quality of teachers' interactions with their students (Jennings et al., 2017). The physiological and behavioral (task based and observed) outcome data lend support to the case that MBIs may not just change participants' thoughts and perceptions of stress, but also their physiological reactivity and interpersonal behavior, which is particularly important for teachers who are constantly interacting with others. Future studies should aim to measure similar outcomes related to teaching and learning.

Researchers and program developers are examining alternative models of program delivery, which may boost the impact MAPs may have on physiology. For example, a recently published study examined the feasibility and efficacy of a brief, daily MBI presented to middle school teachers for 20 minutes before school four days per week for 16 weeks (Harris, Jennings, Katz, Abenavoli, & Greenberg, 2015). Two middle schools were randomly assigned to intervention or wait-list control and 64 educators (42 teachers, 22 paraprofessionals, learning support, etc.) from these schools were recruited to participate in the study ($n = 34$ intervention, $n = 30$ control). Results of a series of analyses of covariance showed significant intervention effects on blood pressure (BP), and cortisol awakening response (CAR). While teachers in the control school showed blunted CAR at post-intervention assessment, the treatment teachers maintained a healthy CAR pattern suggesting that the intervention protected teachers against the cumulative negative effects of occupational stress on CAR. Similar to other studies, significant treatment effects were also found on mindfulness (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) positive affect (PANAS; Watson, Clark, & Tellegen, 1988), efficacy for classroom management (TSSES; Tschannen-Moran & Woolfolk Hoy, 2001) distress tolerance (measured by the Distress Tolerance Scale; Simons & Gaher, 2005), and physical symptoms (DPS; Larsen & Kasimatis, 1991). Furthermore, program participants showed high degrees of satisfaction and engagement. While the study was limited by the small sample size and quasi-experimental design it demonstrated the feasibility of offering regular daily MAPs to teachers in their work setting and preliminary evidence of promise. The results also suggest that to affect diurnal patterns of

cortisol requires more consistent daily practice. Future research should examine such programs in the context of more rigorous studies.

Researchers should also explore other measurement strategies that are just beginning to be applied to studying teachers in the context of their working day. A number of new and innovative methods that involve momentary assessment are showing promise for refining our understanding of teachers' occupational stress and how best to craft our intervention efforts (Carson, Weiss, & Templin, 2010; Cross & Hong, 2012; McIntyre et al., 2016).

Another critical limitation of the current research is that most of the samples were self-selected. This may limit the generalizability of their results to teachers without a predisposed interest in learning mindfulness. The issue of teachers' motivation to engage in a mindfulness intervention is one to consider for administrators seeking to implement school- or district-wide mindfulness programs for all teachers, as it is possible that the programs may only benefit those motivated to receive them. This is a common concern for all new professional development programs because one's level of intrinsic motivation to engage in any activity typically leads to improved performance and prolonged engagement (Ryan & Deci, 2000). Future studies can more closely investigate how motivation to enroll in a MBI is related to outcomes.

A similar point is the issue of teachers' motivation and willingness to independently engage in mindfulness practices beyond the duration of the program. The studies that tracked teachers' independent practice of mindfulness techniques found a wide range of reports in how often teachers practiced on their own. The reason why some teachers practiced more regularly was not specifically investigated in these studies, but possible reasons for the differences in practice could be related to variability in the teachers' time availability, family dynamics, dispositional characteristics, or a host of other factors. It would be worthwhile for future studies to investigate teachers' motivation to engage in mindfulness practices, barriers that limit practice, and how frequency of practice relates to improvements in well-being.

Finally, in addition to the challenges faced by the mindfulness research more generally (Davidson & Kaszniak, 2015; Dimidjian & Segal, 2015), researchers conducting trials in schools must perform research within the constraints of educational settings which pose their own methodological challenges. Many of the early studies on MBIs for teachers employed pretest-posttest designs, which contain numerous threats to validity. Others used random assignment and waitlist controls, which begins to mitigate threats to validity by distinguishing treatment effects from maturation or other effects. However, all but the most recent CARE study did not account for the nesting that is inherent in educational settings (e.g. teachers nested within schools and students nested in classrooms). However, it is promising that Jennings et al. (2017) found significant effects on teachers and classrooms when utilizing advanced statistical methods (HLM) that accounted for the teachers and classrooms nested within schools.

Encouragement can also be found in IES's funding of a large-scale evaluation of a MBI for public school teachers. As mindfulness becomes increasingly popular in Western culture, its presence in public settings is receiving a warmer response than what may have been the case decades ago. Continual funding of MBIs and rigorous

evaluation studies will expand the research base on mindfulness in teaching and provide greater accessibility to interested teachers.

The field of mindfulness in education and mindfulness for teachers has experienced rapid growth in the last 15 years, and public interest in MBIs continues to grow. The research base supporting MBIs for teachers is also growing and developing greater rigor. The present chapter tracked the evolution of the field to demonstrate mindfulness training for teachers is a promising approach for reducing stress and burnout while improving well-being.

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Chapter 15

Individual-Organizational Interface (IOI) Interventions to Address Educator Stress

Raymond Randall and Cheryl Travers

Abstract In this chapter we discuss the wide variety of interventions that can be used to achieve a better fit between educators, the demands they face and the resources available to deal with those demands. Individual-Organizational Interface (IOI) interventions often involve collaborative problem-solving and educator capacity building activities that help workers to meet or to change work demands. These interventions are based on solid theoretical foundations and appear to offer the potential to address a number of the stress-related problems commonly encountered by educators. Unfortunately, there is a limited amount of good quality intervention research and very few rigorous evaluation studies of IOI interventions that directly target educators. In this chapter we draw upon what evidence there is in an attempt to summarize the type of IOI interventions that appear likely to be of benefit to educators. We highlight the wider research on some IOI interventions that have been used within other contexts in order to tackle the types of stressors commonly reported by educators. We discuss future avenues for research and identify the practical applications of existing research findings for those currently working as educators.

Keywords Educator stress interventions • Collaborative problem-solving • Mentoring • Teamwork • Classroom management

15.1 Definitions of Individual-Organizational Interface (IOI) Interventions

There is a growing body of good evidence that can be used to design intervention to tackle educators' experience of stress. The validity of several models and theories of work stress is well-established: interventions developed from these strong theories should therefore have a good chance of success. In this book, the different types of

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interventions are defined according to their target. Organizational-level interventions target exclusively features of the work being carried out, for example through adjustments to work demands or workers' level of control over the planning and execution of work (Ivancevich, Matteson, Freedman, & Phillips, 1990). Individual-level interventions target the educator, for example, by changing the way they evaluate the demands they face or by helping them to develop a broader repertoire of coping skills. Another type of intervention is designed to deliver its active ingredients at the point where the demands faced by the worker *interact* with their capacity to respond to such demands. These are individual-organizational interface (IOI) interventions.

Several specific examples of IOI interventions and their active ingredients are provided by Giga, Noblet, Faragher, and Cooper (2003). They describe these interventions as being delivered and working at:

...the interface between the individual and the organisation and encompasses role issues (e.g., role conflict and ambiguity), relationships at work, person-environment fit and employee involvement in decision-making. Examples of specific individual-organisation level strategies include co-worker support groups, role feedback and clarification mechanisms and participatory decision-making programs. (p. 159)

Ivancevich et al. (1990) summarized IOI interventions as *processes* that improve three different aspects of fit between the worker and their work environment. These types of fit are: the fit between the demands of the job and the individual worker's own personal working style; the fit between the worker's preferences for participation in decision-making and practices in the organization that allow and encourage such participation; and the fit between the worker's preferences for autonomy and the working practices that provide autonomy. Given these objectives it is common to find activities in this type of intervention that capture employees' expertise and preferences as part of the process of maximizing different aspects of fit.

The active ingredients of IOI interventions are congruent with various well-established theories of work-related stress. These interventions can impact positively on the work characteristics that are core elements of *structural theories* of work-related stress (e.g. the Demand-Control-Support model; Johnson & Hall, 1988; Karasek & Theorell, 1990). They can also change the way that individuals transact with their working environment by changing how educators appraise and respond to their working conditions – and to how they evaluate the effectiveness of these responses (Richardson & Rothstein, 2008). *Transactional theories* of work-related stress indicate that altering psychological appraisals of work and the relative efficacy of different coping responses can lead to positive feedback loops in which more positive appraisals of working conditions lead to better choices of action in response to challenging situations (see Lazarus & Folkman, 1984). Drawing on the more recent Job Demands-Resources theory (Bakker & Demerouti, 2007; Tetrick & Winslow, 2015), the effectiveness of IOI interventions may be underpinned by several concurrent working mechanisms that influence educators' perceptions of the demands placed upon them, and the resources available to them to meet those demands. IOI interventions can work by providing opportunities for employees to protect, enhance or make better use of their job resources (through increased

perceived support, control, feedback and autonomy) and personal resources (e.g. through developing work-related skills and self-efficacy). These interventions can also help educators to better manage job demands (such as high workload) and to reduce demands that hinder effective work performance (e.g. role ambiguity and conflict at work).

Naturally, IOI interventions come in various forms, but are usually characterized by clusters of problem-solving activities that can also be effective by building employees' capacity to meet work demands. One example discussed later in this chapter is training in classroom management techniques (Ford et al., 2012; Hansford et al., 2015), many of which are intended to develop educators' self-efficacy. Given their objectives, it is not surprising that IOI interventions are often carried out over medium-to-long-term timescales of at least several months and that these usually take longer to deliver and implement than many individual-level interventions.

There are many possible ways of achieving the objectives of IOI interventions, but it is possible to identify several common features of this type of intervention activity. These features include actions and activities designed to provide workers with access to regular opportunities for discussing work issues with colleagues and mechanisms for understanding, influencing and managing work demands and resources. In the educator stress intervention literature it is not uncommon to see several of these features delivered within multi-modal interventions alongside both individual- and organizational-level interventions (e.g. Jesus & Conboy, 2001).

IOI interventions have at least three possible working mechanisms (see Nielsen & Randall, 2012). All of these mechanisms are linked to positive changes in working conditions or reductions in organizational stressors:

1. The *process* of engaging in IOI activities such as structured discussions with co-workers or collaborative personal development and problem-solving activities is a beneficial intervention in itself.
2. The *outcomes* of the processes described in point 1 (above) such as changes or improvements to work practices and personal psychological resources subsequently have a positive impact on educator well-being.
3. These interventions stimulate the educators themselves to *enact further on-going changes to their own working practices* and working conditions.

IOI intervention processes may follow predictable protocols (the first mechanism), but the actions and changes that emerge from them (the second and third mechanisms) are less easy to anticipate and document. This means that it is not always easy to use conventional evaluation methods to determine the effects of such complex and multifaceted interventions.

In the first working mechanism, intervention design and delivery processes include activities that can help to ameliorate the demands placed on the individual and provide them with important psychological resources (Bakker & Demerouti, 2007). For example, an educators' involvement in mentoring (Smith & Ingersoll, 2004), or in participative problem-solving activities, (Tunnecliffe, Leach, & Tunnecliffe, 1986) can open up better access to instrumental, informational and

emotional support. In the second and third mechanisms intervention-related activities *lead to* changes in stress-related work characteristics. For example, these activities can lead to more opportunities for accurate and timely feedback on work performance, and could lead to the development of new working practices that allow participants to influence work demands and achieve better levels of control (Murta, Sanderson, & Oldenburg, 2007; van der Heck & Plomp, 1997). All of these changes to work characteristics have been shown to have the potential to alleviate stress and enhance employee well-being and motivation (Tetrick & Winslow, 2015).

Depending upon the nature of the intervention, a fourth working mechanism, *personal development*, may also be activated. IOI interventions sometimes also include (or help to stimulate involvement in) personal development activities that improve the fit between the individual and their work situation. These activities allow the individual to manage differently the interface between their personal capabilities and various work demands. For example, training in classroom management skills can help to increase educators' capacity to deal with challenging situations while at the same time helping them to reduce the future likelihood and severity of such situations (Dicke, Elling, Schmeck, & Leutner, 2015). These interventions can help employees adjust the way they approach work demands in ways that help to reduce their exposure to common sources of stress (Prilleltensky, Neff, & Bessell, 2016).

The diversity of IOI intervention practices means that multiple *active ingredients* can usually be identified and the effects of each are difficult to disentangle. IOI interventions can be used to simultaneously enhance personal psychological resources (e.g. by improving self-efficacy) increase challenge demands (e.g. increased variety at work) and social support, and to help to reduce hindrance demands (e.g. reducing exposure to difficult or time-consuming interactions with colleagues, pupils or parents). Furthermore, different individuals involved in the same intervention may benefit from it in different ways according to their own specific needs and the extent to which they choose to engage with each component of the intervention, but this diversity of experience is rarely examined in intervention research (Nielsen & Randall, 2012).

While these features make IOI interventions challenging to evaluate, they also make them particularly suitable when the sources of stress are not easily identified, vary from one individual to another or when off-the-shelf tried-and-tested solutions are unavailable. They offer an adaptable and responsive way of developing effective interventions when workers' expertise is needed to find a solution or when the sources of stress are likely to change or develop over time (e.g. as classroom environments become more challenging or difficult). As LaMontagne et al. (2007) pointed out, some IOI intervention components might work by helping educators to prevent or reduce their exposure to stressors. For example, groups involved in sharing and developing classroom management techniques might find ways of identifying and addressing the underlying causes of pupils' disruptive behavior in classrooms, or may find innovative ways of reducing the workload associated with the assessment of student learning. Other components can work by providing educators with ways of reducing the intensity and duration of the stress response. For example, these interventions can help workers by providing them with a reliable and

quick way to access good levels of emotional, or instrumental, support from colleagues, or to re-think the meaning, or causes, of pupil behaviors (Prilleltensky, Neff, & Bessell, 2016).

15.2 The Suitability and Popularity of IOI Interventions in Educational Settings

It is clear that the working mechanisms and active ingredients of a number of IOI interventions are consistent with well-established theories of work-related stress. It is also easy to see the potential for many of the IOI interventions already mentioned in this chapter to be implemented within educational settings. A review of the intervention literature shows that there are some interesting and varied examples of IOI interventions being used to tackle educators' stress. However, compared to individual-level interventions examples of IOI interventions are relatively rare (Education Support Partnership, 2014, Bricheno, Brown, & Lubansky, 2009).

The high level of worker involvement in the development and implementation of many IOI interventions means that intervention activities are unpredictable. As a result managers may be uneasy about the disruption to everyday work practices associated with intervention activities. It may also reflect managers' preferences for individual-level approaches based on the perception that the content of these interventions is convenient to deliver (e.g. through buying in expert-led delivery). These interventions place the onus on the educator to change the way they respond to stressors that some stakeholders may see as an unavoidable part of the job (e.g. dealing with disruptive pupils). IOI interventions require a medium-to-long-term commitment to intervention activities. School managers may hold the perception that intervention processes (e.g. meetings and discussions) get in the way of educators meeting important everyday work demands. There is also extensive evidence regarding the short-term efficacy of individual-level interventions particularly when self-reported measures of health are used as evaluation criteria (see Chap. 14). However, there are questions about whether these effects are sustained in the long-term (Richardson & Rothstein, 2008). IOI interventions have the potential to bring about *long-term* sustainable structural changes well beyond the initial intervention period and increase educators' personal psychological resources. Compared to individual-level interventions, these interventions are also less likely to be interpreted as a signal that individual educators' psychological capacity for dealing with stress is the root cause of their distress. Instead the focus is on reducing educators' exposure to the sources of stress found in the school environment.

IOI interventions can be particularly useful in educators' workplaces because they can be used to target the types of chronic organizational-level problems frequently identified by educators themselves. Using the European Trade Union Committee for Education survey, Billehøj (2007), identified high workload, intense work, role overload, poor pupil behavior and lack of management support as being particularly widespread, and of a serious nature, in a range of educational settings.

In an extensive discussion of the literature on teacher stress Prilleltensky, Neff and Bessell (2016) identify several examples of IOI interventions that can be used to tackle stressors at the personal level (e.g. educators' sense of isolation and the difficulties they experience when managing students), the interpersonal level (e.g. interactions with colleagues) and at the organizational level (e.g. lack of role clarity and empowerment). Surveys in the Higher Education sector regularly report problems such as the poor management of change, long working hours, lack of role clarity and inadequate management support (e.g. Kinman & Wray, 2013). These problems might also be considered to be natural targets for top-down organizational-level work-redesign interventions (see Chap. 16). However, contemporary theories of stress underline the importance of considering the ways in which employees may be empowered and encouraged to take action themselves to influence their work situation in order to effect changes that are suitable for them (Mark & Smith, 2008). These participatory processes are common features of many IOI interventions and can contribute to their effectiveness (Elo, Ervasti, & Mattila, 2008). This is because high levels of worker involvement the intervention process allows for the identification of workable solutions and enhances worker commitment to the implementation of solutions (Nielsen & Randall, 2012).

15.3 Examples of IOI Interventions in Educational Settings

Several organizations that have studied the causes and consequences of educator stress have published material that refers to the potential effectiveness of IOI interventions. For example, in its recommendations for action on teacher stress the European Agency for Safety and Health at Work (2008) describe actions such as: encouraging collaborative problem-solving, implementing mentoring networks and peer support systems, developing educators' capacity to meet challenging work demands (e.g. training in classroom management techniques), the use of formal routes for delivering feedback on performance and discussing the requirements of the role and teambuilding interventions. Advice for teachers published by the American Psychological Association (2016; see <http://www.apa.org/ed/schools/cpse/activities/class-management.aspx>) detail the importance of personal organization and classroom management techniques as ways of dealing with stressful situations. Prilleltensky, Neff, and Bessell (2016) identify a wide range of potentially effective IOI level interventions including the use of peer support and mentoring networks, the development of effective classroom management techniques and the implementation of participatory decision-making processes. These various recommendations from reputable organizations and knowledgeable researchers appear to be consistent with the central tenets of well-validated theories of work-related stress. The recommendations are focused on the features of educators' jobs that feature in structural theories of work-related stress (e.g. demands, control and social support) and the development of personal resources that feature in transactional and resources-based theories.

The complex and multifaceted nature of IOI interventions means that they are not easily categorized and, as a consequence, it is difficult to draw conclusions about their generalizable effects. For example, training in classroom management techniques may be a core component of an intervention package. This type of intervention often also involves facilitated group discussions and expert advice / input. Therefore, other active ingredients such as peer support and mentoring may also be present. Trials of the widely used “Incredible Years” intervention (Ford et al., 2012) integrate elements of peer support and the development of psychological resources (e.g. self-efficacy) with the use of different classroom management strategies. In the following section we describe intervention content and highlight both the core components and the other likely active ingredients. We will consider the following types of IOI intervention: collaborative problem-solving; mentoring support and induction; developing educators’ classroom management capabilities; performance-related feedback; and teamwork interventions.

15.3.1 Collaborative Problem-Solving

Interventions that stimulate collaborative problem identification and establish systems of consultation before and during organizational change have a reasonable track record of enhancing employees’ perceptions of control and support, their self-reported well-being, job satisfaction and, in some studies, work performance in a range of work settings outside of the educational context (Elo, Ervasti, & Mattila, 2008, Heaney et al., 1993). Approaches such as Participatory Action Research (PAR; see Elo et al., 2008) involve workers collaborating with each other and external experts to identify the sources of stress they are facing and then developing and implementing action plans to tackle them. This might take several forms depending upon the nature of the problems to be tackled. Difficult, organization-wide problems might be tackled through the formation of problem-solving committees, or steering groups made up of employee representatives. More localized issues might only involve input into the problem-solving process from employees who are experiencing the problem. Typically, these problem-solving groups meet with a specific agenda on several occasions (though often no more than four to five times for at most a few hours each meeting). The process is often facilitated by an external consultant with experience in implementing participatory activities. In successful processes a small number of knowledgeable, experienced and well-respected employee volunteers manage a process through which they identify and agree upon the core problems, plan solutions and monitor the implementation of solutions. Their work may also involve conducting research (e.g. surveys) to collect information from those outside of the group. Whatever the specific activities involved, those with good knowledge of the stressful environment can design, and set in motion, specific activities that target the sources of work-related stress. Very often this involves workers from a range of different functions and levels of seniority so that different perspectives shape the design of the intervention. Such interventions

require support from senior management so that the members of the problem-solving groups feel adequately supported and motivated during the process (Nielsen, 2013). One commonly cited advantage of this approach is that it makes good use of educator expertise to resolve stressors that are ‘designed into’ work systems or process. These active ingredients are well summarized by Tunnecliffe, Leach, and Tunnecliffe (1986):

This is done by providing a framework for intervention, by teaching a set of generalized, problem-solving skills that can be applied to a variety of specific issues, and by encouraging the development of a staff support system that allows teachers to share resources, give feedback to each other, provide mutual reinforcement, and become actively involved in decision making. (p. 129)

Naturally, the actions that emerge from these processes vary from one context to another, but examples include the re-organization of workload, or the implementation of new processes for delivering frequent and accurate performance feedback (Randall & Nielsen, 2010). It is notable from research carried out in various work contexts that when these interventions have led to reductions in employees’ self-reported symptoms of work-related stress (e.g. psychological distress) participants often report enhanced levels of control over decision-making and the opportunities they have to use their skills at work. These work characteristic that appears to be significantly influenced by collaborative problem-solving activities (Bond, Flaxman, & Loivette, 2006).

An example from educational settings is “Collaborative Behavior Consultation” (Tunnecliffe, Leach, & Tunnecliffe, 1986). This intervention involves educators identifying, sharing and implementing good practice to deal with the type of organizational stressors identified in structural, transactional and resource-based models of stress. In their study, group problems-solving meetings facilitated by a consultant were used as a vehicle for organizing and shaping discussions around ways of dealing with stressors. Their intervention was implemented in an Australian primary school setting where expert consultants worked closely with the entire teaching staff of a school ($n = 7$) to identify stressors and to develop practicable solutions to organizational stressors. Weekly meetings were held over a five-week period. During these meetings teachers worked with each other and the consultant to develop ways of solving problems that would reduce their exposure to stressors by changing their work environment, the way they interacted with colleagues and dealt with work tasks. After some consultant-facilitated rehearsal during the meetings, interventions were implemented by the staff in the work setting. An important factor in this, and many other, successful IOI interventions was senior management support for the intervention: the school principal committed to a contract to support the implementation of the interventions developed by the teachers. The intervention led to the development of a set problem solving methods that could be applied by individual teachers to manage better the demands they faced (specific details of these were not provided by the authors). The authors note that the way that the intervention was delivered (i.e. the involvement of all teaching staff in structured collaborative meetings) allowed participants to share teaching resources, provide mutual feedback and reinforcement and supported involvement in decision-making. Therefore

the intervention had at least three active ingredients: educators were able to reduce their exposure to organizational stressors, exerted more control over their working practices and had access to significantly improved support mechanisms. Recent research shows that such multifaceted approaches to the reduction of several linked organizational stressors tend to have a larger impact on employee health than those focused on any single specific stressor (Montano, Hoven, & Siegrist, 2014). Although tested on a small sample, the CBC study included control schools (relaxation training and waiting list). Results from a questionnaire survey showed that those involved in CBC reported significant reductions in the sources of stress commonly reported by teachers immediately after the intervention and at a three-month follow-up. Before the intervention the three groups reported similar levels of stressors and there was little change in the other two schools. These strong study design features are extremely rare in stressor reduction intervention research.

Schaubman, Stetson, and Plog (2011) describe a collaborative problem solving (CPS) intervention where external experts in pupil behavior worked closely with teachers to discuss problems faced by 7th and 8th grade students in the U.S. who regularly experienced difficulties in fully engaging in the classroom environment. These discussions focused on how teachers could identify students' lagging skills in order to help them solve problems (e.g. lack of the skills needed to engage in classroom activities) that might be underpinning disruptive classroom behavior. This intervention focused on developing effective collaborative working relationships between teachers and other professionals (e.g. psychologists), and the schoolchildren themselves, to formulate stress reducing changes to their work activities. From the description given the intervention could enhance teachers' personal and organizational resources and reduce some hindering demands (e.g. the need to deal with frequent disruptive classroom behavior). Teachers received two days of training (12 h total) and then were supported by weekly meetings with psychologists (75 min each) to discuss how to implement it effectively with specific students. For this intervention, the level of external expert consultation and support was particularly frequent and the level of resources required for such an intervention may be one reason why the sample size (in this case eight teachers) is small in many studies. The intervention with children consisted of three parts. First, teachers identified the skills that were lagging. Second, they prioritized the problems to be solved (e.g. the problems that required the teacher to work collaboratively with the child to help them learn new skills). Third, they worked with the child to agree plans of action to help solve the problem. Importantly, in this intervention, teachers were evaluated on the extent to which they implemented the principles of the intervention in their own classroom practices – and it was found that only five of the eight teachers involved were fully implementing CPS. This left a very small sample size for an analysis that did reveal some significant changes in problematic pupil behavior and associated lower levels of teacher-reported stress. However, with such a small sample it is not possible to reliably estimate the intervention effect size.

These types of collaborative interventions are surprisingly rare in the research literature on stress reduction interventions in educational settings. Expert-facilitated group discussions that have the goal of identifying stressors and practical solutions

are mentioned in several published stress reduction interventions (see Naghieh, Montgomery, Bonell, Thompson, & Aber, 2015). However, the exact content, outcomes and impact on teacher stress of these activities is difficult to determine given the lack of detail within the articles. For example, Wu et al. (2006) identify intervention components such as changes to the physical workspace, flexible work schedules and the re-design of work tasks that resulted from actions stimulated by the feedback of staff survey results which identified the existence of work stressors that were being experienced by many of those who had completed the survey. These interventions were delivered alongside individual-level stress management training interventions in a randomized cluster control study in China that included a 12-month follow-up. This is one of the few intervention studies conducted with a large sample (control group $n = 502$ across four schools; intervention group $n = 459$ from four different schools). Modest, but positive, changes were found in teachers' responses to the Occupational Stress Inventory (these included improvements in the physical work environment and some role-related stressors) and the Work Ability Index questionnaire (which measures the extent to which workers feel their work performance is impaired in some way). One problem with this type of research is that the details of the content of the intervention (e.g. how the problem-solving process was conducted) are not always reported in enough detail to support replication (Naghieh et al., 2015).

15.3.2 Mentoring Support and Induction Programs

Mentoring networks and peer support systems can help employees to enhance emotional and instrumental support at work and to develop the skills needed to meet work demands. Some form of mentoring activity appears within many IOI interventions used in educational settings. Its place in induction programs has been widely recommended as a means of preventing shock associated with experiencing the marked differences between teacher training and classroom teaching and subsequent early exit from teaching professions (Prilleltensky, Neff, & Bessell, 2016). These interventions are designed to help teachers develop knowledge, skills and strong working relationships, but also their own confidence in their ability to achieve successful outcomes (i.e. self-efficacy). Therefore, mentoring appears to be a particularly important component of interventions for novice teachers (Smith & Ingersoll, 2004). Many individually oriented stress management training programs include IOI-type sub-components such as the structured sharing of professional experiences and information about how teachers can proactively manage their environment (e.g. Jesus, Rus, & Tobal, 2011; Żołnierczyk-Zreda, 2005).

It appears that for that successful interventions of this type involve both the transmission of knowledge about teaching tasks and the specific demands of working in the wider educational environment (e.g. how to work with administrators). Other important features include the opportunity to work with a mentor from the same field of expertise, collaborative working with other teachers (e.g. shared lesson

planning time), instructional seminars, reduced workload (e.g. fewer classes or classes to prepare) and help with developing communication links with parents and non-academic school staff (Prilleltensky, Neff, & Bessell, 2016; Smith & Ingersoll, 2004).

Direct measures of educator well-being are infrequently used to evaluate the effectiveness of these interventions. It can be argued that indirect measures such as teacher turnover offer a reasonable proxy measure of the experience or work-related stress. Teachers who experience frequent and strong negative emotions at work may be more likely to seek employment elsewhere. Several large scale studies have shown there to be a relatively large positive impact of well-designed induction and mentoring on the retention of those entering the profession (Smith & Ingersoll, 2004). In a study of over 3,000 U.S. teachers in their first year in the profession in 1999–2000 Smith and Ingersoll (2004) found that 40% of beginning teachers who reported no induction supports left the profession or moved to another school. In comparison the figure was only 18% for those who reported receiving eight induction supports (e.g. mentoring, collaboration with others on work tasks, seminars aimed at beginning teachers, a mentor from the same field, shared lesson planning time etc.). It is worth noting that turnover behavior is complex and is likely to be affected by a wide range of variables in addition to work-related stress including the prevailing state of the labor market (Breukelen, Van der Vlist, & Steensma, 2004).

Interventions containing very high levels of emotional support may have some potential drawbacks. Beehr et al. (2010) found that high levels of unwanted concern from colleagues and frequent discussion of work stressors by colleagues can be perceived as a stressor when these are unwanted and may undermine workers' confidence in their own ability to do the job. Such findings indicate that educators should be given the opportunity to tailor their access to mentoring support to meet their individual circumstances and needs.

15.3.3 Developing Educators' Classroom Management

Developing teachers' capacity to work more effectively with pupils, parents and colleagues is a feature of many intervention studies. Classroom management is an umbrella term for variety of teaching practices that can be used to maintain an orderly classroom, decrease disruptive behaviors and increase the proportion of time students spend on their academic work. It refers to a wide range of actions that educators can take to shape the teaching environment in such a way as to help students develop across academic, social and emotional domains (Evertson & Weinstein, 2006). Interventions include training to organize the physical workspace and teaching support materials so that classroom activities are well-planned and run smoothly (e.g. the American Psychological Association Classroom Management Modules). Much of the informal literature and advice for stressed educators (e.g. Botwinik, 2007) advocates this type of intervention as an effective means of alleviating stress. For example, better classroom management may help educators focus

on teaching students social and emotional skills that allow them to fully engage in classroom activities, thus helping them to reduce problems with pupil behavior (Schaubman, Stetson, & Plog, 2011). Other interventions teachers can use include the use of clear and enforceable classroom rules, enlisting the support of other professionals (e.g. psychologists) when pupils present with serious problems and the consistent and unambiguous consequences when pupils engage in disruptive behaviour.

Despite their potential for reducing significant work stressors including hindering demands, workload, emotional strain, and dealing with conflict, staff training and development activities are rarely implemented and evaluated as stress-reduction interventions. Research on the use of these interventions with educators tends to focus on measuring improvements to teacher effectiveness. However, there are some good studies including randomized control trials that also show their impact on stress-related outcomes such as emotional exhaustion and quality of sleep over a period of several months (Dicke et al., 2015).

The most common interventions focus on developing proactive (as opposed to reactive) teaching practices and the use of proven effective techniques for the management of classroom conflict and pupils' disruptive behavior. Research carried out with strong study designs and large sample sizes has shown that proactive classroom management techniques have been found to be linked to lower levels of stress among Australian primary school teachers (Clunies-Ross, Little, & Kienhuis, 2008). Interventions are often designed to provide participants with the knowledge, skills and sense of mastery of tasks to manage their experiences differently and in a way that is beneficial to students, but that also protects their own well-being (by making the teaching experience less stressful and more fulfilling). A key ingredient of many of these interventions is that participants build their psychological resources (e.g. self-efficacy and sense of control) by actively practicing their new skills in the classroom between intervention sessions. They then reflect on their experiences with trainers and other participants at the subsequent intervention sessions.

Dicke et al. (2015) used a version of an established intervention (the Classroom Organization and Management (COMP) program) to test its impact on the well-being of 36 new teachers (a group for whom lack of student discipline is often a significant source of stress) entering into various teaching roles in Germany. The COMP program involved the teachers in very active and participatory intervention activities (e.g. group discussions, group projects and role plays) to examine a range of components of effective classroom management. For example, some of these activities centered on the identification of behaviors associated with good classroom organization, the appropriate use of classroom rules and procedures and for dealing with problematic pupil behavior (in total there were seven sessions lasting a total of two-and-a-half days). In contrast to many studies of stress reduction interventions, changes in the well-being of this group were compared with those observed in a no-intervention control group and to a comparison group receiving stress management training. Self-report measures of emotional exhaustion, quality of sleep and rumination all showed the intervention to have significant, modest and positive effects that were maintained after 12–14 weeks. These effects appeared to have been underpinned by significant

changes in teachers' knowledge of classroom management, their self-efficacy, achievement of their teaching goals, and positive feedback from colleagues – even if the number of classroom disturbances did not change significantly.

A well-known educator development intervention package is the “Incredible Years Intervention” aimed at those working with children up to 13 years-old (Webster-Stratton, 2006). An example of the implementation of this intervention, the Supporting Teachers and Children in Schools (STARS project), involves six whole days of intervention activity delivered over a six month period (Ford et al., 2012). In common with other IOI interventions that have improved educators' well-being it is delivered in a very collaborative and active way. Experts in children's behavior problems, and social, emotional and academic competence work with groups of ten teachers in which participants share and discuss their experiences of classroom management and are encouraged to draw upon the experiences of others. The STARS program has a number of active ingredients: it is designed to support participants to develop their own plans for proactive management of the classroom environment; to help them to develop ways of adopting and promoting to pupils social and emotional regulation skills; and to strengthen relationships with parents. Together these intervention components are designed to reduce hindering work demands and to enhance the personal and organizational resources available to educators. The program draws upon a number of tried-and-tested educational and motivational techniques (e.g. goal-setting, reflective learning, modeling of others' behavior and group discussions) to effect changes to the way educators choose to interact with their work environment. At the time of writing a rigorously designed study of this intervention is currently underway (see Ford et al., 2012) for the detailed intervention protocol).

Using a somewhat different approach Hall, Hall, and Abaci (1997) examined the impact of changing teachers' underlying philosophy to their interactions with pupils. They evaluated a long-term experiential training course in human relations delivered to a diverse sample of 42 experienced educators drawn from across a range of educational settings. Participants attended the training for three hours per week for five consecutive 10-week terms (around 150 hours of training). Structured exercises were used to allow participants to develop their effectiveness in face-to-face interactions with students. These exercises encouraged participants to consider their own use of body posture, encouragement, reflecting back what people had said, expression and reflection of feelings. The effects of the intervention on teacher burnout (measured using the original 1981 version of the Maslach Burnout Inventory) were positive and significant with respect to personal accomplishment and emotional exhaustion. This was accompanied by participants reporting a shift towards a humanistic pupil control ideology – giving students more choice and responsibility, showing empathy and a more democratic approach (as opposed to exercising strict control over students).

These various classroom management interventions are based on a range of different underlying theories relating to the factors that influence pupil behavior. However, what they have in common is that these interventions may help to reduce teacher stress by driving changes to the work environment (e.g. by reducing

exposure to hindering demands associated with disruptive behavior) through the development of the resources (both individual and organizational) that educators have available to them.

Other IOI interventions also consider educators' workload outside the classroom setting. This can include helping educators to develop a more realistic and manageable view of their workload and responsibilities. For example, *Żołnierczyk-Zreda (2005)* combined activities designed to improve time management, goal-setting and interpersonal skills training with training in classroom management techniques and other more individually-focused interventions. This small study included random allocation of participants to an intervention or control group ($n=29$ in each group). Results from self-report questionnaire measures showed that the intervention had a modest significant positive effect on perceived control, and small effects on overload, emotional exhaustion and the reporting of somatic complaints. However, it was not possible to determine whether these positive intervention outcomes were directly linked to the elements of the intervention designed to help participants better manage their workload.

It is clear that many of these classroom management interventions help educators to develop the psychological resources (knowledge, skills and work attitudes) they need to take more control over their working environment. Job crafting is a proactive activity that involves employees taking action to: reduce demands that get in the way of effective performance; identify and use opportunities to grow their psychological resources; make the work more challenging and interesting; or to take action to increase their access to sources of support (*Wrzesniewski & Dutton, 2001*). Job crafting can have a positive impact on employee well-being (*Nielsen & Abilgaard, 2013*). Short and simple interventions that involve showing workers ways of crafting their job to make it more fulfilling, and healthier, have been shown to encourage job crafting activities (*van der Heuvel, Demerouti, & Peeters, 2015*). It is feasible that the many of the effects sought about by classroom management training may be linked to educators more actively, effectively, and consistently, crafting their own work environment to reduce their exposure to stressors. Visible and tangible middle- and senior-management support is needed for changes to work practices emerging from intervention to be transferred to and maintained in everyday work practice (*Nielsen, 2013*). Educators may be less likely to make changes to their work practices if they feel that their innovations are likely to be criticized or curtailed. It is noteworthy from descriptions of intervention studies that many of the successful interventions have very strong support from all levels of management (with in the institution itself or from the wider educational authorities).

15.3.4 Performance-Related Feedback

The introduction of routes for feedback is widely suggested as a method of reducing several significant sources of work-related stress. These include role ambiguity, low social support, lack of feedback and, in particular, imbalances between effort and

reward (Siegrist, 1996). Such interventions can enhance educators' role clarity and allow them to be more focused in using their energy on work tasks. A very well-designed large-scale U.S. study (the Chicago Teacher Advancement Program (TAP); Glazerman & Seifullah, 2012) provides some insight into the possible effects of this type of intervention.

TAP is a program designed to provide all teachers with greater access to performance appraisal, feedback and performance-related rewards. In the TAP program performance, evaluation discussions are linked closely to observed classroom performance and the impact of the teachers' behavior on student performance. In order to isolate the effects of the intervention, researchers compared levels of teacher retention in 40 'high need' schools implementing TAP to both waiting-list control schools and comparable schools in the Chicago area that were not implementing TAP. Teachers involved in TAP were regularly observed by their teacher mentors and met with them every week to discuss their performance (as evaluated by their mentors using structured rubric). The program was linked to financial reward for teachers meeting their performance targets (from around \$1,000 to around \$2,500). The researchers reported that those involved in the study did not always receive as much financial reward as they had anticipated given their performance and the potential level of reward available. Linked to this mentors found it was extremely difficult to carry out an evidence-based evaluation the effect of teacher behavior on student performance. One striking finding was that teachers involved in the TAP were 20% more likely than those not involved to be in the same school after 3 years. Retention is a widely used proxy measure of work-related stress: it is complex but is likely to be influenced by whether teachers feel they are adequately equipped and rewarded for the job that they do.

15.3.5 Teamwork Interventions

Team building interventions are often used to increase collaboration across interdisciplinary boundaries, to improve worker control, stimulate and support problem-solving and provide workers with additional social support (Nielsen, Randall, & Christensen, 2015). While such interventions may be beneficial to educators, there is little evidence from rigorous research that has tested directly its impact on educators' reported stress levels. There is some evidence that working in a multidisciplinary team is associated with lower levels of work-related stress, perhaps because it re-enforces an educators' sense of professional identity and the value of their contribution (see Gatewood, Cline, Green, & Harris, 1992). Several stress reduction interventions include team building activities as intervention components. For example, de Jesus, Rus, and Tobal (2011) summarize the results of three trials of an intervention (total $n = 79$) that included team development (exercises to foster group creativity and brainstorming, problem solving and decision making) alongside the sharing of professional experiences and several individually-focused interventions (the development of coping strategies and resilience, management of irrational

beliefs, relaxation, developing a healthy lifestyle) and job-related skills (assertiveness and conflict management). Evaluating the 30-hour intervention package they found modest effects on psychological well-being but small effects on negative outcomes of work such as psychological distress and emotional exhaustion. Naturally, it is extremely difficult to isolate the effects of the specific teamwork component in such a complex intervention process.

Some studies are more squarely focused on the teamwork element of stress reduction interventions. For example, Lhospital and Gregory (2009) used a longitudinal study to examine how teachers' involvement in pre-referral intervention teams (PITs) made up of their peers, students' parents, educational specialists and administrative staff impacted upon their access to social support. PITs are interdisciplinary teams that meet to plan and review interventions to deal with issues with student behavior and learning. They studied the effects of involvement in PITs on 33 general education teachers in public elementary schools in the U.S. They tracked teachers' dyadic stress (the self-reported dyadic distress related to 'lack of time and energy and a sense of ineffectiveness to address the scope of a student's needs and behavior' (p. 1102)). Using established self-report questionnaire measures of features of teachers' work environment they measured directly the level of support teachers felt they experienced from participating in a PIT (e.g. whether they felt that members of the PIT cared about them, the extent to which they felt they had learned new skills and received positive feedback). Over a 2–3 month period teachers reported a significant reduction in dyadic distress that was in part due to improved student progress but that was strongly linked to the level of support teachers felt they received from the PIT. From interviews with the teachers the particularly important elements of the PIT appeared to include the availability of assistance and feedback from others. It was also noteworthy that the PIT did not work for everyone: some felt that PITs were frustrating when they provided some emotional support but did not lead to specific practical interventions that teachers could implement, or when teachers felt under pressure in the group to devise solutions.

Looking outside of educational settings the literature on the impact of team building activities shows that stress-related outcomes are mixed and somewhat unpredictable. In their review of team building interventions, Klein et al. (2009) found that team building was particularly effective when it was used to address problems with role ambiguity through the discussion and clarification of roles within teams. The effects of team building activities were also found to be strongest when they were implemented in larger teams. These findings suggest that team-building interventions might be especially useful in large, complex educational organizations in large educational organizations and for educators in work roles that give them little opportunities to discuss the content and boundaries of their role with colleagues.

15.4 Quantity, Quality and Usability of IOI Intervention Research

The details of the studies discussed in this chapter show that there is a relatively small literature on specific IOI interventions that have been in educational settings. The implementation and evaluation of IOI interventions presents several challenges that limit the quantity of research available. As far as possible, we have included IOI intervention targeted at educators in our discussion of intervention activities. Studies of these interventions in educational settings are often characterized by small samples, an absence of control groups and relatively simple analysis of intervention effects. The IOI interventions themselves are also varied, multifaceted, tailored to a specific teaching and context, and aimed at different sub-groups of educators (e.g. some are aimed at novice teachers, others at those teaching students with special educational needs, some target educators working in higher or further education etc.). Some IOI interventions are also delivered as part of a package alongside other interventions with different active ingredients or components such as relaxation or cognitive re-structuring (e.g. de Jesus & Conboy, 2001). These features of IOI intervention research make it difficult to identify the consistent and transferable effects of a good range of IOI interventions on educators as a specific occupational group.

Taking a traditional positivist approach to the evaluation of IOI intervention research quality, it is evident that strong research designs that include multiple intervention and control groups, multiple outcomes measures (e.g. self-reported and observer rated changes) and long-term follow-up evaluation are very rare. Therefore, in many studies discussed in this chapter it is not possible to rule out alternative explanations for the changes observed.

We have applied liberal criteria to the inclusion of relevant research in order to present a good number of examples of IOI intervention. This approach means that it is not possible to identify, with precision, the extent to which the effects of these interventions will generalize and be useful to other educators. Many of the interventions discussed in the chapter are tested on less than 50 participants. Descriptions of intervention protocols and procedures are sometimes brief and challenging to replicate. That said, IOI interventions necessarily reflect the specific opportunities and constraints provided by the context in which they are implemented, certainly to a greater degree than do individual-level interventions.

In many studies of IOI interventions a very limited amount of process evaluation data is reported. These data provide insight into several important issues including the extent to which the intervention was delivered as intended, how it was received and perceived by participants and whether the intervention context hindered or facilitated intervention delivery and uptake. A notable exception is the work on the STARS intervention in the UK (see Hansford et al., 2015) which includes a series of measures to track teachers' experiences of the intervention, and the extent to which factors in the school environment influence the ways they make use of the intervention. Such data can be used to enhance the effectiveness of interventions while the intervention is being delivered.

Interventions similar to those described in this chapter have also been used with good success in non-educational work contexts (most notably the Participatory Action Research interventions). There is a reasonable amount of well-designed quasi-experimental research that tests these interventions that includes both self-report and organizational outcome measures. In the case of IOI interventions, the effects of the *process* of delivering intervention (e.g. participative problem-solving or teambuilding activities) may generalize more readily than the specific details of *content* of the intervention itself (Nielsen & Randall, 2013). A key feature of IOI interventions is that participants are usually very active in their design and implementation and this allows them to be tailored to fit any work context. Those tasked with tackling stress in educational settings will find lots of relevant and useful examples of IOI interventions from other settings that can be used as a source of inspiration and guidance.

Educators should also be aware that some researchers have noted that IOI interventions sometime bring with them additional workload (Böckerman, Bryson, & Ilmakunnas, 2012). Many involve the implementation of high-involvement work practices: getting together to solve work problems takes time and effort. Given that many educators already find themselves in demanding work situations, these additional demands need to be handled with care in order to minimize the possibility of the solution becoming part of the problem. Support from key stakeholders (school management, administrators, unions and educational authorities) is needed in order to make manageable the workload placed on employees involved in this type of intervention activity and to ensure that there is sufficient long-term change in organizational stressors (Nielsen, 2013). In several of the effective interventions the theoretical basis for the intervention is well-tested, well-specified and evident in the delivery of the intervention.

15.5 Future Directions

There is a clear need for more well-designed research into the effectiveness of IOI interventions in educational environments. Few interventions are reported in enough detail to allow for them to be replicated fully by others. Control groups, larger intervention groups, random allocation and complex statistical analysis are rarely used as a means of ruling out alternative explanations for intervention effects. These limitations are likely to be due to the practical difficulties associated with the implementation of such designs in complex functioning organizations (Cox, Karanika, Griffiths, & Houdmont, 2007; Randall, Griffiths, & Cox, 2005). In this chapter, we have discussed examples of interventions that do not always meet the very stringent requirements of the quantitative quasi-experimental research paradigm. We have taken this approach to provide the reader with good insight into the type of IOI intervention activities available. Given the quantity and quality of research, educators should approach the use of IOI interventions with caution and seek every opportunity to rigorously evaluate their outcomes.

It could also be argued that it is unwise to delay action when such interventions clearly target well-established problems that feature prominently in theories of work-related stress and that are widely reported by educators. Clearly there remain many ethical and practical dilemmas associated with the use of IOI interventions. The presence of the active ingredients of these interventions, in both intervention processes, (e.g. educators collaborating to discuss work issues) and intervention outcomes, (e.g. changed work process) is a strong argument in favor of their use. Their potential long-term efficacy through their impact on the psychological and organizational resources available to educators are important and positive features of IOI interventions.

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Chapter 16

Organizational Interventions to Reduce Sources of K-12 Teachers' Occupational Stress

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Abstract Organizational interventions that may reduce sources of occupational stress faced by K-12 teachers take many forms, including support/skills building interventions, such as mentoring programs, Peer Assistance and Review (PAR), teacher assistance teams, and teacher training on classroom management, as well as forms of job redesign. Most interventions have been designed primarily to improve or support professional practice and not to address work-related stress. We reviewed 27 empirical studies and review papers on organizational interventions published between 1990 and 2015, and found some evidence that mentoring and induction programs and PAR programs can increase support, skill development, decision-making authority, and perhaps job security, for teachers. However, there is limited evidence linking these interventions to a reduction in teacher stress or improvements in teacher health. We also describe other policy, union (collective bargaining) and legislative drivers of some of these models such as union and collective bargaining initiatives that have resulted in mentoring, PAR, and team teaching, state legislation on prevention of bullying and harassment of teachers and district pro-

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grams, participation/school-based management, prevention of harassment/ bullying/violence, management of disruptive students, and employee assistance programs. However, these policy-based interventions need to be evaluated by research. Research is also needed to evaluate the impact on job characteristics and teacher health of professional learning communities, professional capital, co-teaching, school climate, and workplace violence prevention. Finally, we present a research agenda to enable a better understanding of the types of organizational programs and policies that can reduce stressful working conditions faced by K-12 teachers and potentially improve their health.

Keywords Job stress • Organizational interventions • Teachers • Job stressor reduction

16.1 Introduction

While teaching at the primary and secondary school level has traditionally exposed teachers to a variety of work stressors (see Chaps. 1 and 2 of this volume), a number of recent trends appear to be increasing these stressors. Such trends include budget cuts and layoffs (McCord et al., 2009), larger class sizes (Schanzenbach, 2014), attacks on seniority/tenure (Kahlenberg, 2015), integration of students with special needs into standard classes (Gallagher & Odozi, 2015), teacher evaluation systems based on standardized testing (Baker et al., 2010) and introduction of mandated curricula (such as the common core) without adequate teacher preparation (Weiss, 2013). Teachers have also been the target in a public narrative on the failure of public education. In a recent survey, the American Federation of Teachers found that 55% of teachers and education employees attributed the “negative portrayal of teachers and school employees in the media” as a major source of their stress (American Federation of Teachers & Badass Teachers Association, 2015). Such trends may be increasing the demands faced by teachers, while simultaneously limiting their support, decision-making authority, professional judgment (use of skills) and job security, thus increasing their stress.

Job stress may be contributing to high turnover rates among teachers, a nearly 20% annual turnover rate among teachers with 1–3 years of experience and nearly 16% overall (https://nces.ed.gov/surveys/sass/tables/TFS1213_2014077_cf1n_002.asp). Evidence suggests that teachers leave schools with stressful and poor work environments making it more difficult to build instructional capacity and maintain a strong organizational culture. What seems to matter most to teachers are “the social conditions—the school’s culture, the principal’s leadership, and relationships among colleagues—that predominate in predicting teachers’ job satisfaction and career plans” (Johnson, Kraft, & Papay, 2012, p. 5). A number of the studies we reviewed used teacher turnover, or retention, as surrogate measures of job stress.

16.1.1 Models of Organizational Interventions

Our review is based on the model of job stress interventions developed by the U.S. National Institute for Occupational Safety and Health (NIOSH) (Murphy & Sauter, 2004). This model differentiates between primary, secondary and tertiary prevention, and between various levels of intervention. Interventions can be conducted at the legislative/policy level, the employer/organizational level, the job/task level or the individual/job interface. This chapter focuses on primary prevention interventions at the employer/organizational level and the job/task level – both of which are forms of organizational interventions. In addition, legislative interventions are briefly discussed in Sect. 16.3.2, since they typically mandate the development of policies at the school/organizational level. Individual/job interface interventions in the NIOSH model refer to health promotion and stress management programs, which are addressed in Chaps. 14 and 15 of this volume.

Employer/organizational-level interventions address policies, procedures, or reward/benefit systems, for example, work-family programs, such as flexible work schedules, childcare and paid family leave (Murphy & Sauter, 2004). They may focus on leadership training, on improving organizational culture/climate, for example, safety climate, or developing “magnet” hospitals or creating healthy work organizations (Murphy & Sauter, 2004). They may involve developing new systems of work organization such as the Scandinavian socio-technical systems model (Gardell, 1982). Employer/organizational level interventions are typically achieved through employer-initiated programs or through collective bargaining (Landsbergis, 2009).

Job/task level interventions may involve job/task redesign, job enrichment, or job rotation, for example, workload or time-pressure reduction, participation in decision-making, team working, career development, and increasing coworker or supervisor support, job skills, autonomy or job control, including control over schedules or autonomous work groups (Bambra, Egan, Thomas, Petticrew, & Whitehead, 2007; Landsbergis, 2009; Landsbergis et al., 2011; Murphy & Sauter, 2004). Such interventions often focus on features of Karasek’s job demands-control-support model (Karasek & Theorell, 1990), Siegrist’s effort-reward imbalance model (Siegrist et al., 2004) or Schaufeli’s job demands-resources model (Schaufeli & Bakker, 2004), such as autonomy, opportunities to learn new skills, and social support. Some job redesign interventions have a limited scope, while others seek to change multiple job characteristics (Holman & Axtell, 2016).

Montano, Hovenn, and Siegrist (2014) distinguish between work time-related interventions, e.g., work speed, shifts, deadlines, pace of work, breaks, and work organization interventions, e.g., psychological and social factors (job demands, job control, efforts and rewards, responsibility), and processes and procedures required to accomplish work tasks (e.g. methods of work, order of tasks, team organization, structure of hierarchy). In the NIOSH model utilized in this chapter, support groups at work whose main function is on sharing problems, giving reassurance and support, and listening empathetically would be considered more of a stress management intervention and not eligible for the review in this chapter. However, a support group that addressed and implemented changes in working conditions or job char-

acteristics would be eligible. Job/task level interventions are typically achieved through labor-management committees and initiatives, participatory action research, or employer-initiated job redesign (Landsbergis, 2009).

One common approach to job redesign is to involve employees in problem assessment, and intervention design, implementation and evaluation. Such an approach may be called “participative job redesign interventions” (Holman & Axtell, 2016) or “participatory action research” (Rosskam, 2009). The nature of such interventions makes it difficult to predict ahead of time which job characteristics will be changed, however, changes are most likely to be implemented in areas of the job viewed by employees as problematic (Holman & Axtell, 2016).

Types of organizational and job interventions have been conceptualized in a variety of ways, for example, “team-based” (participatory action approach; increase collective/team-efficacy) vs. “organization-based” interventions (job (re)design: increase job resources; leadership training; career development) (LeBlanc & Schaufeli, 2008). Both these types would be eligible for our review. Other researchers have simply differentiated between organizational and individual level approaches (LeBlanc & Schaufeli, 2008; Montano et al., 2014). Some earlier researchers had classified interventions focusing on relationships at work, autonomy and participation into a category of “individual/organizational (I/O) interface” (Ivancevich, Matteson, Freeman, & Phillips, 1990; van der Hek & Plomp, 1997). However, such an approach is not consistent with the NIOSH model and has not been the typical approach in recent years, and thus is not utilized in this chapter.

16.1.2 Models of Organizational Interventions in Primary and Secondary Education

A variety of types of interventions have been implemented and evaluated at the employer/organizational or job/task levels that have the potential to reduce sources of occupational stress faced by K-12 teachers. These include mentoring programs (Ingersoll & Strong, 2011), peer assistance and review (Darling-Hammond, 2013), teacher assistance teams (Kruger, Struzziero, Watts, & Vacca, 1995), and teacher training on classroom management (Zhai, Raver, & Li-Grining, 2011). Such interventions primarily focus on increasing necessary job skills and social support, although some also appear to increase job control and team working and assist in career development. Only two studies were found that included a more traditional job redesign approach, with a focus on establishing flexible work schedules or career ladders (Framke & Sørensen, 2015; Hart, 1990; Wu, Li, Wang, Wang, & Li, 2006).

We did not find interventions among K-12 teachers that focused specifically on supervisor-teacher relations, leadership training, or initiatives that may be found in other sectors, such as total quality management or autonomous worker teams. The various types of interventions revealed by our literature search, which we classify into “support/skills building” and “job redesign”, are described and assessed below, and recommendations for future practice and research provided.

In addition, teachers and their unions have negotiated contracts which include the implementation of some of these types of interventions, along with others, such

as professional learning communities (job skills and social support), participation/school-based management (job autonomy, control), prevention of harassment/bullying/violence, and management of disruptive students (improving safety climate). Collective bargaining is a form of job control being exercised collectively rather than individually (Johnson, 1989).

Kansas and Florida also enacted legislation on prevention of bullying and harassment of teachers. However, the bargained and legislated interventions have not been evaluated by researchers for their impacts on employee stress or health.

16.2 Research on Organizational Interventions in Primary and Secondary Education

We conducted a systematic literature review to find articles published in English from 1990 to July 2015 within five databases: PubMed, Web of Science, PsycInfo, Medline, and EBSCO Host (including the Teacher Reference Center, the Education Resource Information Center, Academic Search Complete, Social Sciences Full Text, Education Source, Professional Development Collection, and Psychological & Behavioral Science Collection). Three search terms (teachers, schools, educational systems) were paired with a set of 12 search terms for a total of 36 combinations queried uniquely of each of the five major databases. The 12 terms were: stress prevention, stress reduction, stress intervention, stress program, work organization, organizational development, healthy school organizations, organizational interventions, mentoring programs, peer evaluation, team teaching, and joint governance. If the yield was deemed low, search terms were taken out of quotation marks. If the search yielded over 350 references, an additional refining search term, "stress," was added.

This activity yielded 5,338 articles from which 259 were selected (after duplicates were removed) for further review because they focused on teachers, schools and education systems for grades K-12. We excluded all studies that focused on teachers in pre-schools or in colleges or universities. Upon further review of these 259 articles, 27 articles were found eligible for this chapter. Eligible articles described or evaluated workplace interventions in primary and secondary education that focused on changes in organizational policies or programs, or job characteristics. Stress management programs, which are primarily directed towards individuals, were not eligible.

Three of the eligible articles described the design of controlled trials of two promising ongoing intervention programs: (1) the "Bottom-up Innovation" project, a participatory, primary preventive, organizational level intervention for workers in vocational education in the Netherlands (Schelvis et al., 2013); and (2) the "Incredible Years" teacher classroom management course in England (Ford et al., 2012; Hansford et al., 2015). Of the remaining 24 articles, nine were review articles or commentaries and 15 were empirical studies. A review of "organisational interventions for improving wellbeing and reducing work-related stress in teachers", which included randomized controlled trials and controlled before-and-after studies (Naghieh, Montgomery, Bonell, Thompson, & Aber, 2015) included only four studies, three of which were found eligible for this chapter.

16.2.1 Support/Skills Building Interventions

Mentoring Programs The most widely studied model of organizational intervention revealed by our search was that of support, guidance and orientation programs for new teachers, which are called “mentoring” or “induction” programs (Ingersoll & Strong, 2011). Our search revealed five empirical studies (see Table 16.1), two reviews and four commentaries on mentoring or induction programs.

A pilot study in a Chicago public school on a professional development model for urban early career teachers (Teachers Supporting Teachers in Urban Schools) linked five new teachers with peer-nominated key opinion leader teachers and an external coach to provide support in evidence-based practices for classroom management and engaging learners, and to connect new teachers with their larger network of colleagues in professional learning communities (PLCs) (Shernoff et al., 2011). Analysis of qualitative data after one school year suggested that “...group seminars and PLCs mitigated some of the isolation that teachers, particularly newer teachers, experienced” Several adaptations were made including “written feedback from the coach after classroom visits when post-conferences were not possible”, greater use of e-mail and phone calls, “more field-based training and coaching with the newly hired coach” (Shernoff et al., 2011, p. 479) and more time spent in post-conferences.

Another program in Chicago public schools (Teacher Advancement Program or TAP) allowed teachers to earn extra pay and take on added responsibilities as a mentor teacher or master teacher and become eligible for annual performance bonuses based on their contribution to student achievement and observed classroom performance (Glazerman & Seifullah, 2012). Over 4 years, using a quasi-experimental design, the researchers found that teachers in TAP schools reported receiving significantly more mentoring support than teachers in similar non-TAP (control) schools. However, there were mixed positive and non-statistically significant findings for the impact of TAP on teacher retention.

In a Midwestern school district, 15 newer physical education teachers received training in a standard physical education curriculum (EPEC) and were mentored by 15 experienced teachers trained in that curriculum. Over the course of a school year, increases were reported in mentoring skills (by the mentors) and psychosocial support and career mentoring functions (by the mentees). However, no statistical tests were conducted for the difference between initial scores and final school year scores (McCaughy et al., 2005).

Qualitative data was used to compare teachers in one Boards of Cooperative Educational Services (BOCES) District in New York State with a Mentor-Intern Program (MIP) to teachers in another District without such a program (Marable & Raimondi, 2007; Mayoral, 2014). MIP teachers identified their mentor as their most significant source of support, while colleagues and administrative support were identified as most supportive for non-MIP teachers. Leaving the District was reported by 2% of MIP and 7% of non-MIP teachers (no significance test provided of this comparison).

Table 16.1 Empirical studies of organizational interventions to reduce stress or ill health or improve job characteristics among K-12 teachers, published 1990–2015

First author, year, state/country	Study population	Sample size (total, f) response rate	Study design; control group(s)	Nature of intervention (including whether elements of TWH included)	Outcome variables	Covariates controlled for	Data analysis	Findings
Mentoring								
(Shernoff et al., 2011) Chicago, IL, USA	Teachers in a K-8 elementary school on west side of Chicago; 98% African American & 99% free or reduced-price lunch status	17 of 23 (74%) of eligible school personnel agreed to participate in PLCs and contributed data, including 2 peer-nominated key opinion leader (KOL) mentors who co-facilitated PLCs, 5 early career (new) teachers and 10 other school personnel; 2 coaches selected from retired teachers	Cross-sectional, qualitative 1 midyear focus group of all 5 new teachers 1 PLC focus group at end of first year ($n = 7$).	Teachers Supporting Teachers in Urban Schools: developing, adapting and testing feasibility and impact of a service model for early career teachers designed to increase their effectiveness in classroom management & motivating learners and connectedness to colleagues; Linking novices with peer-nominated KOL teachers & an external coach to: (1) provide intensive support in evidence-based practices for classroom management & engaging learners (2) connect new teachers with a larger network of colleagues; Teachers collectively responsible for supporting struggling teacher. (a) Group seminars 2x/month (b) Regular classroom-based coaching for early career teachers by veteran teachers (c) PLC meetings monthly, led by KOL mentors, for all faculty with reflective dialogue, staff collaboration & collective responsibility for school improvement	-16-item Y/N checklist after each group seminar indicating whether specific instructional methods used, completed by new teachers; -17-item Y/N checklist after each PLC on use of specific instructional methods + helpfulness ratings. -15–20 item Y/N checklist following each coaching contact by new teachers indicating whether each coaching element was used and how helpful.	n/a	Thematic analyses using Atlas. ti. The constant comparative approach used to ensure internal coherence and consistency within each theme Kappa for the final list of 19 master codes ranged from 0.67 to 1.0 ($\kappa = 0.81$) Fidelity measures and focus group data showed varying attendance rates throughout the school year and that although seminars and PLCs were delivered as intended, adaptations to enhance the relevance, authenticity, level and type of instrumental support were needed.	Group seminars and PLCs eased some of the isolation that teachers, particularly newer teachers, experienced. Several adaptations made including written feedback by the coach after classroom visits when post-conferences not possible, greater use of e-mail & phone calls & more "field-based training and coaching with the newly hired coach" and more time spent in post-conferences. Fidelity measures and focus group data showed varying attendance rates throughout the school year and that although seminars and PLCs were delivered as intended, adaptations to enhance the relevance, authenticity, level and type of instrumental support were needed.

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Table 16.1 (continued)

First author, year, state/ country	Study population	Sample size (total, f) response rate	Study design; control group(s)	Nature of intervention (including whether elements of TWH included)	Outcome variables	Covariates controlled for	Data analysis	Findings
(Glazerman & Seifullah, 2012) Chicago, IL, USA	Teachers in 34 out of >300 schools in Chicago Public Schools	17 TAP & 17 wait-list control schools; Of 826 eligible teachers, 617 completed the survey, 75% response rate	4-year prospective study, 2007–2011; Random assignment of schools to TAP or non-TAP each year TAP implemented; control schools implemented TAP in the second year after randomization Propensity score matching of TAP to non-TAP schools.	Chicago Public Schools version of the Teacher Advancement Program (TAP). Teachers can earn extra pay and take on increased responsibilities through promotion to mentor teacher or master teacher & become eligible for annual performance bonuses based on their contribution to student achievement (at the school-level and, in the final 2 years, at school-grade team level) and observed classroom performance. Weekly meetings of teachers and mentors and regular classroom observations by a school leadership team	-Teacher attitudes, school climate (spring 2008 and spring 2010 surveys); ---Principal interviews (fall 2008). -Retention from teacher administrative records from all years starting in 2005–2006. -Teacher scores on classroom observation performance, program review on implementation fidelity.	Teacher education, assignment, years of service, prior teacher retention at school, prior student achievement, student race/ethnicity, student language, student poverty, school size.	Intention to treat analysis; Linear or logistic regression analysis	Teachers in TAP schools reported receiving significantly more mentoring support than teachers in non-TAP (control) schools; No evidence of an impact on <i>teacher attitudes, school climate</i> . Fidelity to model averaged 3 out of 5 points in first 3 years; elements of TAP introduced, but implementation not "rigorous": In fourth year, implementation scores averaged >4 out of 5. <i>Retention</i> : 67% of teachers in cohort 1 schools (fall 2007) returned to their same school in fall 2010 vs 56% of teachers in non-TAP schools. However, in later years, some retention impact estimates not statistically significant. Some evidence of impacts on retention for subgroups, such as for teachers with less experience, but pattern of findings not consistent.

<p>(McCaughy, Kulima, Cothran, Martin, & Faust, 2005) Midwest, USA</p>	<p>Teachers in a Midwestern school district implementing the Exemplary Physical Education Curriculum (EPEC)</p>	<p>12 female & 3 male mentors; 6 female & 9 male new teachers ($n = 30$); Volunteers, response rate not reported</p>	<p>Prospective, 2003–2004 school year; Mentor's Aptitude Inventory (MAI) completed by mentors nine times across school year; Mentoring Functions Scale (MFS) completed by new teachers seven times across school year</p>	<p>(1) 15 experienced EPEC teachers learned to be mentors for newer PE teachers. Each had previously attended at least 5 1-day EPEC workshops, received comprehensive at-school support & guidance, demonstrated high levels of EPEC implementation identified through teacher observations & self-reports. In 2003–4, 1-day mentor training in November, mentor-new teacher pair workshop in December, workshops in January & March. (2) 15 newer elementary PE teachers volunteered to learn and be mentored in the EPEC curriculum for 1 school year, including 1 day workshops in October, January & March.</p>	<p>-MAI, 8 subscales: developing performance-coaching skills, displaying sensitivity to individual differences, modeling and coaching effective classroom-management standards, modeling and coaching effective teaching standards, nurturing the novice, promoting collaborative learning, shaping professional relationships, understanding mentoring role ($\alpha = .95-.99$), -MFS, 2 subscales for new teachers: psychosocial support and career mentoring functions ($\alpha = .85-.96$)</p>	<p>None</p>	<p>Paired t-tests pre & post each workshop; no overall statistical test comparing scores from beginning to end of school year</p>	<p>Overall: increase in total MAI & MFS scores from beginning to end of school year, despite some declines after some workshops for MAI scores.</p>
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Table 16.1 (continued)

First author, year, state/ country	Study population	Sample size (total, f) response rate	Study design; control group(s)	Nature of intervention (including whether elements of TWH included)	Outcome variables	Covariates controlled for	Data analysis	Findings
(Marable & Raimondi, 2007) New York, USA	Teachers employed over a 10-year period by 2 Boards of Cooperative Educational Services (BOCES) Districts in NY State. Services provided include career, alternative & special education classes	Surveys sent to 157 MIP, 168 non-MIP employees ($n = 326$); Responses received from 99 MIP (63% return rate), 66 non-MIP (39% return rate) ($n = 165$); 41 non-teachers excluded from analysis; 75% female	Cross-sectional, qualitative; Since 1988, 1 BOCES District required new employees to participate in a Mentor-Intern Program, (MIP), while the other district did not	Mentors chosen from a pool of tenured teachers who met criteria established by district administration & teachers union. Mentors provided extensive training & required to document bimonthly meetings with their interns. Mandatory topics included orientation to the district, overview of policy and procedures, explanation of the paperwork process, communication skills & peer review.	4 open-ended questions: Whether teachers had left their district, factors that were most or least supportive during their first year as a teacher, and factors that would have been beneficial during their first year as a teacher	None	Authors coded responses, combined categorized responses into themes. Final categories & themes reached by consensus. Frequencies determined for each district and each theme & category	Leaving district reported by 2% of MIP, 7% of non-MIP; MIP teachers identified their mentor as the most significant source of support; Non-MIP teachers reported at least 1 person as their "mentor"; Colleagues and administrative support identified as most supportive for non-MIP teachers; Least supportive factors similar between the 2 groups: dissatisfaction with training, administration, lack of materials; 5 areas that would have been beneficial during their first year as a teacher: mentoring, peer support, training, administrative/supervisory support, resources.

<p>(Barrera, Braley, & Slate, 2010) Texas, USA</p>	<p>Teacher mentors of first-year secondary teachers in South Texas public secondary schools</p>	<p>Random sample of 25% of schools, including 95 mentors, selected to receive survey; 28 female, 18 male mentor teachers returned survey (n = 46); 48% response rate</p>	<p>Cross-sectional survey</p>	<p>School districts & individual schools in Texas provide mentorship programs for first-year teachers, as required by state statute. However, the incidence & influence of the experiences of what & when vary by districts & by school. The purpose is to provide new teachers with the skills & knowledge to be successful & remain active in the profession. Mentoring programs are required to be examined periodically to assess the extent to which the needs of beginning teachers are satisfactorily met.</p>	<p>27 survey questions developed by first author and reviewed by 17 experts: 4 scales: teacher involvement/ support ($\alpha = .66$), staff development support ($\alpha = .77$), administrative materials ($\alpha = .65$).</p>	<p>None</p>	<p>% responding to each item as: absolutely, mostly, somewhat, or not essential</p>	<p>Almost all of the mentor teachers believed a teacher mentoring program that had well-defined goals was necessary for retaining beginning teachers. Some considered that staff development that provided strategies to serve students in special populations better was important for retaining beginning teachers. Mentors indicated that the most difficult parts of their duties involved scheduling conflicts with the mentee, receiving little support from administration (e.g., limited release time to meet with beginning teachers), and having no guidelines or preparation for what they were expected to do.</p>
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Table 16.1 (continued)

First author, year, state/country	Study population	Sample size (total, f) response rate	Study design; control group(s)	Nature of intervention (including whether elements of TWH included)	Outcome variables	Covariates controlled for	Data analysis	Findings
Peer Assistance & Review								
(Papay & Johnson, 2012) USA	School districts using PAR (Toledo & Cincinnati, OH; Rochester & Syracuse, NY; Minneapolis, MN; San Juan, CA; Montgomery County, MD)	Site visits of 2–3 days in each district; interviewed 155 people, including key union & district officials, PAR Panel members, current & former consulting teachers (CTs), principals, superintendents; Reviewed documents	Case study; December 2007 to April 2008	<i>Peer Assistance and Review (PAR)</i> Expert teachers (often called “consulting teachers”, CTs) appointed to mentor, support, & evaluate teachers in the program: (1) Novice component provides a strong induction program; helps new teachers get a successful start working with an engaged and skillful mentor (2) Underperforming experienced teachers provided counseling to “get back on track.” (3) Teachers who cannot meet district standards are dismissed	-Retention; Climate; Costs	n/a	Coded documents, interview transcripts, Developed theoretical and open codes identified in thematic summaries and interviews. Created matrices to identify patterns (based on Miles & Huberman).	<i>Retention:</i> In districts that reported turnover data, first-year teacher retention averaged ~90%, far exceeding national average for urban districts. <i>Climate:</i> PAR encouraged culture of collaboration among teachers & between labor and management at school & district levels. Focused teachers’ attention on instruction, promoted dialogue about sound practice, instructional standards; In some districts, PAR was controversial when first adopted because some teachers did not think that teachers should evaluate peers or that the union should sponsor a program that could lead to a teacher’s dismissal. However, once the program had been well established, it was widely endorsed by teachers; Range of opinions about PAR from principals; initial opposition to PAR subsided as principals saw that it enhanced rather than undermined their authority

Teacher Assistance Teams

<p>(Kruger et al., 1995) Massachusetts, USA</p>	<p>Current & former teachers assistance team (TAT) members and users in 27 public elementary schools</p>	<p>288 teachers, 247 female; 125 current TAT members (79% of all TAT members in the schools); 42 former members; 121 TAT users; 40.7% response rate</p>	<p>Cross-sectional survey of 27 randomly selected schools; no control group</p>	<p>Teachers assistance teams (TATs), a collaborative problem-solving structure for general education teachers dealing with students who are difficult to teach or manage</p>	<p>Satisfaction with TATs</p>	<p>None</p>	<p>Linear regression</p>	<p>TAT <i>satisfaction</i> associated with: Administrators: (1) help find release time ($\beta = .22$), (2) facilitate relevant training ($\beta = .22$), (3) provide positive feedback ($\beta = .40$) (for consumers); (1) ($\beta = .18$) & (3) ($\beta = .28$) (for members); Can depend on co-workers for assistance ($\beta = .35$) (for members only)</p>
<p>(Lhospatial & Gregory, 2009) USA</p>	<p>General education teachers in public elementary schools in a southeastern county participating in a pre-referral intervention team (PIT) program</p>	<p>33 teachers (32 female) in 14 schools who had made referral to the PIT process within the past 2 months of spring 2007 or fall 2007 semester; response rate not reported</p>	<p>Prospective; no control group; average follow-up time 2.5 months (range 43–140 days)</p>	<p>Teachers refer students to an interdisciplinary PIT, which may include specialists, administrators, fellow teachers, parents, PIT members help plan & implement student interventions & monitor whether students are responsive to the interventions, thereby mitigating the need for special education evaluation or placement</p>	<p>-Distress due to referred students; disruption of teaching process (DTP subscale of Index of Teaching Stress); -Support from team members (adapted from Basic Need Satisfaction at Work Scale); -Student progress (PIT meeting records)</p>	<p>Spring vs. fall semester; number of student difficulties at time of referral (from records)</p>	<p>Hierarchical linear modeling</p>	<p>Significant decline in distress pre-post referral (from 2.82 to 2.52 on 1–5 scale); Student progress predicted post-intervention distress level, but not change in distress (controlling for student difficulties and semester); Support from team members at first follow-up meeting predicted change in distress (control for student difficulties & semester)</p>

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Table 16.1 (continued)

First author, year, state/country	Study population	Sample size (total, f) response rate	Study design; control group(s)	Nature of intervention (including whether elements of TWH included)	Outcome variables	Covariates controlled for	Data analysis	Findings
(Bay, Bryan, & O'Connor, 1994) Chicago, IL, USA	Teachers in 2 public elementary schools in Chicago	<i>Intervention:</i> 10 teachers (9 female); <i>Controls:</i> 10 teachers (6 female); response rate not reported	Prospective; volunteers; from January to May (5 months); Teachers identified 2 children difficult to teach due to academic (not behavior) problems; 33 remained in class at end of project	<i>Pre-referral model:</i> 3 Information Sharing sessions (each 90 min) incorporating advance organizers into instructional process, distinguishing between limited English proficiency and language disabilities, teaching phonemic awareness strategies to young children experiencing reading difficulty; 3 <i>Peer Exchange sessions</i> (2 weeks after each Information session, 1 hr); University special education professors presented at all sessions 4 <i>Peer coaching sessions</i> over the course of the project	-Referral rates at end of school year; -Interviews with teachers, 6 open-ended questions -Teachers' evaluations of intervention components	None	Researchers discussed responses to each interview question to search for themes; outlined idea units to ensure they were represented by themes; selected comments & phrases teachers typically used	<i>Referral rates for special education:</i> Intervention group: 4/16 Control group: 15/17 <i>Interviews:</i> Intervention group teachers offered more categories of teaching strategies to address children's problems and identified more successful teaching strategies than did the control group (skill development) <i>Program evaluation:</i> All intervention group teachers reported that the program helped them to work with children perceived to be at-risk for referral.
(Cooley & Yovanoff, 1996) USA	Elementary, middle and high school teachers	67 of 92 volunteers who completed the 2 interventions;(34 special educators, 17 related service staff, 16 case managers, administrators, counselors) 60 female; response rate not reported	RCT; Cross-over; volunteers;Tx groups 1 and 2 received intervention in reverse order; waiting-list control group; 6 and 12 month follow-up	<i>Peer collaboration workshop</i> (training pairs of teachers to use a 4-step collegial dialogue to assist each other in solving student-related problems, including implementing and evaluating action plans) <i>Stress management workshop</i> (situational, cognitive & physiological coping skills) (TWH) 2 h/week for 10 weeks total	-Maslach Burnout Inventory, -Organizational Commitment Questionnaire Administered pre-intervention, and after each intervention	None	MANOVA	<i>Intervention vs control group:</i> Greater improvements over time ($p < .05$) for emotional exhaustion and personal accomplishment (MBI) and organizational commitment; Depersonalization (MBI) (<i>ns</i>) Through 1-year follow-up: Sustained positive effect for emotional exhaustion and organizational commitment;

Teacher Training on Classroom Management

<p>(Zhai et al., 2011) Chicago, IL, USA</p>	<p>Teachers in 35 classrooms at 18 Head Start sites in low income neighborhoods (children aged 3–5)</p>	<p>90 teachers, 87 female (teaching 602 children); teacher response rate not reported</p>	<p>Cluster RCT; 9 pairs of Head Start sites matched on 14 demographic variables; Intention to treat analysis</p>	<p><i>Chicago School Readiness Project</i>: services to preschool teachers, including 30 h of teacher training on behavior management strategies (adapted from the Incredible Years Teacher Training Program, average attendance 18 h), mental health consultation, stress-reduction services & workshops (TWH)</p>	<p>-Job control ($\alpha = .56$), job resources ($\alpha = .62$), job demands ($\alpha = .67$), from the Child Care Worker Job Stress Inventory; confidence in behavior management</p>	<p>teacher demographics, classroom characteristics & site fixed effects</p>	<p>3-level HLM, teachers nested within classrooms nested in Head Start sites;</p>	<p>Significant improvement of teachers' job control (0.74 SD) and work-related resources (0.53 SD); Significant decrease in confidence in behavior management (-0.51 SD); Job demands (<i>ns</i>)</p>
<p>(Tyson, Roberts, & Kane, 2009) Australia</p>	<p>Teachers in public primary schools in Western Australia</p>	<p>405 teachers in 63 public primary schools; school participation rate 69%; teacher response rate not reported; 96 (65 female) completed job-related anxiety and depression scales 3x</p>	<p>Cluster RCT with 3 groups; Pre-test, 12 and 24 month follow-up Many survey dropouts changed schools or classes, or moved out of the district</p>	<p>(1) <i>Aussie Optimism</i> (cognitive-behavioral techniques, Optimistic Thinking Skills Program & Social Life Skills Program to prevent anxiety and depression in 11–13 year olds; 20 1-h lessons) with Teacher Training (16 h) ($n = 37$) (2) <i>Aussie Optimism with Teacher Training & Coaching</i> (from school psychologists) ($n = 26$) (3) <i>Usual Care</i> ($n = 33$)</p>	<p>-Job-related anxiety & depression (modified from scales by Warr) Scores ranged from 1 to 6 for each scale</p>	<p>Age, gender, teaching experience, pre-test anxiety or depression</p>	<p>Multiple linear regression analyses, control for schooling by a sandwich estimator for standard errors</p>	<p><i>Training + Coaching</i> vs <i>controls</i>: significantly lower job-related anxiety at 12-months (0.42 points) and depression at 12 months (0.38 points) and 24-months (0.26 points) ($n = 96$) However, intention-to-treat analyses for the original sample of 405 showed no significant effects at 12 or 24 months for either anxiety or depression. <i>Training only vs controls (ns)</i></p>

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Table 16.1 (continued)

First author, year, state/country	Study population	Sample size (total, f) response rate	Study design; control group(s)	Nature of intervention (including whether elements of TWH included)	Outcome variables	Covariates controlled for	Data analysis	Findings
Dicke, Elling, Schneck, & Leuner, 2015 Germany	Beginning teachers in Germany, volunteers recruited through seminars at their teacher training college	97 (67 female) teachers, response rate not reported; 56 completed 3 rounds of surveys	RCT; Pre-test, 2 days training for 2 intervention groups, 3-h follow-up session and post-test 4–5 months later; post-test 10–12 months later	(1) <i>Classroom management training</i> , CMG ($n = 36$), classroom organization, rules and procedures, importance of beginning of the school year, maintaining classroom management system, problematic behavior, interpersonal relationships, communication (adapted from The Classroom Organization and Management Program) (2) <i>Stress management training</i> , SMG, based on German AGIL ($n = 42$)(TWH) (3) <i>wait-list control group</i> (CG) ($n = 19$)	-Emotional exhaustion (MBI), -Utrecht engagement scale, rumination (Treyner et al., 2003) -Sleep quality (Gortelmeyer 1986) (all $\alpha \geq .82$); -Self-Efficacy in Classroom Management (subscale of Teachers' Sense of Efficacy Scale), -Classroom disturbances, -Goal achievement, -Prosocial success, Positive feedback	Age, gender, school type, teaching experience	Repeated measures analyses of covariance (RM-ANCOVA) with Time 1 score as a covariate	CMG & SMG significantly more favorable than CG on well-being (emotional exhaustion, engagement, rumination, sleep quality); CMG significantly more favorable than SMG on emotional exhaustion, rumination (engagement, sleep quality, ns) Participating in CMG led to higher self-efficacy in classroom management, higher perceived success, and fewer classroom disturbances than SMG or CG (other variables, ns)
Job Redesign								
(Wu et al., 2006) China	Teachers from 8 middle schools in Sichuan Province	<i>Intervention</i> $n = 459$ (212 female) from 4 schools; <i>Controls</i> : $n = 502$ (231 female) from 4 schools; response rates not reported	Cluster RCT; Pre-tests and 1-year follow-up post-tests	Strategies designed to modify or diminish sources of stress inherent in the work environment (e.g. redesigning the task, establishing flexible work schedules & redesigning the work environment). Implemented with the help of the school leaders. Also included stress management. (TWH) (Further details not available)	-Occupational stress, psychological strain, coping resources (Occupational Stress Inventory-Revised (OSI-R); -Work Ability Index (WAI)	Age, gender, education, marital status	paired- t-test for change in each group over time; independent-samples t test for differences between intervention & control groups	<i>Intervention group</i> : Significant decreases over 1 year for role overload, conflicting role demands, responsibility, unhealthy physical environment, & interpersonal strain. Significant increases for Work Ability Index, recreation, self-care, rational/cognitive coping. No change in role ambiguity, role insufficiency, problems in work quality/output, psychological or physical strain, social support <i>Control group</i> : No significant changes in scores.

(Hart, 1990) Utah, USA	Teachers in a district of 12,000 students	Teachers in 2 junior high schools; one with 34 teachers, 700 students; other with 43 teachers, 855 students. All but 3 teachers from the 2 schools participated; 96% response rate	Cross-sectional; Data collected September through May; No control group	Career ladders, including ranks of teacher leader (3 in each school) & teacher specialist (40% of all teachers). Includes collegial assistance, peer supervision, curriculum assistance in specialties, in-service, observation & consultation on instructional techniques, school-wide climate & curriculum programs. Commitment to continuous professional growth. Increased involvement of teachers in professional decisions affecting the school. Resulted from a state education reform initiative.	-Based on nonparticipant observation 2 days/month; 164 structured interviews (30-60 min) and unstructured interviews with teachers, principals, asst. principals; documents, audiotapes of meetings, teacher journals	n/a	Inductive approach of Guba & Lincoln guided early stages of analysis, more systematic processes (Miles & Huberman) used to finalize conclusions	The outcomes at one school (affirmation & integration) contrasted sharply with the other (denigration of authority, competition, and principal and career ladder teacher isolation); Influence of the school social unit outweighed strength of individual teachers' efforts or the formal work structure in its impact on teachers' assessments of the new structure and on the functions of redesigned work in schools.
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Note. *m* male, *f* female. *HLM* hierarchical linear modeling, *K* kindergarten, *MANOVA* multivariate analysis of variance, *PAR* peer assistance and review, *PLC*s professional learning communities, *RCT* randomized controlled trial, *TWH* total worker health, *YN* yes/no

In a sample of South Texas public secondary schools, 46 surveyed teacher mentors of first-year secondary teachers reported that the most difficult parts of their duties involved scheduling conflicts with the mentee, receiving little support from administration (e.g., inadequate release time to meet with new teachers), and no guidelines or preparation for their role (Barrera et al., 2010).

The two review papers included studies of mentoring and teacher retention which were not identified by our search terms. Waterman and He (2011) reviewed 14 studies conducted in the U.S. and published between 2005 and 2010 (only one captured by our search terms), five of which used quantitative data, two used qualitative data and seven used mixed methods. Overall, findings were “inconclusive”: five studies found an association between new teacher mentoring programs and teacher retention, three inferred a connection, three had mixed findings, and three showed no association. Waterman and He reported that two of the most statistically rigorous studies (Glazerman & Seifullah, 2012; Wechsler, Caspary, Humphrey, & Matsko, 2010) investigated comprehensive mentoring programs, which included full-time trained mentors, sheltered new teacher status, strong administrative support, frequent interaction between mentors and novices, and continuing professional development, and found no connection between mentoring and retention. (The final 4-year report from the Chicago study (Glazerman & Seifullah, 2012), included in Table 16.1, was published after the Waterman & He review was published.) Waterman & He report that Wynn et al. (Wynn, Carboni, & Patall, 2007) also found no connection between a comprehensive mentoring program and retention, however, they found principal leadership and the PLC model to have a positive effect on retention.

Ingersoll and Strong (2011) reviewed 15 studies, conducted since the mid-1980s (only one captured by our search terms), on the effects of induction programs. They included only evaluative (vs. descriptive) studies, those that used a control group or measured degree of participation in induction, and those with explicit descriptions of data sources, sample sizes and methods. Most studies showed that new teachers who participated in induction showed positive impacts on intention to remain in teaching and on retention, measured by survey or a state database on retention. Comprehensive induction, comprising “multiple supports”, had the strongest effect on intentions to remain in the same school (Ingersoll & Strong, 2011, p. 212). The majority of studies reviewed showed that new teachers in induction programs had greater development of job skills related to teaching, e.g., “keeping students on task, using effective student questioning practices, adjusting classroom activities to meet students’ interests, maintaining a positive classroom atmosphere, and demonstrating successful classroom management” (Ingersoll & Strong, 2011, p. 201). Exceptions to this overall pattern included the large randomized trial in a sample of large, low-income schools in Chicago (in Table 16.1) (Glazerman & Seifullah, 2012), which did not find effects on teacher retention or teachers’ classroom practices (Ingersoll & Strong, 2011).

Four commentaries discussed obstacles to effective mentoring programs. Long (2009) reports that, in Australia, mentoring programs have been operating since about 2000. However, often “few resources accompany this role, such as mentor training, release from other duties” (p. 319). Many highly skilled practitioners perceive it to be time consuming, takes them away from their main job of teaching, and

offers few incentives to participate. Dzikowski (2013, p. 355) reports similar challenges including “time constraints, incompatible pairing of mentors and mentees..... and training of mentors”. Steinke and Putnam (2011) argue that in technology education traditional mentoring programs overlook: the lab-based nature of technology programs, lack of funding for supplies and equipment, and the necessity of mentors with similar backgrounds and technical expertise. Flynn and Nolan (2008) summarize research-based best practice for new teacher mentoring programs, such as: developed and coordinated by both faculty and administration; mentors selected before beginning of school year, mentor has same certification area as mentee, monthly meetings with other mentors, mentor demonstrates mastery of pedagogy and subject matter, superior teaching skills, willingness to participate; summer orientation; mentee training in classroom management, monthly meetings with other mentees; principal receives orientation to program, reduces workload for mentee and mentor and develops schedules that provide for common planning.

The limited number of studies identified by our search terms, despite some positive findings, prevents us from drawing any strong conclusions on the potential for induction or mentoring programs to reduce teachers' stress. None of the studies examined teacher stress or health outcomes (other than the surrogate measure of teacher retention) and none used measures of job characteristics typical in organizational research. Only one of the five studies we identified used a quasi-experimental design (Glazerman & Seifullah, 2012). The two recent review papers, which identified additional studies, each came to somewhat different conclusions about the impact of such programs on retention. However, one of the reviews (Ingersoll & Strong, 2011) found a positive impact on the development of job (teaching) skills, a key component of the job demands-control and job demands-resources models. Further research is clearly needed on the impact of mentoring and induction programs on teachers' health and on teachers' job characteristics, such as job skill development and social support at work.

Peer Assistance and Review (PAR) Programs A somewhat expanded version of mentoring called peer assistance and review (PAR) began in Toledo, Ohio, in the early 1980s as a partnership between the teachers union and the school board (Darling-Hammond, 2013; Marshall, 2008). The Toledo program became a blueprint for U.S. PAR programs, currently used in at least 41 districts in 13 states. PAR includes instruments for evaluation, skilled consulting teachers released from some classroom teaching to serve as mentors, and a system of due process and review involving a panel of teachers and administrators who recommend personnel decisions based on evidence from evaluations (Darling-Hammond, 2013). “Consulting teachers...undergo an intensive selection process that includes classroom observations, interviews, a review of their teaching evaluations, and recommendations from peers and administrators” (Darling-Hammond, 2013, p. 26).

PAR programs are designed to support and evaluate both novice and struggling experienced teachers. About 2/3 of “veterans identified for intervention improve [their teaching skills] substantially and successfully complete the program; about one-third resign or are dismissed” (Darling-Hammond, 2013, p. 27). (Retention data is provided in: <http://www.gse.harvard.edu/~ngt/par/resources/outcome.html>.)

The Montgomery County (Maryland) Education Association, together with administrators, jointly run a PAR program which enjoys widespread support (Sullivan, 2012). All beginning teachers are “evaluated by principals and consulting teachers; tenured teachers are evaluated every three to five years”. If a teacher is referred to the next phase of the process, he or she “is required to work with the principal and consulting teacher to devise a plan to address the areas in which improvement is necessary”. Each consulting teacher has a caseload 15–20 teachers, allowing each teacher to receive attention and support” (Sullivan, 2012, p. 149).

We found one empirical study which used site visits and interviews in seven school districts that adopted PAR (see Table 16.1). Papay and Johnson (2012) found that first-year teacher retention averaged ~90%, far exceeding the national average for urban districts. They also reported that PAR encouraged a culture of collaboration, and focused teachers’ attention on instruction, promoted dialogue about sound practice and instructional standards. Given the apparent potential of PAR programs to improve teachers job skills, increase their decision-making authority and improve social support, PAR programs need to be further evaluated using measures of teachers’ health and standard measures of job characteristics.

Teacher Assistance Teams A variety of teacher assistance teams (TATs) have been studied (Table 16.1), all intended to provide problem-solving assistance to general education teachers for students who are “difficult to teach or manage” (Kruger et al., 1995, p. 203). Such teams can provide social support and opportunities for job skill development, key features of the job demands-control, effort-reward imbalance and job demands-resources models.

A study of 167 TAT members and 212 school staff in 28 randomly-selected Massachusetts public elementary schools who had used TAT services surveyed, found that over 50% of the variance in user satisfaction with TAT services was accounted for by administrator support variables. However, this study did not include measures of teacher’s health and only indirect measures of job characteristics (Kruger et al., 1995).

Thirty three teachers in 14 public elementary schools in a southeastern U.S. county were followed through their participation in pre-referral intervention teams (PITs), which addressed individual student difficulties before consideration for special education (Lhospital & Gregory, 2009). Over an average of 2.5 months, teachers’ level of distress related to referred students’ disruption of teaching declined, partially accounted for by student progress on referral concerns. Teachers’ experience of PIT support from team members was also associated with reductions in distress after pre-referral interventions were implemented.

Ten teachers in two Chicago schools volunteered for an intervention and pre-referral model with information sharing sessions, peer exchange sessions, and peer coaching teams, designed to assist general educators with children who were experiencing learning problems (Bay et al., 1994). Ten other teachers in those same schools served as the control group. Interview data suggested that “program participants offered more categories of teaching strategies to address children’s problems and identified more successful teaching strategies than did nonparticipants.” (p. 10). Referral rates for special education showed that participants referred significantly fewer children than nonparticipants. Together these findings suggest that the pre-

referral model may be able to increase teachers' job skills and social support. However, quantitative assessment of such job characteristics was not provided.

An intervention in the U.S. combined stress management workshops with a program designed to facilitate supportive collegial interaction among pairs of teachers to assist each other in solving student-related problems, including implementing and evaluating action plans (Cooley & Yovanoff, 1996). The intervention groups showed greater reductions in emotional exhaustion and improvements in organizational commitment relative to the wait list control groups over 1 year.

The four TAT studies reviewed included a cross-sectional survey and three prospective studies, including one RCT. Only two included quantitative measures of teachers' psychological distress, and one of those included a stress management component, thus limiting our ability to conclude which component was responsible for the reduction in distress observed. Standard measures of job characteristics were not included in the studies. Three of the four studies had small ($n < 70$) samples. Only one study reported a response rate (40.7%). Thus, despite some evidence of the benefits of this model of intervention, study limitations preclude drawing any conclusion.

Teacher Training on Classroom Management Three studies were found that evaluated a variety of teacher training programs on classroom behavior management strategies, focusing on problem behaviors or student mental health issues (Table 16.1). Such programs are an example of increasing job skills, a key component of the job demands-control and job demands-resources models.

The Chicago School Readiness Project (CSR) provided a variety of services to preschool (Head Start) teachers, including teacher training on behavior management strategies, mental health consultation, and stress-reduction services and workshops. Using a clustered RCT design, the CSR significantly improved teachers' job control and work-related resources, but had no statistically significant effects on job demands, and led to a *decrease* in confidence in behavior management (Zhai et al., 2011).

"Aussie Optimism" was a mental health promotion program delivered by primary school teachers to students to prevent internalizing problems in children in Australia (Tyson et al., 2009). Teachers in the Aussie Optimism with Teacher Training and Coaching group reported significantly lower levels of job-related anxiety at the 12-month assessment and depression at both the 12- and 24-month assessments (effect sizes ranging from 0.26–0.42 points on a 1–6 scale) than teachers in the Usual Care group. However, there were no significant differences between the Aussie Optimism with Teacher Training only group and control group after intervention.

Beginning teachers in Germany were randomly assigned to either classroom management training, stress management training or to a wait-list control group (Dicke et al., 2015). The mean of the two training groups at follow-up was significantly lower for emotional exhaustion and rumination, and significantly higher for engagement and quality of sleep, compared to the control group. In addition, teachers in the classroom management group reported significantly less emotional exhaustion and rumination than teachers in the stress management group. Participation in the classroom management group also was associated with higher

self-efficacy in classroom management and several other process measures (Table 16.1).

The three studies found on teacher training on classroom management were randomized trials, either cluster (Tyson et al., 2009; Zhai et al., 2011) or individual RCTs (Dicke et al., 2015) with appropriate statistical analyses. One study found positive impacts of the intervention on job control and job resources among teachers of 3–5 year olds, despite relatively low scale internal consistency reliability (Zhai et al., 2011). However, that intervention included a stress management component limiting our ability to conclude that the training on classroom management was responsible for the benefits observed. High rates of attrition were observed in the other two studies (Dicke et al., 2015; Tyson et al., 2009) limiting our ability to conclude that the reduction observed in psychological distress in those studies was due to the intervention. For example, intention-to-treat analyses in one of the studies (Tyson et al., 2009) showed no significant effects at 12 or 24 months for either anxiety or depression. Thus, given these limitations, the small number of studies, and the variety of training programs evaluated, it is not possible to draw conclusions about the potential job stress reduction impact of any particular program.

16.2.2 Organization of Work Interventions: Job Redesign

Job redesign interventions have been defined in a variety of ways, including increasing job resources (LeBlanc & Schaufeli, 2008), workload reduction, team working, career development, flexible work schedules or autonomous work groups (Bambra et al., 2007; Landsbergis, 2009; Landsbergis et al., 2011; Murphy & Sauter, 2004). We found only two studies that at least partially fit the definition of “job redesign” (see Table 16.1).

One study, from China, explicitly focused on strategies designed to “modify or diminish sources of stress inherent in the work environment (e.g. redesigning the task, establishing flexible work schedules and redesigning the work environment). The intervention was implemented with the help of the school leaders” and also included stress management (Wu et al., 2006, p. 331). Unfortunately, no further details were provided on the nature of the job redesign intervention. Significant decreases in the intervention group over 1 year were seen for role overload, conflicting role demands, responsibility, unhealthy physical environment and interpersonal strain. Significant increases in the intervention group were seen for the Work Ability Index, recreation, self-care and rational/cognitive coping. No significant changes were seen in six other outcome measures, nor in the control group for any measure. Use of simple statistical tests prevented assessment of comparisons of change between the two groups.

Interviews, surveys and systematic field notes over the course of a year were used to examine the impact in two junior high schools in the western U.S. of a legislated career ladder for teachers (Hart, 1990). The legislation included: an extended contract year based on existing salary schedules, a performance bonus based on classroom teaching performance, the use of expert teachers as a resource for improvement of instruction, and increased involvement of teachers in professional

decisions. However, results in the two schools were quite different (Table 16.1). The authors concluded that the influence of the school social unit outweighed individual teachers' efforts or the formal work structure in their impact on teachers' assessments of the new structure and on the nature of redesigned work.

A recent study in Copenhagen was not eligible for our review because the sample was pre-school; however, it is briefly described below as a useful model because of its design. It was a cluster randomized trial with 44 schools assigned to the intervention group and 34 schools assigned to the control group (a total of 2576 employees). The intervention included elements of both job redesign (improved working & holiday schedules, and allocation of overtime) and support/skills building (improving cooperation and communication and opportunities for professional reflection) (Framke & Sørensen, 2015; Framke, Sorensen, Pedersen, & Rugulies, 2016). Seminars, workshops, workplace-directed activities focused on the core work task, and a steering group of teachers, employee representatives, shop stewards, and occupational safety and health representatives helped direct the intervention. Both short-term (adjusted RR = 0.89, 95% CI 0.83–0.96) and long-term (adjusted RR = 0.84, 95% CI 0.69–1.01) sickness absence days (from a municipal register) per person-year during follow-up was reduced in the intervention group relative to the control group.

In summary, given that only two studies were found since 1990 with elements of job redesign, the variety of types of job redesign conducted, and multivariate statistical analysis conducted in neither study, there is very little evidence to draw conclusions on the potential of job redesign interventions to reduce K-12 teachers' stress.

16.2.3 Summary of Research on Organizational Interventions

The 27 studies identified by our search described and assessed a variety of models of organizational interventions. Many of the programs and policies studied were not explicitly designed to reduce teachers' job stress, rather were designed to improve teaching quality, to manage children who are difficult to teach or manage, and to provide support and opportunities for skill development for teachers. Peer Assistance and Review (PAR) programs and some mentoring programs were also designed to provide teachers with: a vital role in evaluating their peers; due process; and help for struggling teachers. Thus, many of the programs were designed to provide support for teachers and to increase their skill levels, and decision-making authority – key variables in studies of job stress. However, very few interventions were explicitly based on job stress models.

A participatory action research approach was not commonly used in the interventions listed in Table 16.1, which may be understandable given the highly structured school environment. Much more common were program packages that had been developed and tested in other schools. However, a number of these packages and models of interventions, such as Teacher Assistance Teams, peer collaboration and even mentoring programs, involve employees in problem-solving as part of an overall structured program. A more participatory approach to both problem identification and solution implementation was used in the study of Copenhagen pre-

schools. (Framke & Sørensen, 2015). In addition, Peer Assistance and Review, while now a structured program, was originally developed through collective bargaining, another form of employee participation (Darling-Hammond, 2013; Papay & Johnson, 2012). The limited number of studies reviewed prevents us from drawing conclusions about the impact of varying degrees of employee participation in the intervention process.

Three studies combined an organizational intervention with stress management training (Cooley & Yovanoff, 1996; Wu et al., 2006; Zhai et al., 2011) with all reporting positive results. However, this is too small a sample to determine whether such combined interventions (which could be considered a “high systems approach” (LaMontagne, Keegel, Louie, Ostry, & Landsbergis, 2007) or “total worker health” (Anger et al., 2015) are more effective than organizational or individual (stress management) interventions separately.

Since the studies were published mainly in educational journals, and not in occupational health or occupational stress journals, only 5 of 15 studies examined measures of psychological distress, anxiety or exhaustion as outcomes (Cooley & Yovanoff, 1996; Dicke et al., 2015; Lhospital & Gregory, 2009; Tyson et al., 2009; Wu et al., 2006) and only 4 of 16 had direct measures of job characteristics, such as job demands, job control, job support or job resources (Lhospital & Gregory, 2009; McCaughtry et al., 2005; Wu et al., 2006; Zhai et al., 2011). Only one included a measure of teachers’ physical health, a self-report measure (Wu et al., 2006). Three studies examined teacher retention as the outcome (Glazerman & Seifullah, 2012; Marable & Raimondi, 2007; Papay & Johnson, 2012), and retention was the focus of several review papers on mentoring (Ingersoll & Strong, 2011; Waterman & He, 2011). Such a focus is understandable since the teaching profession has a relatively high turnover rate during the first years on the job compared to other professions (Ingersoll & Strong, 2011).

Five of the 16 studies (Bay et al., 1994; Hart, 1990; Marable & Raimondi, 2007; Papay & Johnson, 2012; Shernoff et al., 2011) analyzed qualitative data which, while providing rich information for hypothesis generation and process evaluation, limited our ability to draw conclusions about associations between interventions and outcomes. Only four articles (Darling-Hammond, 2013; Lloyd & Payne, 2012; Papay & Johnson, 2012; Sullivan, 2012) explicitly discussed the role of labor unions in the intervention. Few studies used quasi-experimental study designs (pre-post measures and control groups). Naghieh et al. (2015) identified only four such studies, three of which were found eligible for our review (Glazerman & Seifullah, 2012; Tyson et al., 2009; Wu et al., 2006).

There were few empirical studies of each type of intervention. Thus, along with the methodological limitations of the studies reviewed, it is difficult to draw any conclusions about the relative effectiveness of different types of interventions in reducing teachers’ stress, improving teachers’ health or improving job characteristics associated with health.

Assessing the impact of complex intervention programs is challenging since it requires not only the use of quasi-experimental designs, qualitative data, and valid measures of worker health, job characteristics or retention, but also measures of the fidelity of the intervention to the proposed model and the quality of the intervention.

Waterman and He (2011, p. 152) point out that, when studying complex relationships such as mentoring, the more important questions may well be “how” and “in what context” are mentoring programs effective? Most of the studies did not collect data from mentors. The studies we reviewed do suggest that such intervention programs all require time, support, training and resources.

16.3 Current Approaches Towards Organizational Interventions in Primary and Secondary Education

16.3.1 Collective Bargaining

Collective bargaining agreements have the potential to reduce stressful working conditions by increasing job security, employee decision-making authority and control over schedules, social support, and worker safety, and by moderating job demands (Landsbergis & Cahill, 1994). Language from teachers' collective bargaining agreements in the U.S. is summarized in Table 16.2. While some of the language establishes programs such as mentoring or PAR that have been assessed by researchers in a limited number of studies for their impact on teachers' job characteristics, such as job skills, other programs or policies established by bargaining (e.g., assistance for struggling teachers, team teaching, empowerment/participation/School-Based Management, school discipline, or prevention of bullying, harassment or workplace violence) remain to be evaluated in research studies.

In 1985, Cincinnati adopted Peer Assistance and Review and has also experimented with various team-based instructional approaches written into collective bargaining agreements (Anrig, 2013–2014). The Cincinnati Federation of Teachers (CFT)-Board of Education 2011–2013 contract states that “Each school is governed by a local decision-making committee comprising three teachers, three parents, and three community members along with the principal.” (Anrig, 2013–2014, p. 10). The latest CFT-Board contract (July 1, 2014-June 30, 2017) renews the commitment to labor-management collaboration with more autonomy and joint decision-making between teachers and principals at the school level. The district and CFT agree to work together to “co-design and implement the Cincinnati Teacher Evaluation System. Teacher performance will be measured by several factors including professional standards, the application of best practices, and the use of multiple measures of student achievement”. In addition, there is a “commitment to provide support and professional development opportunities to new hires” (<http://cft.oh.aft.org/press/cincinnati-teachers-and-office-staff-ratify-new-contracts-public-schools>).

In 2009, the New Haven, Connecticut school system and the union negotiated a new process for evaluating teachers based on a combination of “qualitative criteria that come from observing teachers in classrooms, paired with quantitative metrics from a variety of student tests”. The plan, titled the School Change Initiative (<http://>

Table 16.2 Contract language on organizational programs and policies with potential impact on teachers' stress

Cincinnati Federation of Teachers	<p>A. 1 New Teacher Support/Mentoring</p> <p>New Hires/1st Year Teachers will receive assistance, including: Practicum session, informal observations 1 to 1 support as needed Mentoring Improvement plan if deficiencies are recognized New to Cincinnati Public Schools will receive: Ohio Resident Education mentoring from his/her site mentor Peer support from site leader Admin support from principal/principal designee</p>
Washington (DC) Teachers Union	<p>“require participation of all teachers within their first 3 years of service” “training in classroom management and effective teaching techniques” “offer a continuum of professional development for all teachers” “Recruit, develop, and assign mentor teachers with the newest staff to ensure that each new Teacher is assigned a mentor” “every DCPS School shall be provided with a full-time Instructional Coach, whose sole responsibility shall be to provide professional development in a job-embedded manner”</p>
United Federation of Teachers (NYC)	<p>“The primary responsibility of a LIM (Lead Instructional Mentor) will be to build school capacity to develop the skills of its teaching population with a specific focus on new teachers”</p>
<p>A. 2 Peer Assistance and Review (PAR); for new or experienced teachers</p>	
Toledo Federation of Teachers	<p>Peer evaluators bring recommendations to a panel → Superintendent → Board of Education → retention decision “Leeway for teachers who are almost there but need just a bit more support” Has accomplished stress reduction as a lifeline for those that need support <i>Evaluation Standards</i> “[Consulting Teachers] find that having clear standards that are widely understood makes their work more straightforward and objective and helps them stay on course. Having standards that are endorsed by teachers and administrators ensures that the decisions of CTs and Panels will be well-informed and based on evidence.”</p>
<p>A. 3 Assistance for Struggling Teachers</p>	
Albuquerque Teachers Federation	<p>“The principal will informally discuss with the teacher the unsatisfactory performance and the changes necessary to improve”</p>

Cincinnati Federation of Teachers	<p>"A teacher's CTES Annual Evaluation shall be considered for retention and promotion and separation decision. Teachers in danger of termination due to inadequate progress or completion of the Improvement Plan will be placed on Comprehensive Assistance Review."</p> <p>Tenured teachers can be referred because of unsatisfactory evaluations</p> <p>"To help correct job-related deficiencies, to assist the teacher in improving performance, and to evaluate the teacher's progress toward the correction of the deficiencies;"</p>
B. 1 Team Teaching	
GUAM Federation of Teachers	<p>Duties of department/chair/team lead: "assist teachers"</p> <p>"with development of improved classroom procedures"</p> <p>"in the use of available instructional materials"</p> <p>"conduct team meetings"</p> <p>"serve as instructional liaison"</p> <p>"use their training & experiences to assist teachers with problems they might have"</p>
B. 2 Professional Learning Communities (PLCs, a broader model of team teaching)	
Cincinnati Federation of Teachers	<p>"Improving student achievement by establishing Professional Learning Communities in which all stakeholders take collective responsibility to ensure student learning and to promote a collaborative educational culture focused on continuously improving results"</p> <p>"The dominant models for the PLCs are teaching teams and learning teams."</p>
C. Empowerment/Participation/School-Based Management	
Detroit Federation of Teachers	<p>"Local schools have greater autonomy in educational decision-making process"</p> <p>"Toward the goal of empowerment"</p> <p>"School-based planning teams at each location will have Union representation including the Union representative"</p> <p>"Obtain a secret ballot vote of approval from at least 75% of instructional staff"</p> <p>"Empowered schools may seek waivers of District policy, contractual language, and state or federal guidelines in order to implement programs that meet school level needs."</p> <p>"There shall be no threats, acts of intimidation or retaliation against bargaining unit members in connection with their position on empowerment issues"</p>
Cincinnati Federation of Teachers	<p>Instructional Leadership Teams</p> <p>"...principal, teachers, parents, and other members may share leadership and make decisions in the following areas: plan and monitor training of staff create and maintain a safe and orderly school environment"</p>

(continued)

Table 16.2 (continued)

<p>D. Prevention of Employee Harassment or Bullying</p>	<p>Harassment: “inappropriate conduct by any person in the school environment” “Policy of the District to provide a safe, positive work environment free of harassment for its entire staff” “Harassment through any means, including electronically transmitted methods, may be subject to disciplinary procedures, [...] whether it takes place on or off school property” “Will result in prompt and appropriate remedial action” “Retaliation against any person for complaining about harassment, or participating in a harassment investigation, is prohibited” “Intentionally false harassment reports, [...], are also prohibited” “Adopted a policy against violence or threatening behavior toward staff members” “Threatening behavior consists of any words or acts that would cause a reasonable person to believe s/he may be harmed”</p>
<p>Houston Independent School District</p>	<p>“The employee may file a complaint orally or in writing by completing the Employee Complaint Form” “The supervisor or department chief to whom the report of the alleged workplace bullying is made shall conduct an investigation based on the allegations in the report and, if appropriate, shall promptly take interim action calculated to prevent workplace bullying during the course of the investigation.” “An employee who alleges he or she has experienced workplace bullying and who is dissatisfied with the outcome of the investigation may file a grievance”</p>
<p>Broward Teachers Union</p>	<p>“School Board employees should not be subjected to harassment, abusive language, upbraiding, insults or interference by a parent or other person in the performance of the employee’s duties” “Bullying/harassment shall be defined as unwanted and repeated written, verbal, or physical behavior, including any threatening, insulting, or dehumanizing gesture, by an adult or student that is severe or pervasive enough to create an intimidating, hostile or offensive educational environment, cause discomfort or humiliation, or unreasonably interfere with the individual’s school performance or participation.”</p>
<p>Duval Teachers United</p>	<p>“The Employer’s administrators shall not reprimand or criticize an individual employee in the presence of the employee’s colleagues, teachers, or in the presence of students or the parents of such students.” “The employee shall have the right to Union representation or a witness” “An employee whose appeal of a disciplinary action is successful shall not lose any seniority, rank, or pay as a result of the Employer’s action.”</p>
<p>Boston Teachers Union</p>	<p>“The aim of this policy is to create a workplace climate of understanding and mutual respect for the dignity and worth of every person so that each person is able to contribute fully to the development and well being of the students of the City of Boston.”</p>
<p>E. Commitment to a Respectful Climate and Culture</p>	<p>“Create a system in which the staff and students can learn, grow, thrive, and be healthy” “Working together through continuous improvement, effective communication, and meaningful involvement in the decision making process” “Committed to shared responsibility and a collaborative partnership” System of trust, honesty, civility, team building, high expectations without fear of retribution, value of contributions</p>
<p>Minneapolis Federation of Teachers</p>	<p>“Create a system in which the staff and students can learn, grow, thrive, and be healthy” “Working together through continuous improvement, effective communication, and meaningful involvement in the decision making process” “Committed to shared responsibility and a collaborative partnership” System of trust, honesty, civility, team building, high expectations without fear of retribution, value of contributions</p>

F. Prevention of Workplace Violence	
Detroit Federation of Teachers	<p>"Members of the bargaining unit who are the unfortunate victims of such occurrences as robbery or assault, while in school or engaging in school related activities, assignments, or duties regardless of time or place shall have released time with pay for court appearance and any other necessary appearances to prepare the criminal case."</p> <p>"Employee absences, from school-related assault shall not be charged against sick leave"</p>
Minneapolis Federation of Teachers	<p>"... teachers must be informed of their student's academic and behavioral histories."</p> <p>"Middle and high school students who have been involved in violent assaultive behavior ...shall be considered for an alternative program appropriate to the student's behavioral needs and shall not be returned to the classroom where the...behavior occurred."</p> <p>"Middle and high school students who have been involved in legally chargeable violent assaultive behavior, [...] shall not be returned to the school site where the legally chargeable violent assaultive behavior occurred."</p>
G. Management of Disruptive Students/School Discipline	
Lake Federation of Teachers	<p>"Non-conforming student behavior shall be reviewed and addressed through the Response to Intervention (Roti) or Positive Behavior Intervention System (PBIS) process for the purpose of changing student behavior and/or school practice(s)."</p> <p>"Shall not be returned to the class of the referring teacher"</p>
Detroit Federation of Teachers	<p>"A teacher may exclude from his/her class a child who, in the teacher's opinion, is causing serious disruption"</p> <p>"The teacher will re-admit the child after some adjustment has been made, following a conference with the child and at least two (2) of the following parties as determined by the principal: an administrator, a counselor, school social workers, school psychologist, attendance officer, a parent of the child."</p> <p>"Suspension may result from any persistent disobedience that interferes with the well-being of other students or...prevents the teacher from carrying on normal class activities"</p> <p>"A continuous record of student discipline cases will be maintained in a place available for staff use as a basis for recommendations for suspension and intelligent administering of penalties for misdemeanors."</p>
H. Employee Assistance Program	
Hardee Education Association	<p>"An employee has the right to refuse referral into the program and discontinue participation at any time"</p> <p>"If the employee enters an in-patient or out-patient program, he/she will be considered to be on approved sick leave and he/she may utilize any accumulated sick days or vacation days to the extent necessary to avoid loss of pay"</p> <p>"Requests for assistance and program use shall not be used in any disciplinary job action"</p>

Source: American Federation of Teachers

www.nhps.net/schoolchange), included input “from a broad coalition, including teachers, administrators, and parents” and “structures for teachers’ career advancement, parent involvement, and wrap-around childcare services” (Dean, 2013, p. 42).

New York State’s teacher evaluation law “requires multiple evaluators and allows districts to use trained peer observers” (Saunders, Fall 2015). For example, the Rochester, NY Career in Teaching (CIT) Program (<http://www.rcsdk12.org/Domain/40>, <http://www.gse.harvard.edu/~ngt/par/practice/rochester.html>), a PAR program, is now one component of teacher evaluation in Rochester. CIT, originally created during 1987 contract negotiations between the Rochester Teachers Association and the School District, includes new teacher mentoring, and voluntary peer coaching to experienced teachers, including those having performance difficulties. CIT demonstrates an 88% teacher retention rate after 1 year in the novice program (<http://www.gse.harvard.edu/~ngt/par/resources/outcome.html>).

Many aspects of these contracts listed above and in Table 16.2 involve providing teachers with a voice (decision-making authority) in instruction, performance evaluation and career development, and thus could be expected to reduce their job stress. PAR programs have been evaluated for their impact on teacher retention. However, researchers have yet to evaluate many of the collective bargaining “interventions” for their direct impacts on teachers’ stress and health.

Prevalence of Some Current Intervention Approaches In April 2015, a national U.S. on-line survey of teachers and other school personnel on working conditions and stress (American Federation of Teachers & Badass Teachers Association, 2015) found that 37% reported that “My school has a good mentoring program, especially for new teachers”, but only 17% agreed that “My school has a good system of peer evaluation, as part of the teacher evaluation system”. Seventy percent reported that their district or school has a workplace bullying policy or a harassment policy “that includes a prohibition against bullying”, and 42% reported that their “school district provide regular training on workplace harassment and bullying”. Having these policies was associated with “finding your work stressful” less often (see Tables 16.3a, 16.3b and 16.3c).

Table 16.3a Questions on organizational policies from the AFT national well-being online survey, April 18–May 1, 2015, $N = 35,422$ respondents (% agree)

	Teacher (%)	Special Ed teacher (%)	Other in-class (%)
My school has a good mentoring program, especially for new teachers ^a	36	39	48
My school has a good system of peer evaluation, as part of the teacher evaluation system ^a	15	17	39
Does your district or school have a workplace bullying policy or a harassment policy that includes a prohibition against bullying?	69	69	76
Does your school district provide regular training on workplace harassment and bullying?	41	42	50

^aAsked only of teachers and paraprofessionals/teachers assistants ($n = 30,004$)

Table 16.3b Questions on organizational policies from the AFT national well-being online survey, April 18–May 1, 2015, $n = 35,422$ respondents (% agree)

	Teacher				Special Ed teacher				Other in-class ^b			
	Often (%)	Sometimes (%)	Rarely/never (%)		Often (%)	Sometimes (%)	Rarely/never (%)		Often (%)	Sometimes (%)	Rarely/never (%)	
My school has a good mentoring program, especially for new teachers. ^a	32	46	57		35	51	56		35	57	72	
My school has a good system of peer evaluation, as part of the teacher evaluation system ^a	12	23	36		14	26	31		28	47	61	
Does your district or school have a workplace bullying policy or a harassment policy that includes a prohibition against bullying?	68	71	79		68	75	83		74	78	77	
Does your school district provide regular training on workplace harassment and bullying?	40	45	56		40	48	55		46	52	57	

^a Asked only of teachers and paraprofessionals/teachers assistants ($n = 30,004$)

^b Differences between school setting groups should be interpreted with caution since less than 2% of respondents identified themselves as being from charter or private/parochial schools

Table 16.3c Questions on organizational policies from the AFT national well-being online survey, April 18–May 1, 2015, $n = 35,422$ respondents (% agree)

	Teacher				Special ed teacher				Other in-class ^b			
	Public (%)	Charter (%)	Private/parochial (%)	Public (%)	Charter (%)	Private/parochial (%)	Public (%)	Charter (%)	Private/parochial (%)	Public (%)	Charter (%)	Private/parochial (%)
My school has a good mentoring program, especially for new teachers. ^a	36	26	30	39	32	20	49	36	23			
My school has a good system of peer evaluation, as part of the teacher evaluation system ^a	15	17	22	17	18	7	40	46	15			
Does your district or school have a workplace bullying policy or a harassment policy that includes a prohibition against bullying?	69	56	46	70	54	60	76	73	67			
Does your school district provide regular training on workplace harassment and bullying?	41	28	27	42	31	53	50	36	13			

^aAsked only of teachers and paraprofessionals/teachers assistants ($n = 30,004$)

^bDifferences between school setting groups should be interpreted with caution since less than 2% of respondents identified themselves as being from charter or private/parochial schools

16.3.2 *Legislative/Policy Approaches*

Legislation in the U.S. at the Federal level (e.g., the Occupational Safety and Health Act) or at the state level (e.g., state laws banning mandatory overtime and requiring safe staffing levels for nurses) have the potential to reduce stressful working conditions by increasing worker control over schedules, moderating job demands, and improving worker safety (Landsbergis, 2009).

In addition to the state teacher evaluation laws discussed above, all states have laws to prevent bullying of children in schools (<http://www.stopbullying.gov/laws/>). However, only Kansas and Florida (as far as we can determine) also include protections against bullying of school staff. For example, the Kansas law, effective July 1, 2013, requires schools to include the following in their bullying policies: “Bullying means: a) any intentional gesture or any intentional written, verbal, electronic or physical act or threat either by any student, staff member or parent towards a student or by any student, staff member that is sufficiently severe, persistent, or pervasive that such gesture, act or threat creates an intimidating, threatening or abusive educational environment that a reasonable person, under the circumstances, knows or should know will have the effect of: a. Harming a student or staff member, whether physically or mentally...” including “cyberbullying” (<http://community.ksde.org/Default.aspx?tabid=3899>).

The Florida law required each school district, by December 1, 2008, “to adopt a policy prohibiting bullying and harassment of any student or employee of a public K-12 educational institution...” (http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=1000-1099/1006/Sections/1006.147.html).

In 1999, the California State Legislature authorized a statewide grant program for PAR programs as part of a “hybrid model” designed to work together with an existing induction program (Darling-Hammond, 2013, p. 27).

State legislatures also remain the focal point of current debates over school budgets, teacher staffing and tenure. For example, in 2012, the California legislature passed Proposition 30 which “increased income taxes for the wealthiest Californians” and generated “needed funds for the state’s schools and public services” (Dean, 2013, p. 41). Many interventions described in this chapter require time, support, staffing and resources. Thus, their effectiveness will depend, in part, on adequate school funding.

Only one study was found which attempted to assess international differences in teachers’ job characteristics and relate them to differences in policy and labor relations. Vocational teachers (specifically, hairdressing teachers) in three schools in Norway reported higher levels of autonomy, discretion and decision-making influence than those in four schools in England and Wales (Lloyd & Payne, 2012). The authors suggest that the institutional and policy context (the use of a “particular form of NPM [New Public Management] in England and Wales centered around ‘marketization’ and ‘performativity’”), along with the actions of trade unions, explain the differences (p. 44). They conclude that educational professionals in Norway have a stronger collective voice than those in England and Wales.

16.3.3 *Promising Models for Research*

Studies eligible for our review did not include evaluations of a number of promising interventions, which may have the potential to reduce teachers' stress. These are described below:

Professional Learning Communities (PLCs) are defined as an “ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results” for students, operating “under the assumption that the key to improved learning for students is continuous job-embedded learning for educators” (<http://www.allthingsplc.info/about>). Our literature search found no studies which specifically assessed the impact of PLCs on teacher outcomes. However, the web site, <http://www.allthingsplc.info/>, lists about 150 schools where teachers are organized into “grade-level, course-specific, or interdisciplinary collaborative teams” (Anrig, 2013–2014, p. 8). To receive recognition as a model PLC, schools need to demonstrate a collaborative culture: “Members of teams work interdependently to achieve common goals for which they are mutually accountable; Teachers are provided with time to collaborate during their contractual day; Teachers use their collaborative time to engage in collective inquiry regarding issues directly related to student learning” (<http://www.allthingsplc.info/evidence-submission-online>). If PLCs can improve job skills, decision-making authority and social support among teachers, they should be evaluated as a model to reduce teacher stress.

Professional Capital A related concept is “professional capital”, a combination of “human capital” (the qualifications and competencies of individuals), “social capital” (trust and collaboration) and “decisional capital” (the development of professional judgement) (Hargreaves & Fullan, 2012, 2013). Hargreaves and Fullan (2013) provide examples of efforts to develop social capital and professional capital in education. These include teachers in Finland creating curriculum together, teachers in Ontario, Canada taking collective responsibility for all children across grades, and the California Teachers Association lobbying for additional funding for low-performing schools and with teachers as “drivers of system change”. Thus, the professional capital approach appears to encompass a variety of strategies at school, state or country level. Our literature search found no studies which specifically assessed the impact of “professional capital” interventions on teacher outcomes. However, this approach also appears to focus on improving teacher skill and competency development, decision-making authority and social support, and thus holds potential for reducing teachers' stress. It needs to be more concretely operationalized and evaluated for its impact on teacher outcomes.

Co-teaching No empirical studies were found that evaluated the impact on job characteristics or teacher health of “co-teaching”, a potential form of support and skill development for teachers, where two professionals (typically a special educator and a general educator) work in the same classroom at the same time (Simmons & Magiera, 2007). However, a number of qualitative studies have examined the

process of co-teaching. For example, Simmons and Magiera (2007), examining three high schools in a suburban U.S. school district, suggested the need for updated training to more consistently apply the co-teaching model within the classroom, keeping effective co-teaching pairs together, and providing common planning time". A study in four Helsinki schools found that co-teaching was seen as a developing mode of teaching and suitable for all school subjects (Takala & Uusitalo-Malmivaara, 2012). In Australia, Main (2012) found that it took time for teachers to learn and perfect the necessary new forms of instruction, and that administrative support was needed. Further research is needed to evaluate the impact of co-teaching on teachers' job characteristics, stress and health.

School Climate A large body of research has been conducted on school climate, defined as "norms, values, and expectations that support people feeling socially, emotionally and physically safe" (National School Climate Council, 2007, p. 4). Positive school climate is "fostered through a shared vision of respect and engagement across the educational system" (O'Brennan & Bradshaw, 2013, p. 1). While there is no universally agreed upon set of core features, the following elements have been identified: (1) safety (including physical and social-emotional security); (2) support for teaching and learning; (3) social support from peers and adults, and respect for diversity; (4) institutional environment (including school connectedness and engagement); (5) staff relationships (O'Brennan & Bradshaw, 2013) and (6) the school improvement process (Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013).

The main focus of school climate research has been on student behavior problems and discipline (O'Brennan & Bradshaw, 2013) and students' mental and physical health (Thapa et al., 2013). However, a positive school climate has been associated with higher levels of teacher commitment and more collegiality (Singh & Billingsley, 1998), with fewer threats or assaults by students against teachers (Gregory, Cornell, & Fan, 2012) and with less teacher burnout (Grayson & Alvarez, 2008) and attrition (Miller, Brownell, & Smith, 1999).

While school climate standards "do not recommend or detail specific assessment, curricular, leadership, professional development, and related....programs, curricula, or services" (National School Climate Council, 2009, p. 3), those standards do include "Leadership and staff are provided continuous professional development" and "The school community creates an environment where all members are welcomed, supported, and feel safe in school: socially, emotionally, intellectually and physically" (National School Climate Council, 2009, p. 7).

A large 5-year randomized controlled trial of the widely-used Positive Behavioral Interventions and Supports (PBIS) program in 37 Maryland elementary schools, among 2596 staff, found a significant effect of PBIS on the schools' overall organizational health, and specific teacher outcomes such as staff affiliation (social support among staff) and, when implementation fidelity was included in the model, collegial leadership (a supportive principal) (Bradshaw, Koth, Thornton, & Leaf, 2009).

In recent contract bargaining, St. Paul, MN teachers achieved expanded school climate improvement teams, with parents included. The team from each school can apply for a grant for “restorative practices”, a novel approach to student discipline designed to reduce student suspensions, especially for minor rule-breaking (Winslow, June 8, 2016). Therefore, to better fulfill its potential, future iterations of school climate standards should more explicitly describe teachers’ working conditions, stress and health, and school climate researchers need to more explicitly assess measures of teachers’ working conditions, stress and health.

Workplace Violence Prevention Workplace violence is a common hazard facing K-12 teachers. Annual incidence of physical assault at work among K-12 educators was estimated to be 8.3/100 in Minnesota (Gerberich et al., 2011) and 12.3/100 in Pennsylvania (Tiesman, Konda, Hendricks, Mercer, & Amandus, 2013). Annual incidence of non-physical workplace violence (threats, sexual harassment, verbal abuse and bullying) was estimated to be 38.4/100 in Minnesota and 28.9/100 in Pennsylvania. Special education teachers were significantly more likely to be physically assaulted and experience a non-physical event compared to general education teachers (Tiesman et al., 2013). In Pennsylvania, assaulted educators were more likely to find work “always” stressful (adjusted odds ratio = 2.5, 95% CI 1.5–4.1) and to “very likely” leave the education field in the next year (adjusted odds ratio = 10.7, 95% CI 4.1–28.1). (Tiesman, Hendricks, Konda, & Hartley, 2014). Therefore, programs to reduce both physical and non-physical violence against teachers in schools, such as PBIS, “Handle with Care, Restorative Justice Practices or Safe & Civil Schools”, need to be evaluated for their potential to also reduce teachers’ stress and improve teachers’ health.

16.4 Conclusions and Recommendations

Our review of research, collective bargaining language and legislative initiatives identified a variety of types of organizational interventions, primarily support and skills building interventions, which have the potential to reduce job stress and improve the health of K-12 teachers. Evidence suggests that mentoring and induction programs and Peer Assistance and Review (PAR) programs can increase workplace social support, job skills, decision-making authority, and, perhaps, job security for teachers, and thus may be able to reduce their job stress and improve their health. The focus on skills development is understandable since teaching is a profession in which a significant portion of skills can only be acquired on the job (Ingersoll & Strong, 2011). Evidence for other models of interventions is more limited. Some models, such as contract language or legislation on prevention of bullying, harassment or workplace violence, are promising, but await further evaluation research.

Based on our review, we recommend that a national research agenda on teacher stress prevention and health in the U.S. include the following elements:

1. While the focus of much educational research is often unavoidably on student outcomes, a comprehensive assessment of the impact of school programs and policies should include contextual measures of teachers' working conditions (including job demands, job control, job support, job security, and career development) and physical and mental health (including psychological distress, anxiety, depression and burnout).
2. The impact of stress on educators in every setting needs to be examined -- special education, pre-K, elementary, middle school and high school. There are particular challenges in each of those settings.
3. Studies need to include quasi-experimental designs whenever possible, including pre- and post-measures and control groups, and follow-up assessments.
4. Studies need an adequate assessment of the fidelity of the intervention to the proposed model and intervention quality. Can the study answer the questions of "how" and "in what context" are programs and policies effective? Were the programs and policies adequately funded?
5. Studies which evaluate the impact of collectively bargained or legislated programs.
6. Participatory research where educators assist in the identification of intervention models to study and participate in implementing and evaluating the intervention
7. Studies of promising approaches, such as professional learning communities, professional capital, co-teaching, school climate and workplace violence prevention.
8. Novel approaches to student discipline, such as "restorative practices" (Winslow, June 8, 2016).
9. The development of evidence-based interventions to reduce violence (both physical and non-physical) faced by special educators.
10. Studies of the role of unions in developing and implementing interventions.
11. Periodic (e.g., annual) national U.S. surveys of teachers that include valid measures of teachers' psychosocial working conditions, stress and health.
12. Comparative studies between countries of school programs and policies that take into account measures of teachers' working conditions stress and health.
13. Studies which implement and assess job stress reduction interventions combined with stress management or health promotion programs, consistent with a high systems approach (LaMontagne et al., 2007) or NIOSH's Total Worker Health approach (Anger et al., 2015).

The current debate over methods to improve student achievement is beyond the scope of our review. However, the classic study "Organizing Schools for Improvement" (Bryk, Sebring, Allensworth, Luppescu, & Easton, 2010) identified five key organizational features for advancing student achievement. Three of the five are consistent with programs and policies described in this chapter which modify job characteristics and thus may reduce sources of teachers' stress: "A coherent instructional guidance system...with meaningful teacher involvement....An effective system to improve professional capacity...and enable ongoing support and

guidance for teachers....Leadership focused on cultivating teachers, parents and community members so that they become invested in sharing overall responsibility for the school's improvement" (as reported by Anrig, 2013–14, p. 6). Similarly, in a Massachusetts study, favorable conditions of work predict higher rates of student academic growth (Johnson et al., 2012). Thus, there is the potential for such programs and policies to play a role both in improving student achievement and reducing teacher stress, ill health and turnover.

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Chapter 17

New Directions in Intervention: Cyber-Bullying, Schools and Teachers

Tom Cox, Magda Marczak, Kevin Teoh, and Juliet Hassard

Abstract Many of the most serious challenges that teachers face through their work in schools are related to violence, bullying and harassment among their students. Indeed, together, these challenges have come to define a growing literature in the psychological and educational sciences. This literature encompasses both physical and psychological variants of these social phenomena. This chapter focuses on bullying. The development of information and communication technology over the last two or three decades has allowed bullying to be even more destructively expressed in the school context by the use of social media. This chapter looks at cyber-bullying in the school context. Its focus is teachers and their role, at the front line, in handling this problem. It begins by discussing what is and what is not cyber-bullying and then presents a narrative review of the evidence on the risk that it poses to student well-being, broadly defined, and performance. It establishes the prevalence of the problem, although the data are very varied, and the nature and magnitude of its effects. In doing so, it notes the growing but small literature on the cyber-bullying of teachers themselves. It argues that teachers need to understand the nature of the risk so that they can deal with it through the use of prevention and management strategies. It provides a brief account of the legal and policy contexts, in the U.K. and U.S., for action at school-level. Finally, it looks at the emergent literature on intervention strategies and concludes with a suggestion for a four-point generic strategy based on the information that is currently available.

Keywords Cyber-bullying • Schools • Teachers • Risks, policies, and interventions

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The aim of this chapter is to introduce and explore the issue of cyber-bullying in schools from the teacher's perspective both as someone with a responsibility to manage it among their students and also as a potential victim. The teacher's work involves managing the learning environment around a social dynamic of fluid relationships. In order to achieve required academic goals, teachers have to support their students not only in navigating the demands placed upon them by learning, but also by their social, emotional and peer relationships. The latter can include dealing with the different forms of adolescent aggression including cyber-bullying. This narrative review of the literature has been designed to explore the research on cyber-bullying that has relevance to the teacher's understanding of this risk to student well-being in the school context and their role in managing the challenge. It considers how cyber-bullying has been defined and can be recognized; the different forms that it can take, its prevalence and possible effects. It then looks at cyber-bullying in its legal and policy contexts in the U.K. and U.S. Both are central to understanding how the risk that it poses in schools might be assessed and managed and the responsibilities that teachers have. The final section briefly discusses the actions and research that have taken place on how cyber-bullying might be best dealt with in the school context. It concludes by suggesting a four-point strategy for dealing with cyber-bullying at school.

17.1 Defining Cyber-Bullying

Definitions of cyber-bullying vary, but most researchers agree that it is an intentional, repeated and aggressive behavior carried out by an individual or group that uses information and communication technology as an instrument of that aggression (see Table 17.1). The behavior is usually directed against someone who cannot easily defend him or herself or otherwise terminate the bullying (Smith et al., 2008; Vandebosch & Van Cleemput, 2008). There is an implied power imbalance between the victim and the perpetrator.

The definitions presented in Table 17.1 incorporate the three main characteristics of cyber-bullying: the intention to harm, repetition of the behavior and a power imbalance between the victim and the perpetrator(s). While these three characteristics are widely accepted (Dooley, Pyzalski, & Cross, 2009) issues remain (Marczak & Coyne, 2015; Nocentini et al., 2010).

Intention to Harm Some researchers have argued that the mediated nature of cyber-bullying makes it very difficult to establish intention to harm (Menesini & Nocentini, 2009; Slonje & Smith, 2008) partly because those involved may not be aware of the consequences of their behavior (Smith, Mahdavi, Carvalho, & Tippett, 2006). It is possible that even when electronic communications are sent in jest and not intentionally meant to cause harm, they can detrimentally affect the recipients (Grigg, 2010). Therefore, the combination of the recipient's perception of the perpetrator's intention and the impact of the behavior on the recipient might offer a better criterion.

Table 17.1 Conceptual definitions of cyber-bullying used in research

Study/year	Definition
Finkelhor, Mitchell, and Wolak (2000)	Online harassment: Threats or other offensive behavior (not sexual solicitation) sent online to the youth or posted online about the youth for others to see (p. 9)
Belsey (2004)	Cyber-bullying involves the use of information and communication technologies such as email, cell phone and pager text messages, instant messaging, defamatory personal websites, and defamatory online personal polling websites, to support deliberate, repeated, hostile behavior by an individual or a group that is intended to harm others (http://www.cyber-bullying.ca/)
Ybarra and Mitchell (2004)	Internet harassment: An overt, intentional act of aggression towards another person online (p. 320)
Patchin and Hinduja (2006)	Willful and repeated harm inflicted through the medium of electronic text (p. 152)
Aftab (2006)	Cyber-bullying is when a child, preteen or teen is tormented, threatened, harassed, humiliated, embarrassed or otherwise targeted by another child, preteen or teen using the Internet, interactive and digital technologies or mobile phones. It has to have a minor on both sides, or at least have been investigated by a minor against another minor. Once adults become involved, it is plain and simple cyber-harassment or cyberstalking (http://www.stopcyber-bullying.org/doc/what_is_cyber-bullying_exactly.doc)
Willard (2011)	Sending or posting harmful or cruel text or images using the Internet or other digital communication devices (p. 1)
Slonje and Smith (2008)	Aggression that occurs through modern technological devices and specifically mobile phones or the Internet (p. 147)
Smith et al. (2008)	An aggressive, intentional act carried out by a group or an individual, using electronic forms of contact, repeatedly and over time against a victim who cannot easily defend him or herself (p. 376)
Juvonen and Gross (2008)	The use of the Internet or other digital communication devices to insult or threaten someone (p. 497)
Li (2008)	Bullying via electronic communication tools such as e-mail, cell phone, personal digital assistant (PDA), instant messaging, or the World Wide Web (p. 224)
Tokunaga (2010)	Cyber-bullying is any behavior performed through electronic or digital media by individuals or groups that repeatedly communicates hostile or aggressive messages intended to inflict harm or discomfort on others (p. 278)

Repetition The repetitive nature of behaviors that typically characterize definitions of traditional bullying could be applied to cyber-bullying as a criterion. However, the very nature of social media means that the originator of the cyber-bullying act might quickly lose control over it. An electronic communication ‘going viral’ sometimes against the originator’s wishes provides an example of this loss of control in relation to repetition and impact. This scenario usually arises when a perpetrator posts an electronic communication on a public forum, a public blog, or possibly creates a ‘hate page’. In such instances, their one single act has infinite

scope in terms of the speed with which it can be distributed and accessed by large numbers of people (Langos, 2012). Moreover, the original electronic communication can be saved and then accessed later and re-posted. This provides an easy platform for others to recreate and modify the original perpetrator's original one-off communication. As a result, the victim may experience distress repeatedly (Menesini & Nocentini, 2009). Langos (2012) has argued that it should no longer be necessary for a victim to prove a course of repeated behaviors on the part of the perpetrator to satisfy the criterion of repetition.

Power Imbalance A power imbalance between perpetrator(s) and victim is characteristic of most forms of bullying, but can be increased by the very nature of cyber-bullying. In many definitions of school bullying, the victim is described as 'weak' (Dooley et al., 2009). The perpetrators are seen as stronger exerting their power and control through physical, psychological or social means over weaker individuals (Atlas & Pepler, 1998). Online, however, even the smallest and weakest of individuals can engage in cyber-bullying to some effect. Neither the perpetrators' nor the victim's physical stature are of significance. Instead, the more technologically knowledgeable individuals can hold the power (Vandebosch & Van Cleemput, 2008; Ybarra & Mitchell, 2004). This technological power is also characteristic of the virtual worlds such as Second Life.¹ Chesney, Coyne, Logan, and Madden (2009) concluded that a virtual world is a specific environment in which those with greater expertise may become more powerful than others and therefore more able to do harm to those others.

Interestingly, Dooley and colleagues (2009) have argued that power in an online environment is not based on the perpetrator's possession of power, but rather on the victim's *lack of power*. This point picks up on the discussion of repetition as a possible criterion. Dooley and co-authors (2009) believed that as the electronic communications exist in cyberspace, the online environment itself makes it more difficult to remove or to avoid it as it can be circulated, saved, reposted, or edited and amended by people other than the original perpetrator. This fact can contribute to the victim's feelings of powerlessness.

It can be seen that defining cyber-bullying may not be as clear-cut as defining traditional bullying. Thus the debate on whether and how to apply the characteristics of intention to harm, repetition and power imbalance as defining criteria necessarily continues. At the very least, these characteristics provide a framework within which teachers can think through cyber-bullying in their schools and how they might understand and deal with it. Perhaps, like many psychosocial risks, it is challenging to tightly define and to operationalize cyber-bullying. Arguably with experience based on more extreme, and thus more obvious cases, teachers can "recognize cyber-bullying when they see it". This strategy might not be judged to be scientifically, or legally, ideal. But might be practically adequate at the school-level. It might offer a way forward that is "fit for purpose". If so, the question then arises as to the forms that cyber-bullying can take in practice.

¹ Second Life provides an on-line environment for a three dimensional virtual world with a clear emphasis on social interaction (<http://slife.com/>, Boulos, Hetherington, & Wheeler, 2007).

17.1.1 *Different Forms of Cyber-Bullying*

There has been much research that allows us to describe the different forms of cyber-bullying that have been reported or observed. Examples of this research are discussed here. A putative three-dimensional model is suggested based on: types of *media used*, *those involved* and on the *behavior enacted*. Applying this model within the characteristics framework discussed above may help teachers decide what is, and what is not, cyber-bullying.

Cyber-bullying has been studied according to the *media or technology used*. Smith et al. (2008), for example, identified seven types of cyber-bullying. They listed these as text messages, pictures and video clips, phone calls, emails, chat-rooms, instant messaging and bullying via websites. Other significant types of cyber-bullying related to particular media used have been more recently discussed. Examples are *sexting* (distributing sexualized images using cell phones or the internet without person's consent), *trolling* (uploading persistent abusive comments on a website) and *griefing* (harassing someone in an online game or virtual world) (Slonje, Smith, & Frisé, 2013). All three will achieve greater prominence in the literature in the coming years.

Cyber-bullying has also been investigated in terms of three of the key *role or stakeholder groups* involved: victims, perpetrators and bystanders. There are obviously other active stakeholder groups such as students' parents. Huang and Chou's (2010) study has shown that harassment and threats followed by making jokes about or fun of the victim are the most common behaviors reported by those victims. The least commonly reported behavior is the spreading rumors.

Finally, Rivers and Noret (2010) identified ten categories of enacted *behavior*. These were threats of physical violence, abusive, hate-related and homophobic name calling, death threats, threats to family and home, menacing chain messages, threats to damage existing relationships, the ending of platonic relationships, sexual acts, and demands and instructions.

17.2 Risks Associated with Cyber-Bullying

It has been established that the concept of risk is central to the assessment and management of all stress and related health and performance issues (Cox, Griffiths, & Rial-Gonzalez, 2000). Usually, such risk is expressed as a function of the likelihood of an event occurring and the magnitude of its effects. Here, the likelihood of cyber-bullying occurring among young people at school is treated as a reflection of its prevalence rate and the magnitude of its possible effects, as a reflection of its association with poor academic, and social impairment and suicidal behavior. There are, at least, two important caveats. First, risk has to be expressed in terms of an outcome (effect). Here, the focus is on *impairment of well-being or performance* to include the extreme of suicidal behavior as well as poor academic and social performance.

The breadth of this definition is not really satisfactory scientifically, but the available data do not allow a more specific approach. Second, there are two aspects to cyber-bullying: perpetration and victimization. The focus here is on the *victim*.

17.2.1 Prevalence Rates

Cyber-bullying appears to occur among people of all ages. However, most research has examined this phenomenon in young people, children and adolescents (Tokunaga, 2010) at school or in College. The reported prevalence rates for cyber-bullying, across such studies, have ranged from about 10 to 72% (for example, Dehue et al., 2008; Hinduja & Patchin, 2008; Juvonen & Gross, 2008; Kowalski & Limber, 2007; Li, 2007; Mishna, Cook, Gadalla, Daciuk, & Solomon, 2010; Patchin & Hinduja, 2006; Raskauskas & Stoltz, 2007; Schneider, O'Donnell, Stueve, & Coulter, 2012; Williams & Guerra, 2007). A recent meta-analysis of data from 80 such studies has suggested that prevalence rates for cyber-bullying among adolescents are 15% for victimization and 16% for perpetration (Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014).

The wide variation in reported rates across studies is probably a reflection of differences in focus and participants, in the measures and methods used, and in differences over time, between countries, cultures and schools, and by age and gender. Such differences make comparisons across studies and summarizing data difficult. Some examples will suffice.

Some studies have used a relatively restrictive time frame when asking young people when a cyber-bullying incident took place (such as within the last year) (DeHue, Bolman, & Völlink, 2008; Williams & Guerra, 2007; Wolak, Mitchell, & Finkelhor, 2007; Ybarra, 2004; Ybarra & Mitchell, 2008). This could lead to lower prevalence rates than might be reported with longer time frames or with no time frame imposed. Researchers who did not impose a time frame have indeed reported higher prevalence rates (Juvonen & Gross, 2008; Mishna et al., 2010; Raskauskas & Stoltz, 2007). In addition, Kowalski, Giumetti, Schroeder, and Lattanner (2014) suggest that the discrepancy in reported rates of cyber-bullying may depend on the most popular method of online communication used by the participant sample at the time of the research being conducted. Smith et al. (2008) included seven forms of online communication in their work: cellphone calls, text messages, picture and video clips, e-mails, chat rooms, instant messaging and websites). Hinduja and Patchin (2010) included nine types: e-mails, websites, instant messaging, webcams, chat rooms, social networking sites, blogs, cellphone calls and text messages). Wachs and Wolf (2011) used five: e-mails, text messages, social networking sites, instant messaging, and chat rooms). Interestingly, with the emergence of smart phones, different online communication media can be accessed using a single cell phone (Marczak & Coyne, 2015).

A conservative interpretation of the available data would suggest prevalence rates, for victimization, of about 1 in 6 or 1 in 7, but they may be much higher in particular circumstances.

17.2.2 Age and Gender Differences in Prevalence

Some studies report a relationship between age and cyber-victimization (DeHue et al., 2008; Hinduja & Patchin, 2008; Kowalski & Limber, 2007; Slonje & Smith, 2008; Ybarra, Diener-West, & Leaf, 2007; Ybarra & Mitchell, 2008). Others have failed to observe such an association (Beran & Li, 2008; Juvonen & Gross, 2008; Katzer, Fetchenhauer, & Belschak, 2009; Patchin & Hinduja, 2006; Smith et al., 2008; Wolak et al., 2007; Ybarra, 2004). One explanation for these apparently contradictory results is again methodological in nature relating to the wide and differing ranges of age groups included within samples. Despite such methodological differences that seem to characterize research in this area, a pattern of age related effects appears to be emerging.

Williams and Guerra (2007) have reported that both physical and cyber-bullying peak in middle school and decline during high school. However, Ševčíková and Šmahel (2009) have given examples from their data of students' perceptions that older adolescents are more often the perpetrators of cyber-bullying. They also believed that, although it can take place throughout adult life, cyber-bullying decreases after late adolescence. Tokunaga (2010) concluded that the age trend across studies describes a curvilinear relationship for victimization with the highest number of incidents taking place around 13–15 year olds.

Gender may also be an important factor in cyber-bullying (Keith & Martin, 2005). However, inconsistent findings have also been reported regarding gender differences (Hinduja & Patchin, 2010; Smith et al., 2008; Tokunaga, 2010). Although some studies have shown that boys tend to be more involved than girls in cyber-bullying (Erdur-Baker, 2010; Li, 2006; Smith et al., 2008), some observe the opposite effect (Rivers & Noret, 2010) and others report no significant gender differences at all (Livingstone, Haddon, Görzig, & Ólafsson, 2010; Smith et al., 2008). Slonje et al. (2013) suggest that, once again, the inconsistencies in relation to gender difference may reflect methodological issues.

It is clearly necessary to have a reliable indication of prevalence rates for cyber-bullying that take account of the person's role in that issue, victim or perpetrator, as part of the estimation of the risks that it poses. To date, however, reported prevalence rates vary too widely, largely for methodological reasons, for there to be any reliable estimate of base prevalence. This variation may obscure the answers to important questions such as those relating to age and gender effects. Little trust can be placed in the existing prevalence data taken collectively and at face value. This has led some to effectively ask the question "cyber-bullying: myth or reality?" (Sabella, Patchin, & Hinduja, 2013).

17.2.3 *Effects of Cyber-Bullying*

The psychosocial impact of cyber-bullying has been variously reported to be greater than that of traditional bullying (e.g. Campbell, Spears, Slee, Butler, & Kift, 2012).

A relatively recent meta-analysis of 131 studies by Kowalski et al. (2014) suggested that cyber-bullying was related to several physical and mental health problems both in terms of perpetration and victimization. Victimization appeared correlated with reports of a wide range of significant psychological and social markers of poor well-being. These included stress, suicidal ideation, depression, anxiety, loneliness, reduced life satisfaction, conduct problems, somatic symptoms, emotional problems, reduced self-esteem, substance abuse and lower prosocial behavior. At the same time, perpetration correlated significantly with substance abuse, anxiety, depression, reduced life satisfaction, reduced self-esteem, lower academic achievement and loneliness. A Finnish study by Sourander et al. (2010) highlights the range and seriousness of the possible effects of cyber-bullying victimization. In this study, being a victim was associated with emotional and peer problems, headaches and abdominal pain, sleeping difficulties, and not feeling safe at school. The latter was particularly marked when cyber-bullying involved a group of people. Obviously, the pattern of such effects varied from individual to individual and by circumstance but collectively these data do underline the substantive impact that cyber-bullying victimization might have on well-being broadly defined.

Furthermore, there is evidence that cyber-bullying can also affect the learning process in those who are victimized. It has been shown to detrimentally affect academic skills and achievements (Li, 2007; Shariff & Hoff, 2007; Ybarra et al., 2007), to decrease students' motivation (Li, 2007) and school attachment (DiPaola & Tschannen-Moran, 2014; Schneider et al., 2012), and to affect concentration and give rise to absenteeism (Beran & Li, 2008).

Several studies have examined the association between cyber-bullying victimization and suicidal behavior. A meta-analysis of 491 studies reported between 1910 and 2013 by Van Geel, Vedder, and Tanilon (2014) is of particular interest. Their data showed that victimization was strongly related to both suicidal ideation (OR 2.23) and suicide attempts (2.55) and that these effects were not moderated, in this data set, by age or gender. Some individual studies, however, do support the notion that there are gender differences in the relationship between victimization and suicidal ideation.

Klomek, Marrocco, Kleinman, Schonfeld, and Gould (2007) suggested that, for girls, victimization immediately increases the risk for suicidal ideation but, for boys, only prolonged victimization is related to suicidal ideation. Cyber-bullying was more strongly related to suicidal ideation than traditional bullying.

The question of the relationships among cyber-bullying, traditional bullying and suicide has been developed further. Litwiller and Brausch (2013) examined the relationships among the two forms of bullying and suicidal behavior and also the role of violent behavior, unsafe sexual behavior and substance abuse in those relationships. Their findings underscore how complex the problem of cyber-bullying can be and the involvement, and importance, of additional risk factors in that complexity. Their data

demonstrated significant relationships among this group of behaviors. Violent behavior and substance abuse were shown to partially mediate the relationship between both forms of bullying and suicidal behavior. The direct effect of cyber-bullying on suicidal behavior appeared greater than that of traditional behavior. However, the overall effects (direct and mediated) were similar for both forms of bullying accounting for about 67% of the variance in suicidal behavior. A study by Schneider et al. (2012) also suggests a relationship between cyber-bullying victimization and suicidal behavior. Interestingly, they report a particularly strong relationship between suicide attempts and being subjected to both cyber- and traditional bullying (OR 5.35).

17.2.4 Teachers Being Victimized

Most of the literature on cyber-bullying in schools focuses on the student whether perpetrator or victim. However, although less researched, there is compelling evidence that teachers not only have to deal with cyber-bullying among their students but are also subject to such bullying themselves. The perpetrators are often their students, but can also be their students' parents. Cyber-bullying is now an occupational health issue for teachers.

Cross, Piggin, Douglas, and Vankaenel-Flatt (2012), in a follow-up to an earlier study conducted in 2009, surveyed 339 teaching professionals working in a range of secondary schools across the U.K. The survey was designed to investigate the prevalence and impact of cyber-bullying within their schools and the effectiveness of the strategies implemented to support students and teachers. They reported that cyber-bullying was clearly a problem for teachers as well as for their students. One in ten teachers reported being harassed through social networking sites and text messages or having hate groups set up against them on websites. Furthermore, teachers also reported that parents were using the internet and social media to voice frustrations, or pursue personal vendettas against them. The teachers who experienced this type of behavior reported feeling afraid for their own safety and that of their families, and feeling emotionally and mentally violated. They also reported that their teaching had suffered as a consequence. Cross and colleagues' (2012) study of secondary school teachers supports other findings where school climate deteriorated as a result of cyber-bullying and this was associated with teachers' perceptions of their working conditions and their intended and actual leaving their schools (Ladd, 2011) and perceptions of school disorder and personal safety (Astor, Guerra, & Van Acker, 2010; LaRusso, Romer, & Selman, 2008).

In a mixed sample of Canadian elementary and secondary school teachers, Matsui (2006) found that while some had been victims of email harassment, overall they were more likely to be targets of verbal harassment. Surveys of junior and secondary school teachers in the U.K. suggest that 15–20% of respondents had experienced a form of cyber-harassment from parents via email, text messaging or malicious websites during 2007–2011 (Association of Teachers and Lecturers (ATL), 2008, 2009; Smith, 2007; Williams, 2010). Moreover, in 2009, one in five

survey participants knew of colleagues who had been cyber-bullied and had not reported it (ATL, 2009). Smith (2007) found that 17% of teachers in U.K. post-secondary education reported being cyber-bullied through emails or unwelcomed texts.

Finally, Daniloff's (2009) reported a case from 2007 of a Boston University music professor cyber-bullied by a disgruntled former student. The student created a Facebook profile in the professor's name with a recent photo and a biography. According to the professor, "embedded in the document were really scurrilous things that were reputed to have been said by me, and they were quite unpleasant and ugly and immature". This prompted other students to post harmful comments on the page (Daniloff, 2009). This incident was described as "incredibly anxiety-producing" (Daniloff, 2009). With the assistance of Facebook, but after many months, this Facebook profile was removed.

17.2.5 Risk & Risk Management

The available data support the common assertion that cyber-bullying is a significant problem within the school context and can cause real damage to those subjected to it. While the prevalence figures appear unreliable in the sense that they are probably methodologically and context dependent, the conservative estimate is that 1 in 6 or 7 young people are affected. This is not an insubstantial number. At the same time, the possible effects of cyber-bullying can be great, if not catastrophic, in terms of suicidal behavior. The conclusion here is that the risk to well-being and performance from cyber-bullying is substantive.

The question of how can it best be dealt with naturally follows from this conclusion. Two things are required by teachers and schools and are discussed below. The first is the legal and policy contexts to the management of cyber-bullying and the nature of teachers' and schools' responsibilities. The second is the nature and availability of evidence-based guidance on management strategies.

17.3 Legal and Policy Context of Cyber-Bullying

In an attempt to compare the different strategies for dealing with cyber-bullying, the sections below will discuss the legal and policy contexts in the U.K. and the U.S. respectively. Generally, cyber-bullying is seen as part of the cyber-crime spectrum that includes a wide range of activities facilitated through the harmful use of the internet (Moitra, 2005).

17.3.1 *The U.K. Perspective*

In the U.K., head teachers have had a relatively long-standing responsibility in law to actively discourage bullying behavior in their schools (School Standards and Framework Act, 1998). Their duty of care to safeguard children from bullying was reiterated in 2004 (Department for Education and Skills, 2004). Every school is required to develop and publish an anti-bullying policy and, once in place, to make the necessary arrangements so that it can be applied effectively (Hopkins, Taylor, Bowen, & Wood, 2013). In 2011, the Department for Education (DfE) in England & Wales extended the definition of bullying to incorporate cyber-bullying and cyber-victimization (DfE, 2011). As a result, educational establishments should have revised their existing anti-bullying policies to incorporate cyber-bullying and, also, to cover the provision of appropriate education for their students on this issue (Hopkins et al., 2013). In response to cyber-bullying, U.K. schools can take disciplinary action and that can include existing penalties used to deal with traditional forms of bullying (DfE, 2011). At present, the U.K. Office for Standards in Education (known as Ofsted) has the responsibility for over-sight of schools' accountability for preventing and dealing with incidents of bullying.

Interestingly, U.K. schools have the power to regulate the conduct of students outside of the school grounds (Education and Inspections Act, 2006), including journeys to and from school and behavior occurring out of school where it affects life in school, for example cyber-bullying.

In the U.K., at present, cyber-bullying is not recognized as an offense *per se* under either Statutory (criminal) or Common (civil) law (Marczak & Coyne, 2010). However, it can be treated as an indictable offense (Patel, 2011). In England & Wales, the expression "indictable offence" means an offense which, if committed by an adult, should be tried by the Crown Court on indictment following an examination of the facts by a Magistrates Court (a lower court) to determine whether or not there is a *prima facie* case to answer. A Youth Court has jurisdiction to try all indictable offences, with the exception of homicide and certain firearms offences, and will normally do so provided that the available sentencing power of 2 years detention is adequate to punish the offender if found guilty.

Currently, cyber-bullying could be dealt under five Statutory laws, namely the *Criminal Justice and Public Order Act 1994*, the *Protection from Harassment Act 1997*, the *Malicious Communications Act 1988*, the *Communications Act 2003* and the *Defamation Act 2013*. In addition, if the cyber-bullying is based on sexual, racial or religious grounds, prosecution can also be brought under discrimination law (The Equality Act, 2010).

In December 2012, the Director of Public Prosecutions issued *Interim guidelines on prosecuting cases involving communications sent via social media* outlining the Prosecutor's decision-making processes in cases under Statutory law where an alleged offence was committed using social media as a means of distribution of the harmful communication (Crown Prosecution Services (CPS), 2012). In accordance with these guidelines, a prosecution may be started if "there is sufficient evidence to

provide a realistic prospect of conviction” and if “a prosecution is required in the public interest” (CPS, 2012, p. 1). Public interest involves all cases in which communication is sent via social media and constitutes “credible threats of violence to the person or damage to the property”, specifically targets “an individual or individuals, and which may constitute harassment or stalking within the meaning of the *Protection from Harassment Act 1997* or which may constitute other offenses, such as blackmail, and which may amount to a breach of a court order under the Contempt of Court Act 1981 or under Section 5 of the *Sexual Offences (Amendment) Act 1992* (CPS, 2012, p. 2).

In the U.K., the age of criminal responsibility starts at 10 years, and, therefore, secondary school students could face some form of prosecution for proven cyber-bullying. However, the CPS 2012 guidelines clearly state that “the age and maturity of suspects should be given significant weight, particularly if they are under the age of 18” as children may not understand “the potential harm and seriousness of their communications” (CPS, 2012, p. 12).

One of the most important recent reports to include the problem of cyber-bullying was the Byron Review *Safer Children in a Digital World* authored by Professor Tanya Byron, a clinical psychologist and journalist (Byron, 2008). This was commissioned by the then U.K. Labour Government to review the risks that children face from the internet. Interestingly, one of the conclusions of the review was that, rather than continuing to discuss how the internet is “causing” harm to children and young people, it is more important to focus on developing an understanding of how to empower them to manage risks in the digital world. The Byron Review makes a number of recommendations for schools when dealing with issues relating to cyber-safety, including the development of *Acceptable Use Policies* and the need for the continuing professional development of staff focusing on e-safety issues. One limitation of the Byron Review is that, although it considers the views of parents and students, it did not gather data from teaching professionals. This is of particular consequence given the number of whole-school recommendations that it made. The multi-stakeholder U.K. Council for Child Internet Safety (UKCCIS) was set up as a result of the Byron Review with the aim of helping to keep children and young people safe online (Cowie, 2011). In 2010, a consideration of progress made since the Byron Review suggested that UKCISS had been able to make an impact on the well-being of children, young people and their parents in relation to cyber-bullying (Department for Children, Schools and Families, 2010).

17.3.2 *The U.S. Perspective*

In the U.S., and similar to the U.K., criminal legislation can be used to prosecute behaviors such as harassment, stalking, felonious assault, and certain acts of hate. Libel, defamation of character, intentional infliction of emotional distress falls under the remit of civil law. In June 2008, a Federal law was proposed that would have criminalized cyber-bullying behaviors. However, it was not passed (Olsen, 2008).

Thus, there is currently no existing U.S. Federal law prohibiting or addressing, cyber-bullying in schools or in workplaces (Hinduja & Patchin, 2015; Smit, 2015).

Despite the lack of any U.S. Federal law, some federal government departments and agencies have attempted to raise awareness of the cyber-bullying problem. For example, the Department of Defense's Education Activity developed the *Bullying Awareness and Prevention Program* that offered information and resources to children, parents and educators to raise awareness around *National Bully Prevention Month* (Department of Defense Education Activity, 2012). The Department of Health and Human Services created a website offering information and advice on bullying and cyber-bullying, as well as providing information links to programs offered by the Department of Justice and Department of Education (www.stopbullying.gov).

The legal situation is different at State-level. To prevent and deal with bullying and cyber-bullying in schools, all States have passed bullying prevention laws, that (apart from Montana) require schools to have a policy to deal with bullying that (apart from Alaska and Wisconsin) includes electronic forms of harassment (Hinduja & Patchin, 2015). For example, in 2012, Hawaii introduced a measure to combat cyber-bullying and Michigan added cyber-bullying to *Matt's Safe School Act*. In that year, New York amended its *Dignity for All Students Act* adding a proscription on bullying in that applied to all forms of electronic communication.

Four states have bullying policies that include off-site behavior. These are Arkansas, California, Connecticut, Florida, Illinois, Louisiana, Massachusetts, Minnesota, New Hampshire, New Jersey, New York, South Dakota, Tennessee and Vermont). Georgia was the first state that codified requirements for school districts to address student bullying in public schools (Willard, 2011).

Cyber-bullying has been criminalized in 16 states with imposed sanctions such as a fine or a jail sentence (Hinduja & Patchin, 2015). These are Alaska, Arkansas, Colorado, Idaho, Iowa, Kentucky, Louisiana, Mississippi, Missouri, Montana, Nevada, North Carolina, North Dakota, Tennessee, Washington and Wisconsin.

The New York State Educational Department (NYSED) provides schools and teachers in the State with guidance on policy, internet safety programs and legal considerations in relation to cyber-bullying. NYSED also assists the Boards of Cooperative Educational Services and County Vocational Education & Extension Boards in creating a comprehensive approach for dealing with cyber-bullying. Together with the New York State Office for Mental Health, it developed *Guidelines and Resources for Social and Emotional Development and Learning* which is designed to help schools to create positive school environments where bullying and cyber-bullying is minimal (NYSED, 2012).

Non-profit and non-governmental organizations now exist to help deal with cyber-bullying. The *Cyberangels* provide an example of an organization launched in 1995 as an online safety education program by a non-profit community patrol organization in New York, the Guardian Angels, organization that was founded earlier in 1979. The *Cyberangels'* declared aim is to prevent such bullying through education, to help cyber-victims trace and identify perpetrators, and to monitor legal issues and developments in this area (Cyberangels, 2012). *Wiredsafety*, another internet safety

program, started in 1995, provides one-to-one help to internet users of all ages on privacy and security issues, and offers education and free downloadable online resources (Wiredsafety, 2012). Other non-profit organizations attempting to raise help deal with cyber-bullying include the National Crime Prevention Council, the End to Cyber-bullying Organization and Common Sense Media.

17.3.3 Similarities: The U.K. and U.S.

In both the U.K. and U.S., the legal contexts to dealing with cyber-bullying appear complex largely reflecting the relatively newness of the problem; the legal framework is still developing and arguably is not yet mature. In the U.S., there are two levels at which cyber-bullying can be addressed in law: the State-level and the Federal-level and the evidence is that progress is more easily accomplished at the former, but this might not be a problem. In both countries, there are non-regulatory and non-governmental bodies, largely in the voluntary sector, that seek to offer advice, resources and support in this area. Most are mainly focused on the individuals involved but there are exceptions. Finally, in both countries, the burden of policy development and enactment, prevention and management naturally weighs heavily on the operational level in schools and with their teachers. Much of the responsibility for successfully dealing with cyber-bullying rests with head teachers and their colleagues on the teaching staff.

17.4 Preventing and Managing Cyber-Bullying

Initially, the response to the addressing the problem of cyber-bullying in schools was slow and piecemeal. This has been attributed, in part, to teaching professionals not having the requisite knowledge and understanding to be able to address it. However, this tied in with a popular perception that cyber-bullying was more an issue of the home environment than of the school (Kowalski, Limber, & Agatston, 2008). Cassidy, Jackson, and Brown (2009) addressed this question by exploring where cyber-bullying was initiated and how it then developed. In a survey of 365 students aged 11–15, they found that 64% of their participants reported that cyber-bullying started at school, but then was carried on at home. They suggested that the students surveyed were not suggesting that online bullying was taking place in school, but rather that face-to-face bullying spilled over into online exchanges at home. These results would appear to support the earlier findings of Brown, Jackson, and Cassidy (2006) who had already argued that cyber-bullying primarily originates in the school setting and is followed by digital retaliation at home. Whether this is true or not remains the focus of some debate. Momentum in dealing with cyber-bullying at school-level has now built up and it is possible to provide some oversight of what is known.

17.4.1 Banning Phones at School

Research by Kowalski et al. (2008) suggested that although most forms of cyber-bullying do not take place in school, text messaging is used for bullying during the school day. This research was conducted in 2006, prior to the widespread availability of smart phones with greater technological capabilities (Juvonen & Gross, 2008). Most probably, these technological developments have made cyber-bullying at school easier if not more prevalent.

Some schools in the U.K. and U.S. have responded to the threat of cyber-bullying on their premises by banning the use of students' phones during the school day or confiscating them if used. Most of these schools are at the secondary level. It has been argued that, in part, this reflects concerns regarding the inappropriate content and tone of some of the messages sent by students. Undoubtedly, phone use in the classroom also distracts from and disturbs both the teaching and the learning environments. This *ban and confiscate* strategy has been subject to criticism. It has been suggested that a more useful intervention would be to use an educational approach in which the school discusses with its students how messages can be perceived as harassing and harmful due to the language being used (Ybarra, Mitchell, Wolak, & Finkelhor, 2006). This is in line with the arguments that prevention through student education (King, 2010; Marczak & Coyne, 2010) might be a preferred way forward. Furthermore, banning students' phones on school premises may create difficulties in terms of reporting. Kowalski et al. (2008) suggest that although students may later agree to having sent and received bullying messages on their phones during the school day, they may be reluctant to report incidents for fear of having their phones confiscated and of getting into trouble by breaking school rules. Furthermore, Smith et al. (2006) suggested that when questioned, students thought that banning phones on school premises would not have an impact on cyber-bullying as students would continue to use them in secret, away from adult supervision.

17.4.2 Anti-bullying Programs

Many programs designed to prevent traditional bullying have been found to have good success rates. A meta-analysis of 44 studies in Europe and North America has been conducted by Ttofi and Farrington (2011). The sample was not classified by school level but the study did distinguish between interventions with children under the age of 11 years (commonly at primary or junior schools) and those with children older than 11 years (commonly at secondary schools). The analysis looked at the effectiveness of anti-bullying programs in schools and showed that, overall, the school-based anti-bullying programs studied were effective: on average, bullying decreased by 20–23% and victimization decreased by 17–20%. The data also suggested that interventions with children over 11 years old (commonly at secondary schools) were the more effective. Furthermore, interventions conducted in Europe

appeared more effective than those conducted in the U.S. Given this level of success, it has been suggested that cyber-bullying should be included in these programs (Slonje et al., 2013). This might serve to establish the problem as a school-wide issue and help establish a whole-school approach combining an anti-bullying policy with awareness-raising curriculum-based activities (student education).

In Finland, students in 39 control schools that did not undergo KiVa, a Finnish anti-bullying program, were more likely to be bullied compared to students in 39 intervention schools. The research was conducted across both primary and secondary schools. The KiVa program includes both universal and targeted (or prescribed) sessions. The universal sessions consist of student lessons (primary school) and themes (secondary school) and a virtual learning environment (an anti-bullying computer game for primary school students and an Internet forum “KiVa Street” for secondary school students). The student lessons include discussion, video films, and exercises done in dyads and small groups. The topics cover a variety of issues related to group interaction and group pressure, the mechanisms and consequences of bullying, different forms of bullying, and especially, what the students can do together in order to counteract bullying and support the victimized peers. In addition, the universal sessions include a parent’s guide as well as posters and highly visible vests for teachers supervising recess time to remind both students and school personnel of KiVa. The targeted interventions involve discussions with victims and perpetrators, as well as with selected prosocial classmates (who are challenged to support the victimized classmate). The discussions with the perpetrators and victims are managed by KiVa teams within each school. The class teacher organizes separate meetings with the potential supporters of the victim (Salmivalli, Kärnä, & Poskiparta, 2010a, 2010b). In the evaluation study, nine different forms of bullying were considered along with a global measure. These types included physical and cyber-bullying.

Overall, bullying was reported as 29% lower in the intervention schools than in the control schools. Cyber and physical bullying were lower to about the same extent: physical bullying by 53% (OR 1.94) and cyber-bullying by 50% (OR 1.80) demonstrating KiVa’s ability to reduce cyber-bullying as effectively as it did traditional bullying (Salmivalli, Kärnä, & Poskiparta, 2011).

The quality circles (QC) approach is another type of intervention used primarily for traditional bullying but which has been demonstrated to be effective for cyber-bullying (Slonje et al., 2013). The QC approach allows explorative analysis of problems in school settings. Students embark on a collective problem-solving exercise over a period of time. The process involves identifying key issues and prioritizing concerns, analyzing problems and generating solutions through participation in a series of workshops. Paul, Smith, and Blumberg (2012) reported on the use of such a study. The school involved responded to the students’ ideas by introducing a student leadership scheme, incorporating peer mentors, mediators and behavior monitors to encourage continued student involvement in the school anti-bullying program.

In the U.K., *CyberMentors*, a cyber-bullying intervention program by the non-governmental organization *BeatBullying*, was launched in 2009. It offered online peer-support involving young people, aged 11–17, who having undergone comprehensive training, become mentors on the program. The training that they received

built upon their skills and confidence to mentor their peers offline in school and online via the BeatBullying website. The training was rated highly by students. Some staff wanted more feedback and the provision of continuing support for the students after the initial training. The Beatbullying website was rated as easy to use and safe and cyber-mentors as easy to contact and talk to (Thompson & Smith, 2012).

17.4.3 Educational Resources

Again in the U.K., new educational resources aimed at preventing cyber-bullying continue to be developed. *ChildNet International* and *Child Exploitation & Online Protection* have created two e-safety films for the students in secondary schools *Let's Fight It Together* and *Exposed* respectively. Both students and staff have rated these films as good (Thompson & Smith, 2012).

17.4.4 Intervention Strategies: An Overview

Our knowledge of the nature and effectiveness of intervention strategies is growing. However, at present, it is based on a relatively small number of studies many using mixed groups by school-level or student age. Some simply do not provide sufficient information of these important variables.

Based on approaches to dealing with traditional bullying, five key areas have been identified to enable schools create a comprehensive and effective prevention strategy (Byron, 2008; Erwin-Jones, 2008). For schools, they include: (1) understanding and talking about cyber-bullying, (2) updating existing policies and practices, (3) making reporting cyber-bullying easier, (4) promoting the positive use of technology and (5) evaluating the impact of such prevention activities.

Marczak and Coyne (2016) investigated teachers' perceptions of the cyber-bullying strategies used in secondary schools in the U.K. In terms of policies and procedures, teachers considered their responses to possible cyber-bullying incidents to be both proactive and reactive. Proactive measures included policy development, training for students, school staff and parents, and working with students to develop their understanding of how to stay safe online and what behaviors constituted cyber-bullying. In contrast, the reactive measures used by teachers included encouraging students to change their privacy settings on social media, contacting parents of the students involved in cyber-bullying, imposing school-based sanctions (such as detention) and reporting incidents to the police or to the website providers when appropriate. Other methods used by teachers included referring students to the school counselor and arranging meetings between the cyber victim and his/her perpetrator.

Overall, the evaluation data appear to suggest that interventions can prove effective both in terms of prevention and as a response to cyber-bullying. Perhaps unsur-

prisingly, such interventions appear more successful with students at secondary schools (over 11 years) than with those at primary schools. Interestingly, there is a hint that interventions conducted in the U.S. are less effective than those conducted in Europe (Salmivalli et al., 2010a, 2010b). There might be for a whole host of reasons but might be worth considering further.

Additionally, to promote safer internet use, the technology industry has started to embrace some technical and educational features in line with those already adopted by some organizations such as self-regulatory codes of practice encouraging safe online behavior (Coyne & Gountsidou, 2013). The effectiveness of these codes of practice with regard to reducing cyber-bullying is yet to be established but, at the very least, they serve to draw attention to the problem of cyber-bullying.

Taken together, the use of such different elements of a strategy highlight the need for a more holistic approach involving students, teaching professionals and the wider community including the technology industry. This type of strategy necessarily goes beyond a whole-school approach. Bryce and Klang (2009) have similarly argued that, due to the blurring of boundaries, a multi-stakeholder response is necessary. In reality, each of these stakeholders may have a different notion about their relative legal and moral responsibilities and their ability to contribute. Key to this multi-stakeholder approach must be teachers. It has already been argued here that they are effectively the front-line and bear much of the burden of preventing and managing cyber-bullying.

17.5 Conclusions

It is now widely recognized that cyber-bullying is a real and growing problem in and around schools. Its prevalence among students is roughly known, although the data are very varied. Its effects are also known and can be extreme and result in suicidal behavior. For students, there is a significant risk to well-being, broadly defined, and academic performance from cyber-bullying. It is also known to affect teachers although there is less research in this area but enough to know that the prime sources of such bullying are teachers' students and their students' parents.

It has been argued here, and elsewhere, that the teachers and their schools bear the burden of preventing and managing cyber-bullying (while at the same time being affected by it themselves). It has also been argued that to prevent and manage cyber-bullying effectively, teachers and schools need to understand the problem, its roots, nature and effects, the legal framework to handling it, and have good information about what works and what does not ~ an evidence-based approach.

The legal and policy contexts for managing cyber-bullying are complex in both the U.K. and the U.S. and, in terms of legislation, still maturing. Despite governance differences between the two countries, there are similarities in those contexts. *Inter alia*, they do serve to establish the need and requirement for effective policies and supporting arrangements, set out the actions that can be taken at school-level and the processes for taking such action further.

Quite a lot is known about the intervention strategies that are being used and could be used to prevent or manage cyber-bullying in schools; however, there are not yet enough acceptable evaluation studies available. Furthermore, nearly every intervention has its own unique aspects and blend of actions. With time, there will be better data to inform an evidence-based approach. However, what is recommended here is a more holistic approach that will involve not only schools and teachers, but also the students themselves, their parents and local communities as well as technology companies. This is more easily recommended than achieved. Within this framework, there are several things that are being done and which could be used as the basis for a generic strategy with a reasonable chance of success.

First, each school must have an appropriate policy to deal with cyber-bullying that is part of or sits alongside its policy on traditional bullying. These should be framed by the appropriate national or State legislation. It must also have appropriate arrangements in place to ensure that its policy is implemented in full.

Second, as part of that policy, there should be clear guidance on safe and acceptable use of social media and the internet in general which also covers the use of students' phones. The penalties for misuse should also be made clear to both teachers and their students and applied when necessary. These must include reporting to the authorities outside of school where necessary. There is a question of a zero tolerance approach to be answered here.

Third, there should be educational programs developed and made available to teachers, students and their parents and there are several templates for such programs in existence. They should focus on informing stakeholders about the nature of cyber-bullying and its effects, its unacceptability, how to stay safe when using social media, how to manage your situation if bullied and how to support others if you know that they are being bullied. An important outcome of any educational program is the creation of a safe and supportive culture in which cyber-bullying can be discussed and reported without fear. Finally, there should be counseling and remedial activities available for those who are bullied and for those who bully.

To our mind, the way in which such a strategy is implemented is important. It should be tailored to fit the local culture within and outside the school and be tailored to school-level or student age. Generally, catastrophizing and over dramatizing the problem is not the way forward. Rather, the intervention, particularly its educational component, should be seen as a development opportunity for students (teachers and parents) and treated as positively as possible. It might also offer protection to students' in that it might save them from themselves and the impact of unfortunate adolescent acts on later life. The enduring hope is that for many, perpetrators and victims, their behavior and experiences mark out a phase of their development (sadly) but one that, with help, they might grow through.

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Part IV

Implications for Research, Practice, and Policy in Education

I look forward to the results of your research...I hope that it helps teachers in dealing with stress even if it is just through the knowledge that they are not alone.

Teacher, personal communication, June 1st, 2014

The ultimate purpose of increasing understanding of educator stress is to translate this knowledge into best practices and policies that reduce exposure in educators and students, and thus improve educator health and well-being, and the quality of education. This is not an easy endeavor as there are many barriers to be overcome in terms of the quality of methods and research findings that have been produced on this topic, the lack of dialogue across disciplines in conceptualizing educator stress phenomena and evaluating the effectiveness of theory-driven interventions, and the relatively meager implementation of education policies and practices directed at reducing educator stress. Part IV addresses some of the limitations in the field while presenting some direction and recommendations to move forward on addressing knowledge gaps on educator stress, and directing intervention and policy based on the knowledge we already have. While there is much to be learned and done, we hope that it is clear from the chapters in this volume that addressing the problem of educator stress is urgent and a social responsibility to educators and the community they aim to serve. We hope that this volume made a small contribution to increase awareness of the problem and motivate scientists, practitioners and policy makers to come together to devise creative solutions.

Part IV discusses the implications of current knowledge on educator stress for future research on this topic, and education practices and policy. Chapter 18 by David Francis, Christopher Barr, Julia Benoit, and Teresa Mendonça McIntyre examines developments in measurement and statistics that have altered the landscape for the study of stress in-context. From advances in ecological momentary assessment that allow the ongoing monitoring of physiological and psychological stress responses to advances in the statistical modeling of multi-level and cross-classified data with dynamic functional forms. The use of technological advances to support new methodologies (e.g. iPod or iPhone) will also be discussed. This chapter provides a necessary overview of the advanced measurement and modeling methods used throughout the substantive chapters. Chapter 19 by Peggy McCardle discusses challenges in applying current knowledge on educator stress to changing education practices and policies. It addresses how the evidence presented in this

volume can inform teacher preparation, development and education policies. It also places this reflection in a global context, noting that knowledge in industrialized nations must be shared with those in low and mid-income countries, while being mindful of the uniqueness of their culture and education contexts. In the last chapter (Chap. 20), Scott E. McIntyre, Teresa Mendonça McIntyre and David Francis, make concluding remarks on the key contributions of this volume and the benefits of adopting an occupational health perspective in research and practice on educator stress. The chapters in Part IV will help the reader gain a deeper understanding of the substantive relationships presented in Parts I–III, while also preparing the reader to appreciate where the field is headed methodologically and to use these advances to formulate and answer interesting and important new questions.

Chapter 18

Issues in Research Methodology on Educator Stress

David J. Francis, Christopher D. Barr, Julia S. Benoit,
and Teresa Mendonça McIntyre

Abstract Research on educator stress and its effects on health outcomes faces numerous methodological challenges that affect the design, execution and analysis of scientific investigations. The chapter begins with an overview of the statistical challenges associated with multilevel field studies, which are ubiquitous in research on educator stress. Secondly, we will examine the specific challenges posed by time in the study of stress and the various methods and models used to capture the many roles of time in stress research, including individualized developmental and dynamic models, and ecological momentary assessment (EMA). Finally, we conclude with an examination of the special challenges that arise in the study of event occurrence in multilevel settings, such as leaving the workforce, changing employers, or experiencing a medical incident. These challenges stem from the complex nature of the construct of stress, the time frame over which stress exerts its influences on behavior, health and emotional well-being the many levels at which occupational settings create and mitigate stress, and the many levels at which individuals experience stress and demonstrate its influence on health and work outcomes. The chapter

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provides an overview of some of the more salient methodological, measurement, and analysis related issues that affect the work reported on in this volume. Our goal is to provide the reader with a firm understanding of the more complex methods and analyses relevant to the study of educator stress in an effort to strengthen the readers' ability to benefit from the science presented throughout the volume.

Keywords Multilevel models • Survival models • Educator stress • Ecological momentary assessment

This chapter examines some of the more salient methodological, measurement, and analysis related issues that affect the work reported on in this volume. Our goal is to help the reader develop a foundation for understanding the more complex analytic methods applied by authors throughout the volume, specifically multilevel models (Raudenbush & Bryk, 2002) and survival analysis (Miller, 1998), as applied to physiological and self-report data collected through intensive and extensive longitudinal designs. While we cannot present these methods in extended detail, our hope is to facilitate readers' access to the substantive literature on educator stress and particularly on the methods used throughout that literature and in the present volume. In our experience, greater understanding of the analytic strategies and methods strengthens an individual's ability to critically evaluate the science and to make informed decisions based on the conclusions reached.

In the study of educator stress and its effects on educator health and on student outcomes, researchers must contend with methodological challenges that affect study design, execution, and analysis. Some of these challenges stem from the use of intensive (i.e., highly frequent) data collection that extends over long periods of time. Frequent testing can lead to problems of compliance; extended follow-up can lead to study attrition; the inclusion of observations made over small units of time (e.g., hours and days) along with observations made over extended periods of time (e.g., months and/or years) can complicate the conceptualization and modeling of time effects.

Other challenges stem from the clustering of observations within individuals and the clustering of individuals into larger social units such as classrooms, schools, and districts. This clustering of individuals renders observations made on different individuals dependent on one another. Just as two observations made on the same individual over time will correlate with one another, observations made on two individuals drawn at random from the same social unit will tend to be more similar than observations made on two individuals drawn at random from different social units. If ignored, clustering can bias standard errors and lead to confounding of the within-person and between-person relationships among variables (Algina & Swaminathan, 2011; Raudenbush & Bryk, 2002). When properly treated in the statistical model, statistical inferences are more accurate. In addition, the analyst is able to separate the relationship between variables into distinct within unit and between unit relationships, to examine heterogeneity in the relationship across units, as well as to examine factors that mediate and moderate relationships within units

and across units (Preacher, Zephyr, & Zhang, 2010). Another complication arising in studies of stress stems from the categorical nature of some important outcomes, such as specific health events, (e.g., becoming diabetic, or suffering a heart attack), or specific work events (e.g., leaving the profession). In any given study, one or more of these challenges of time, clustering, and outcomes can be operating.

The chapter begins with an overview of the statistical challenges associated with multilevel field studies, which are ubiquitous in research on educator stress. Secondly, we will examine the specific challenges posed by time in the study of stress and the various methods and models used to capture the many roles of time in stress research, including individualized developmental and dynamic models, and ecological momentary assessment (EMA, see Chap. 12). Finally, we conclude with an examination of the special challenges that arise in the study of event occurrence in multilevel settings, such as leaving the workforce, changing employers, or experiencing a medical incident.

18.1 The Challenge of Clustering Observations

When focused on specific occupations or occupational settings, such as educators or schools, researchers must also contend with specific challenges of measurement and analysis brought about by the multilevel nature of the settings, and the potential bidirectional influences and interactions that occur across levels. Many of these methodological challenges in educator stress research are on display throughout the present volume. Field studies of educator stress are similar to other studies in education. The large number of individual teachers (or students) who participate in the study are typically recruited from a smaller set of schools. This clustering of observations leads to two challenges that threaten the validity of statistical inferences: confounding of within and between unit relationships, and underestimation of standard errors. The use of multilevel statistical models allows for proper treatment of clustered sampling in the statistical model, which in turn facilitates valid statistical inferences while also opening the door for more precise understanding of the relationships among variables, both within- and between-levels of the design. In the present section, we discuss multilevel models and their advantages generally. More formal presentation of specific multilevel models and their application to data on educator stress appears in Sect. 18.4.

Multilevel models engender more precise understanding of statistical relationships through estimation of relationships within-levels and between-levels, and through formulation of questions about mediation and moderation that operate within levels of the design as well as across levels of the design. Importantly, these advantages allow researchers to avoid the ecological fallacy (Cronbach & Webb, 1975), which occurs when one infers a relationship at one level based on evidence of a relationship at a higher level of the design. An example of the ecological fallacy would be observing that teachers who report higher average levels of support report lower average levels of stress and assuming that this relationship applies to individual

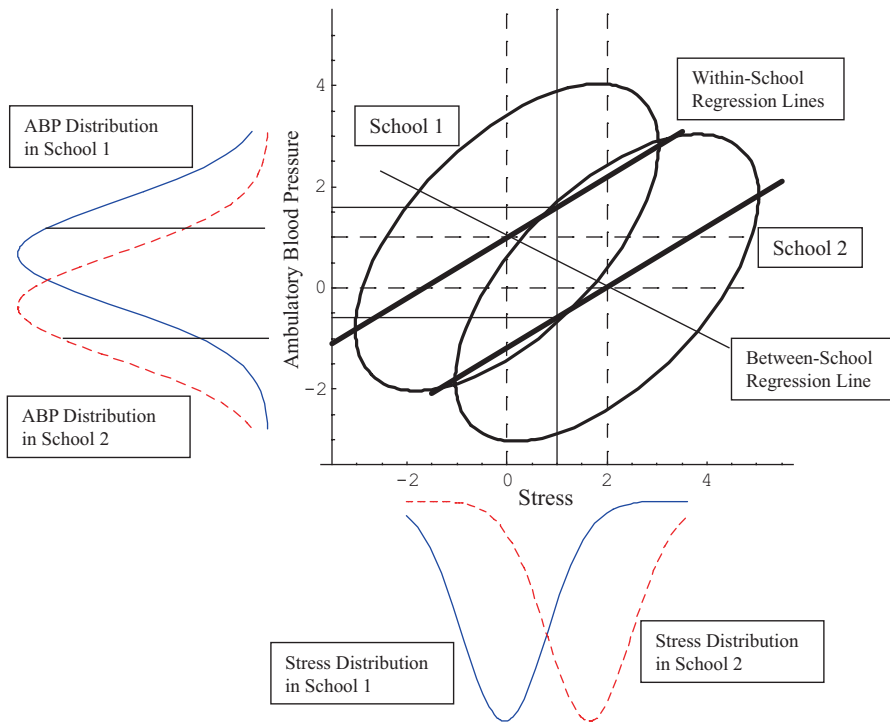


Fig. 18.1 Hypothetical demonstration of the ecological fallacy

teachers, such that a given teacher's stress levels vary over time commensurate with their experienced levels of support. Similarly, observing that schools in which higher average levels of support are reported also tend to be schools in which lower average levels of stress are reported does not imply that teachers who report higher levels of support in a given school also report lower levels of stress. We cannot assume the direction or strength of the relationship within schools based on the direction or strength of the relationship that exists between schools. Fortunately, multilevel models allow the specification of functional relationships among variables at each level of the design, as well as to specify variables that influence relationships across levels of the design.

To illustrate these points, Fig. 18.1 presents a fictional example of an extreme situation. The figure shows the bivariate distribution between Stress and Ambulatory Blood Pressure for two hypothetical schools. Each bivariate distribution is represented by an ellipse, while the univariate, marginal distributions are presented in the margins of the figure. It is clear from the univariate distributions that the school with the higher mean level of stress has the lower mean level of ambulatory blood pressure, possibly reflecting differences in the demographics of the two schools.

The slope to the regression line labeled “Between-school Regression” evidences the negative relationship that exists between average stress levels and average ambulatory blood pressure between-schools. Importantly, in each school, individuals experiencing higher levels of stress show higher levels of resting blood pressure as evidenced by the positive tilt to the ellipses and the solid black lines that mark the within-school regression slopes. These within-school slopes are equal in these two schools. If the clustering of individuals within schools were ignored, the slope between blood pressure and stress would be a combination of these two slopes. Although this total-groups slope describes the relationship between blood pressure and stress at the individual level across the entire collection of individuals, it misestimates the relationship that exists between these two variables for individuals within any given school, as well as the relationship that exists between schools. Multilevel models allow researchers to avoid the ecological fallacy and bias that can result from combining information from multiple levels in a single estimate.

A second limitation of standard statistical models in the context of studying educator stress arises from the assumption of independence across observations. This assumption is violated in situations where the individuals are clustered into larger social units, such as students within classrooms, or teachers within schools. This lack of independence across observations made on different individuals from the same cluster has long been known to be an important cause for concern in the analysis of data collected in schools (Raudenbush & Bryk, 2002) and other organizations. In general, ignoring non-independence across subjects arising from clustering, results in underestimation of standard errors. The magnitude of the bias depends on the degree of non-independence across subjects as evidenced by the intra-class correlation, which can be thought of as the variance in cluster means relative to the total variance in the outcome (i.e., the sum of the variance in cluster means and the pooled variance within clusters). Fortunately, multilevel models allow for the correct estimation of standard errors by estimating both within and between cluster components of variance that contribute to the sampling variability. Multilevel models exist for normally distributed errors, as well as for non-normally distributed errors, and can be used to model complex variance functions, such as correlated errors over time, and heterogeneous errors across groups (Little, Milliken, Stroup, Wolfinger, & Schabenberger, 2006). Models also exist for dealing with multiple levels of clustering, for example time within teacher, teacher within school, school within district, as well as for designs involving cross-classified clusters (e.g., students within neighborhoods and schools; or responses to test questions cross-classified in students and test items) (Raudenbush & Bryk, 2002), and designs involving partial nesting of observations within clusters (e.g., when all children are nested within classroom teachers, but some students also receive small group intervention and are nested within an intervention provider, whereas other children in the sample do not receive small group instruction, and thus are not nested within intervention providers) (Lohr, Schochet, & Sanders, 2014).

18.2 The Challenge of Time

It goes without saying that events take time to unfold, and that the time scales on which events unfold vary widely. For example, when an individual smokes a cigarette, there is a near instantaneous effect on tissues in the lungs and a slightly delayed response on brain function as nicotine is absorbed into the blood stream and makes its way to the brain. These acute effects which occur in seconds and/or minutes are distinct from the chronic effects of smoking on heart, lung, and brain systems that unfold over many years of sustained smoking, vary somewhat in level and timing across individuals, and are influenced by differences between individuals in both their behavior and the consequences of that behavior. When phenomena unfold over time, estimation of one variable's influence on another will be biased when those variables are observed on a time scale that is not matched to the temporal dynamics of the causal relationship between variables (Boker, 2001).

One of the more vexing challenges affecting the study of educator stress concerns the various time scales on which stress operates, from moment to moment fluctuations that go on throughout the day, to weekly and seasonal cycles, to long term developmental trends. Stress and the behavioral and affective responses it engenders operate on all of these time scales, all of which are overlaid onto ongoing biological rhythms and normative developmental changes in biological and social systems that take place over years and decades. Historically, research has operated on either very short time scales, where intensive data is collected in one or two laboratory sessions, or on long time scales, where more macro level measures of stress and affect are collected using surveys, or brief direct assessments, over an extended period of time (e.g., once every six months for two to three years). In a review of 43 longitudinal studies of organizational stress, Zapf, Dorman, and Frese (1996) found that most studies used two ($n=25$) or three ($n=6$) waves of data collection spread out across three ($n=6$ studies), six months ($n=11$ studies), or one year ($n=13$ studies), although lags as long as 18 months ($n=5$), two years ($n=4$), five years ($n=2$), 10 years ($n=2$) were also observed, and longer ($n=1$), were observed.

Stress research has benefitted from advances in design, analysis, and automated data collection that have allowed researchers to embed intensive data collection at individual time points into longitudinal study designs involving data collection over extended time frames. Through the use of minimally disruptive techniques, such as automated capture of heart rate and activity monitors, and creative technologies that allow random time sampling, and event triggered sampling, as well as more fully developed tools for addressing problems caused by attrition and missing data, it has become possible to combine intensive data collection with extensive follow-up intervals. To address the problem of assessments collected on different time metrics, analysts use embedded time vectors. For example, consider a design where teachers make hourly recordings of their emotions, environmental stressors, and sense of support from their school. Observations are made on two consecutive days in the fall and spring in each of two consecutive school years. At the most discrete level,

observations are occurring hourly nested within individual teachers, clustered within schools. Moreover, these hourly measurements are nested within days, the days within semesters, and the semesters within years. Through multilevel models, it is possible to measure the hourly covariation across the three measures within-person, heterogeneity in this covariation across individuals within schools, as well as the effects of day, semester, and year on both the level of each behavior and on the covariation across behaviors.

Advances in dynamic systems models (Boker & Nesselroade, 2002) also signal promise for research on educator stress. Dynamic systems models can make use of longitudinal data to study the temporal dynamics of individual and/or interconnected systems, modeling both the variability that occurs within an individual over time in one or more systems, as well as differences in level over time within and between individuals in those systems. Boker and Nesselroade (2002) define a system as any collection of variables that are logically connected, and further define the state of the system as the collection of values on the variables that define the system at any given moment in time (t). Given these simple conceptual definitions, a dynamic system is a system where the state of the system at time ($t+1$) is dependent on the state of the system at time t . A self-regulating dynamic system is one that adjusts itself over time in response to its present state, that is to say, the change observed between time t and $t+1$ is a function of the state of the system at time t . In a dynamic system, the current state of the system can be determined by the initial state, the first and second derivatives of the function that describes the system, and the amount of time that has elapsed between the initial state and the current one. The same process can be used to determine the state at any time ($t+k$) given the state at time t . Importantly, dynamic systems are quite distinct from standard multilevel longitudinal models, such as individual growth models (Francis, Fletcher, Stuebing, Davidson, & Thompson, 1991), in that dynamic systems with the same model parameters can describe quite different temporal trajectories based on different initial states, whereas two growth models with the same parameters yield equivalent trajectories. Dynamic systems models are a type of structural equation model, which simply put means that the variances and covariances among the variables have a structure that is determined by the equations that define the relations among the variables, except that in the case of a dynamic systems model the variables are not the measures and time, but the first and second differential equations for the variables with respect to time. That is, in a dynamic system, the structural equations are differential equations that describe the change in the system as a function of time, where the first derivative gives the rate of change per unit time and the second derivative gives the curvature (i.e., acceleration). Like growth models, the parameters of a dynamic systems model may be invariant across individuals, or may vary randomly across individuals, or may differ systematically across groups of individuals while not varying randomly across individuals within a group. We will not discuss dynamic systems models further in this chapter. Interested readers are referred to the references by Boker and Nesselroade (2002), and Penny, Stephan, Mechelli, and Friston (2004).

18.3 Ecological Momentary Assessment

In this section, we will briefly describe Ecological Momentary Assessment (EMA) and its advantages over traditional self-report data, discuss the methodological and statistical considerations, and present an empirical example illustrating the analyses of real-time EMA data. The logic of EMA will focus on the advantages of EMA over traditional cross-sectional or longitudinal designs. EMA methodological considerations will focus on logistical and procedural considerations that are either unique to EMA or vastly augmented by EMA. The EMA statistical considerations will focus on the statistical modeling aspects of EMA. The empirical example will use real data from 202 teachers assessed with EMA for six waves over the course of two years as part of an Institute of Education Sciences (IES) funded study (McIntyre et al., 2016; Grant R305A110080 to the University of Houston). The example will use reports of stress as the outcome measured at up to 79 time points, a time invariant covariate of neuroticism, time-varying predictors being job demand, control, and social support measured simultaneously with stress, and specific time structures of season.

18.3.1 *The Logic of Ecological Momentary Assessment (EMA)*

There has been increasing interest in using alternative methods to traditional paper-and-pencil surveys. Occupational stress researchers have become interested in methods that are able to capture behavior and psychological states in the moment, or in real-time. These methods have been labeled “experience sampling methods” (ESM) or ecological momentary assessment (EMA). Thus, EMA refers to the repeated collection of real-time data in the participant’s natural environment (Stone & Shiffman, 1994) and typically involves repeated, periodic sampling of co-occurring phenomena in an effort to capture the moment to moment variations in emotions, states, and behaviors (Shiffman, Stone, & Hufford, 2008). The general idea behind EMA is that momentary variations in mood and behavior occur in response to environmental challenges, which themselves vary throughout the day. Moreover, accurate assessment of the stimuli, the responses, their covariation, and temporal dynamics is not possible through self-reported retrospective assessments that span large time frames, through physiological assessments at single time points, or through longitudinal assessments spanning days, weeks, months, or years.

These traditional methods of retrospective self-report and cross-sectional or longitudinal assessment of physiology disconnected from the environmental events that provoke them are subject to various forms of error that are difficult to control or account for in statistical analyses. Traditional surveys have been found to be confounded by inaccuracies of retrospective recall (Stone, Shiffman, Atienza, & Nebeling, 2007), and related to factors that affect memory, such as affective state at the time of recall and the recall interval. Further, traditional surveys usually provide

summative evaluations of the person's behavior or affect, and do not capture the person's momentary states (Beal & Weiss, 2003). Shiffman, Stone, and Hufford (2008, pp. 3–4) highlight the advantages of EMA methods over traditional surveys as being: (a) their ecological validity since data is collected in the person's natural, real-world, environment, (b) immediate reporting (momentary aspect of EMA), which avoids some limitations of retrospective recall, and (c) repeated assessments that capture how a person's experience varies with time and across contexts. The new technologies such as Personal Digital Assistants (PDAs) lend themselves to the use of EMA methods (McIntyre et al., 2016).

EMA is a data capturing technique which is particularly suited to examine dynamic and complex processes, providing repeated evaluations that profile temporal patterns of change (Smyth & Stone, 2003). This method is particularly useful to study the phenomenon of teacher stress as it occurs. Resulting data reveal co-occurring changes in the variables studied (e.g. class demands, teacher affective response and heart rate) and pinpoint the temporal order of these changes. The use of EMA to study teacher stress has several advantages (Beal & Weiss, 2003): (a) allows researchers to examine meaningful within-teacher variability (see Chap. 12, and McIntyre et al., 2016) in job characteristics and teachers' stress responses, (b) enables the study of factors that impact teacher stress dynamics, which may be different from those that influence overall stress levels, and (c) allows access to real-time teacher experience, which provides a more detailed understanding of teacher stress and its contingencies.

The detailed longitudinal data on teacher stress obtained via EMA can be very useful in intervention development to address this important problem facing teachers and schools. Whereas traditional survey methods, often used in cross-sectional designs, only determine factors that differentiate stress response between-teachers, EMA data provide information on factors that impact within-teacher changes in stress response (e.g. Johnston, Beedie, & Jones, 2006). As indicated in Chap. 12 and Part III of this book, stress reducing interventions ultimately aim to produce changes at the individual level. Thus, determining the factors that influence these within-teacher variations in strain is crucial to effective intervention development.

EMA gets around the problems associated with traditional surveys, cross-sectional designs, and traditional longitudinal designs by recording events in real time, allowing for close coordination and near simultaneous assessment of subjective self-report of internal states and emotions, objective measurement of physiology, and objective and subjective measurement of the environment (Moskowitz & Young, 2006). EMA is particularly useful for investigating teacher stress on a micro time-scale (e.g. hourly) during which changes in teacher stressors lead to stress response and impact teacher functioning. The intensive longitudinal time sampling in EMA allows EMA data to reveal co-occurring changes in variables of interest (e.g. environmental and job demands, teacher affective response, and heart rate -HR) and to pinpoint the temporal order of these changes. It is not uncommon for EMA studies to measure ambulatory blood pressure (ABP) and HR as physiological indicators of cardiac reactivity to stressors (Kamarck, Schwartz, Janicki, Shiffman, & Raynor, 2003) and to simultaneously collect participant self-reports of

psychological states. The value of EMA in the study of job strain and its links to cardiac risk in various professional groups has been demonstrated by Kamarck et al. (2004, 2005). EMA has also been used to study links between job strain and ABP and HR in teachers by Steptoe, Roy, Evans, and Snashall (1995), who found that teachers with high job strain had elevated systolic BP during the work day, and by Serrano, Moya-Albiol and Salvador (2008), who found that peaks in reported stress corresponded to teaching moments and that valleys corresponded to no direct contact with students. These latter findings suggested that student interaction may be stressful and elicit important cardiovascular responses among teachers. Together, these studies show the value of physiological assessment over time and the use of intensive longitudinal assessment through EMA. The study described in the present chapter relied on EMA of ABP and HR, and teacher self-report of stress, job demand, control, and social support in order to better understand stress processes and their impact on middle school teacher and student outcomes. Substantive findings from this study, which draws on the use of EMA to examine the Dynamic Integrative Teacher Stress (DITS) Model in middle schools, are presented in greater detail in Chap. 12.

18.3.2 EMA Methodological Considerations

EMA creates several methodological challenges in data collections. Using the example of teacher stress, these challenges include burden for respondent stemming from the interruptions of daily routines, but also the challenge of measurement stemming from the variation in work related stressors that vary cyclically throughout the day, daily throughout the week, and seasonally throughout the year. To capture these dynamic variations in inputs and teachers' responses necessitates EMA collection over potentially extended periods of time, which may not be feasible in all contexts. At the same time, there are specific methodological considerations in EMA implementation that have been pointed out by several authors (for a review of issues in EMA implementation, see Beal & Weiss, 2003; Shiffman, Stone, & Hufford, 2008; and Tennen & Affleck, 2002). Among these are participant burden, compliance, scheduling, coverage of the target experience, and cost. We will briefly review these methodological issues when using EMA to assess teacher stress factors and responses (for more detailed considerations on EMA feasibility in teachers, see Carson, Weiss, & Templin, 2010; McIntyre et al., 2016).

EMA methods carry potential burden to participants in that they require repeated assessments over hours, days, weeks or longer periods of time. Despite these assessments being shorter (usually 1–3 mins) and collected digitally, the frequency, and interference with daily activities (e.g. teaching duties) does carry additional burden that needs to be monitored. Participant burden issues can also translate into compliance issues either at each assessment (missed or incomplete diary entries) or over time (participant withdrawal), especially when monitoring occurs over long time periods (e.g. years). In our study (see Chap. 12 and McIntyre et al., 2016), we conducted an

in depth feasibility assessment at the end of the first wave and at subsequent waves, via objective compliance data and a self-reported feasibility survey examining user-friendliness and EMA interference. This continued monitoring allowed us to make changes in target areas (e.g. timing of assessments, item response logic) that reduced entry completion time and increased user-friendliness over time, potentially increasing study retention. We note that our objective compliance data indicated excellent participant response (80% or above in entry and item completion) despite the challenges of EMA implementation. These data suggest that EMA implementation in schools is feasible when EMA methods are carefully implemented. User-friendly devices (iPod Touch), short items with visual analogue response scales, alarms to prompt diary entries, and snooze functions to accommodate inconvenient times, were some of the features that contributed to increased compliance and feasibility.

Scheduling of EMA assessments is a key issue in successful implementation and valid sampling (e.g. Tennen & Affleck, 2002). EMA assessment methods include *event-sampling*, when data is collected to sample a particular event (e.g. teacher's mandated testing periods) or *time-sampling*, when data is collected to capture experience over a longer period of time (e.g. teacher stress over a work day). There is also a combination approach which focuses both on discrete events and changes over time (Shiffman et al., 2008). We will focus on time-sampling approaches, which are the most used in occupational stress research. Time-based sampling is particularly suited to study teacher stress, because stress responses such as mood, and stress symptoms such as increased heart rate, tend to vary over time, in association with work characteristics. Assessment schedules can be at fixed intervals (e.g. Kamarck et al., 1998), or at variable times, usually at random times, which aims at obtaining a more representative sampling of the person's experience or state. The frequency of assessments is another important consideration, potential participant burden and the time variability of the targeted state or behavior being important factors in this decision. For example, in our study of teacher stress, we elected to use a fixed schedule with an hourly frequency. This schedule matched teachers' school schedule and reduced interference with teaching duties, data entries being prompted during class breaks. The hourly scheme was considered a reasonable sampling of work conditions and stress responses, based on previous research with service professions (e.g. Johnston, Beedie, & Jones, 2006), providing a good coverage of the constructs being measured.

Increased costs are associated with EMA methods, such as the purchase of devices (e.g. PDAs) to collect the data, IT personnel time in programming devices and data entry schedules, and staff time in training participants in device use. The complex longitudinal data obtained via EMA is also harder to manage and requires specialized data analytic strategies that account for the complex, usually multilevel, nature of the data. This chapter illustrates some of the data analytic considerations using intensive EMA data from our teacher stress study (see below).

Despite the many challenges, there is agreement among researchers that EMA methods are needed to capture dynamic experiences such as teacher stress and its contingencies (see Chap. 12 and McIntyre et al., 2016; Schonfeld & Feinman, 2012).

18.3.3 *EMA Statistical Considerations*

The methodologies employed by EMA data collection strategies result in several statistical considerations that necessitate the use of more sophisticated multilevel models. These statistical considerations include unequal time intervals between assessments, unequal numbers of subject assessments either due to missing data or by design, a combination of both time invariant and time-varying predictor variables, the ability for time-varying predictor variables to differ in their association strength with the outcome at the person level, and the nested data structure of time within persons and persons within higher order units. In addition, EMA data sets tend to be vast with thousands of reports on a variety of outcomes and predictors when considering these variables reported between persons, as well as within persons across time. Most of these statistical considerations preclude the analysis of EMA data with traditional repeated measures ANOVA, either because of the violations of assumptions or the requirement of equal interval data with no missingness (Shiffman, Stone, & Hufford, 2008; Schwartz & Stone, 1998, 2007). As mentioned above, these statistical considerations can be easily handled through the application of modern multilevel models (Laird, Donnelly, & Ware, 1992).

18.4 Multilevel Modeling of EMA Data

Multilevel models are needed in stress research because study designs regularly involve the clustering of observations within higher order units as discussed in Sect. 18.1. In a typical EMA design, observations are made over time on each of several individuals. Those individuals may also be clustered into higher order social units, such as schools. In such a design, time defines the first level of the design, individuals define the second level, and schools define the third level. For simplicity, we will restrict the present example to two levels, time (Level 1) and teachers (Level 2). EMA data can be analyzed with traditional multilevel models, which simultaneously account for within-person and between-person variability. In this section, we will begin by briefly presenting the general multilevel model for two-level data. We will begin by formally defining the two-level multilevel model, followed by a discussion of fixed and random effects, covariance structures to account for the relations of variables between time points, and will conclude with an examination of parameterizations of more sophisticated time structures.

Two-level multilevel models involve the simultaneous estimation of Level 1 and Level 2 effects in predicting study outcomes. For a detailed presentation of multilevel models see Bryk and Raudenbush, (1992) or Bryk, Raudenbush, and Congdon, (1996). The Level 1 effects describe the relation between the study outcome and the time-varying predictors. Below, we will present the basic forms of the Level 1 and Level 2 models for didactic purposes, as these models are not traditionally fit by

themselves, and then the combined model that simultaneously fits Level 1 and 2 effects. The basic form of the Level 1 model is:

$$y_{it} = \pi_{0i} + \sum_{k=1}^K \pi_{ki} z_{kit} + \varepsilon_{it} \quad (18.1)$$

In this model, y_{it} is the report for an outcome for the i th person at the t th time point, π_{0i} is the person specific intercept (i.e., the expected value for person i at time $t = 0$), which will be discussed in detail in the Level 2 model below, π_{ki} is the regression coefficient relating the predictor, z_k , to the outcome, y , and z_{kit} is the i th persons score on predictor variable z_k at time t . The summation over k simply serves to indicate that there may be multiple predictors, each with its own person-specific coefficient whose products are summed together with the intercept to explain the outcome at a given point in time. The ε_{it} is the residual value for person i at time t , or the degree to which the observed score for person i at time t differs from what we expect for that individual based on their intercept and person-specific model. Variability in these residuals expresses the lack of fit in Eq. [18.1], or the degree to which observed scores do not fall on the person-specific regression lines. In the context of the empirical example to be presented below, $y_{1,6}$ would represent the first participant's self-report of feeling stressed at the 6th time point, $z_{1,6}$ for $k=job\ demand$ would be the first participant's self-report of job demand at the 6th time point, and π_{ki} would be the person specific regression weight relating *job demand* to *stress* over time for person i . It is important to note that these regression weights are, in fact, person-specific and indicate that the relation between job demand and stress over time can be stronger for some teachers and weaker for others. The size of π_{ki} describes the strength of this relationship for person i in the sense that larger values of π_{ki} indicate that stress changes more per unit change in job demand in comparison to individuals with smaller values of π_{ki} . In contrast, the variance in ε_{it} signifies the strength of the relationship between stress and the set of predictors in the sense that a small value for $Var(\varepsilon_{it})$ in comparison to the $Var(Y)$ indicates that the set of predictors does a good job of accounting for the temporal variation in stress. Thus, the magnitude of the π_{ki} signifies strength in the sense of the magnitude of response, whereas $Var(\varepsilon_{it})$ relative to the $Var(Y)$ signals strength in the sense of precision, or fit. This distinction is analogous to the difference in simple linear regression between the slope of the line and the dispersion of points around the line.

The Level 2 model focuses on the π s and models them as the outcomes. Below is the basic form of the Level 2 model for the intercept and regression weights for the Level 1 model:

$$\pi_{0i} = \beta_{00} + \sum_{j=1}^J \beta_{0j} x_{ij} + \delta_{0i} \quad (18.2a)$$

$$\pi_{ki} = \beta_{k0} + \sum_{j=1}^J \beta_{kj} x_{ij} + \delta_{ki} \quad (18.2b)$$

In model 18.2a, π_{0i} represents the person-specific intercept for person i from the Level 1 equation, β_{00} is the grand mean intercept and is the mean of all person-specific intercepts for the given outcome, x_{ij} is the score for the i th person on person-level predictor variable x_j , β_{0j} is the regression coefficient relating the predictors to π_{0i} , and δ_{0i} is the person level deviation from the sum of the grand mean intercept and the effects of the person level predictor variables. That is, δ_{0i} captures the degree to which the intercept value (π_{0i}) for person i is not perfectly accounted for by the overall mean of the intercepts (β_{00}) plus the sum of the products of the individual predictors (x_j) and their weights (β_{0j}). From our data example, π_{01} would be the person-specific intercept for stress for person $i=1$, β_{00} is the average of all person-specific intercepts conditional on the other predictors, x_{1j} for j =neuroticism would be the first person’s score on neuroticism, β_{0j} is the regression coefficient relating neuroticism to the teacher-specific intercepts, and δ_{01} would be the residual value in the intercept after taking into account the mean of the intercepts, the person level predictors, and their weights. For Eq. 18.2b, the interpretation would be similar except that the k subscript indicates that the equation is for the k th Level-1 regression coefficient as opposed to the Level-1 intercepts.

At this point, we can integrate the Level-1 and -2 models into a single integrated model by substituting the Level-2 equations for π_{0i} and π_{ki} into the Level-1 equation. The integrated equation takes the form of:

$$y_{it} = \beta_{00} + \sum_{j=1}^J \beta_{0j}x_{ij} + \delta_{0i} + \sum_{k=1}^K \beta_{k0}z_{kit} + \sum_{j=1}^J \sum_{k=1}^K \beta_{kj}x_{ij}z_{kit} + \sum_{k=1}^K \delta_{ki}z_{kit} + \epsilon_{it} \tag{18.3}$$

As seen in Eq. 18.3, individuals’ time specific reports of stress are fully explained by the grand mean intercept, the person level predictor variables, the average effect of the time-varying predictors, and the person-specific effect of the time-varying predictors, as well as the residual values at Level-2 ($\delta_{0i} + \sum \delta_{ki}z_{kit}$) and the person-level residual values (ϵ_{it}). This complex residual signals that the residual variance in Y , which is equal to the $Var(\delta_{0i} + \sum \delta_{ki}z_{kit} + \epsilon_{it})$, is heterogeneous.

As just mentioned, at its most complete, the integrated model [Eq. 18.3] estimates an average effect for the relation between the predictor and the outcome and an individual-specific effect of the predictor on the outcome. It is important to note that researchers need not estimate person-specific effects of a predictor. Estimation of the person-specific effect of the time-varying predictors implies that the coefficient for the predictor varies randomly across the population, which is to say that the coefficient has a distribution with a mean value (estimated by the between-person average value of the coefficient) and a variance (estimated by the variance of the residual value in Eq. 18.2b). If this residual variance is negligible, then the coefficient varies as a function of the values of x in Eq. 18.2b, but not randomly. Whether to model these regression slopes as randomly varying is an empirical decision, with

theoretical implications. If a predictor is modeled as fixed, then the relation between the predictor and outcome, for example the relation between job demand and stress, is the same for all individuals with the same values on the x_j in Eq. 18.2b. On the other hand, if the predictor is modeled as random, then the relation between the predictor and outcome varies randomly across individuals. So to continue the example, if job demand was modeled as a random effect, it would suggest that the relation between job demand and stress varies across teachers. In part, differences across teachers in the relationship between job demand and stress is attributable to teacher differences on the x_j in Eq. 18.2b that explain the slope for job demand ($\pi_{\text{job demand}}$). However, the relationship between stress and job demand may also vary across teachers who are comparable on the values of the x_j in Eq. 18.2b. This variability across teachers with comparable values of the x_j is captured by the term $\delta_{ki}z_{kir}$ in Eq. 18.2b. Thus, the choice of modeling predictors as fixed or random has both substantive and statistical implications.

The traditional, univariate approach to repeated measures ANOVA assumes that variances at different time points are equal and the covariances among all time points are identical¹. This assumption about the covariances is almost always violated with EMA data, because more proximal scores tend to covary more highly, and more distal scores tend to covary less. To model this difference in covariances due to the temporal proximity of EMA assessments, implies an autoregressive structure to the covariances across time points. The first order autoregressive model assumes that the relation between two assessments decreases exponentially as a function of time. Thus, the relation between the within-person residual correlations for two different time points is equal to $\rho^{|\tau_i - \tau_r|}$ where ρ is the within-person residual correlation, and τ_i and τ_r are two different times. This expression indicates that as the time interval nears 0, the correlation approaches 1. In other words, we would not expect someone's stress to differ if it were measured twice within moments of each other. However, most datasets don't follow this first order autoregressive structure, with adjacent measures not approaching correlations of 1, and more distal measures not demonstrating exponential drops. This lack of a first order autoregressive structure to EMA data is likely due to assessments containing some degree of measurement error (Stone, Shiffman, Atienza, & Nebeling, 2007; Schwartz & Stone, 2007). Thus, the most common within-person residual covariance structure contains a serial autoregressive component and a measurement error component.

As a final statistical consideration of EMA, we note that the intensive nature of the longitudinal data collection in EMA affords researchers the ability to examine a variety of time structures in their data. The specific time structures will depend on the specific nature of the data collected. For example, if one were to collect data

¹Although the multivariate approach to repeated measures relaxes this assumption and allows the covariance matrix to have any structure, the multivariate approach cannot handle missing data and requires that the sample size be at least as large as the number of time points, both of which can be problematic for EMA data.

seasonally, as was done for the data in the empirical example, specific temporal effects for season could be modeled. This design would result in Level 1, 2, and integrated models as follows:

$$\begin{aligned} \text{Level 1:} \quad & y_{it} = \pi_{1i} \text{Season}_{1it} + \pi_{2i} \text{Season}_{2it} + \dots + \pi_{pi} \text{Season}_{pit} + \varepsilon_{it} \\ \text{Level 2:} \quad & \pi_{1i} = \beta_{10} + \delta_{1i} \\ & \pi_{2i} = \beta_{20} + \delta_{2i} \\ & \vdots \\ & \pi_{pi} = \beta_{p0} + \delta_{pi} \\ \text{Integrated:} \quad & y_{it} = (\beta_{10} + \delta_{1i}) \text{Season}_{1it} + \dots + (\beta_{p0} + \delta_{pi}) \text{Season}_{pit} + \varepsilon_{it} \end{aligned}$$

In this integrated model, the season takes on a constant value for all individuals (e.g., Fall = 1 for all teachers when the observation is in the Fall and 0 otherwise), π_{1i} is the average level of the outcome for teacher i in the Fall, and it is composed of the average level of the outcome for all teachers in the Fall and a teacher deviation from that average (e.g., teachers have an average level of stress in the Fall but individual teacher's levels of stress in the Fall vary). With models such as this, researchers can investigate if outcomes follow specific temporal patterns.

18.4.1 Empirical Example

The following empirical example will illustrate some of the concepts discussed above. We will use data from 202 teachers measured over two years with three waves per year, and a total of 12 days (IES funded Grant R305A110080 to the University of Houston). Teachers were assessed up to 7 times a day and the times corresponded to a beginning of day rating, ratings at the end of periods 1–5 and an end of day rating. The outcome that will be modeled is teacher stress collected via EMA (Teacher Stress Diary, McIntyre & McIntyre, 2011), which was a single item measured on a visual analog scale (VAS) from 0–100. Time-varying predictors include job demand, which is a 3-item EMA scale assessed on a VAS from 0–100, and control, which is a single item assessed on a VAS scale from 0–100. Time invariant predictors are neuroticism, which is a 12-item scale assessed with a ‘yes/no’ response scale for each item. A “yes” response indicates the behavior was endorsed. The score is the sum across the 12 items. For a more detailed description of these measures, see Chap. 12. Finally, season will serve as a specific time structure for the observations.

The empirical example utilizes a series of models. Model 1 will fit an unconditional model for stress, which simply models the between-teacher, within-teacher, and error components of the variability of teacher reports of stress. Model 2 will include a time invariant/teacher level predictor – neuroticism. Model 3 will add two

Table 18.1 Covariance parameters for the unconditional stress model

Parameter	Variance estimate	SE	z	p
Between variance	321.4	35.20	9.13	<.001
Within variance	304.7	14.64	20.81	<.001
Autocorrelation	0.84	0.02	49.82	<.001
Measurement error	317.5	12.09	26.27	<.001

time-varying predictors – job demand and control – to Model 2. Finally, Model 4 will add season as a specific time component to Model 3.

Model 1 The unconditional model of teacher stress simply seeks to decompose variability in teacher stress scores into between-teachers and within-teacher components. The multilevel model equations are:

$$\text{Level 1: } \text{Stress}_{it} = \pi_{0i} + \varepsilon_{it}$$

$$\text{Level 2: } \pi_{0i} = \beta_{00} + \delta_{0i}$$

$$\text{Integrated: } \text{Stress}_{it} = \beta_{00} + \delta_{0i} + \varepsilon_{it}$$

In this integrated equation, β_{00} is the grand mean of all of the teachers' mean scores on stress, δ_{0i} is the deviation of the teacher's mean from the grand mean, and ε_{it} is the teacher's time specific deviation from his/her mean stress score. The model further assumes that the δ_{0i} are independent of the ε_{it} , and that the ε_{it} have homogeneous variance across time and a type of autoregressive covariance structure that allows decomposition of the variance components into variability within-teachers, variability between-teachers, a single covariance parameter, and a measurement error component.² By decomposing the variability in this way we can determine how much variability in all reports of stress can be explained by differences between teachers, how much of the variability can be explained within-teachers and what portion of the variability is measurement error. In this data example, we obtained a point estimate for teacher stress of 40.0, or $\beta_{00} = 40.0$. The breakdown of the covariance parameters can be seen in Table 18.1.

As seen in Table 18.1, the total variance is 944.44. Between-teacher variability is $321.4/944.44 = .34$ or 34% of total variability, whereas within-teacher variability is $304.7/944.44 = .32$ or 32% of total variability. The between-teacher variance corresponds to a standard deviation of 17.9, thus teacher average reports of stress were quite variable – with 40.0 \pm 2SD having a range of 6.2–75.8 on the 0–100 VAS scale. Additionally, there was substantial variability within teachers in their reports of stress with a standard deviation of 17.5 about the teachers' specific means. Thus, we can conclude that reports of stress vary across teachers, and within-teachers reports of stress vary across time.

²To fit this structure, we use a spatial covariance matrix with local dispersion effects using the TYPE=SP(POW) *timestructure* LOCAL; option in SAS PROC MIXED. Interested readers may contact the authors for more information.

Table 18.2 Covariance parameters for the time invariant covariate model 2

Parameter	Variance estimate	SE	z	p
Between variance	269.2	29.98	8.98	<.001
Within variance	304.5	14.64	20.79	<.001
Autocorrelation	0.84	0.02	49.70	<.001
Measurement error	317.6	12.11	26.24	<.001

Model 2 The second model adds a time invariant covariate, neuroticism, to the unconditional model. Neuroticism is a trait that is reported only once per teacher and is a constant teacher level variable across time. Because neuroticism is a teacher level variable, it explains variance between-teachers, but does not explain variability within-teachers – it is a constant across time within-teacher. The multilevel model equations are:

$$\begin{aligned} \text{Level 1: } & \text{Stress}_{it} = \pi_{0i} + \varepsilon_{it} \\ \text{Level 2: } & \pi_{0i} = \beta_{00} + \beta_{01} \text{Neuro}_i + \delta_{0i} \\ \text{Integrated: } & \text{Stress}_{it} = \beta_{00} + \beta_{01} \text{Neuro}_i + \delta_{0i} + \varepsilon_{it} \end{aligned}$$

Note that from the model above, the regression weight for neuroticism β_{01} does not have an *i* subscript and thus the regression weight is the same across all teachers. The model results indicate that there was a significant effect for neuroticism with an estimate of 2.4, indicating that a one unit increase in neuroticism is associated with a 2.4 unit increase in stress.

To determine the amount of variability that is accounted for by neuroticism, it is necessary to investigate the variance reduction in the unconditional model that resulted from the addition of neuroticism. Table 18.2 presents the covariance parameters for this model.

As can be seen in the table, the between-teacher variance has decreased from 321.4 in the unconditional model to 269.2. Thus, by including neuroticism as a time invariant covariate, we have explained $(321.4 - 269.2) / 321.4 = .16$ or 16% of the between-teacher variability in reported stress. It should also be noted that the within-teacher variance is effectively unchanged, 304.7 versus 304.5, which is to be expected because neuroticism is constant within-teacher and thus cannot relate to the within-teacher variability.

Model 3 The third model adds two time-varying covariates, job demand and control, to the model, conditional on neuroticism. Job demand and control are job characteristics and vary both between teachers and within-teacher over time. Because job demand and control are repeated within teacher and vary between teachers, the variables explain variability between teachers and within teachers. It should also be noted that because job demand and control are within teacher variables, it is possible that the relation between job demand and stress, as well as control and stress can differ by teacher. For example, greater job demand could increase stress, but for some teachers more job demand is associated with a substantial increase in stress,

Table 18.3 Covariance parameters for the time-varying covariate model 3

Parameter	Variance estimate	SE	z	p
Between variance	323.96	60.92	5.32	<.0001
Job demand	0.023	0.01	4.66	<.0001
Control	0.025	0.01	4.63	<.0001
Within variance	244.77	13.65	17.93	<.0001
Autocorrelation	0.85	0.02	41.87	<.0001
Measurement error	300.26	12.04	24.94	<.0001

whereas for other teachers, the same increase in job demand could be associated with smaller increases in stress. For this model, the multilevel model equations are:

$$\begin{aligned}
 \text{Level 1 :} & \quad \text{Stress}_{it} = \pi_{0i} + \pi_{1i}JD_{it} + \pi_{2i}C_{it} + \varepsilon_{it} \\
 \text{Level 2 :} & \quad \pi_{0i} = \beta_{00} + \beta_{01}Neuro_i + \delta_{0i} \\
 & \quad \pi_{1i} = \beta_{10} + \delta_{1i} \\
 & \quad \pi_{2i} = \beta_{20} + \delta_{2i} \\
 \text{Integrated :} & \quad \text{Stress}_{it} = \beta_{00} + \beta_{01}Neuro_i + \delta_{0i} + \beta_{10}JD_{it} + \delta_{1i}JD_{it} + \beta_{20}C_{it} + \\
 & \quad \delta_{2i}C_{it} + \varepsilon_{it}
 \end{aligned}$$

Note that from the model above, for both job demand (JD) and control (C) there is a common regression weight for all teachers, β_{10} and β_{20} , respectively, but there is also a random component for teachers, δ_{1i} and δ_{2i} , respectively. The model results indicate that there was a significant effect for both job demand and control of .24 and $-.27$, respectively, indicating that every one unit increase in job demand is associated, on average, with a .24 increase in stress, whereas every one unit increase in control is associated with a .27 decrease in stress. However, to test whether the regressions predicting stress from job demand and control vary across teachers, it is necessary to examine the covariance parameters associated with this model in Table 18.3.

As can be seen in Table 18.3, the effects of both job demand and control vary significantly across teachers as evidenced by the estimated variance components, their associated standard errors, and the tests of significance. This variability in the effects of job conditions across teachers indicates that the regression coefficients differ across teachers. The model assumes that the coefficients for job demand are normally distributed, and estimates the standard deviation at .15 (i.e., $\text{SQRT}(.023) = .15$). These distributional assumptions imply that the regression coefficient for job demand falls between .24 $\pm 1.96(.15)$ or from $-.06$ to .54 for 95% of teachers. Likewise, the regression coefficient for control is normally distributed with a standard deviation of .16. Thus, the regression coefficient for control falls between $-.27 \pm 1.96(.16)$ or from $-.58$ to .04 for 95% of teachers. So, for most teachers increased job demand is associated with increased stress, and increased control is associated with reduced stress, but these effects vary substantially across teachers, such that demand and control have greater effects on stress for some teachers than other teachers.

Table 18.4 Covariance parameters for the seasonal effects model 4

Parameter	Variance estimate	SE	z	p
Fall	234.14	28.14	8.32	<.0001
Winter	157.26	28.90	5.44	<.0001
Spring	247.12	32.71	7.55	<.0001
Within variance	250.58	13.60	18.43	<.0001
Autocorrelation	0.80	0.02	39.09	<.0001
Measurement error	296.94	11.72	25.33	<.0001

Model 4 In the final model, we add season as a specific time pattern. In the empirical example, fixed and random effects for each season – Fall (F), Winter (W), and Spring (S) – will be estimated separately, but it would be possible to estimate more specific patterns, such as a high point of stress prior to state testing, but lower levels at other times of the year. Also, to simplify the integrated model, we will remove the random effects for job demand and control. As mentioned above, season varies exclusively within-teacher and not between teachers – at any given time point, all teachers have the same value for season. For this model, the multilevel model equations are:

$$\begin{aligned}
 \text{Level 1:} \quad & Stress_{it} = \pi_{0i} + \pi_{1i}F_{it} + \pi_{2i}W_{it} + \pi_{3i}S_{it} + \pi_{4i}JD_{it} + \pi_{5i}C_{it} + \varepsilon_{it} \\
 \text{Level 2:} \quad & \pi_{0i} = \beta_{01}Neuro_i \\
 & \pi_{1i} = \beta_{10} + \delta_{1i} \\
 & \pi_{2i} = \beta_{20} + \delta_{2i} \\
 & \pi_{3i} = \beta_{30} + \delta_{2i} \\
 & \pi_{4i} = \beta_{40} \\
 & \pi_{5i} = \beta_{50} \\
 \text{Integrated:} \quad & Stress_{it} = \beta_{01}Neuro_i + \beta_{10}F_{it} + \delta_{1i}F_{it} + \beta_{20}W_{it} + \delta_{2i}W_{it} + \\
 & \beta_{30}S_{it} + \delta_{3i}S_{it} + \beta_{40}JD_{it} + \beta_{50}C_{it} + \varepsilon_{it}
 \end{aligned}$$

Note that in this model, we are no longer estimating a random intercept but instead are estimating random effects for season. Thus, for each season we obtain a point estimate for the intercept and estimate teacher variability around that season specific intercept. The results of this model indicate that across teachers, their reported stress is 33.2 in the Fall, 32.3 in the Winter, and 31.4 in the spring. However, there is substantial variability between teachers in their reports of stress by season (see Table 18.4).

As can be seen in Table 18.4, there is substantial variability in teacher reports in all seasons, with standard deviations for teacher reports of stress in the Fall, Winter, and Spring of 15.3, 12.5, and 15.7 respectively. So from this example, seasonal point estimates of stress were somewhat comparable, but the spread of teacher reports tended to be somewhat smaller in the Winter.

18.4.2 EMA Summary

In this section, we discussed the logic of EMA, methodological and statistical considerations of EMA, and presented an empirical example using real data from 202 teachers over two years. As was demonstrated, application of multilevel models to EMA provides considerable flexibility to the investigator for formulating questions about factors operating within individuals, as well as between individuals. Together, these within-person and between-person factors capture both the exposure to stress and the presence of factors that potentially influence the response to stress. At the same time, the multilevel models allow for the possibility that the same factors may influence different individuals in different ways, and that characteristics of the individuals may predict variation in the personal response to stressors and the mitigating influence of stress buffers. In our example, we did not explore the possibility that contextual variables operating at the level of the school might contribute to individual differences across teachers in their exposure to stress or the moderating influences of job control, but the models presented here could be extended to allow for additional levels in the design and analysis. Moreover, the intensive nature of EMA data collection allows for more nuanced questions about temporal patterns and dynamics to be investigated.

18.5 Survival Analysis

This section focuses on survival analysis, statistical methods used when the outcome of interest is time until occurrence of an event. While this section focuses on one event of interest, more than one event could be considered which is termed *competing risks* and is beyond the scope of the present chapter. The ‘event’ is usually spoken of in terms of ‘failure’ because the kind of event usually of interest is death or some other detriment. In the context of stress research, loss of job, the experience of extreme fatigue, leaving the profession or employment setting, or experiencing a serious health event, such as a heart attack or hospitalization are common examples. However, the connotation could be a positive experience such as receiving an award for outstanding performance, recovery from illness, or the like. Time is usually referred to as *survival time* because it indicates the amount of known time an individual has ‘survived’ the event of interest or the amount of time until the event occurs (Kleinbaum & Klein, 2012). Because survival time is not always known when the event does not occur within the study period, unlike other statistical analyses, survival analysis typically involves *censoring*, the most common being right censoring. A censor time is the known survival time assigned for those individuals for whom the event does not occur by the end of the study, who are lost to follow-up, or who have withdrawn.

The main goals of a survival analysis are to estimate and interpret survivor and/or hazard functions from survival data, to compare survivor and/or hazard functions,

and to assess the relationship of explanatory variables on survival time using regression methods. *Time to event data* are continuous in nature and the event of interest is binary, signifying the occurrence (or non-occurrence) of the event of interest. Familiar regression methods include linear regression for continuous outcomes and logistic regression methods for binary outcomes, neither of which can be used for survival data. Ordinary least squares estimation, such as is used in linear regression is not appropriate for this type of data due to the fact that time to event is not normally distributed. Logistic regression methods fail to incorporate the time information.

This section describes survival analysis in the context of the outcome *time to clinically stressed* using nonparametric and semi-parametric approaches. It begins with motivational stress research questions that warrant survival methods with the previously described study and some mathematical background. The most commonly used methods for survival analysis, including estimated survival curves and regression modeling will be introduced, implemented, and interpreted in each subsection. SAS procedures PROC LIFETEST and PROC PHREG are utilized to obtain the results in this section, but other statistical packages also contain modules for survival analysis and the methods demonstrated here are easily generalized to other packages.

18.5.1 Teacher Stress Dataset and Analysis Objectives

Throughout this section we will analyze 124 teachers from the study described in Sect. 18.4 who were at risk for becoming clinically stressed at baseline and followed for up to two years. Baseline factors to be assessed include level of psychological distress, neuroticism at baseline, and level of fatigue that may influence survival time for becoming clinically stressed. Time-dependent variable level of fatigue will be used as well. Follow-up time for study teachers begins from the time of enrollment into the study. The goals of this section are to demonstrate the steps in conducting a survival analysis. Specifically, we will:

- Characterize the overall survival experience of 124 study teachers who are at risk of becoming clinically stressed.
- Compare the survival of study teachers who, at baseline, self-reported high versus low levels of psychological distress
- Estimate the hazard rate of those who, at baseline, are at high versus low levels of psychological distress
- Estimate the hazard rate of those who, at baseline, are at high versus low levels of psychological distress adjusting for neuroticism and testing for interaction between neuroticism and psychological distress.
- Estimate the hazard rate incorporating a time-dependent indicator of fatigue.

To carry out the analysis, we will employ several measures from the study described in Sect. 18.4. Specifically, the variables used and their operational defini-

tions are as follows: Time defines the length of follow-up, and is measured as either the time from baseline until the individual is determined to be clinically stressed, or is censored, if the individual completes the follow-up interval without becoming clinically stressed. Stress is the outcome, and serves as an indicator of clinically stressed (1) or is censored (0). Psychological distress is a binary variable reflecting self-reported psychological distress at baseline. Psychological distress is taken to be 1 if the self-reported distress scale was greater than 2 at the baseline, and 0 otherwise (measured by the General Health Questionnaire-12, Goldberg & Williams, 1988). Neuroticism (EPQ-R, Eysenck & Eysenck, 1991) was also collected at the baseline assessment and is the sum of 12 yes/no items as described in Sect. 18.4. In addition to the foregoing, we include a measure of Fatigue (measured via the Teacher Stress Diary, McIntyre & McIntyre, 2011), which is coded 1 if the teacher's self-reported baseline fatigue scale was greater than 33 (VAS scale of 0–100) and 0 otherwise.

18.5.2 Mathematical Background

Let T denote the random variable *survival time*, where ($T \geq 0$) and t denote the realization of T , that is, a specific value of survival time. Then let $f(t)$ be the probability density function (pdf) of survival times or the function that generates observed survival times. Given these definitions, the probability of observing survival time within the interval $[a, b]$, is defined to be $\int_b^a f(t) = P(a \leq T \leq b)$. When $f(t)$ is not easily specified or does not follow a known distribution, which is often the case in survival analysis, non-parametric methods are used.

This section focuses on non-parametric and semi-parametric methods for analyzing survival data. The cumulative distribution function (cdf), defined as $F(t)$, is the probability of observing T less than or equal to t . We designate this probability as $\Pr(T \leq t)$, which we take to signify the probability of observing a survival up to t . The importance of these functions is that they allow us to define what is known as the survival function, $S(t)$, which is the probability of surviving *past* time t or $\Pr(T \geq t)$, which is given mathematically by $1 - \Pr(T \leq t)$ or $S(t) = 1 - F(t)$. For example, if we are interested in whether a teacher survives 'clinical stress' for more than a year after undergoing a certain level of psychological distress, this would be denoted as $\Pr(T > t = 365)$. The advantage of the survival function is that it allows us to plot a survival curve (see Fig. 18.2) to visualize the survival at each value of t . As t approaches infinity, $S(t) = 0$ and at $t = 0$, $S(t) = 1$. In other words, at the beginning of the study, no one has yet had the event of interest, therefore the probability of surviving past time 0 is 1. Theoretically, this function provides a smooth function decreasing from 1 to 0, but in practice with collected data, the estimated survival function will be a step function and t will not reach infinity, thus the estimated survival will not reach 0. It is usually of primary interest in survival analysis to model

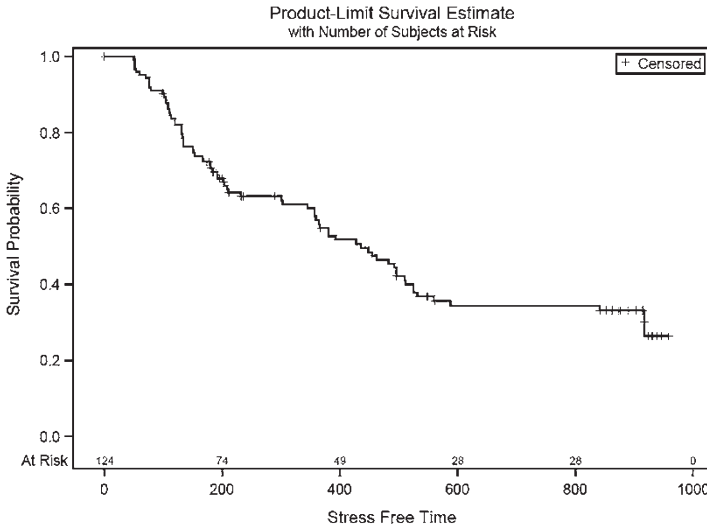


Fig. 18.2 Kaplan Meier survival curve

the hazard rate, $h(t)$, which has the following relationship with the functions previously defined:

$$h(t) = \frac{f(t)}{S(t)}. \tag{18.4}$$

The hazard rate, $h(t)$, is also called the conditional failure rate, and gives the instantaneous potential or risk per unit of time that the event (i.e., failure) is likely to occur, given survival until time t . The hazard function is directly related to the survival probability mathematically and most computer programs can give either result.

18.5.3 Kaplan Meier Estimator of the Survival Function

This subsection characterizes the overall survival experience of the 124 study teachers who are at risk of becoming clinically stressed. The Kaplan Meier survival function estimator, $\hat{S}(t)$ is commonly used to estimate $S(t)$ and calculated as $\hat{S}(t) = \prod_{t_i < t} \left[1 - \frac{d_i}{Y_i} \right]$, where at time t_i , Y_i is the number at risk and d_i is the number of teachers who fail. The 95% CI for the estimated survival time is

$\hat{S}(t) \pm 1.96 \times \widehat{SE}(\hat{S}(t))$, where $\widehat{SE}(\hat{S}(t)) = \hat{S}(t) \sqrt{\sum_{t_i < t} \frac{d_i}{n_i(n-d_i)}}$ is the Greenwood estimator, the most common estimator of the SE of KM estimated survival times, produced by default in PROC LIFETEST. Notice that $\hat{S}(t)$ is a product

of multiple terms, each of which is an estimated conditional probability of survival beyond time t_i . This product-limit estimator allows us to characterize survival over time graphically. Specifically, the KM estimator is plotted at each time point in what is referred to as KM survival curve. Using the teacher stress level data and the data provided below of product-limit estimates $\hat{S}(50) = \frac{122-1}{122} = 0.992$. From the Kaplan Meier survival curve presented below, which estimates the probability of survival at each observed survival time, we can visualize the KM estimator across time. When an individual becomes clinically stressed at a particular time point, the step function drops, whereas between event times the graph remains flat. The survival function decreases most steeply at the beginning of the study, suggesting that the hazard rate is highest during the first 200 days, around the winter and spring follow-up visit of the first year of the study. The last failure occurred at day 918 and then notice that the line becomes flat (does not drop) but observed censored times extend until day 959.

18.5.3.1 Comparisons of Survival Functions across Independent Groups

Researchers may suspect that the survival experience is worse for individuals who, at the time of enrollment, have self-reported high versus low levels of psychological distress. This subsection uses the stress dataset to examine KM survival curves and formally compare survival experiences across independent groups.

Figure 18.3 displays the KM curves stratified by psychological distress level at the time of enrollment. These curves suggest that individuals with self-reported

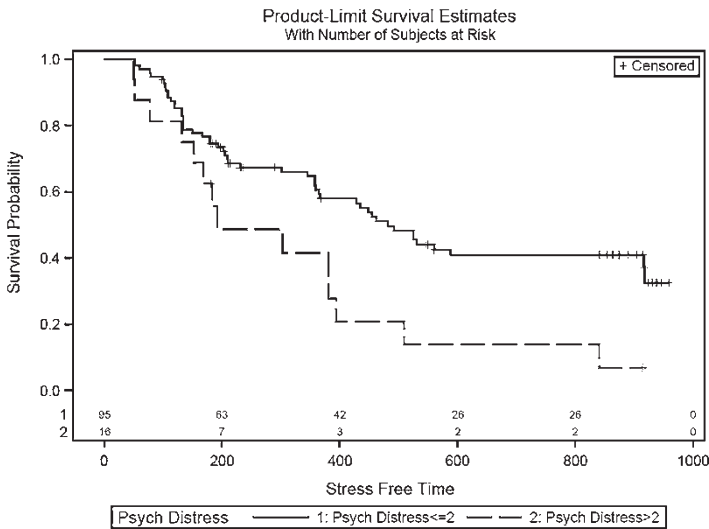


Fig. 18.3 Kaplan Meier survival curves stratified by psychological distress (Psych) at enrollment

high levels of psychological distress at enrollment time have worse survival. As indicated by the graph, the median survival time for those with high levels of stress is ~366 days, which is much lower than those with low levels of stress, who have a median survival time of ~530 days.

A log-rank (Flemming and Harrington) test is used to test the hypothesis that the two survival functions are equal across strata. The Log-rank statistic is

$$\text{calculated as } Q = \frac{\sum_{i=1}^m (d_{ij} - \hat{e}_{ij})}{\sum_{i=1}^m \hat{v}_{ij}}, \text{ where in stratum } i \text{ at time } t_j, d_{ij} \text{ is the observed}$$

number of failures, \hat{e}_{ij} is the number of expected failures, and \hat{v}_{ij} is the estimator of the variance of d_{ij} . Under the null hypothesis, Q follows a Chi-square distribution with $m-1$ degrees of freedom. In the graph of the KM estimators stratified by psychological distress, highly psychologically distressed individuals generally have a worse survival experience. This conclusion is reinforced by the log-rank test of equality across strata (log-rank statistic=7.71, p -value=.006). From the formula, one can see that the log-rank test can also be used to compare three or more groups. An alternative to the log-rank test not presented here is the Peto test, which is a weighted statistic that places more weight on early failures.

18.5.3.2 Cox-proportional Hazards Model

To answer the remainder of the research questions posed in the beginning of this section, regression methods in survival analysis are utilized. Recall that $h(t)$, conditional failure rates, is the probability of failure per unit time and briefly, is the derivative of the cumulative hazard function, $H(t)$. With regression type methods, the emphasis is modeling the relationship between the explanatory variables and the hazard rate. The mathematical model most commonly used to analyze survival data is the Cox proportional-hazards model (Cox, 1972). For a vector $X = (X_1, X_1, \dots, X_p)$ of time-independent explanatory variables, p unknown parameters, and baseline hazard denoted as $h_0(t)$, the Cox PH model is written as:

$$h(t) = h_0(t) \exp\left(\sum_i^p \beta_i X_i\right) \tag{18.5}$$

Equation 18.5 is the product of the baseline hazard, $h_0(t)$, involving t but not X 's, and the exponential term containing parameters, β_i involving X 's but not t (when X 's are time-independent), and is a multiplicative effect on the baseline hazard. Equation 18.5 also ensures non-negative estimates of the hazards. In survival analysis, the measure of effects is called a hazard ratio (HR) and is expressed as the exponential regression coefficient β . The interpretation of a HR is similar to that of an odds ratio in that a $HR < 1$ indicates a positive or protective effect of the exposed compared with the unexposed and $HR > 1$ indicates an increased risk for the exposed compared with the unexposed. A major assumption, hence its name, is the proportional hazards

assumption, that the HR of two groups is constant over time. In other words, the HR for on individual should be proportional to that of another. This can be expressed as:

$$HR = \frac{h(t|x_1)}{h(t|x_0)} = \frac{h_0(t)e^{\beta_1x_1}}{h_0(t)e^{\beta_1x_0}} = e^{\beta_1(x_1-x_0)} \tag{18.6}$$

Graphically speaking, the hazards for two independent groups should not cross. Methods to check the PH assumption include graphically, formal goodness-of-fit tests, and time-dependent variable approaches, and will not be presented here. Further information can be found in Kleinbaum and Klein (2012). Maximum likelihood estimation (MLE) is used for parameter estimation of the partial likelihood due to the fact that the likelihood ignores assumptions made about the baseline hazard function. Standard statistical packages perform MLE and provide estimates of the HR parameter, β . Chi-square statistics are performed to evaluate regression parameters. Although semi-parametric models such as the Cox proportional hazard model will be demonstrated here, parametric models can be used to model survival time. The Cox PH is used primarily because of uncertainty regarding the appropriateness of parametric approaches in any given context, and because of the robustness of the Cox PH model. Finally, estimated adjusted survival curves may be plotted.

In the foregoing section we graphed and formally tested the difference in survival functions for individuals with high versus low levels of psychological stress. We now examine the relationship between levels of psychological distress and the hazard of stress by estimating three different models. Model 1 examines the impact of Distress on the hazard function. Model 2 includes Neuroticism along with Distress, and Model 3 includes the interaction of Neuroticism and Distress, addressing the possibility that the effects of Psychological Distress are not the same for individuals high and low on neuroticism.

Table 18.5 displays the estimated model coefficients, tests of significance, Hazard Ratio (HR), and 95% CI for the HR for each model. Notice that the column titled

Table 18.5 Estimates for three proportional hazard models of clinical distress

	Estimate	SE	Hazard Ratio	95% CI ^a	p
<i>Model 1</i>					
Psychological distress (>2)	.821	.305	2.27	1.25, 4.13	.007
<i>Model 2</i>					
Psychological distress (>2)	.667	.314	1.95	1.05, 3.60	.033
Neuroticism	.082	.043	1.09	0.998, 1.18	.060
<i>Model 3</i>					
Psychological distress (>2)	.483	.824	1.62	0.32, 8.15	.558
Neuroticism	.078	.047	1.08	0.99, 1.18	.097
Neuroticism*psych. distress	.032	.132	1.03	0.80, 1.34	.807

^aHazard Ratio HR: $e^{\hat{\beta}}$; 95% CI: $e^{\hat{\beta} \pm 1.96 SE(\hat{\beta})}$

Hazard Ratio estimates the risk of clinical distress among those defined as psychologically distressed relative to individuals considered not at-risk, while Model 2 adjusts for neuroticism, and Model 3 includes the interaction between psychological distress and neuroticism. In Model 1, teachers with self-reported high levels of psychological distress have a $e^{.821} = 2.27$ increased hazard rate compared to less psychologically distressed teachers (HR: 2.27; 95% CI: 1.3,4.1; $p=.007$). In Model 2, the hazard ratio for the effect of psychological distress adjusted for neuroticism is $e^{.667} = 1.95$, suggesting a 95% increase in risk of clinical distress in teachers with high levels of psychological distress compared to less psychologically distressed teachers for a fixed value of neuroticism (HR: 1.95; 95% CI: 1.05, 3.60, $p=.033$). Model 3 includes a product term. Note that a p -value of 0.807 is obtained for the coefficient of the product term psychological distress and neuroticism. Because the interaction is not significant, we would reject this model in favor of Model 1 or Model 2, depending on our disposition toward the marginal effect of neuroticism in Model 2. However, to calculate the adjusted risk (HR) of clinical distress for psychologically distressed teachers in the presence of interaction, we would need to include a value for neuroticism (e.g. 3.9) and compute $e^{0.438 + .032 * neuroticism} = e^{0.438 + .032 * 3.9} = 1.76$.

18.5.3.3 Extended Cox Model: Time-Dependent Covariates-Fatigue

The hazard of becoming clinically stressed may not always be modeled using baseline variables alone, but may be modeled using explanatory variables that change over time. In this subsection, an extended Cox PH model is used to assess the relationship between time-dependent incidence of fatigue and stress levels. Recall that the Cox PH model takes the following form with the assumption of time-independent covariates or baseline covariates as we have been referring to

$$h(t,X) = h_0(t) \exp\left(\sum_i^{p_1} \beta_i X_i\right) \tag{18.7}$$

Including time-dependent variables $X = (X_1, X_2, \dots, X_{p_1}, X(t)_1, X(t)_2, \dots, X(t)_{p_2})$

the extended Cox PH model takes the general form:

$$h(t,X(t)) = h_0(t) \exp\left(\sum_i^{p_1} \beta_i X_i + \sum_j^{p_2} \delta_j X(t)_j\right) \tag{18.8}$$

Note that in the extended Cox PH, the hazard depends on time unlike Cox PH with constant hazard. This dependence on time fails the PH assumption. A model with time-dependent variables can be thought of as including a product term $X*time$. We will now use the following extended Cox PH regression model to investigate whether teachers self-reporting higher levels of fatigue survive

clinical stress more poorly than teachers who self-report low levels of fatigue using the following model:

$$h(t, \text{Fatigue}(t)) = h_0(t) \exp(\delta_i * \text{Fatigue}(t))$$

We will define a fatigue event as self-reporting high levels of fatigue. Among the teachers who were at risk of becoming stressed, a subset of 103 teachers who were at risk of becoming fatigued at enrollment, were analyzed. The fatigue status at time t , denoted by $\text{Fatigue}(t)$ is defined to take on the value 0 at time t if the teacher has not had the fatigue event at this time and 1 at time t if the teacher is highly fatigued prior to or at time t . Thus, for a teacher who does not ever report high levels of fatigue during follow-up, the value of $\text{Fatigue}(t)$ is 0 at all remaining time points. For a teacher who does report high levels of fatigue at some point during follow-up, the value $\text{Fatigue}(t)$ is 0 at the time of enrollment and continues to be 0 until the time at which the subject reports high levels of fatigue at which point the value of $\text{Fatigue}(t)$ changes to 1 and remains 1 throughout the remainder of follow-up. To summarize, fatigue status is a time-dependent variable and takes the value 1 or 0 at time t (measured from baseline assessment), depending on whether or not the teacher had the self-reported fatigue event at that time or before. Note that the value changes for teachers in each risk set (teachers still not clinically stressed just before each distinct event time).

Fitting the model, we obtain an estimate of the HR for $\text{Fatigue}(t)$ of 1.53, with 95% CI (0.84, 1.29), and p -value of .162. Since fatigue is time-dependent, a slightly different interpretation of the HR is needed. That is, at any given time t , the hazard for a teacher who has not yet experienced high levels of fatigue (but may become highly fatigued) is approximately $1/1.53=0.65$, a protective effect, though not significant.

This section has provided the stress education researcher with a brief introduction to survival models of relevance to stress researchers. We have focused specifically on models for time to event data, such as time to experience a stress event. We provided background to understand the model and data applications implementing collected stress data. We could not begin to touch upon the analysis for every type of scenario and refer the readers to texts such as Kleinbaum and Klein (2012) for more extensive survival analysis, including model selection strategies, model diagnostics, competing risks, and other types of censoring.

18.6 Chapter Summary

This chapter introduced the reader to some of the methodological challenges that confront researchers studying educator stress. These included problems associated with clustered observations, and managing the many time scales on which stress related phenomena unfold, from moment to moment to months and years. We also

showed how both of these challenges could be addressed through the use of multi-level models coupled with ecological momentary assessments. The chapter concluded with an overview of survival analysis and proportional hazard models that can be used to study time to event phenomena where some outcomes are censored due to the finite nature of follow-up intervals. The chapter demonstrated the use of multilevel, survival, and hazard models using data from a recently completed study of stress in middle school teachers. Combined with EMA, the methods discussed in this chapter and on display throughout the book provide researchers with a powerful set of tools for studying educator stress, and its effects on educator's health, work, and effectiveness.

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Chapter 19

Translating Educator Stress Research into Practice and Policy

Peggy McCardle

Abstract What we know about stress in general and specifically how it applies to educators is a critical issue, as it not only affects who stays in the workforce but also the quality of the education they provide our children and youth. Change itself is difficult and stressful; changing policy is hampered by legislation, administrative requirements, and even personal beliefs. The same is true of changing practice – which is steeped in traditions, as well as beliefs. This chapter addresses how the evidence presented in this volume might inform education policies, teacher preparation, and ongoing professional development, and how chapter authors' evidence-based practice and policy recommendations might be implemented to improve both the individual lives and practices of teachers and education administrators, the overall school climate, and education outcomes for students.

Keywords Policy • Legislation • Teacher knowledge • Student outcomes

19.1 The Issue

What we know about stress in general, and specifically how it applies to educators, is a critical issue, as it not only affects recruitment and retention, who enters and who stays in the teaching workforce, but also the quality of the education they provide our children and youth. It is important that educator stress be recognized, defined, studied, and ameliorated. To accomplish this, policies informed by what is known about educator stress, stress in general, and prevention and intervention programs, will be crucial, as will a reasoned, flexible implementation of practices governed (not dictated) by such policies. And like programs, policies should be studied, evaluated, and updated to keep pace with changes in education environments and economic and societal needs.

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19.1.1 *Recognizing Educator Stress*

If we are to improve education, a perennial cause both nationally and globally, it is important that society acknowledge that stress is an important factor in the work and lives of today's educators. Many of the chapters in this volume assert that teaching is one of the most stressful jobs. Yet surprisingly, neither *Forbes* (2016) nor *Fortune Magazine* (2016) list it among their 10 most stressful or 10 worst jobs, respectively (based on four factors: environment, income, outlook, and stress). This tells us that society in general may not recognize teaching as a stressful occupation. Those who look specifically at education report that it is highly stressful (see chapters in this volume, as well as an article in TES [Wiggins, 2015], formerly the U.K.'s Times Educational Supplement, and a survey by the U.S. American Federation of Teachers [AFT, 2015a, 2015b]). This is an under-researched topic, yet one that is rich with potential research projects that could serve to inform improved policy and provide the evidence needed for more effective intervention and prevention programs that could better arm teachers to recognize, prepare for, and cope with the stresses of the job.

Despite societal awareness being low, teacher stress is not a new issue; it has been a concern since the 1970s and 1980s. Cunningham (1983) reported studies from the 1970s and cited major professional associations including AFT, the National Education Association, the national associations of elementary and secondary school principals, expressing concerns during that time period about teacher stress and burnout. His recommendations for ameliorating the situation included improving teacher status, rewarding motivation and performance, preservice stress preparation, joint problem solving involving teacher, parent, and student, and participatory team leadership. Sadly, little seems to have changed over the decades.

The major sources of stress, according to several accepted theories and the available research supporting them, is an imbalance between job demands and resources to cope with those demands (Cano, Flores, Claeys, & Sass, Chap. 6, this volume; McCarthy et al., Chap. 7, this volume). Throughout the chapters in this volume, several key factors are repeatedly cited as contributing to educator stress and to this imbalance:

- lack of leadership support and threats to teacher autonomy, with an overly controlling work environment (Collie, Perry, & Martin, Chap. 1, this volume; Travers, Chap. 2, this volume; Schonfeld, Bianchi, & Luehring-Jones, Chap. 3, this volume);
- inadequate time and resources (Bellingrath & Kudielka, Chap. 4, this volume);
- poor interpersonal relationships (with students and colleagues; for example, classrooms that include a broad ability span in students, large portions of students with learning disabilities, linguistic differences, or low socio-economic status, which can hinder formation of adaptive teacher-student relations (Collie et al., Chap. 1, this volume);
- student misbehavior, including destructive or aggressive behavior (Travers, Chap. 2, this volume; Schonfeld et al., Chap. 3, this volume; Bellingrath & Kudielka, Chap. 4, this volume);
- and education policy changes (Collie et al., Chap. 1, this volume).

Things that seem to ameliorate stress, or enable educators to cope with workplace stress include feelings of competence and self-efficacy, personal resilience, leadership support for autonomy, teacher inclusion in decision-making, and professional and social support, including collaborative relationships with other teachers (Collie et al., Chap. 1, this volume; Skaalvik & Skaalvik, Chap. 5, this volume; McCarthy et al., Chap. 7, this volume).

It is clearly in the best interest of society to support well-trained, resilient teachers who value the job and choose to remain in this profession.

19.1.2 Teacher Shortage and Attrition

There is a worldwide teacher shortage in at least 74 countries, worse in low and middle income countries (LMICs) (UNESCO, 2015). The United Nations Sustainable Development Goal 4 (SD4), to provide every child with 12 years of quality education by 2030, drives increased enrollment and increased years of schooling, making this situation more acute. Class sizes in LMICs are already large, and conditions stressful. While many of these countries have managed to boost recruitment, some have done this by having relatively low entry-level requirements. Without ongoing, excellent professional development, these teachers will be unable to contribute to the SD4 goal, and will likely experience even more stress than their better-trained colleagues. Even in industrialized nations, teachers are in short supply. In the U.S., the teacher shortage is cited by the leader of the American Federation of Teachers as a looming crisis (Weingarten, 2016).

Meanwhile, attrition is also a factor. According to NCES, preliminary results of a longitudinal study of teacher attrition indicate that for the U.S. cohort beginning in the 2007–2008 school year, 10% of new teachers did not continue after their first year, and that percentage went up annually to 12%, 15%, and 17% by 2011–2012 (Gray & Taie, 2015). A 2011 policy brief by the University of Northern Colorado Education Innovation Institute cites research on teacher attrition and makes the point that why teachers leave the profession is a key factor, but one that is difficult to fully elucidate given the dearth of research on the topic (Education Innovation Institute, 2011). However, it seems clear that the conditions under which they practice is likely to play a role in at least a fair portion of those leaving the profession. The role of stress should clearly be explored as a potential cause, and as an area for preventive action and remediation.

Educator stress, specifically Pre-K – 12 teacher stress, is considered by many to be a major contributor to high teacher attrition and early retirement. Throughout this volume, we hear about teacher stress in developed nations such as Germany, Norway, and the U.S. The factors underlying educator stress and how to change them may be more easily studied in these countries, but it is equally critical to understand these factors in many developing countries where, for example, teachers may have their school days/years interrupted by war violence or health crises (e.g., Ebola virus), where class sizes exceed what could even be temporarily considered reasonable in a developed country, and where resources (heat or air conditioning, running water, electricity, even books and paper) are often inadequate. (Federal Ministry for Economic Cooperation and Development, 2010–2016).

19.1.3 Teacher Preparation, Professional Development, and Content Knowledge

We need to ensure that teachers are adequately prepared for what we ask them to do. Being asked to perform well and competently, and to be accountable for the results of their students' achievement gains, is only a fair demand if those upon whom those demands are placed are fully and well prepared. The demands made on all professionals change with new research findings and with changes in society – our lifestyles, economy, and technology, so that ongoing professional development, as well as thorough up-to-date preparation, is crucial. While we know a lot about how best to provide professional development (Gulamhussein, 2013; Hunzicker, 2010), we know less about how best to gauge the specific content knowledge needs of teachers without increasing their stress.

In her analysis of what constitutes good vs. successful teaching, Santoro (2011) makes this statement: “Successful teaching does not hinge on any particular method or pedagogical approach but depends upon students demonstrating that they have learned the material, skill, or disposition that the teacher intended to impart” (p. 8). This clearly signals the need for a thorough, in-depth knowledge by the teacher of what is being taught, linking teacher success to student outcomes, and underscoring the importance of teacher content knowledge.

McLean and Connor (2015) also underline the importance of teacher content knowledge and expertise, as well as teacher mental health. They found that student achievement for math was associated with higher levels of depressive symptoms in teachers, while reading achievement was not. Possible explanations included that a previous parent intervention study had shown greater gains in reading than in math, and these results could have carried over, but McLean and Connor also noted that math teachers in the study had recently been required to use a new core curriculum with which they were less familiar and which had a focus (conceptual vs. skills) different from the previous curriculum. Further, they noted that instruction in reading for this population might have been more robust than instruction in math, given that reading teachers in the state had received extensive training in reading instruction since 2002, while there was no such program for math. Their bottom line was that the teachers' mental health is important to classroom environment and instruction, but it seems clear that the relation between teacher symptoms and teacher competence in the content area should be examined. While it has been argued, quite well, that accountability should not focus on the individual teacher, since in most instances there are others contributing to the education of the student, (Santoro, 2011; Valli, Croninger, & Walters, 2007), our responsibility to ensure that teachers are equipped with the knowledge, expertise, resources, and support they need is not lessened by this point. While the study shows association, not cause, it may well be that teacher depression results from, or is exacerbated by, student failure, and/or that it lessens the teacher's ability to instruct and support better student learning – that is, it may well be a reciprocal effect, and one that can be intervened with and/or prevented, to the benefit of both teacher and students.

19.2 Moving Toward Possible Solutions

19.2.1 *When to Intervene*

Four of the chapters in this volume are particularly instructive as we think about interventions, key being a public health approach – that is, an approach that is community-focused, population-based, and aimed at prevention. The emphases included in these chapters are that we need to understand the antecedents of educator stress (Taris, Leisink, & Schaufeli, Chap. 11, this volume advocate using occupational health theories as a basis for getting at an understanding of what these antecedents are), and that we should intervene at all levels (Siegrist, Chap. 10, this volume; Taris et al., Chap. 11, this volume; Sinclair, Cheung, & Cox, Chap. 13, this volume). All are clear that prevention, at multiple levels, dealing with the system/organization, is vital. While they do not lay out and test specific interventions, but rather give us theories and models, they do lay the groundwork for solid, serious prevention work that must be done.

A key approach to prevention in schools is represented by Sinclair and colleagues (Chap. 13, this volume). In their chapter on healthy schools, they examine, from an occupational health psychology perspective, how best to conceptualize policies and practices to promote a physically and psychologically healthy work environment for teachers. While they agree that training employees to recognize and assess coping resources, as well as learn or develop strategies for coping with workplace stress, is important, they assert that changes to the workplace itself are equally important, as factors within the workplace represent the proximate cause of the stress workers are asked to cope with. They appropriately liken it to treating disease symptoms without dealing with underlying cause; in this, they are clearly advocating a prevention approach. Overall, Sinclair and colleagues define a healthy school as one that recognizes the importance of and designs, then implements, policies and practices that target employee health concerns, minimizes risk exposures, and benefits the organization, the teachers, and the students. Of course the success of identifying concerns in these areas, evaluating the policies and programs to implement them, and doing so in a replicable way, will be foundational to such an effort.

To change a system, or organization, preventive interventions at the individual level are also essential. Jennings and Greenberg (2009) propose a theoretical model whereby teachers' social-emotional learning (SEL) skills are part of a cyclical process; teachers with better SEL skills have more positive teacher-student relationships, are better classroom managers, and can more effectively implement SEL programs. Those with weaker SEL skills are likely to be in a "burnout cascade". The more socially-emotionally competent teacher is better able to contribute to a healthy classroom and school climate.

Two programs presented by Jennings and DeMauro (Chap. 14, this volume), employing mindfulness-based approaches, are focused on improving the SEL of individual teachers as a means of reducing teacher stress and preventing attrition. Their review of the literature on mindfulness-based interventions indicates that these programs result not only in reduced stress, but also in increased empathy, emotion regulation,

and self-awareness. *Stress Management and Relaxation Techniques (SMART; Cullen & Wallace, 2010)* in Education focuses on teachers' work experiences and how they might incorporate mindfulness techniques into their daily teaching routines, while *Cultivating Awareness and Resilience in Education (CARE for Teachers, 2015)* is specifically focused on helping teachers reduce their own occupational stress. Both have been studied empirically with rigorous methods, sufficient to warrant serious consideration for inclusion in teacher professional development activities, and both were accepted well by teachers, a key to successful implementation. Jennings and DeMauro note that the programs address not teaching skills per se, but teacher's ability to manage their own emotion reactivity, to self-regulate even in challenging situations, which can enhance teaching efficacy. They call for further studies to address change over time (longitudinal work), longer-term outcomes, physiological effects, and student outcomes when teachers undergo these interventions, as well as the impact of teacher motivation to participate in all of these outcomes. They are, in fact, implementing a longitudinal implementation study which should inform future use of these programs.

Cox, Marczak, Teoh, and Hassard (Chap. 17, this volume) present a preventive approach to dealing with a serious stress-inducing situation for both teachers and students. Many of the most serious occupational challenges faced by teachers today are related to school violence, bullying, and harassment among their students. Technology has created a new level of bullying, cyber-bullying, which is harder to define, but easier to implement, somewhat anonymously, and to spread quickly via social media (thus more difficult to contain), but which can have effects as devastating as traditionally defined bullying (both physically and mentally/psychologically, including effects on learning). In addition, teachers themselves may be victims of cyber-bullying, so that it is an occupational health issue for them as well. Cox and colleagues discuss how teachers might cope with and intervene in cyber-bullying, as well as how policies and legislation help or hinder these efforts.

Cox and colleagues review the legalities of bullying, including cyber-bullying, for the U.K. and for the U.S. (where it is handled more at the state level). Both nations are still developing a legal framework within which to deal with cyber-bullying. New York is given as an example of a positive, preventive approach; here the state department of education provides educators with policy guidance on internet safety and legal considerations, and has, together with the state mental health office, developed a resource document designed to help educators create a positive school environment. The U.K. has also developed educational resources for prevention of cyber-bullying. In both nations, much of the responsibility for dealing with cyber-bullying rests with principals and teachers.

A meta-analysis of traditional anti-bullying programs (Ttofi & Farrington, 2011, cited by Cox et al., Chap. 17, this volume) showed decreases of ~20% in both victims and perpetrators, which Cox and colleagues assert argues for including cyber-bullying in such programs. They advocate a holistic approach to include students, educators, parents and community, and the technology industry, built around the five key elements for effectively combating bullying (1) comprehensive school prevention programs: (2) informed and up-to-date policies and practices, (3) promoting understanding and discussion of cyber-bullying, making it

easier to report it, (4) promoting positive use of technology, and (5) evaluating prevention programs and activities. Thus, they offer several recommendations, for schools or school systems: develop a specific, informed cyber-bullying policy (in addition to their policy on traditional bullying); develop clear guidance on what constitutes safe and acceptable use of technological devices, the internet, and social media platforms with reporting guidance and clear indicators of penalties for misuse; develop educational programs for teachers, students, and parents/community on these policies, practices, reporting and penalties; and offer counseling and remediation for both perpetrators and victims. This is an exemplary positive, preventive approach that empowers teachers with information and should engender support from parents and school leadership.

19.2.2 Legislation and Policy

Some of the key issues contributing to educator stress can be dealt with through local policies, and through organizational level changes. Some may require legislation (such as cyber-bullying, see Cox et al., Chap. 17, this volume), but often federal level intervention via policy and legislation is resented, rejected, not uniformly implemented, and not rigorously evaluated. The very process of legislation is fraught with problems – those who deeply understand the issues (even with evidence to present and evidence-based practices to recommend) do not have the final say, issues such as accountability may be layered on, or altered by, others writing the legislation or contributing to it at political levels, and evaluations of implementation of new laws or policies may fail for reasons of design (which may be compromised, e.g., by insufficient funding).

The history of education legislation is littered with good intentions and less-than-fully successful efforts; under NCLB (No Child Left Behind [NCLB], 2002), greater rigor was brought to the teaching of reading, yet this effort was widely resented (to state it mildly) for its punitive approach to accountability. (For a history of education legislation and policy that led to NCLB, see Sweet, 2004; see also Loveless, 2015) While testing and accountability are factors that were much maligned in NCLB, it appears that there are some valuable lessons that underscore the message in this volume, that multiple levels must be involved in any efforts to improve the education working environment. Ahn and Vigdor (2014) made this comment regarding the impact of NCLB:

Overall, our results suggest that accountability systems can have modest impacts on student performance, and if properly designed can in fact improve the performance of some students without harming others. The association of strongest, and broadest, effects with restructuring indicates that management and leadership issues are the most significant obstacles to strong performance in public schools (p. 4).

Another initiative that has been much-maligned as a federal mandate, but was, in fact, state initiated, is the Common Core States Standards (CCSS), which are education standards (learning goals) in various content areas for each grade level through

high school. Reportedly the CCSS is hated because teachers don't feel they were part of the process (Jackson, 2015) and teachers, parents, and students resent the testing put in place to determine whether standards are being met (Associated Press, 2015). Yet testing was in place even prior to NCLB, which preceded CCSS development and implementation (Loveless, 2015). However, the CCSS were developed by the National Governors Association Center for Best Practices and the Council of Chief State School Officers (2010), with input from various teacher organizations, including the teacher unions (NEA, AFT), and professional organizations, such as the National Council of Teachers of English and the National Council of Teachers of Mathematics. They were voluntarily adopted by a majority of states, and the implementation was left to the individual states.

The unavoidable issues here are that having goals and standards is important, and knowing if those have been met requires some assessment. All of this does relate to educator stress, since, as is ably pointed out in the various chapters of this volume, feeling that they have no voice, and little autonomy, are themselves stressors for teachers. Yet, somewhere a balance between accountability and teacher autonomy must be sought, if we are to ensure quality education for students. Another important message is that if parents, teachers, and students are not informed, and included, in the development of new policies and initiatives, in a way that engenders support, then these new efforts are doomed to fail. Future, professional organizational leadership is important. While legislation seems a difficult way to reform education as it tends to dictate rather than encourage, perhaps with the most recent reauthorization of federal education law – Every Student Succeeds Act (ESSA, 2015), there is reason to hope.

In one of her several *New York Times* columns, Weingarten (2015), head of the AFT, cites the ESSA as a law that can create positive change by introducing an atmosphere of assistance, rather than punishment, and by requiring standardized testing, but with greater flexibility, supposedly better tests, and an obligation to assist struggling schools. Funds are to be provided for community schools, early childhood programs, and for class-size reduction. Teacher and principal evaluations can no longer be federally mandated, but are in the hands of each state.

Weingarten (2015) also lauds NY State's plan to develop new standards and abandon teacher evaluation based on student test scores. It seems unfortunate that tying teacher evaluation to student outcomes is tarred with the same brush as punitive policies, given that the whole point of education is for students to learn. Without assessments (standardized, objective ones that assess concepts students need to master to progress in their education), documenting whether students are in fact learning is difficult at best. But ESSA does retain the basic testing requirements in reading, math, and science, which hopefully will document student learning (or lack thereof) and be used to improve education policy and systems. Such reform must include continuing education and professional development for classroom teachers. So perhaps there is reason to hope that, this time, educators and legislators may have found common ground and can work toward positive solutions for both teachers and students.

In developing policies that are informed by research, and that address content knowledge, teacher preparation and professional development, and the working environment or “climates” in which educators are asked to perform (see Sinclair et al., Chap. 13, this volume, for a description of these multiple climates), we must consider (and study) the impact that those policies and their implementation can have on teachers.

One impact of research-informed policies addressing content knowledge and teacher professional development that has been written of is demoralization – policies that when strictly enforced push teachers to compromise what they feel to be right and fail to represent what they believe to be good teaching. Such policies, it is argued, are demoralizing. Santoro (2011) asserts that when teaching conditions change to such an extent that the teacher finds the moral rewards of the profession inaccessible, what has been considered burnout (focused on individual teacher characteristics) is better labeled “demoralization” (focusing on the practice of teaching itself). She argues that the moral rewards of teaching are being endangered. Santoro succinctly defines “good teaching” as depending on the practice itself rather than on individual teacher virtues, so that it depends on the community of practice within which that teaching is done, and in which the moral rewards are found. Teachers may feel that know what they should do to engage in “good teaching” but may be prevented from doing so by policy constraints. Policies and rules that stop teachers from doing what they feel is “right” challenge their morals and ethics; a compelling example given is a bilingual teacher who was prohibited from speaking Spanish to help a child learning English. Similarly, Rosales (2012), offered the example of a teacher who was required to place first graders in a 3-hour test with no breaks. Rosales asserted that what leads to demoralization is usually an accumulation of events and mandates that change the very character of the job – policies that are not properly implemented or that teachers see as affecting their ability to deliver “good teaching”.

Cox and colleagues’ example of a positive approach to cyber-bullying in schools, discussed earlier, is an example of how policy can function to address a stress-inducing problem that implements less-than-clear legislation. That example, however, does not specifically address education. Another noteworthy example of a prevention effort that moves us toward research-informed education policy is that of implementation of SEL in schools (Jones & Bouffard, 2012). SEL is being implemented through a collaboration among schools and the Collaborative for Academic, Social, and Emotional Learning (CASEL), an organization formed by researchers and practitioners focused on advancing academic, social, and emotional competence through research, practice, and policy. Eight states are working with CASEL to create and implement social-emotional learning in their schools (Blad, 2016; CASEL, 2013), and a total of 26 states have applied to join the collaborative. While each state’s plan will be unique, there will be developmentally sensitive standards for how students would be expected to demonstrate SEL at various grade levels. Materials are being, or will be developed, (and presumably shared across states), along with strategies for both state-level support and teacher support (professional development plans). CASEL has a record of working with school districts and

studying the implementation and results of SEL programs, offering a model of how to move evidence into practice while gathering additional data to inform and influence policy (see Payton et al., 2008 for a review which includes several studies by CASEL collaborators). While there are few easily administered objective measures available to measure SEL within schools (Denham, Ji, & Hamre, 2010), and CASEL is not pushing for an accountability framework for SEL standards, they do encourage schools to examine data, including student self-reported perceptions. One hopes they will also examine teacher reactions and perceptions, and perhaps even the impact on educator stress in at least some pilot cases.

The call for evidence-based practices is a common plea; policies and laws should be subjected to the same scrutiny, and held to some standards of accountability, as are instructional practices and interventions. If policies are studied (and often they are not), we should be able to see whether they are effective in improving the education workplace environment, or not, in terms of teacher recruitment, retention, and well-being, but also in terms of student achievement and well-being. (See Loveless, 2015, for some pitfalls in how previous education legislation and policy have been studied.) Antiquated policies should be reviewed, and new or revamped policies should be informed by research evidence, including that on educator stress. Because educator stress clearly has an impact on both educators, and those they seek to educate, student outcomes should always be part of the assessment of policies. Further, studies of teacher competence and self-efficacy, clearly crucial to understanding how best to provide preventive interventions for healthy schools, should include measures of teacher content knowledge and expertise. Such approaches need not be punitive, but can be constructive and supportive. Those teachers who are secure in their knowledge of the content they seek to impart to students will be more confident, which should serve them well in terms of self-efficacy.

While policies and legislation may look like ways to “fix” problems in our education systems, it seems clear that we should at the same time be evaluating the systems themselves, and looking toward a more positive, preventive approach. Through preservice training, professional development, and in using evidence-based practices, we must arm teachers with the expertise and knowledge they need to feel competent and self-assured within their subject areas. We must arm school leadership with the resources to provide ongoing professional development in both content, coping strategies, and skills (such as mindfulness training), and arm leadership at all levels of the system with policies that allow some flexibility of enforcement (where reason can prevail), as well as arm both teachers and education leadership with guidance that makes clear the lines of responsibility and necessary actions, such as how to manage student aggression, violence in the workplace, and bullying and cyber-bullying.

We must not lose sight of the global picture in educator stress. In low and middle income nations, where simply having a safe place to teach children, in a building with electricity and running water may not be a given, the stressors may be much more basic, but these teachers will also experience many of the same stressors as teachers in industrialized nations – bullying, testing and accountability at governmental levels, low pay, limited opportunities for higher level education and

advancement. As we develop programs that are shown to be efficacious, these should be shared – even developed and evaluated in collaborations with LMICs. For example, a collaboration of projects developed under USAID funding to non-governmental agencies has been addressing policy, teacher education, and reading interventions in several LMICs with results that show student progress in reading (Gove, Brombacher, & Ward-Brent, 2017; Christina & Vinogradova, 2017; Dowd et al., 2017; Gove, Korda, Piper, & Ward-Brent, *in press*). While these programs are not addressing educator stress directly, they are certainly dealing with it, and such programs may be open to collaborations to integrate preventive interventions with their teacher education programs.

With reasonable policies guiding the implementation of evidence-based practices, and the flexibility to adapt when standards and mandates are given, we can empower educators to cope with the stressors of the education workplace. Such stressors can be mitigated; they will not disappear or be cured or conquered, but their deleterious effects on educators and those they seek to educate can be prevented or minimized.

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Chapter 20

Implications of an Occupational Health Perspective for Educator Stress Research, Practice, and Policy

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Abstract This final chapter reviews the implications of applying an occupational health perspective to research, practice and policy on educator stress. It argues for the need to bring educator stress to the forefront of education research and practice in terms of explanatory models, research methodology, and intervention strategies. Applying models and methods of occupational health psychology to addressing the negative individual and organizational consequences of educator stress is one such avenue. The chapter outlines important areas for research that have the potential to expand knowledge and inform interventions directed at supporting quality teaching and student learning. The relation between educator stress and performance has seen fewer studies, especially in its relation to teaching effectiveness. The topic of school violence has merited public attention and policy development, although educator stress processes have not been included in the research or intervention efforts to address this important issue. An occupational health perspective emphasizes the importance of a systemic and preventive view of work stress, and thus expanding the research agenda to consider stress in school systems would greatly benefit comprehensive intervention and policy efforts. Expanding educator stress research and intervention with school leadership could better inform administrative practices

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with positive implications for the whole school organization. Knowledge on educator stress also draws implications for training and development of school leaders and teachers, bringing well-being to the center of improving schools and transforming them into healthy organizations.

Keywords Educator stress • Occupational health perspective • Educator stress research • Organizational interventions • Policy implications

20.1 Introduction

This book addresses the topic of educator stress, its consequences on the teacher as an individual, and on the school as an organization. This chapter will provide a summary of the issues that were presented and comment on future avenues for educator stress research, practice and policy.

The main contribution of this book is perhaps the bringing together of education and occupational health models and knowledge, in helping to better understand and account for educator stress. As mentioned in the Preface, these two disciplines have operated mostly independently in examining educator stress; this book attempts to bridge this gap. Both disciplines can gain from this dialogue. For instance, education stress literature offers valuable information on factors that influence worker well-being in one of the largest public sectors in the nation's economy, this knowledge being useful to occupational health researchers interested in this sector and other large service sectors, such as law enforcement or health services. Occupational health scientists, and professionals, have been successful in developing organizational-based models and interventions to improve worker health and work outcomes, and yet these approaches have seldom been applied in education contexts.

Another key intent of this book is to call attention to the problem of educator stress, arguing for the need to bring educator stress to the forefront of education research and practice in terms of explanatory models, research methodology and intervention strategies. This need has recently been recognized in the U.S. at the national level by the release of a Policy Brief on "Teacher stress and health: Effects on teachers, students and schools." (Greenberg, Brown, & Abenavoli, 2016) supported by the Robert Wood Johnson Foundation and Pennsylvania State University. The brief calls attention to the negative consequences of educator stress on teacher well-being and morale, as well as on teaching and student outcomes. It also notes that there is a lack of intervention testing at the organizational level in terms of leadership practices that could benefit educator well-being and promote a healthy school culture. Finally, there is a call for integrating educator stress knowledge in new teacher training. The policy brief is promising in terms of stimulating a dialogue at the policy level on educator stress. This book elaborates on these issues and presents ample evidence that educator stress is a problem of international scope that deserves front billing in school, district, state and national education policy. The brief, and this book, also underline the need for further research on this topic as noted later on in this chapter. This mandate requires that funding sources in education and occupational health, increase support of exploratory, development and efficacy studies on this topic, which still constitutes a relatively small percentage of studies being funded. Furthermore, for research results to be utilized to better educator

well-being and effectiveness, they need to be properly disseminated by scientific outlets and translated into best practices by education entities. Education journals need to approach teacher work stress as a credible, and important, education topic, while work sciences journals need to prioritize teachers as a key population to study and to generate knowledge about work behavior as well as the organization of work.

In terms of utilization of knowledge on educator stress by educators and education administrators, there seems to be a long way to go. Most training programs of principals and superintendents do not properly cover the topic of educator stress or stress in schools, leaving these leaders ill-prepared to effectively manage educator stress and its consequences (Goldrick, Osta, Barlin, & Burn, 2012). The same is true of teacher training programs. Although job stress is a central complaint of teachers at all levels of teaching (MetLife Survey, 2012), teacher training does not provide enough preparation on how to manage and prevent negative stress responses (e.g. Roeser, Skinner, Beers, & Jennings, 2012). There is evidence that educator stress is a leading factor in turnover during the first 5 years of teaching (e.g. Ingersoll, 2002; Tourkin et al., 2007). Furthermore, recruitment of new teachers in the U.S. is difficult, and will be more so, as a 2016 national survey of college freshman found that the number of students who will major in education is at its lowest point in 45 years (Flannery, 2016). These trends point to the need for comprehensive teacher mentoring and induction programs for beginning teachers that include components that address stress monitoring and management, socio-emotional competence, and resource utilization. Induction programs have been shown to successfully impact teacher success and retention (e.g. Goldrick et al., 2012), but their benefit to educator stress is yet to be determined. Similarly, professional development programs, which have focused typically on instructional skills and classroom management (APA Teacher Needs Survey, 2006), need to be expanded to include stress awareness and stress management training (Jennings & Greenberg, 2009).

National and local education policy has also neglected to address teacher stress. Most education legislation has focused on student outcomes and teaching effectiveness contributing to those outcomes (e.g. No Child Left Behind [NCLB], 2002; more recently, the Every Student Succeeds Act [ESSA], 2015). There is growing evidence of the negative impact of teacher stress on teaching effectiveness and student outcomes (e.g. Dorman, 2003; Garner, 2010; Hoglund, Klinge, & Hosan, 2015; McLean & Connor, 2015), which suggests that supporting teacher well-being is a key factor for student achievement and socio-emotional development. Therefore, reducing teacher stress and promoting their well-being needs to be put forth as a policy priority in terms of achieving quality education. There is also a need for policymakers to reflect upon the implications of education policy for teachers' well-being. For example, there is increasing recognition that teacher accountability policies, and directives for their teaching practices, which focus on maximizing students' performance on standardized testing, may have deleterious consequences on teacher stress and morale (Berryhill, Linney, & Fromewick, 2009; Cruz & Brown, 2010), yet these policies are widespread. Teachers' unions (e.g. American Federation of Teachers – AFT) can also play a key role in the making of policies which potentially impact teacher well-being, as illustrated in Chap. 16. Collective bargaining on workload, overtime, work scheduling, teacher evaluations and promotion, teacher induction programs, team teaching and participation in school management, are

areas of influence that can have a positive impact on teacher stress and well-being. We note that these categories do not directly address teacher stress, nor its reduction or prevention. Therefore, educator stress can also be brought to a more prominent place in collective bargaining. Furthermore, there is a lack of research on the impact of policies, or policy changes, (either governance-based or union-based) on teaching effectiveness, teacher stress and well-being. As indicated in Chap. 19, there is a need to hold policy-making to the same standard as teaching practices, i.e. that the former be informed by research on its impact on teachers, students and schools. Linn (2000) points out that educational reform policy such as the standards-based accountability systems can have unintended negative effects, and recommends that systems be evaluated in terms of both positive and potential ill-effects.

We argue that applying an occupational health perspective to educator stress contributes to bringing educator stress to the forefront in the areas reviewed above. We will summarize the main tenets of this approach and how it may apply to educators as amply shown in this book.

20.2 An Occupational Health Perspective

The concern with worker health, safety and well-being has a long tradition internationally. Internationally, the best known organizations that embody the mission of defining and improving occupational health, i.e. safety and health in the workplace, are the World Health Organization (WHO) and the International Labour Organization (ILO), dating back to the 1950s. In the U.S., the Occupational Safety and Health Administration (OSHA) and the National Institute of Occupational Health (NIOSH), which were created in the 1970s, share this purpose (Burton, 2010). The Occupational Health (OH) perspective advanced in this book is based on several aspects of occupational health emphasized by these organizations, including occupational safety and health, workplace health and occupational health services. The ILO/WHO provide a common definition of occupational health which was adopted in 1950 and revised in 1995 (Rantanen & Fedotov, 2016) where OH involves the promotion and maintenance of physical, mental, and social well-being of workers. A “healthy workplace” is defined by WHO (Burton, 2010) as “one in which workers and managers collaborate to use a continual improvement process to protect and promote the health, safety and well-being of all workers and the sustainability of the workplace...” (p. 16). This definition brings together health protection (e.g. from physical and psychosocial hazards) and health promotion (e.g. health education). However, the ILO and WHO have different emphases, differentiating between OH and OH programs. OH would focus more on the safety side of the work environment, while OH programs, such as health education, stress management and assessment of health risks, would fall under general health education. The ILO does not consider these kinds of programs as “occupational health programs, but as public health services delivered in the workplace, because they focus attention and resources on personal health habits rather than on protection of workers against occupational hazards” (Rantanen & Fedotov, 2016). WHO includes in OH, the promotion of personal health resources at work such as a healthy diet and physical

activity, and the participation in the community to improve the health of workers and their families (Burton, 2010; WHO, 2007).

WHO has recognized the issue of stress in the workplace for many years. According to the World Health Organization (WHO), work related stress is “the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope.” (WHO, 2016). WHO views stress as being worse in conditions where there is little support from supervisors/colleagues, and when the individual does not have control over work demands. In the U.S., NIOSH has been the primary research organization for worker safety and health, having recognized that stress at work is a leading factor in employee safety and health since the 1970s (Sauter et al., 2002). NIOSH has focused on the “organization of work” as a leading factor in worker safety and health. “Organization of work” refers to “the work process [the way jobs are designed and performed] and to the organizational practices [management and production methods and accompanying human resource policies] that influence job design” (Sauter et al., 2002, p. 2). The external context, which includes economic, legal, technological, and demographic factors, is also part of this multilevel conceptualization of “organization of work”. The occupational stress models presented in this book focus on different aspects of the organization of work (e.g. job demand, reward, work resources), as factors influencing worker’s health and motivation.

Related to the field of Occupational Health is the development of Occupational Health Psychology (OHP) in 1990 (Raymond, Wood, & Patrick, 1990), which is the application of psychological knowledge and principles to occupational health (Cox, Baldursson, & Rial-González, 2000), and includes improving the quality of work life, and the protection and promotion of safety, health and well-being of workers. NIOSH has partnered with the American Psychological Association (APA) in several initiatives to address worker stress and health which are: the organization of bi-annual international conferences on “Work, Stress and Health”, the sponsoring of post-graduate programs in Occupational Health Psychology, and the creation of the *Journal of Occupational Health Psychology*. The European Academy of Occupational Health Psychology (EAOHP), created in 1999, the Society of Occupational Health Psychology (SOHP), APA and NIOSH have collaborated in promoting the field of OHP. Several contributors of this book have been leading researchers in the field of OHP.

A major goal of this book was to examine stress in teachers from an Occupational Health (OH) perspective. The OH perspective has been widely used in the occupational health field, but is relatively unknown in the educational field. As shown in Parts II and III of this book, an OH and OHP framework can be applied to educator stress to increase knowledge and inform intervention development. We will summarize below some of the unique aspects of the OH perspective that can be valuable in conceptualizing and addressing the problem of educator stress.

The OH Perspective Focuses on Worker Health and Safety Worker health has become a recognized value in corporate culture (Zwetsloot & Leka, 2010). The mandate for employers to establish occupational health services for employees dates back to 1985 (ILO Convention 161, 1985) and in 2007 the World Health Assembly of the WHO supported a “Global Strategy on Occupational Health for All” (WHO, 2007) which included primary prevention of occupational hazards,

health promotion at work, access to occupational health services, and incorporation of occupational health into other policies at work. These mandates are based on the premise that worker health is a strategic asset for employers, and that health is a strategic resource for companies to achieve their business goals, including productivity, flexibility, continuity, and innovation (Zwetsloot & Leka, 2010, p. 259). The *Seoul Declaration on Safety and Health at Work* (ILO, 2008) further declares that a safe and healthy work environment is a basic human right, which makes worker health an issue of business ethics and a moral issue as well.

The application of the OH perspective to educators brings the focus of education and education policies to educator health and safety. Focusing on educator health is a strategic priority in achieving quality of life for both teachers and students, and the ultimate goal of quality education. Much effort has been placed over the past century in improving schools, teaching effectiveness and access to education. Student and school health have gained increased attention (e.g. the CDC Coordinated School Health approach since 1987), but educator health has been relatively neglected in these efforts. The OH perspective places educator health as a key component of student success, going hand in hand with teaching effectiveness as a resource to be valued and promoted. Learning and health have recently been brought together to improve student achievement (Basch, 2011); bringing together teaching and health can be considered the next priority in promoting teaching effectiveness and closing the achievement gap.

The OH Perspective Focuses on Organizational Factors and Work Organization The occupational health perspective brings attention to the organization and how it contributes to stress in the workplace. An OH approach focuses on management structures (e.g. how the organization is structured), leadership practices, how work is done, and human resource policies (e.g. benefits and compensation, work-life balance programs), which define the organizational context of work (Sauter et al., 2002). It also examines job characteristics such as climate and culture, worker roles, task (e.g. complexity, demands), and opportunities for training and development.

Applying an OH perspective to educator stress brings the focus to the role of education organizations/systems in creating physical and psychosocial hazards for teachers. How districts and schools are organized, leadership practices in districts and schools, how teachers' work is structured, what are the district's human resource policies and programs, are all factors potentially contributing to educator stress and well-being. Similarly, school climate and culture, how teachers' roles are defined, how teaching and teacher tasks are organized and implemented (e.g. levels of demand, degree of autonomy, schedules), teacher incentives and opportunities for training, are also likely to impact educator s' stress and health. Focusing on work organization factors will generate new knowledge on educator stress that can greatly benefit intervention development and guide policy for schools and educators.

The OH Perspective Focuses on the Prevention of Work Stress and on Organizational Intervention The focus of an OH perspective is on eliminating the roots of worker stress which are considered to be organizational risk factors or hazards (Houdmont & Leka, 2010). Although health promotion efforts that increase worker's resources (e.g. health education, stress management) and help workers be

more resilient to organizational risks, also constitute primary prevention, the focus of OH and OHP is on health protection. Health protection involves intervening in the work environment to reduce exposure to health hazards (ILO, 2008).

Much research and many interventions focus on training the individual to develop more capacity to confront stress or to help them develop better coping strategies. Although effective, if used alone, this approach has the potential of implicitly blaming the individual for their inability to deal with stress. This “blaming the victim” places the responsibility of the individual being stressed on the individual, as an “if they can’t deal with it, then it is their fault” mentality. The OH perspective (WHO, NIOSH) places responsibility for workers’ well-being on the organization (Cox & Thomson, 2000; Jones & Bright, 2001). This implies a shift of focus from the worker to the organization, from “fixing the worker” to “fixing the system”. The OH perspective relates to Deming’s 85/15 rule, which is a longstanding view of the quality movement in the corporate world (Deming, 2000). It states that 85% of organizational failures are due to system breakdowns involving factors such as management, machinery, or work rules, workers themselves being responsible for failures only about 15% of the time. Consequently, Deming criticized the standard practice of blaming and punishing individuals for what are typically system failures that are beyond their immediate control.

Applying this approach to educator stress implies a shift in focus from the teacher to the school organization in addressing the problem of educator stress and promoting teacher well-being. Interventions to address teacher stress have typically focused on the individual (See Part III in this book) to increase a set of skills to effectively manage stressors (e.g. in classroom management) or stress symptoms (e.g. in stress management). However, since the work environment is not targeted, there is a high likelihood that the sources of stress will continue, stress symptoms will re-occur and teachers’ motivation to persist in the newly taught competencies will decrease over time (Rani & Merga, 2016). The chapters in this book (e.g. Chaps. 1, 7 and 8, 9, 10, 11, 12) presented substantial evidence for the predictive role of psychosocial characteristics of the work environment on employee stress and health, thus making a compelling argument for organizational level interventions. Organizational level interventions focus on reducing or eliminating stressful job characteristics and work conditions, targeting work organization and work practices. Interventions at this level in education contexts are rare and there is no systematic evaluation of the fidelity or effectiveness of the efforts implemented (see Chap. 16 and Greenberg et al., 2016).

In conclusion, an OH perspective applied to educator stress places the focus on educator health as a priority for education systems (government, districts, schools) as part of a mandate to protect and improve educator safety and well-being. It also shifts the responsibility to address educator stress to the education leadership (at national, state, local levels) and the focus of intervention to the organization of districts, schools and subunits within schools, addressing both how a teachers’ work is organized (task, load, decision-making, support) and work practices (school culture and climate, leadership style, teacher incentives/recognition).

20.3 Implications of an OH Perspective for Educator Stress Research

The focus of an OH perspective on worker health and safety, on organizational sources of worker stress, and on prevention, suggests a new direction for educator stress research. In education, this translates into placing teacher health and safety as a priority in education policy, education administration, and collective bargaining. In terms of educator stress research, it implies focusing on researching the factors in teachers' working environments that constitute organizational risks for stress, illness and injury, and using those findings to develop explanatory models that can inform multi-level intervention development (see Sect. 20.4). This new paradigm also implies a shift from testing interventions directed solely at the teacher (e.g. skills-building) to outcome studies of interventions focused on work organization factors (on task and work practices) or on combining both individual and organizational levels (see TWH approaches in Sect. 20.4).

Districts, schools, units within schools are organizational structures with potential impact on educator stress, but little is known about which organizational models would have a positive impact on educator well-being. Leadership practices operate at several levels such as the school board, superintendent and principal/assistant principal. There is increased research on the role of school leaders in producing healthy school organizations, which would ultimately impact educator stress (see Chap. 7; e.g. van Maele & Van Houtte, 2015; Wong & Zhang, 2014). However, the impact of different leadership practices on educator stress needs to be examined further, including the role of mediating variables (e.g. school culture, teachers' perceptions) in the process from leaders' behaviors to educator outcomes. School culture and climate (see Chap. 13), have been popular topics of research (e.g. National School Climate Council, 2007). Changing the school culture (e.g. norms, beliefs, values, rituals) has been a motor of school change in efforts to improve teacher relations and student outcomes (e.g. Muhammad, 2009), but the impact of these changes on teacher stress and health is seldom investigated. How teachers' work is organized (class scheduling, curriculum development, time allocation, teaching versus non-teaching activities) is also a key factor in their effectiveness and well-being, more research being needed on how these aspects of work organization impact educator stress.

NIOSH has developed a national research agenda on "work organization" since 1996 designated as NORA (National Occupational Research Agenda, 2013), which stems from a collaboration between researchers and practitioners. Education and schools are part of this agenda. The three main goals can outline an agenda for OH research on educator stress. First, Goal 4.1 aims the *surveillance of health and safety* to identify risk factors for illness and injuries in school employees, focusing on identification and control of chemical, biological and physical hazards. Second, Goal 4.4.5 includes the *characterization of the organization of work* (e.g. stressors such as communication methods, violence, and lack of job control) and definition of key characteristics of a healthy school work environment. Thirdly, Goal 4.5.1 targets the *evaluation of existing occupational safety and health programs* in schools. These goals remain valid for future application of an OH perspective to address educator stress. Unfortunately, as indicated in the review of OH literature applied to educator stress presented in this book, there is much in this research agenda to be

accomplished. We outline below some suggestions for research encompassing these three domains.

- *Implement systematic surveillance systems* of educator stress, health, and relevant work organization risk factors as well as work outcomes (e.g. job satisfaction, work engagement, absenteeism, and turnover). This data collection needs to be conducted regularly (e.g. annually) at the national and local levels. The variation of these variables with contextual (school characteristics) and professional variables (e.g. teaching level, subject matter, class size) also needs to be surveyed. Examination of changes in occupational risk factors and emerging trends is also needed (e.g. violence in schools, cyber-bullying, technology use).
- *Examine the impact of educator stress on teaching effectiveness and student outcomes.* There is a need for longitudinal and multilevel studies that will better determine the relation between educator stress and burnout, and teaching effectiveness, with more differentiation regarding type and duration of organizational risk factors, types of stress responses (e.g. emotional, cognitive), areas of teaching effectiveness (e.g. instruction, classroom management), and student outcomes (e.g. classroom behaviors, achievement).
- *Study long-term and cumulative effects of educator stress.* Another area of need are longitudinal studies that will track organizational risks, and educator stress and health outcomes over time, especially studies examining the cumulative effects of work stress in school contexts, which are virtually non-existent.
- *Focus on work organization and changes in work practices* (e.g. work load, scheduling, work environment, human resource policies, training opportunities) to examine which organizational risk factors are more predictive of educator stress and health outcomes. Well-tested theoretical models have pinpointed the psychosocial work variables to examine (e.g. job demand, autonomy, social support, reward, other resources). This includes studying the impact of changes in work organization in schools on educator stress and health (e.g. in teaching practices, in accountability procedures, in scheduling, in rewards/incentives, in leadership practices).
- *Explore integrative explanatory models of educator stress and well-being.* As indicated in Chap. 12, a combinative approach that integrates different models from the OH perspective (e.g. JDCS and ERI) or integrates educator stress models and OH models (e.g. Kyriacou's teacher stress model and ERI) provides a more comprehensive understanding of educator stress processes and has the potential of increasing predictive value of educator health and work outcomes (Shyman, 2011). Integrative models also have the potential of informing interventions that are multi-level (e.g. individual, interface individual-organization, and organization).
- *Develop and test organizational interventions* directed at changing teachers' work (work content and process) and school work practices; build a portfolio of effective cases of organizational change in schools with positive impact on teacher stress and well-being.
- *Evaluate existing organization-wide programs and their impact on educator stress* such as worksite health programs (WHP), Positive Behavioral Interventions and Supports (PBIS), new teaching practices (e.g. mentoring, co-teaching).

- *Test combinative models of intervention* such as the TWH approach, which combines lifestyle change with organizational changes, or the integration of organizational change targeting educator stress in school health programs.
- *Account for educator stress dynamics in daily work life.* Research on dynamic changes in work conditions and stress responses (e.g. temporal changes) is needed to better understand the real-time contingencies that drive teachers' responses to their daily stressors, those organizational factors that impact real-time stress, and how educators utilize resources as stress happens (See Chap. 12; e.g. Carson, Weiss, & Templin, 2010). Research that tests OH models dynamically in school context is rare, but promising (e.g. the Dynamic Integrative Teacher Stress model- DITS, Chap. 12). Learning about organizational risk factors' association with teachers' daily stress, especially at a within-teacher level, can be very useful in intervention development.

Fulfilling the above agenda and the application of an OH perspective to educator stress research carries methodological challenges. OH research has the same pitfalls of other behavioral sciences research such as small sample sizes, cross-sectional designs, measurement issues, lack of a control group, and of long-term follow ups. Data analytic challenges are also evident such as those involved in intensive longitudinal studies (repeated measurements over time) and multilevel studies (observations clustered within individuals and individuals clustered into classrooms, schools, and districts). We refer the reader to Chap. 18 for a review of data analytic issues and recommendations in those types of studies. Two promising methodological advances can be beneficial to further research on educator stress: the use of ecological momentary assessment methods, and the use of participatory action research.

Ecological momentary assessment (EMA) has been used in work stress and health research (e.g. Johnston, Beedie, & Jones, 2006; Vrijkotte, van Doornen, & Geus, 2000), but its application in educator stress studies has been limited. EMA refers to the collection of data in real-time via repeated assessments (e.g. Stone, Shiffman, Atienza, & Nebeling, 2007). The collection of data in real-time, usually via some form of electronic device, is advantageous in comparison to traditional survey methods in that reports are immediate and thus less subject to retrieval biases (Smyth & Stone, 2003). The repeated assessments also allow the study of changes over time and context, which reflects work stress dynamics and increases ecological validity. EMA methods have been found to be feasible in school context (e.g. McIntyre et al., 2016) and can provide useful data in terms of educator stress theory development and intervention design. Both education and OH researchers on educator stress have come to recognize that teachers' work environment is complex, as are their stress responses and outcomes (e.g. Schonfeld & Feinman, 2012). Some areas that could benefit from EMA methodology are the study of the: a) impact of specific stressors on educators such as violence and discipline stressors, (b) contingencies between work stress and teachers' lifestyle behaviors (e.g. nutrition, physical activity, sleep), (c) relation between leadership and peer behavior, and teachers' stress and work outcomes, and (d) cumulative effects of work risk factors on teachers' health and work behaviors.

Issues and challenges in designing, implementing and evaluating organizational interventions are outside the realm of this chapter (we direct the readers to an issue of *Work & Stress* in 2010 to delve into this topic), but we will refer to a couple of challenges and promising trends. As in other areas of intervention research, the use of randomized controlled designs has been considered the gold standard in testing OH interventions (e.g. Sauter et al., 2002). However, these designs are often not feasible due to practical, ethical or contextual constraints. For instance, in education contexts, the application of other district-initiated programs renders difficult the isolation of mediators or outcomes targeted by the OH intervention and the definition of no-intervention control groups in terms of school units or schools. The rapid changes in school organizations (in terms of policies, programs, and staff) add to these challenges. All this has prompted the search for alternative methods of testing OH intervention effectiveness. Participatory action research approaches, which involve the participants in all stages of intervention development, implementation and evaluation, have become more popular, especially in Europe (e.g. Framke & Sorensen, 2015). Nielsen, Randall, Holten, and Rial González (2010) have proposed a five-phase model of OH interventions and have supported employee participation which is tailored to each phase: preparation, screening, action planning, implementation, and evaluation. Implementations of this approach have been beneficial in achieving proposed outcomes, one reason being increased empowerment, ownership of change, and adherence on the part of employees (Nielsen & Randall, 2012).

Other suggestions for applying an OH perspective to educator stress research are provided below in relation to the implications for intervention, and more specific recommendations are also offered in the chapters of this volume.

20.4 Implications of an OH Perspective for Educator Stress Intervention/Practice

Regarding educator stress, the bulk of intervention efforts have been directed at teachers (Greenberg et al., 2016). Applying the OH perspective to educator stress implies a shift in paradigm from individual intervention to intervention at the organizational level, or multi-level approaches. This broader based approach, at the primary prevention level, would include interventions targeting the job/task (e.g. job redesign, workload reduction, team work, increasing job autonomy), the employer/organization (e.g. improving the organizational climate, leadership training, changing reward/benefit systems), and legislation/policy (e.g. on work hours, maternity/family leave, sexual harassment) (Murphy & Sauter, 2004).

20.4.1 Interventions Focused on the Job/Task

Chapters 13, 15 and 16 gave examples of job/task oriented interventions in education such as via team teaching or professional learning communities, and increasing supervisory support via mentoring or induction programs. Job redesign interventions (e.g. improving work schedules, reducing overload) are relatively rare (e.g. Framke & Sorensen, 2015). Other efforts such as increasing participatory decision-making by teachers in schools, are more frequent (e.g. contractual negotiations by some teacher unions addressing shared leadership and decision-making), but their impact on educator stress has seldom been evaluated (e.g. Hart, 1990).

20.4.2 Interventions Focused on the Employer/Organization

Primary prevention organizational interventions also target work practices such as improving organizational climate, leadership training and reward/benefit systems (Murphy & Sauter, 2004). There are no specific studies reported that only address work practices. However, the Positive Behavioral Interventions and Supports (PBIS) program was established by the U.S. Department of Education's Office of Special Education Programs (OSEP) with a focus on the social, emotional and academic outcomes for students with disabilities. This is a prevention strategy to reduce disruptive behavioral problems and includes organizational behavior components, such as creating improved systems (e.g. discipline, reinforcement, data management) and procedures (e.g. office referral, training, and leadership), which promote positive change in staff behaviors and would subsequently alter student behaviors. Some of the results of this initiative have demonstrated increased social support among staff and principal support (Bradshaw, Koth, Thornton, & Leaf, 2008; Bradshaw, Koth, Thornton, & Leaf, 2009).

Another initiative that sprung from OHP development was the American Psychological Association's initiative (APA Center for Organizational Excellence) that rewards organizations that implement cost-effective practices that benefit employee health: the APA Psychologically Healthy Workplace Awards -PHWA (see Chap. 13 and Grawitch & Ballard, 2016). The criteria for evaluating organizations reflect a primary prevention focus on improving work organization and practices: employee involvement and recognition, work-life balance, employee growth and development, and health and safety. Two schools received this award (Sandia preparatory school in New Mexico and Chimney's school in New York), which indicates that this type of organizational change is possible in education contexts. However, it is not clear the impact that these changes had on teacher stress and well-being.

In Part III, which focused on managing and reducing stress in education systems, most authors agreed that there is a lack of organizationally-focused interventions to address educator stress. One reason for this may be that organizational-level interventions are more complex (address the job, the organization and policies;

address groups of workers rather than individuals), take longer to implement, and is more difficult to isolate meaningful outcomes (Framke & Sorensen, 2015). Another reason may be that management does not perceive that occupational health interventions are as crucial to achieving the goals of productivity and quality for the organization (Kristensen, 2005). Both of these may apply to education contexts since schools are complex organizations, principals and superintendents like to see results short-term, and many education programs may be taking place at the same time that will render outcome findings difficult to interpret. On the other hand, as previously mentioned, occupational health for educators has not been a priority in education reform, and thus organizational level interventions to target educator stress and well-being as an outcome may not be considered as important to achieving teacher quality or productivity in terms of student outcomes as other initiatives.

20.4.2.1 Leadership Training and Development

Research has supported the positive impact of autonomy-supportive work climates and leaders (see Chap. 1; e.g. Collie, Shapka, & Perry, 2012). The impact of leadership training on educator stress has received little attention, although some findings suggest a positive impact of principal empowering behaviors on teacher job satisfaction and stress (e.g. Davis & Wilson, 2000). Some of the behaviors found to be most important in the leader-teacher relationship, and which impact job performance and job satisfaction, are the quality of the leader-member exchange or the relational leadership practices (Graham, Hudson, & Willis, 2014). Billingsley and Cross (1992) demonstrated that teacher job satisfaction and work commitment are highly influenced by the amount and quality of leadership support. In another study of 170 employees in an organization, Janssen and Van Yperen (2004) reported that when a principal creates a positive school climate, this is related to a more positive evaluation by teachers of their job satisfaction and work commitment. The training of leaders is important to the well-being of those reporting to the leader. The style of leadership can impact not only job satisfaction, but the levels of stress and burnout in teachers. For example, Sosik and Godshalk (2000) studied the leadership styles (transformational, transactional, and laissez-faire) used by mentor leaders and how they correlated with stress and burnout. Their conclusion was that a leader exhibiting transformational leadership behaviors would often have subordinates with decreased levels of stress and burnout, and increased levels of job or task satisfaction. They proposed that the transformational leadership qualities served to strengthen the emotional bond between the leaders and their followers. School administrators can improve their leadership style by receiving training in the areas of being, or becoming, a transformational leader, improving their interpersonal skills, learning how to create a more positive and inclusive school climate, and how to increase teacher autonomy. Based on more than 70 studies, the Wallace Foundation (2013) outlines the five key practices to be a successful, and effective, principal. The five practices are:

1. Shaping a vision of academic success for all students.
2. Creating a climate hospitable to education.
3. Cultivating leadership in others.
4. Improving instruction.
5. Managing people, data and processes to foster school improvement (p. 4).

20.4.3 Total Worker Health® (TWH)

The types of interventions reviewed above focus on dealing with stressors in the workplace. However, the National Institute for Occupational Safety and Health (NIOSH) has developed a model which recognizes that there are many stressors that impact an employee which also lie outside the work environment. The Total Worker Health® (TWH) model is a strategy which addresses employee health risk from both the physical environment and individual behavior (CDC, 2015). They define TWH as, “policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness prevention efforts to advance worker well-being.” (p. 1). TWH promotes the “integration of work health promotion and health protection activities (Hammer & Sauter, 2013, p. S25). It is based on evidence that stressful working conditions (e.g. few decision-making opportunities, heavy workloads, little social support from co-workers) increase the worker’s risk of engaging in unhealthy lifestyle behaviors such as smoking and not exercising (e.g. Punnett, 2010). The model proposes that interventions should be at both the organizational and individual levels by targeting both work conditions that produce stress and promoting lifestyle changes (Pronk, 2013). This model has not yet been applied to schools, but has demonstrated promise. In a review of studies informed by the TWH approach, most indicated a benefit for a variety of health outcomes such as diet, physical activity, and mood (Anger et al., 2015; Pronk, 2013). While there is a place for worksite health and wellness programs (WHP), NIOSH cautions that employers that only implement wellness programs, and do not address workplace safety and health, are not applying the principles of Total Worker Health (CDC, 2015).

20.5 Future OH Intervention Development in Education Contexts

The application of an OH perspective to educator stress intervention is promising in that it provides a framework for intervention development. Some areas for future consideration are outlined below.

- *Job redesign interventions* that address teachers’ activities (e.g. temporal order, load distribution of teacher tasks, work schedules) with the goal of increasing

effectiveness and reducing workload (e.g. job demand), are essential to reducing stress and improving teacher well-being. Evidence indicates that limiting levels of demand is essential to addressing educator stress (see Chap. 9).

- *Interventions to increase job control and teacher participation in decision-making practices* need to be implemented at a larger scale (multiple sites, regions) and their impact on teacher stress and health outcomes systematically evaluated.
- *Interventions that aim at skills-building and increasing social support at work* (supervisor, colleague) such as team-based approaches and mentoring, need to isolate which ingredients/conditions are effective in reducing teacher stress and improving teacher health, and which ones may aggravate teacher stress (unintended negative effects).
- *More interventions targeting leadership behavior and school climate change* are needed and their impact at different levels of the school system examined (leaders, teachers, staff and students), in particular the impact on educator stress.
- *School-wide Positive Behavior interventions*, which include an organizational focus, can benefit from including components addressing educator stress and evaluating their impact on educator stress and health.
- *Partnerships with teacher unions in testing the effectiveness of collective bargaining interventions* on teacher outcomes, including teacher health, could guide future contractual policies that would benefit educator stress.
- *Participatory-action approaches to intervention development and testing* (e.g. Naghieh, Montgomery, Bonell, Thompson, & Aber, 2013) hold promise and need to be implemented at a larger scale. These approaches have been found to benefit employee participation and retention, and manager support (Framke & Sorensen, 2015).
- *Broadening organizational outcomes.* Regardless of the modality and approach, educator stress intervention outcome studies need to include a broader array of organizational outcomes that have been found to be related to teacher stress such as work engagement, job satisfaction, absenteeism, and turnover (Sauter et al., 2002).
- *Applying the Total Worker Health® approach to intervention development in education contexts* is novel and aligns with broader school health initiatives. By combining intervention directed at the school working environment (health protection) and the educator's lifestyle behaviors (health promotion), these interventions are likely to achieve better results than those with a single focus (Anger et al., 2015).

In all the areas of intervention outlined above, it is necessary to consider educator stress as a diverse experience with specificities related to country, region, location (rural versus urban), school type (public versus private), teaching level, demographic and economic factors of the educator and the student population, among others. This diversity is likely to translate into organizational and individual differences that impact educator stress and how to best intervene to address this problem. Some of these specificities were addressed in Chaps. 1, 6, 7 and 19, but

more research is needed that examines these variations. We also direct the readers to the various chapters in this volume, which provide additional recommendations for future intervention development to address teacher stress and health.

Another aspect that is important in terms of applying an OH perspective to education context is the need to evaluate the cost effectiveness of interventions directed at either health protection, health promotion or both (TWH). There is consistent data on the economic benefits of WHP interventions for decreasing absenteeism and medical costs (Chapman, 2012). Making a “business case” for addressing educator stress and health in education policy and school metrics, may facilitate management support for implementing OH interventions in schools. This implies accumulating evidence of cost-effectiveness by including relevant outcomes in intervention studies.

New approaches are taking place to facilitate OH interventions in school settings. For instance, pilot research in the U.K. has used the Change Laboratory method to design and implement new work practices in school settings directed at improving working conditions and employee well-being (Naghieh et al., 2013). The Change Laboratory method involves a room, or space, in schools where management and teachers meet over a number of sessions to develop and refine interventions to address contradictions and issues in the workplace. This process is facilitated by researchers and/or consultants. Another promising development, sponsored by the Carnegie Foundation, is the application of improvement science to educational contexts (Bryk, 2015) to bring about improved learning outcomes. The proposed improvement paradigm shares some principles described above and could be applied in schools to improve educator well-being: a user-centered approach (defining the problem from the user’s perspective, in this case, the teacher), focusing on the system that produces the outcomes (this aspect is compatible with the organizational focus of OH), and developing practice-based evidence through collaboration with practitioners to develop, test and refine interventions. Additionally, Bryk proposes that achieving desired outcomes can be accelerated by networked communities, defined as “a group of organizations united with the same improvement goal and working theory that come together to use disciplined methods of improvement research to accelerate the refinement and diffusion of solutions to their shared problem.” (Bryk, Gomez, Grunow, & Lemahieu, 2016, in Book Notes, 2016, p. 676). This approach could be implemented to address educator stress as several schools or districts could form a networked community, which would potentially accelerate health and work outcomes for teachers. These novel approaches have in common the promotion of researcher-school-educator partnerships.

20.6 Conclusion

The chapters presented in this book report on many of the issues involved in educator stress, hopefully contributing to bringing educator stress to the forefront in research, practice and policy. Chapters 1, 2, 3, 4, 5, 6 and 7 presented the impact of

stress in teachers. Chapters 8, 9, 10, 11 and 12, described different models of stress from an educator and an occupational health psychology perspective. Understanding teacher stress requires having tested models on which to base future interventions. Chapters 13, 14, 15, 16, and 17 looked at the different types of interventions available to effectively reduce teacher stress at the individual and organizational level. Chapters 18 and 19 addressed methodological issues and policy implications. This chapter drew on the diverse and rich content presented to reflect on the implications of applying the occupational health perspective to direct future research, practice and policy.

Applying an OH perspective to educator stress implies investing in educator health as an invaluable capital in achieving quality education. Teaching and health need to come together to produce effective teaching and learning. This implies an investment in teacher training and development to address stress in the workplace, and the implementation of work policies that reduce organizational risks and benefit educator health (e.g. work-life balance, work time and workload control, wellness benefits/programs). An OH perspective applied to educator stress also focuses on organizational change to promote educator safety and health, and quality education. This implies investing in the training of educational administrators at various levels to develop healthy school organizational practices such as promoting teacher involvement, recognition, peer and administrator support. As in other areas of education, practices to address educator stress need to be evidence-based. This requires national and local investment in rigorous and innovative research to better understand how educator stress develops and evolves in the complexity of education systems. This complexity also requires that intervention be both theory and practice-based, which brings together researchers and practitioners in defining the problems and designing the solutions to improve educator health, and create practices that are supportive of a healthy school environment. More support is needed from funding agencies in education and health for research and practitioner-researcher partnerships in the domain of educator stress, national research agendas needing to reflect this priority. Policy makers and union leaders have a crucial role by bringing educator stress and health to their national and local agenda. Their policies also need to be evidence-based and their impact on educators and school systems needs to be evaluated.

Teaching and education are essential values that cross national, cultural and economic boundaries. We hope that this volume will contribute to support educator health and well-being, and the pursuit of healthy school organizations as universal values in achieving quality education.

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