

Kari Salo

Teacher Stress as a Longitudinal Process

Esitetään Jyväskylän yliopiston yhteiskuntatieteellisen tiedekunnan suostumuksella
julkisesti tarkastettavaksi yliopiston Liikunnan salissa L 303
joulukuun 13. päivänä 2002 kello 12.

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UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 2002

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JYVÄSKYLÄ STUDIES IN EDUCATION, PSYCHOLOGY AND SOCIAL RESEARCH 208

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UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 2002

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Publishing Unit, University Library of Jyväskylä

URN:ISBN 9513913538

ISBN 951-39-1353-8 (PDF)

ISBN 951-39-1310-4 (Nid.)

ISSN 0075-4625

ABSTRACT

Salo, Kari

Teacher stress as a longitudinal process

Jyväskylä: University of Jyväskylä, 2002, 67 p.

(Jyväskylä Studies in Education, Psychology and Social Research

ISSN 0075-4625; 208)

ISBN 951-39-1353-8

Yhteenveto. Opettajien stressiprosessi

Diss.

The main aims were, first, to study teacher stress processes and the connections between stress processes, potential stressors, ways of coping, coping resources, and background variables during the autumn term of 1991 (short-term effects); secondly, to study the connections between teachers' subjective stress, coping, and health over eight-year period of time (long-term effects). Teachers from comprehensive and upper secondary schools in five municipalities (n=70) were studied in two phases during the school year 1983-84 (in all six measurements) and again during the autumn term of 1991 (in all four measurements), mainly by means of questionnaires. Information on the teachers' way of living, work and coping was obtained through interviews. The level of teacher stress increased towards the end of the autumn term in both years, despite the fact that in the autumn of 1991 the teachers in the sample had a one-week holiday in October which did not exist earlier. During autumn 1991, coping resources explained job exhaustion best, while stressors and ways of coping explained anxiety. Also, large interindividual differences in stress during the autumn term were noticed in both years, and the stress process groupings, which illustrated interindividual differences from year 1983 also turned out to be valid in 1991. Teachers' work has become more stressful and teachers' well-being declined during the past eight years. The results suggest that teacher stress is not necessarily a short-lived problem, and individual interventative ways of preventing or reducing stress should be employed.

Keywords: teacher, work, stress, coping, resources, longitudinal

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ACKNOWLEDGEMENTS

This study got under way at the beginning of year 1991 at the Work Research Unit, University of Jyväskylä as part of the research project "Teacher work, stress and health" financed by the Finnish Work Environment Fund. Later, the University of Jyväskylä, the Yrjö Jahnsson Foundation, Finnish Psychiatric Research Foundation, Finnish Work Environment Fund and Seinäjoki Polytechnic supported the study financially or in other ways. I wish to express my gratitude to these organizations and foundations for making available the facilities and resources which enabled me to undertake this study.

I wish to express my deepest gratitude to my supervisor and mentor and ex-boss Docent Ulla Kinnunen, who has given me this possibility and encouraged and guided me from the outset on my studies. Another mentor of mine, especially in my postgraduate studies in psychology, has been Professor Isto Ruoppila whose help and positive attitudes inspired me through the ten years which this study took to complete - thank you.

I thank Docent Jukka Vuori and Emeritus Professor Jouko Kari for the time they dedicated to reviewing and commenting on my thesis. Similarly, I thank the reviewers and opponents of my licentiate study Professor Raimo Rajala and Professor Juhani Kirjonen.

I am very grateful to my research colleagues in the Work Research Unit and Department of Psychology. In particular my room-mate Anne Rasku deserves my gratitude for her multiple services in the line of duty. I want to express my thanks to Orvokki Kujala, Asko Tolvanen and Tuija Riukulehto who have given me valuable advice on statistical issues.

During this longitudinal study process I was wed to Sari (who works as a teacher) and we now have two children, Sanni and Saku. Thanks to this home team I know something about life and the basics of teaching. Sari's support has been invaluable during this longitudinal study. After my first active phase as a researcher, in other words, from 1994 onwards, I have been working as a senior lecturer at Seinäjoki Polytechnic, which has also opened up to me better possibilities to understand teacher stress. A great number of my colleagues and friends are teachers with whom it has been possible to talk about these matters. I'm very grateful for these multiple experiences, which have been taking place around me among students, colleagues and friends.

Seinäjoki, August 2002

Kari Salo

LIST OF ORIGINAL PUBLICATIONS

This thesis is based on the following publications, which are referred to in the text by their Roman numerals.

- I Salo, K. (1995) Teacher stress and coping over an autumn term. *Work & Stress*, 9, 55-66.
- II Salo, K. (1995) Teacher stress processes: How can they be explained? *Scandinavian Journal of Educational Research*, 39, 205-222.
- III Kinnunen, U. & Salo, K. (1994) Teacher stress: an eight-year follow-up study on teachers' work, stress and health. *Anxiety, Stress & Coping*, 7, 319-337.

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1 INTRODUCTION

1.1 Concepts of stress and coping

Starting-points of stress

The term stress is known to have been used as far back as the 14th century (Lazarus & Folkman, 1984). There is no solid agreement even regarding the derivation of the term stress (see, Humphrey & Humphrey, 1986). The modern concept of stress was pioneered by Selye and Cannon, who characterized stress in physiological terms. Since then, different definitions and conceptualizations of stress in the biological, medical and psychological literature have led to continuing confusion in the study of stress. Also, the fact that the term stress has increasingly become a psychological concept as well as entering into general use has had an effect on this tendency.

Traditionally, stress phenomena are seen as a combination of three major conceptual domains (see, Dunham, 1984; Kinnunen, 1989; Rajala, 1988a): sources of stress (engineering model), mediators of stress (interactional model), and manifestations of stress (physiological model). From the environmental, psychological and biological perspective Cohen, Kessler and Gordon (1995) name these same components of the stress process differently: environmental experiences (environmental demands, stressors or events), subjective evaluations of the stressfulness of a situation (appraisal or perception of stress) and affective, behavioural or biological responses to stressors or appraisals (stress responses).

In this study stress is seen from the traditional stress theory perspective (see, Lazarus & Folkman, 1984; Levi, 1994). Stress comes from imbalanced situations where the demands on an employee exceed or undervalue the employee's actual conditions, or situation, where needs and goals are continually frustrated. Stress causes difficulties and changes in psychological functioning, behaviour and the body. In this study stressors, coping and stress-outcomes were associated with teacher work and analysed as a longitudinal process during the autumn term. As a continuation to the follow-up studies of

teachers' stress (Kinnunen, 1989; Kinnunen, Mäkinen & Vihko, 1985), a convenient starting-point was to verify and focus on those findings and investigate the effect of a one-week mid-term break, which was introduced in the autumn of 1991, on retarding the stress process and preventing negative stress accumulation. In comparison with other teacher stress studies the longitudinal and temporal nature of stress was the main focus of the study.

Lazarus (1990a) views stress as a subjective phenomenon, which is best measured by studying individuals' minor annoyances together with sources of stress and adaptation outcomes. In addition, Lazarus pays attention to the periods during which stress is studied. His definition of stress, which includes appraisal and coping mechanisms, has thus emphasized its complex, emotional, multivariate, transactional and process nature (Lazarus, 1990a; 1991). Later in his theoretical considerations, Lazarus (1999) has tried to unite the concepts of stress, coping and emotion.

Researchers have usually defined stress by utilizing well-known models or definitions of stress and applying them to their empirical starting-points and data base. In these models the starting point is that psychological stress affects physical health. The effects of stress on health depend on how a person copes with stress in a particular situation. The effects of stress are mediated by coping which is modified by social support and personality (Holahan & Moos, 1986). In general, coping has shifted the focus of stress research to what keeps people healthy and to factors that might protect a person from the effects of stress.

Coping and time shape the stress process

Coping can be defined via different theoretical formulations. The concept of coping was first developed in animal studies and ego psychology (Lazarus & Folkman, 1984). The psychoanalytic theory of unconscious intrapsychic conflict and defence mechanisms has had also an effect on the concept of coping. In this study stress is seen from the process-oriented view of Lazarus and Folkman (Folkman et al., 1986a; 1986b; Lazarus, 1993a). Coping shapes emotion by influencing the person-environment relation and how it is appraised (Lazarus, 1993b). Coping is the effort used to manage psychological stress. It is seen as a powerful mediator of the emotional outcome of a stressful encounter. Coping is not a moderator, because the process arises, *de novo* from the transaction between the person and the environment (Lazarus, 1999). The newer approach emphasizes the process views of coping, which are more positive and involve expectations regarding interventions (Sommerfield & Curbow, 1992). Practical applications, conceptual models, research methodology and data analysis need to maintain a clear distinction between processes of mediation and moderation. Mediator variables are needed when we are interested in mechanisms (how), while moderator variables are relevant when the research interest is predictors (when) (Baron & Kenny, 1986; Cox & Ferguson, 1994).

The process-oriented model defines coping as, "the person's constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding to a person's

resources” (Folkman et al., 1986a; 1986b; Lazarus, 1993a). Its process (a person’s actual behaviour in the situation), contextual (environmental context and the person’s appraisal) and effort nature are emphasized. The person and situational variables together form the coping effort without assumptions about what is good or bad coping: It is coping whether the process is adaptive or not, or successful or not (Folkman et al., 1986b; Lazarus, 1993a). From the theoretical point of view special importance must be given to the fact that two different coping processes exist: cognitive appraisal and coping. These work together in stressful person-environment relationships affecting their immediate and long-term outcomes. On the whole there is a lack of consensus in coping research about what is meant by coping (traits, styles, processes, behaviours, reactions, strategies, and resources), how it functions in the process of adaptation, and how it should be measured. Its close relation to the concept of stress has undeniably affected the problem of defining coping.

Coping is a main determinant in the process from stressful events to adaptional outcomes such as psychological symptoms and somatic illness (Folkman et al., 1986a; 1986b; Lazarus, 1993a). Stressors are essential for coping processes even if they are physical or psychosocial stimuli (Folkman et al., 1991). The stress processes can in the same way have various physical or psychosocial health outcomes. Lazarus and Folkman (1984; Lazarus, 1991) take the view that coping affects the emotion process in two ways: as problem-focused coping (action) and as emotion-focused or cognitive coping (internal restructuring). A third method of coping, which includes social support, is avoidance-focused coping (Endler & Parker, 1990; 1994). According to Latack and Havlovic (1992) the stress toward which coping is directed expresses the focus of coping: the stressful situation (problem-focused coping) or the attendant negative emotions (emotion-focused coping). This definition makes the concept of stress essential. Methods of coping include the mechanism or mode an individual uses during the coping process: these can be seen as cognitive (control, escape) versus behavioural (social, solitary, control, escape). Some definitions consider coping as 1) relational, 2) a process, and 3) integrative: "The cognitions and behaviours, adopted by the individual following the recognition of a stressful encounter, that are in some way designed to deal with that encounter or its consequences (Dewe, Cox & Ferguson, 1993, 7)."

Coping has two main functions: dealing with the problem (problem-focused coping) and regulating emotions (emotion-focused coping). Problem-focused coping consists of efforts to change the circumstances of an adaptional encounter by changing the environment or oneself. Emotion-focused coping involves cognitive activities which alter the way the situation is interpreted (Lazarus, 1990a). Because people use both forms of coping in almost every type of stressful encounter and many of these strategies serve both problem-focused and emotion-focused coping, researchers have difficulties in separating different coping styles. Solutions to the problem vary according to researchers’ interests and talents and the emphasis of the study (theoretical vs. empirical;

level of detail, ontological ground theory). Folkman and Lazarus initially distinguished two coping strategies: 1) defensive or palliative coping (avoidance, magical or wishful thinking, intellectualization, isolation and suppression), and 2) problem-solving coping (information-seeking, inhibition of action, direct action) on the basis of their process-oriented theory and method Ways of Coping Checklist. Accordingly, the Ways of Coping Questionnaire, coping should be divided into eight forms: confrontative coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planful problem solving and positive reappraisal (Folkman & Lazarus, 1988; Lazarus, 1999).

The coping form used depends on whether one thinks something can be done to change harmful or threatening conditions. If the situation is seen to be changeable or controllable, problem-focused strategies dominate. When little can be done, the emphasis may be on emotion-focused coping. Lazarus (1990a) emphasizes that the form of coping used depends on the type of stakes the person has in the outcome. Because coping is a mediator of emotional reactions during stressful encounters, some forms of coping may increase positive emotions and decrease negative ones, whereas other forms may make things worse. Planful problem solving appears to belong to the first of these, confrontative coping, and distancing to the latter (Lazarus, 1990a). Problem-focused coping strategies have been reported to vary more, i.e., to be contextual, and emotion-focused strategies to be moderately stable by an individual across encounters (Folkman & Lazarus, 1988). In summary, coping may have an effect on the stressful situation itself, and on emotional well-being, health and adjustment of the person.

From stress and coping to resources

In all, there is a growing tendency to define and study stress and coping together. The theory of stress and coping put forward by Lazarus and Folkman (1984) has received the strongest support, especially when stress and coping are studied together as a process. Furthermore, from the very beginning of the 1990s there has been an increase in the number of studies in which different environmental coping resources, such as social and economic conditions (Kalimo & Vuori, 1991; Leiter, 1990; Mauno, 1999), social support (Beehr, King & King, 1990; McIntosh, 1991) and individual coping resources, such as age (Kinnunen & Parkatti, 1993; Labott & Martin, 1990), health (Borg, 1990; Seidman & Zager, 1991), personality factors (Bolger, 1990; Cantor & Norem, 1989; Parkes, 1990; 1991; 1994) and sense of coherence (Feldt, 2000; Flannery & Flannery, 1990; Ryland & Greenfeld, 1991;), etc., have been combined with stress and coping. Simultaneously, these studies have also been unable to resist the temptation to expand the framework of stress and coping definitions in their direction.

Coping, social support and coping resource research usually define coping in the broad sense of the term (see, Antonovsky, 1987). In this way, a variety of different social, psychological, physical and other self-rated resources become open to examination. As a buffer, social support works like a coping mechanism

while it protects the individual from the potentially harmful effects of stress (Cobb, 1976; Cohen & Wills, 1985). Coping, social support and coping resource transform the effects on stress - both strengthening and softening it (Karasek & Theorell, 1990; Parkes, 1990; Parkes, Mendham & von Rabenau, 1994). The coping resources in this study were teachers' social support (from colleagues, friends, family), competence (mastery of subject, teaching ability and interaction with pupils), work ability (total, physical, mental), control at work, the demand-resources ratio at work, social relations at school, the effectiveness of coping, life changes, the work-family relation, satisfaction with life, the adequacy of leisure time, and health variables.

The Sense of Coherence (SOC) scale was also exploited in the study as coping resource (Antonovsky, 1987). The sense of coherence is defined as "a global orientation that expresses the extent to which one has a pervasive, enduring, though dynamic feeling of confidence?" (Antonovsky, 1987, 19). The three components of SOC are comprehensibility (cognitive aspect), manageability (instrumental aspect) and meaningfulness (motivational aspect). In the same way as Lazarus and Folkman (1984), the appraisal process is seen according to Antonovsky in the following way: "one needs to know not only *what* to do about a certain source of stress and that one is *able to do* something about it, but also *why* one should do it" (Feldt, 2000, 11; see also Humphrey & Humphrey, 1986). Antonovsky (1987) presents the stages of appraisal for an individual with a strong sense of coherence in a salutogenic way: 1) a stressor is identified, 2) a stressor is defined as benign or as a welcome challenge (→ salutary emotions), 3) definition of the problem with the great variety of generalized resistance resources at his or her disposal, and 4) openness to feedback and the possibility of corrective action. The concept of generalized resistance resources brings together different kinds of things such as money, ego identity, social support and anything else that is effective against a wide variety of stressors (Antonovsky, 1987).

1.2 Stress and coping process models

In the same way as concepts, the models of stress and coping are diversified. Next, only few models which have been useful in this present research are introduced. These exemplary models are all interactional or transactional models. The transactional approach in stress and coping theory has seemed to be the most advisable (Dewe, Cox & Ferguson, 1993; Schwartz & Stone, 1993). Differences between these models arise mainly out of different research interests. For example, Cox is interested in psychological and physiological stress, while Lazarus is almost exclusively interested in psychological stress and coping. However, these differences do not mean one or the other denies the importance of psychological or physiological stress processes. In this study these two models are seen to complement each other.

Interactional theories emphasize the characteristics of the organism as major mediating mechanism between the environment (stimulus) and person (response). The transactional approach goes even further. The perceptual, cognitive and physiological qualities of individual affect become a significant component of the environment. As in all notable stress models the stress model of Cox and Mackay seeks to tap the dynamic interplay between the main variables (stressors, mediators and adaptional outcomes). Cox and Mackay (1976; Cox, 1978) divided the stress model into five stages:

- (1) Actual capability and demand (external and internal)
- (2) Perceived capability and demand (cognitive appraisal, imbalance = stress)
- (3) Psychophysiological changes
 - Emotional experience (psychological and physiological stress response),
 - Coping (cognitive defence and behavioural response)
- (4) Consequences of the coping responses (actual and perceived)
- (5) Feedback (shape the outcomes at all stages in the stress system)

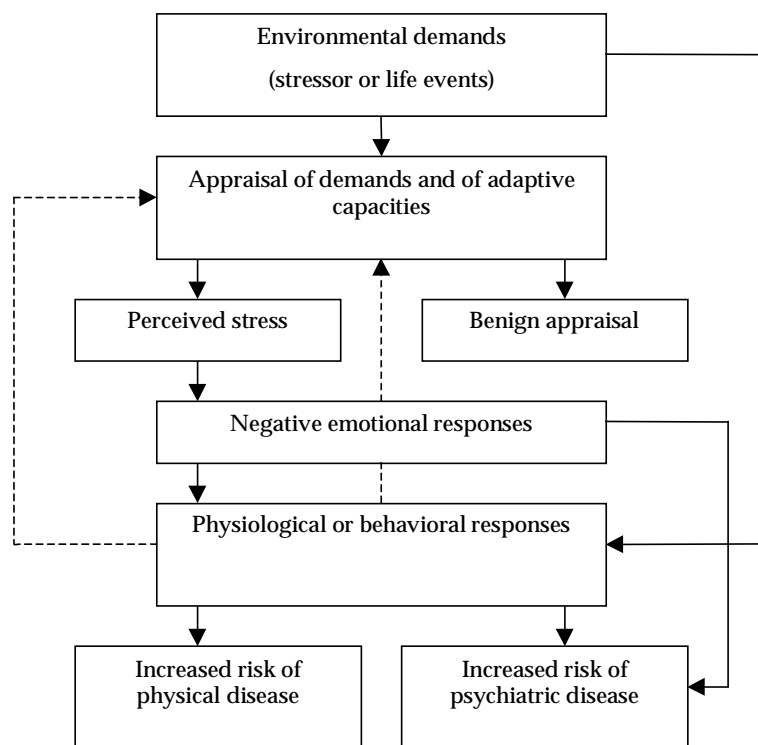


FIGURE 1 A heuristic model of the stress process (Cohen et al., 1995, 11)

In a heuristic model of the stress process (see Figure 1) the potential integration of the environmental, psychological and biological approaches to stress measurement is illustrated (Cohen et al., 1995, 11). Researchers emphasize that

the model is heuristic, primarily unidirectional and does not include all possible pathways and feedback loops between these concepts.

One of the most referred to theories of psychological stress and coping is that of Lazarus and Folkman (1984), which forms the basis to the stress model adopted in this study. The theory is seen as cognitive, because it postulates the processes intervening between the 'stress' stimulus (encounter) and response (coping), and tries to identify the cognitive factors that influence these processes (primary and secondary appraisal). However, in this study the stress and coping processes did not include these appraisal mechanisms, but concerned the stress and coping process during the autumn term (time influence). The stress and emotion process model (Lazarus, 1990a) was also used as an interpretative model in the study of stress and coping processes during the autumn term as well as in the research into the long-term effects of stress (Table 1). Stress is defined as a continually changing relationship between person and environment. Psychological stress is a result of the interplay of system variables and processes in the post appraisal state. Also, Lazarus (1990a) points out that the model is recursive and that short-term and long-term effects are parallel. Within the framework of this study interest was focused, especially, on the stability of the stress and coping variables over a period of time, as well as across situational contexts (see, Salo & Kinnunen, 1993). Because of the collected data in this study only part of the whole stress model of Lazarus has exploited (1990a). In its entirety the model includes also components which were not exploited. Encounters and some of the person variables mentioned in the model were studied by interviews; nonetheless, in this study they were not the topics in question.

TABLE 1 The stress process model of Lazarus (1990a) adopted in the study

Causal Antecedent	Mediating Process	Immediate Effects	Long - term Effects
Person variables	Encounter 1 . . 2 . . 3 . . n		
Commitments,	Within an encounter		
Values and Goals,	Time 1 . . 2 . . 3 . . n		
General beliefs, Such as:			
Mastery, Self - Esteem,			
Interpersonal Trust			
Existential Beliefs			
Sense of control	Primary appraisal	Affect	Psychological Well - being
Interpersonal Trust			
Extential Beliefs	Secondary appraisal	Physiological changes	Somatic Health/ Illness
Environmental Variables	Coping	Quality of Encounter-	Social Functioning
Demands	(+ social support)	outcome	
Resources	Problem - focused forms		
Constraints			
Temporal aspects	Emotion - focused forms		

On the data analytical level (stress processes) the five plausible variants of the exposure model (Frese & Zapf, 1988, 389), which all assume that a stressor has some impact on psychological and psychosomatic dysfunctioning, were exploited in the study (Figure 2). Frese and Zapf (1988) are aware of their model's limits, for example, owing to variation in human behaviour and exposure times. They also introduce a combination of the initial impact and the exposure time models, which a wave-shaped curve is caused by the processes. Lazarus (1991) postulated four main stages of the emotion process: anticipation, provocation, unfolding, and outcome, which should be included in every curve of the model.

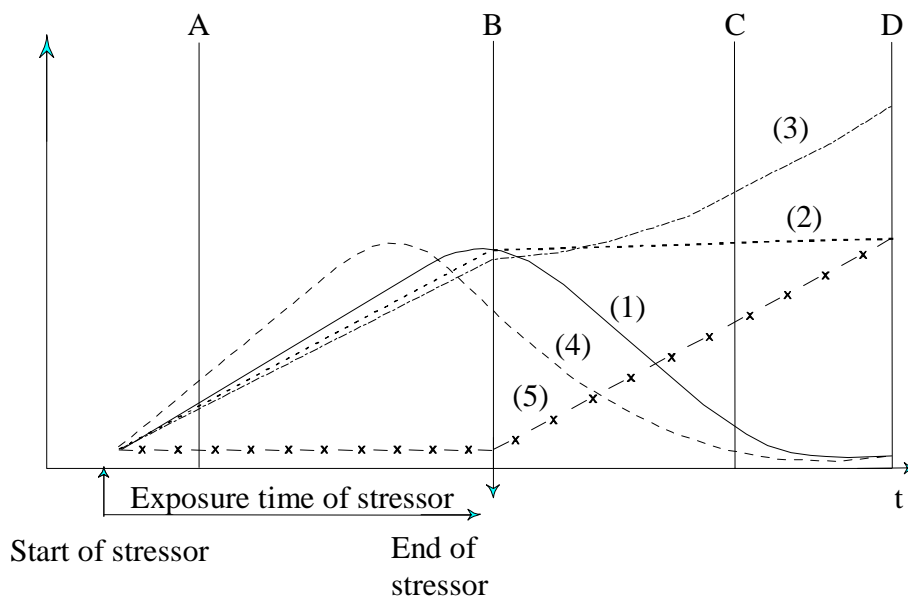


FIGURE 2 Variants of the exposure time model: (1) stress reaction model, (2) accumulation model, (3) dynamic accumulation model, (4) adjustment model, (5) sleeper effect model (Frese & Zapf, 1988, 389)

A longitudinal study design made it possible to catch the process nature of stress and coping in teachers' work. The interests in this study in the longitudinal effects of stress and the interaction between stress, coping and health are consistent with developments in stress and coping theory (Dewe et al., 1993; Lazarus, 1990b). Lazarus (1990a, 12) proposes that "we would be wiser to move away from stress toward the measurement of emotion". Three years later Lazarus (1993c, 36) suggested that "it is high time for psychology, among the social and biological sciences, to place emotion at the center stage of analyses of mind". Many other interactional and transactional models and studies of stress and coping have put forward similar views, even if they have continued to emphasise the cognitive nature of stress more than the emotive nature of stress (e.g. Dewe et al., 1993; Latack & Havlovic, 1992; Schwartz &

Stone, 1993). Admitting the problems facing stress and coping concepts and research methods, the model adopted in the study attempted to maintain close relations with the methods and research problems used in the field. These models were useful in the analyses of the empirical data (stress processes) of the study. According to Lazarus (1990a), subjective and psychological stress was seen in this study mainly as emotional (anxiety, depression, exhaustion) while the different ways of coping were focused on these negative emotions. On the level of the methods used, the ways of coping studied were more behavioural than cognitive in nature and included social support (see, Dewe et al., 1993; Latack & Havlovic, 1992). This approach emphasizes the process by which the person and situation factors combine to influence coping and the mechanisms by which coping in turn influences stress and well-being and the motivation to minimize these impacts (see, Edwards, 1988).

1.3 Problems in stress and coping research

The effect of stress on health and well-being can be studied from different scientific backgrounds and viewpoints. As already mentioned, the major perspectives include emotional and motivational aspects of stress and coping. These overlap and get mixed up in practice. Newton (1989) presented the following seven-item list of recommendations for the conceptualization and operationalization of stress and coping.

1. Researchers need to focus on an individual's cognitive "sense-making" of stressful experience (how and why of stress and coping).
2. The relationship between acute vs. chronic stress and coping needs more attention.
3. A wider conceptualization of strain and the use of alternatives to questionnaire measures are needed (stressful episodes, use of counselling).
4. Studies should concentrate on samples with a wide range of strain levels.
5. A clear distinction between short-term coping behaviour and long-term coping style needs to be made.
6. More qualitative approaches are needed.
7. Studies could be done without using the narrow, traditional definition of occupational stress, while the theoretical traditions (psychoanalytical, sociological) might have something new to offer.

This critique is still valid and the task has turned out to be difficult. The research culture has shown itself resistant to change, hence these same problems continue to appear. This same observation could be made about schools as well. In this way we could add an eighth item to the list: theoretical regeneration and practical effectiveness are called for. Work, phenomena and the contents of studies in the information society have become more abstract,

but the processes of emotions and learning have not changed to the same extent.

Some recent teacher stress studies have tried to satisfy these recommendations, but the more methodological problems of stress and coping studies have been recognized and proposals for improvements have been made (Dewe & Quest, 1990; Kalimo & Vuori, 1990; Latack & Havlovic, 1992; Lazarus, 1990ab). Longitudinal studies and the use of different methods have been seen as important in gathering new data and analyzing the associations between different groups of variables (e.g. Cassidy, 1999; Fay, Sonnentag & Frese, 1998; Rudow, 1999; Spector, 1998). Furthermore, it is important to know the special characteristics of the object studied so that follow-up times can be planned appropriately. As Lazarus (1991) put it, the study of emotions is primarily the study of change and flow over time and across occasions (process). The stress process is a complex, multivariate, feedback system, as is the emotion process. Until now, in longitudinal studies of teacher stress and coping, the methods, number of measurements and interval times have varied considerably. The main interest has been in teachers' stress during a single school year or an autumn term. Times have not changed in this respect since Frese and Zapf (1988): we still we know very little about the exact time-frame that is needed for a stressor to have an impact on dysfunctioning.

Stress and coping research face methodological problems such as conceptual definition, comprehensiveness and specificity (Latack & Havalovic, 1992). The single-method (usually a self-report instrument) approach also presents difficulties of validation because of response styles, reactivity and the consistency effect (Bailey & Bhagat, 1987). Longitudinal studies have been used to reduce the problems associated with cross-sectional studies, particularly empirical validations of causal inferences. On the other hand sensitive mood variables and mood scales make it difficult to propose causal explanations for teacher stress processes. Intensive longitudinal and simultaneous stress and coping process studies have been very rare, although theoretical ideas concerning the associations between stress and coping and the importance of measuring these together over time have been strongly emphasized (Lazarus, 1990ab; Lazarus & Folkman, 1984). Latack and Havlovic (1992; Latack 1986) have also expressed the importance of the coping process dimension (coping is dynamic and changes over time) and called for longitudinal studies in the area of coping research. According to Lazarus (1990a), the relationship between stress and coping cannot be explained by mixing these two together. The contents and sources of stress are as important as its degree. Lazarus also considers the individual's larger adaptional context (system theory) and the time periods during which stress is sampled. In stress and coping studies it is essential to remember that the emotions are always in flux (see, Lazarus, 1991).

Longitudinal studies have characteristic problems, for example in relation to experimental mortality and the test-retest effect (Nesselroade & Baltes, 1979). Also the risk of selectivity (systematic differences) should be analyzed in longitudinal studies. However, the size or homogeneity of the sample often sets limits to the

generalizability of the results. Frese and Zapf (1988) have recognized the difficulties which derive from different models of the time course of cause and effect. They distinguished two basic kinds of causal conceptualization: (1) the exposure time effect: for example, the longer a stressor impacts on the person, the higher should be the incidence of ill-health; and (2) the initial impact, for example, just after a person has started a new job (or is exposed to a new stressor), there is some kind of 'reality shock'. These points of view clearly express a need for theoretical consideration of the time factor in stress research. On the methodological level in empirical studies these two effects warrant different designs in terms of time lags between the measurement points. Longitudinal stress studies have methodological problems in their designs and statistical analytical strategies (Zapf, Dormann & Frese, 1996). Writers admitted that demonstrating the causal relationships and the treatment of third variables in longitudinal designs is not easy. Valuable recommendations regarding the analytical procedures and other methodological issues of longitudinal stress research are included in the article.

Furthermore, the possible affect of general seasonal mood variation and seasonal affective disorder (SAD) and the milder, subsyndromal SAD need to be taken into account in measurements of stress in longitudinal studies. The study of seasonal mood variation and SAD is still at an initial stage and reliable knowledge about its prevalence in the general population, and its sources and mechanisms is lacking (Nelson, Badura & Goldman, 1990; Rosen & Rosenthal, 1991). According to Rosenthal (2002) the prevalence of SAD in the adult US population has been estimated at between 1.4 percent (in Florida) and 9.7 percent (in New Hampshire). The positive correlation between latitude and the prevalence of winter SAD applied predominantly to the age groups over 35 (Rosen et al., 1990). The influence of environmental factors on mood disorders and mood changes in the general population might provide a valuable insight into the pathogenesis, treatment, and prevention of affective illness (Kasper et al., 1989).

Generalizing the efficacy of coping strategies is difficult because of the self-report data (coping process and outcome measures get easily mixed) and strong interdependence between the details of the context and coping strategies (Lazarus, 1999). The efficacy of coping strategies depends on their fit with the situational demands and opportunities in the person-environment relationship (Lazarus, 1999). Most of the studies relating job characteristics to health habits are cross-sectional, so it is difficult to determine whether job strain and health habits may be due to some third factor, such as emotional distress (Taylor, Repetti & Seaman, 1997).

1.4 Teacher stress as a research issue

1.4.1 General issues of teacher stress

In general job stress can be defined as a lack of harmony between the individual and the work environment. The teaching profession is unique in many ways, and as such, it is concerned with certain stress-related conditions (see, Humphrey & Humphrey, 1986). Teacher stress has come under considerably scrutiny since the 1930s. Both international and national teacher stress studies are numerous (e.g. Haikonen, 1999, 23). Differences in the concepts used, and methodological problems make it difficult to compare studies. Teacher stress studies have usually been cross-sectional and focused mainly on psychological stress indicators.

Possibly the most frequently quoted definition of teacher stress links negative affects, perception of demands and threats, coping and health along the lines of the heuristic model of Cohen et al. (1995), which, again, points to the undeveloped state of the stress concept:

"Teacher stress may be defined as a response syndrome of negative affect (such as anger or depression) by a teacher usually accompanied by potentially pathogenic physiological and biochemical changes (such as increased heart rate or release of adrenocorticotrophic hormones into the blood stream) resulting from aspects of the teacher's job and mediated by the perception that the demands made upon the teacher constitute a threat to his self-esteem or well-being and by coping mechanisms activated to reduce the perceived threat." (Kyriacou & Sutcliffe, 1978, 2).

In sum, teaching profession is evaluated as stressful and especially mentally rather loaded (e.g. Kalimo & Toppinen, 1997; Rudow, 1999; Travers & Cooper, 1996). The magnitude of teacher stress varies according to the criteria used and from study to study. While some Finnish studies reports serious stress in a minority (10 – 20%) of teachers (Aho, 1981; Kinnunen, 1989; Mäkinen, 1982; Ojanen, 1982; 1985; Rajala, 1988a; Ruohotie, 1980; Stjernberg, 1986) in some other studies stress was found in 30-90% of teachers (e.g. Travers & Cooper, 1996). Some evidence have emerged that teacher stress has been on the increase during the 1990s (Kalimo & Toppinen, 1997; Salo & Kinnunen, 1993).

Teacher stress is found to be associated with both subjective (e.g. interaction with pupils) and objective (e.g. sex, age, school level) factors. The most general stressors are associated with the quality of social interaction at work (with pupils and colleagues) and time demands and the amount of work (e.g. Cooper & Kelly, 1993; Rasku & Kinnunen, 1999; Salo & Kinnunen, 1993). Also, changes in society-based requirements (Esteve, 1989) and structural changes in schools (Bell, 1995) have been seen as reasons for teacher stress. In studies, the teaching profession has been seen as a mission where feelings of inadequacy and risks of self-esteem are common (e.g. Niikko, 1995). Of course, none of these studies claims that all teachers share these feelings. Line of business is not a central explanatory factor

for stress in the same way as are the organizational mode of actions and the contents of duties (Elo, Leppänen & Jahkola, 1999). Teaching and teacher stress is very individual and dynamic by its nature (Kinnunen, 1989; Salo & Kinnunen, 1993).

Study results concerning teachers' age, aging, sex and work experience in relation to stress and burnout are partly conflicting (O'Connor & Clarke, 1990; Travers & Cooper, 1996). Some studies have shown these negative feelings to be a problem among young teachers (e.g. Byrne, 1991; Kantas & Vassilaki, 1997), while to some others older teachers are more at risk (e.g. Kinnunen, Parkatti & Rasku, 1994; Pedrabissi, Rolland & Santinello, 1993). Some studies claim that females show more symptoms of stress than males (e.g. Byrne, 1991; Kinnunen et al., 1994), while the opposite findings have also been presented (e.g. Burke, Greenglass & Schwarzer, 1996; Pedrabissi et al., 1993). When the occupation group studied has not been narrowly defined, negative interactions with people at work and a heavy workload have been found to be the most general stressors (Schwartz & Stone, 1993).

In the same way as the magnitude of stress and stressors vary according to the criteria (psychological, behavioural, psychosomatic or health variables) used, the manifestations of teacher stress also vary according to their duration and quality. During the short term different emotions are emphasized while in the long-term stress has effects on work satisfaction and commitment as well as on psychosomatic symptoms (Rajala, 1988a). Prolonged stress is also seen to be in connection with burnout. In the stress process model of Lazarus (1990a), shown above, stress has both immediate and long-term effects on the psychological, physiological and social levels. In the case of teachers none of these manifestations are strange.

In general teachers are satisfied with their work (Borg & Riding, 1993; Kinnunen & Parkatti, 1993; McCormick, 1997; Rasku & Kinnunen, 1999; Salo & Kinnunen, 1993). The best aspects of teaching are related to the contents of work (independence, changefulness, versatility) and students. The disadvantages of the job are also found in the same factors. A short working day and liberal leisure time are commonly mentioned in connection with the better side of teachers' work. In relation to time, work satisfaction increases linearly with age (Smith, Smits & Hoy, 1998), i.e. the association U-shaped (Kalimo & Toppinen, 1997; Warr, 1992; Zeitz, 1990). Social support and good relations on the work place are commonly seen to promote well-being in work. In the case of teacher stress, burnout and work satisfaction studies, lack of social support from the school administration, superiors and collaborators has been associated with negative feelings at work (Byrne, 1991).

1.4.2 Longitudinal studies of teacher stress

Despite the great number of teacher stress studies published, relatively little has been done to trace the dynamics of teachers' stress over a period of time, i.e. themes concerning stress as a process which proceeds in time and usually terminates - as a result of successful recovery and coping - with no abnormal end

states. Not until the beginning of the 1980s was the possibility that teacher stress may have an identifiable cycle within the school year first considered (Hembling & Gilliland, 1981). Since, in longitudinal stress studies interest has usually focused only on stress or burnout as a process, whereas coping as a process and the connections between stress and coping over time have been neglected. In only a few studies of teachers' work has the process dimension of coping been taken seriously (Brenner, Sörbom & Wallius, 1985; Rajala, 1988a). Both the latter studies utilised only two measurements of the same teacher group, which is clearly inadequate, if we are interested in stress and coping as processes.

At present knowledge of the interaction between teacher stress and coping processes over time continues to be deficient, and the results of existing studies are partly in conflict with each other. Previous longitudinal studies, in part, support the hypothesis that the teacher stress process varies during the school year (Fleischut, 1985; Kinnunen, 1989; Rajala, 1988a), while in other studies it has been found to be rather stable (Brenner et al., 1985; Capel, 1991; DePaepe, French & Lavay, 1985; Mykletun, Tonder, Vaernes & Ursin, 1988). More recently, the aims of the longitudinal studies have varied widely. Burke, Greenglass and Schwarzer (1996) and Burke and Greenglass (1995) concentrated on some of the antecedents and consequences of burnout over time, while Schonfeld (1991) concentrated on predictors and links between teachers' occupational conditions and depressive symptoms. Methodological issues have also aroused interest in the field of teachers' longitudinal stress (see, Schonfeld, Rhee & Xia, 1996; Travers & Cooper, 1996; Zapf, Dormann & Frese, 1996). In the most recent longitudinal studies structural modelling has captured the main purpose (Brouwers & Tomic, 2000; Tang, Au, Schwerzer & Schmitz, 2001) and the appropriate temporal lags are not taken up until the discussion section, and only then as study limitations. It is a matter of course that these studies utilise only two measurement times.

There are certain similarities and differences between teacher stress studies supporting varying and those supporting stable stress processes during the school term. In both groups of studies the teachers have been drawn from different school levels. Associations between stress and coping and personality have been studied, and subjective and physiological measurements have also been used in both groups. Differences also exist between these two groups of studies. In studies in which teacher stress has been found to be stable during the school year the number of measurements has varied from two to three, which is the minimum in longitudinal studies. Selection of measurement times and the intervals between them are important where stress is being studied as a process over time. Half of the studies favouring the stable teacher stress process have used the concept of burnout and MBI (Maslach Burnout Inventory) as a method of measuring the stress process, while studies supporting a less constant stress process have based their observations on more sensitive methods such as mood variables. The conflicting results can partly be explained by the different methods and measurement times used in these studies. Moreover, in studies where teacher stress has been found to be stable, variation exists in the observed level of stress. DePaepe et al. (1985) found burnout symptoms to be high throughout the school

year, while Capel (1991) noticed that burnout and stress scores were generally quite low among teachers from different school levels.

In Fleischut's (1985) study teacher stress varied significantly at the five intervals studied during the school year. In a 30-week follow-up study actual stress was found to be highest in November and May. Actual stress levels increased during the autumn term (from September to November). Rajala (1988a) and Kinnunen (1989) have obtained similar results in Finland. In Kinnunen's study (1989) research interest was focused on the stress cycle within the school year (17 measurements) and particularly during the autumn term. Teacher stress was found to accumulate during the autumn term so that weekend recovery disappeared in November-December. Holidays during the spring term seemed to prevent stress accumulation. The stress cycle manifested itself most clearly in the form of illnesses, medication, anxiety, depression, sexual passivity, and to some extent in night-rest catecholamine excretion. In part, these findings led the Finnish School Administration to organize a one-week holiday in the middle of the autumn term to prevent negative stress accumulation.

Kinnunen (1988, 1989) found large interindividual differences in stress among teachers. Out of one hundred and fifty-three teachers she distinguished four different kinds of stress accumulation-recovery processes during the autumn term (six measurements): (A) teachers who were exhausted throughout the term (20 %), (B) teachers who recovered from stress on the first weekends of the term but not later (35 %), (C) teachers with no stress (30 %) and (D) teachers feeling tired and anxious at the beginning and at the end of the term (15 %). Among the same teachers three different forms of coping were found: emotional, rational and social. The coping styles and stress process types were related to each other. The rational style of coping was typical of those teachers having no stress, and emotional ways of coping were typical of those having the most stress feelings.

Rajala's (1988ab, 1990) studies have focused on teachers' coping efforts, cognitive appraisal and stress emotions. The findings suggest that stress increases with time during the autumn term and requires more coping at the end of the autumn term (under stress). The most frequently invoked coping efforts were problem-focused coping, social support and positive comparing. Teachers resorted to increased problem-focused coping and social support during the autumn term while they also reported more teaching difficulties and rated their work situation as less challenging. As the autumn term preceded teachers experienced fewer positively toned emotions and more negatively toned ones. Of the clinical emotions, anxiety was more frequently experienced than irritation or depression. Rajala (1990) suggests two conclusions. First, the cognition-affect link may only work in the short run, whereas the reverse link might be more adequate in the longer run. Second, teachers' problems at work tend to be persistent and may predict affects better than cognitions.

Brenner et al. (1985) studied longitudinally the role of coping in reducing teacher stress. Teacher stress varied only slightly from the middle of the autumn term to the end of the spring term. Daily interaction with the pupils in the classroom determined most teachers' stress processes. Brenner et al. found

teachers' coping to be more successful during the autumn term than spring term. The researchers placed greater emphasis on the coping in the short-term but also suggested that long-term adaptation to the work environment, as the second phase of coping processes, would merit study in the future.

In the studies by Brenner et al. (1985) and Rajala (1988a) coping does not seem to be very effective when dealing with occupational stress. Possible explanations derive from many different sources. In longitudinal studies of teacher stress the connections between personality traits and stress have been emphasized (Mykletun et al., 1988), and stress has been found to be very personal in nature (Kinnunen, 1989). Stress management should therefore be tailored to each individual separately, as suggested by Capel (1991). On the other hand teachers' work with pupils in the classroom has certainly not eased or changed much during recent years. Moreover, administrative, planning and pupil guidance duties in schools have increased during the past few years. As Rajala (1990) remarked, teachers' work problems tend to be persistent, which is characteristic of human relations occupations. In addition, occupational stress should not be simplified and described solely as a pathological state, as is done by the mass media (Cole & Walker, 1989). In the human relations professions varying and occasional stress should rather be seen as a natural part of work.

A number of cross-sectional studies have investigated the various actions taken by teachers to cope with stress. The most frequently used have repeatedly been almost the same: try to relax after work, try to avoid confrontations and try to nip potential sources of stress in the bud (Borg & Falzon, 1990). Teacher stress and coping have increasingly been studied in conjunction with each other. Long and Gessaroli (1989) found that those teachers who were most stressed perceived avoidance strategies to be effective, while teachers under less stress perceived problem solving techniques to be more effective. According to Seidman and Zager (1991) maladaptive coping (e.g., excessive alcohol consumption) was associated with higher teacher burnout, and adaptive coping (e.g., hobbies) with lower burnout levels among teachers. In the study by Haikonen (1999) teachers reported on how their ways of coping had changed during their careers. Conflicts were evaluated to depend more and more on occupation than own personality. Teachers gave up an aggressive mode of action and tried to move towards calmness and control of their feelings.

1.4.3 Teacher burnout

A large number of teacher stress studies have been done under the concept of burnout. Burnout is seen as a serious and chronic stress syndrome where symptoms of emotional exhaustion, cynicism, depersonalization, and reduced personal accomplishment separate it from other kinds of stress processes. Emotional exhaustion includes feelings of being emotionally overextended and depleted of one's emotional resources; while depersonalization refers to the loss of idealism and being cynical, detached, and callous toward one's work and the recipients of one's services. Feelings of a lack of personal accomplishment

represent a decline in one's perceptions of one's effectiveness and competence at work.

According to a number of studies teacher burnout can lead to reduced physical and mental well-being (Burke & Greenglass, 1995; Seidman & Zager, 1991, Tang et al., 2001). In the teaching profession emotional exhaustion increased with quantitative and qualitative work overload (Burke & Greenglass, 1995; Byrne, 1994), lack of possibilities for teachers to control their work (Burke & Greenglass, 1995), role confusion and poor student relationships (Byrne, 1994). In addition, poor student relationships have been linked to increased cynicism, while a feeling of reduced personal accomplishment is connected with a lack of individual coping resources and social support (Byrne, 1994). Teachers' sense of reduced personal accomplishment has usually been studied as a component of burnout. In these cases lack of individual resources and social support seem to be the main stressors (Byrne, 1994; Leiter, 1991). Younger teachers experience higher levels of emotional exhaustion and depersonalization than older ones, high-school teachers exhibit lower personal accomplishment and higher depersonalization than teachers in elementary education, and male teachers show more depersonalization than female teachers (Byrne, 1991; Kantas & Vassilaki, 1997).

Both teacher stress and burnout studies have been done utilising various hypothesized associations. Haikonen (1999) found teachers' stress to be related to threats which were directed at one's personality and being as a teacher, and to the concrete consequences of conflicts and concern about the situation continuing. In the study by Kinnunen et al. (1994) reduced personal accomplishment was the most common symptom of burnout among over 45-year-old Finnish teachers. In other Finnish studies, teachers have turned out to suffer more emotional exhaustion than cynicism or reduced personal accomplishment (Kalimo & Toppinen, 1997). Rasku and Kinnunen (1999) see teachers' work as active (high demands but high control) and emphasize the importance of personal control by teachers over lessons and the methods used. In their study Finnish high school teachers evaluated their work conditions, control possibilities and student relationships to be better than those of their European colleagues. Finnish teachers' amount of weekly work was essentially higher than that of European colleagues. The difference was accounted for by other than teaching hours. Similar to previous research in the area, in a study of Chinese teachers, self-efficacy and proactive attitude were associated with burnout and poor mental health, and burnout was also related to negative mental health (Tang et al., 2001). Because these stress resource factors succeed in modifying the level of burnout, individual differences can reduce teachers' negative responses to job strain. In essence the same conclusion could be drawn from the study by Brouwers and Tomic (2000): perceived self-efficacy had a longitudinal effect on depersonalization and a synchronous effect on personal accomplishment, while the relationship between emotional exhaustion and self-efficacy showed the former to have a synchronous effect on the latter.

Teachers' work involves intensive and long lasting interaction with pupils which means that teachers have a strong impact on their pupils' intellectual, emo-

tional and occupational development. Because the quality of interaction is partly dependent on the psychological well-being of the teacher, there is a good case for teacher stress and burnout studies. The facts that we all have memories of teachers, that teachers have a strong trade union, and they form a large professional group, as well as the importance of education in general together with its economic significance keep the issue alive in the media and people's minds. Schools may be viewed from many angles, as institutions, organizations and working communities (Aittola, 1988; Kivinen, Rinne & Kivirauma, 1985). This broader point of view shows that teachers encounter many conflicting demands from various sources (society, work community, self, pupils, and parents). In spite of the strong investment in the study of teacher stress the problem has not gone away, stress remains one of the favourite topics in the profession's journals (e.g. Opettaja in Finland).

1.5 The aims of this study

The main purpose of the study was to investigate teachers' psychological well-being longitudinally. In accordance with the time periods of the study, there are two main foci of interest. First (short-term effect), the study aimed to examine the stress processes and the connections between potential stressors, ways of coping, coping resources, and background variables during an autumn term (study I, II). Secondly (long-term effect), the purpose was to study the connections between teachers' subjective stress, coping and health over an eight-year period (study III). Both retrospective and prospective strategies were used in the study. The specific questions, hypotheses and aims of the study were as follows:

Study I: Teacher stress and coping over an autumn term

- (1) How do teachers' stress and coping proceed during the autumn term?
Hypothesis: teacher stress would increase during the autumn term, but the autumn holiday might retard the process.
- (2) Are there inter-individual differences in stress and coping processes?
Hypothesis: inter-individual differences in stress and coping processes would be found among teachers.
- (3) How are these possible stress processes related to teachers' coping processes and background variables? Hypothesis: the rational ways (problem-solving) of coping would be typical of those without stress and the emotional ways of coping would be typical of those with the strongest stress feelings.

Study II: Teacher stress processes: How can they be explained?

- (1) Which potential stressors, ways of coping, coping resources and background variables explain teachers' stress during the autumn term and how much of the variance do these factors explain?

(2) How do these variables explain the interindividual variance of the stress indicators?

Study III: Teacher stress: an eight-year follow-up study on teachers' work, stress and health.

(1) How has the average level of teacher stress changed between the autumn terms of 1983 and 1991? Hypothesis: occupational well-being among teachers would be lower in the autumn term of 1991 compared to that of 1983, and that this decline in well-being would particularly concern the older age group.

(2) How stable are inter-individual differences in stress as manifested in various patterns of the stress process during the autumn of 1983? Hypothesis: inter-individual differences in the patterns of reaction to stress would be fairly stable over the autumn terms of 1983 and 1991.

(3) Does stress have long-term effects? Hypothesis: the emotional stress reactions would be reflected in simultaneous psychosomatic health, and that, in particular, the psychosomatic health of those teachers who belonged to the group with high emotional stress reactions on both research occasions, would show signs of deterioration.

2 METHODS

2.1 Subjects

The subjects (n=70) were teachers in comprehensive and upper secondary schools in five municipalities. The teachers participating in this second phase of the study during the autumn term of 1991 consisted of 66% of those who had actively taken part in the first phase of the study during the school year 1983-84 (n=137) and were still working as teachers in schools in the same five municipalities (n=106). Thirty-one teachers dropped out owing to retirement (18), moving to another municipality (11) and death (2). Thirty-six teachers refused to take part in this second phase of the study. However, they did not differ significantly either in background variables (sex, age, and school level) or in the indexes of experienced well-being (job satisfaction and emotional stress reactions) from those who agreed to participate (for details see Salo & Kinnunen, 1993). Nevertheless some trends in the background variables and groupings from the first study phase showed that it was the most stressed teachers who most often dropped out between the study phases. Teachers who agreed to participate and those who refused also differed slightly according to sex and school level. Woman and teachers from the sixth, seventh and eighth forms of secondary school more often refused to participate the study than the others.

When comparing the subjects who took part in the first (n=137) and second (n=70) phases, differences were found in the distributions of the background variables (sex, school level, municipality). The largest change concerned municipality: The representativeness of the teachers from the city of 70,000 inhabitants decreased by 10% from 1983 to 1991. The distribution of the basic background variables in the second phase sample was as follows:

Sex:	57 % (40) women, 43 % (30) men
Age:	mean 50 years, range 34-60 years
School level:	37 % (26) teachers of grades 1-6, 36 % (25) of grades 7-9 and 27 % (19) of grades 10-12

Community size: 56 % (39) from a city with 180 000 inhabitants, 24 % (17) from a city with 70 000 inhabitants and 20 % (14) from three rural municipalities with 3000-6000 inhabitants.

After four further drop-outs (retirement, leave, refusal, sickness) sixty-six teachers finally participated in the repeated assessments during the autumn term of 1991. However, on each data collection day, some subjects failed to participate owing to their absence from school. Thus, on average 66 teachers per day answered the repeat questionnaires. The number of subjects did not vary conclusively between the articles (I - III). The group of 66 teachers was the most investigated group from one article to another. In part of the study the statistical method (e.g. cluster analysis) required listwise deletion of cases, and the number of subjects decreased on some scales.

2.2 Methods of data collection

In this study the main emphasis is on the year 1991. A longitudinal follow-up design was used: the teachers made repeat assessments (four in all) of the stress and coping indicators by means of questionnaires during the autumn term of 1991 (see Table 2). On each occasion the assessment involved two questionnaires the first of which covered working days from Monday to Thursday and the second Friday morning lessons. Teachers were also interviewed during April and May 1991. During the autumn term of 1983 six measurements were used (see Table 2). Three of the measurements represented weekends and three working days. The autumn term in Finnish schools begins around August 15th and ends around December 20th. In 1991 the autumn term was interrupted by a mid-term break from October 28th to November 1 st.

TABLE 2 Repeated measurements during the autumn terms 1983 and 1991.

Measurement days	
1983	1991
1 WD September 2 nd	1 WD September 6 th
2 WE September 26 th	-
3 WD October 14 th	2 WD October 18 th
4 WE November 7 th	-
5 WD December 2 nd	3 WD November 29 th
-	4 WD December 13 th
6 WE December 19 th	-

Note. WD = working days Monday through Thursday; WE = weekends Saturday through Sunday.

2.2.1 Repeated questionnaires

Repeated questionnaires were formulated separately for the working days and weekends during the year 1983-84, while for 1991 they were formulated separately for working days from Monday to Thursday and for the Friday forenoon. Questionnaires were constructed to briefly cover all the important aspects of the teacher stress process: the origins and manifestations of teacher stress and some of the intervening variables in that process. Between the years 1983 and 1991 the repeat questionnaires were slightly modified on account of experience and the specific current interest of the study. The largest change was that some intervening variables were left out and coping variables were combined.

The structure and the contents of the repeat questionnaires from the year 1991 are represented by the following three groups of variables:

1. Job stressors

- **The time budget variables**

Teachers' time budgets during the working week and during Friday morning were clarified and calculated in hours per day. The total amount of work was composed of "ordinary" classroom lessons, exam lessons, preparations for lessons, meetings, administrative work and other kind of work.

- **Social relations variables**

In the repeat questionnaires teachers rated their social relations at home and at school. Pupil motivation, Pupil conduct and Relations with colleagues were based on the subjects' general opinions of these variables during the working week at school. Pupil motivation and Pupil conduct were also asked about on the Friday mornings. In same way they rated atmosphere at home or in the nearest human relations during the working week and on the Friday mornings. All the ratings were scored on a scale from one to four.

2. Stress reactions

- **The mood variables**

In the year 1991 the stress variables were based on a set of ten five-point rating scales of the subjects' mood and mental condition during the week (Mo-Th) and on Friday mornings. On the basis of a factor analysis of the scales and reliability coefficients for the devised scales, two mood variables were formed. First, depression was computed by summing up the ratings of five variables: depression, lack of power of concentration, helplessness, exhaustion and absent-mindedness; and, second, anxiety, by summing five variables: anxiety, irritability, distress, hurry, lack of relaxation.

In comparing the two years (1983 and 1991) the emotional stress reaction variables were based on a set of six five-point rating scales of the subjects' mood and emotional state "during the present week". The rated variables were: depression, anxiety, irritability, helplessness, exhaustion and distress. The measure was based on studies by Frankenhaeuser's research group (e.g., 1980) and used in a form to suit Finnish conditions. A score for feelings of stress was computed by summing up the ratings of all six variables. The score was tested for internal consistency, using Cronbach's alpha. For the three measurements during the autumn term of 1983 the coefficients varied between 0.82 and 0.86, and for the four working day measurements during the autumn term of 1991 between 0.83 and 0.87.

• Well-being at work

The exhaustion (bored, exhausted, fatigued, dissatisfied) that teachers experienced during the working week (Mo-Th) was studied using four five-point scales. A work satisfaction scale (course of time, concentration at work, satisfaction with achievement, pleasure and ease at work) was formed of five five-point rating scales. The work satisfaction scale was used only in the questionnaire for Friday mornings. In all, the applied stress variables were selected from different stress scales utilizing experiences based on the first phase of the study. The reliability coefficients (Cronbach's alpha) for the stress scales varied between the four measurements as follows: depression 0.81 - 0.86, anxiety 0.75 - 0.83, exhaustion 0.62 - 0.72 and work satisfaction 0.61 - 0.70.

• Health variables

The effects of stress on health were measured using self-evaluations of psychosomatic symptoms, sleeping problems, health status and work ability. The first two were assessed repeatedly (four times) during the autumn term of 1991, and the last two were assessed only once at the beginning of the first and/or second study phase. Various symptoms were coded according to the number of symptoms reported by the teacher, while sleeping problems were computed by summing up the four-item measure on a scale with five response options. The alpha coefficients of the sleeping problems scale varied between 0.66 and 0.84. Health status was rated on a scale from one (very bad) to four (very good) in both the background questionnaires (1983) and in the interviews (1991). Work ability was a subjective estimation of present work ability compared with lifetime best on a scale from zero to ten. In addition, physical and mental work ability were rated separately on a scale from one (very bad) to four (very good). All these work ability evaluations were included in the interviews in 1991.

3. Coping

Different ways of coping, based on the theory of Folkman and Lazarus (1988), were studied using six five-point rating scales. The variables were avoidance of

thinking, problem solving, social support, thinking about work alone, devoting oneself to free time activities and use of food, alcohol or tobacco. These single variables did not cluster empirically into scales. A physical exercise variable, which was measured in hours during the school week (Mo-Th), was used here as one way of coping (physical recreation).

2.2.2 Interviews

The aim of the interviews was to obtain information on the teachers' way of living and work between the two phases of the study and currently. The interviews contained 28 themes from the following fields:

1. Work situation and strain (changes from year 1983-84 and prevailing situation)
2. Work features and experiences (positive and negative sides of work, goals, planning, development, possibilities to influence work, and working community)
3. Description of oneself as a teacher (resources, skills, professional future)
4. Experiences of stress at work (reasons, manifestations, coping, ability to free oneself from work, social support)
5. Way of living and satisfaction with life (family and home, leisure, changes in life)
6. Health and working capacity (illnesses, symptoms, health behaviour)

The interviews were done by two researchers. A present author made them to a greater extent. The duration of the interviews varied from 45 minutes to three hours. Most often the interviews were conducted at school and they were recorded. The tapes were transcribed according to themes, and variables were formed. Variables and categories were formed according to the variation in the answers. The reliability of the classifications was analysed so that six interviews were recoded using a different rater. In 88 % of cases these different raters agree about the classification made. From case to case, these percentages varied from 81 to 95.

Only a small part of the interview data was utilized in this study (mainly in article II). Coping resources were studied on the basis of the interview data. Social support (colleagues, friends, family), competence (mastery of subject, teaching ability and interaction with pupils), work ability (total, physical, mental), satisfaction with life, control at work, the demand-resources ratio at work, social relations at school, the effectiveness of coping, life changes, the work-family relation, the adequacy of leisure time, and health variables were classified by the interviewers mainly on four-point rating scales. In connection with the interviews one questionnaire was also filled in. Sense of coherence (SOC) was operationalized by using the shorter 13-item and 7-point semantic differential scale (Antonovsky, 1987).

Right after the interviews the interviewers (2) evaluated the prevailing atmosphere and how committed the subjects were to the task in hand. The subjects were estimated to be open and well committed. About 8-15 subjects were

evaluated as hiding to some extent their opinions or not committed themselves to the interview. In every case the atmosphere of the interview was experienced as at least moderate, and in 41% of the cases it was evaluated as very good.

The research material on which each article (I-III) was based was as follows:

I Repeat questionnaires during the autumn term 1991 (four measurements)

II Repeat questionnaires during the autumn term 1991 (four measurements), and interviews (1991).

III Repeat questionnaires during the autumn term 1983 (six measurements) and 1991 (four measurements), background questionnaire (1983), interviews (1991)

2.3 Methods of data analysis

The statistical analysis of the data contained both descriptive and explanatory analyses. The descriptive analyses have been reported previously in Finnish (Salo & Kinnunen, 1993). On the whole in this project quantitative methods have been used more often than qualitative and qualitative material has been coded in quantitative form. Hence, it follows that in this report the methods are almost purely quantitative. Statistical analysis of the data was done by SPSS/PC computer software (SPSS Inc. 1988).

The various courses of the stress process in time were analysed by cluster analysis (Wishart, 1978), which is an exploratory method for sorting similar things or subjects into categories. Because cluster analysis requires list-wise deletion of cases, the data was completed by mean estimates from an incomplete sample. In the cluster analysis hierarchical clustering was applied and Euclidean similarities, which were evaluated by using Ward's method, were used. Statistical comparisons among the four stress process groups found were made by one-way analyses of variance and Student's t-test.

Correlation analyses were also conducted to determine the relationships between the different stress variables and measurements. Multivariate analysis of variance (MANOVA) was used to determine changes in the stress and coping variables over time in each article (Malin & Pahkinen, 1990).

The predictive power of the examined variables for teacher stress was analysed by regression analyses. First, multiple regression analyses were carried out for each of the different explanatory factor-group variables, and second for those variables with repeated significant relationships with the observed stress variables. In the first phase the multiple linear regression method was stepwise and in the second phase the method was enter. In this way separate multiple regression analyses were formed for both the once (coping resource) and repeatedly measured (source of stress, ways of coping) variables.

The comparisons between the different research occasions during 1983 and 1991 were done using a paired samples t-test and Pearson correlations. Comparisons between the four groups from the year 1983 were made by one-way analysis of variance. Cross-tabulations with χ^2 -measure were used on the level of the tentative and descriptive analyses at different points in the articles.

3 OVERVIEW OF THE RESULTS

3.1 Teacher stress and coping processes over an autumn term (Study I)

The aim of this first study was to investigate how teachers' stress and coping proceed during the autumn term. On the basis of the first study phase teacher stress was assumed to increase in the total group of teachers during the autumn term; although the autumn break might retard the process. On the average a third of the teachers experienced significant stress moods in their work, 21 % at the beginning of the autumn term and 41 % at the end. The findings showed a clear accumulation of stress during the autumn term 1991 in the emotional (anxiety, depression) and motivational (exhaustion) stress indicators. Comparisons between these stress scales showed that anxiety and exhaustion characterized teacher stress more than did depression. The stress scores were quite moderate on the average and the teachers from the different school levels enjoyed their work. Work satisfaction did not decrease as much as stress increased during the autumn term.

In line with the hypothesis, interindividual differences in stress and coping processes among teachers were found. Four different teacher groups emerged according to the type of stress reported: (1) teachers who were only moderately stressed; (2) those who were not at all stressed; (3) teachers who were exhausted throughout the term; and (4) those whose stress increased strongly during the term. These stress process groups differed with regard to their coping styles, but not background variables (sex, age, school level or experience as a teacher).

Despite the increase in teacher stress, ways of coping did not vary during the autumn term. Subjective stress and ways of coping showed no direct interaction. On the whole, active and successful palliative actions (avoidance of thinking about work and devoting oneself to free-time activities) were evaluated as the best ways of coping. Typical of the successful ways of coping were the ability to get rid of work in a positive way, for example with the help of regular and active exercise, which allows social contacts. Thinking about

work alone and the use of stimulants (alcohol, tobacco, and food) were evaluated as the most ineffective ways of coping as they were mostly used among teachers with high stress. Problem-solving did not discriminate between the different stress processes at all. Passive and palliative ways of coping were observed to be typical of those teachers who were most stressed, and active and palliative ways of coping among teachers without stress. However, problem-solving and social support were the most commonly used ways of coping during the autumn term. According to the results of the present study, only in exhausted teachers did problem-solving increase during the autumn term.

3.2 Explanations for teacher stress processes (Study II)

Study II was specifically intended to examine the extent to which different sources of stress, coping resources, background variables and different ways of coping determined different stress groups and scales among teachers during the autumn term.

Teachers' appraisals of coping resources affected the different stress processes. Teachers without stress assessed their working abilities the most positively and were the most satisfied with their lives, while teachers with exhausting stress assessed their working abilities as decreased and rated their life as only fairly satisfactory. Neither the amount of stress nor the different stress processes were associated with the background variables: sex, age, school level or experience as a teacher. Of the different potential stressors only teachers' assessments of pupils' motivation and conduct varied between the stress process groups during the autumn term. Teachers without stress assessed pupils' motivation and particularly conduct more positively than those in the other groups.

The different explanatory variables seem to vary depending on the stress scale to be explained. Of the different coping resources, mental working ability, life satisfaction, total working ability and support of friends were the best explanatory variables of the different stress moods during the autumn term. These four coping resources explained exhaustion ($R^2= 0.08-0.28$), depression ($R^2= 0.16-0.29$) and anxiety ($R^2= 0.10-0.21$) in a fluctuating way during the autumn term. The measured potential stressors (amount of work, family relations, relations with colleagues, pupils' motivation and conduct) repeatedly explained exhaustion ($R^2= 0.12-0.27$), depression ($R^2= 0.12-0.37$) and anxiety ($R^2= 0.19-0.35$) slightly more than did the coping resources. During three measurements out of four, the different stress sources and indicators were significantly connected in the following way: anxiety with colleague relations; depression with pupil motivation; and exhaustion with pupil conduct.

All six repeatedly measured ways of coping explained together the stress scales as follow: exhaustion ($R^2= 0.14-0.30$), depression ($R^2= 0.16-0.23$) and anxiety ($R^2= 0.29-0.38$). Of the different ways of coping, the ability to devote oneself to

free time activities and use of food, drinks or tobacco explained teachers' stress during the autumn term. Free time activities were observed to be the most important way of coping with anxiety, while heavy use of food, drinks or tobacco were connected with depression. These findings might be explained by the relative differences in stability of the stress moods studied. Anxiety is seen as a short-term stress indicator, while depression and exhaustion are seen as results of prolonged stress processes. Anxiety did not paralyze as badly as depression and exhaustion. In this way teachers still retain active coping resources (e.g. physical exercise, hobbies).

The percentages of variance in the observed stress scales explained on each measurement occasion by the coping resources, potential stressors or ways of coping varied considerably. In spite of the regularities in content, variation between measurements during the autumn term was fairly high. In the case of the coping resources variables the R^2 values varied between 0.08 and 0.29, while with potential stressors the R^2 values ranged from 0.12 to 0.37, and with ways of coping from 0.14 to 0.38 during the autumn term. For these reasons, stable models would not do justice to the phenomenon under scrutiny.

As the results showed, stress was connected with different ways of coping, coping resources and potential stressors. In all, work stress seems to have effects on comprehensive matters which deal with life (health, life satisfaction, social relations) and work (work abilities, pupil appraisals, colleague relations), and even on specific ways of coping. In addition, the association found between the different sources and scales of stress suggest that individual interventions should be introduced at the beginning of the stress process when colleagues start to irritate and cause anxiety. Pupils might then be saved from stressed teachers and vice versa.

3.3 Teacher work, stress and health over an eight-year follow-up (Study III)

The purpose of the third study was to compare teacher stress between the years 1983 and 1991, in particular to examine to what extent stress had long-term effects on teachers' well-being and health by contacting the same group of teachers twice. During the 8-year period the general working situation among the teachers had remain quite stable: most of them had remained at the same school teaching the same subjects at the same school level.

The results showed a drop in the teachers' well-being over the 8-year period. In particular, those over 55 years of age showed more emotional stress reactions in 1991 than eight years earlier. Furthermore, they evaluated their social relations with pupils to be worse in 1991 compared to 1983. Emotional stress reactions increased towards the end of the term, even though in the autumn of 1991 a one-week mid-term break was introduced. Moreover, 57 % (40) of the teachers stated in the interviews that school work had become more

stressful. The main reasons given for this were an overall increase in duties and tasks as well as negative changes in pupil behaviour.

Interindividual differences in the course of the stress process were shown to have some stability over the period. In particular, a perceived stability in the extreme stress groups was evident, i.e., nobody who was in a high stress reaction group in 1983 had become a member of a group with low stress reactions in 1991, or vice versa. A half of those with low emotional stress reactions and those high in them in 1983 were still in the same categories in 1991. This kind of partial stability in well-being is supported by the rather stable working situation among the teachers and by the hypothesized stability of personal characteristics (e.g., personality and coping strategies).

Emotional stress reactions were reflected in simultaneous work ability and psychosomatic health. The high emotional reaction group reported more problems in work ability and health than the other two groups over the autumn term of 1991. Long-term stress was seen to lead to various psychosomatic complaints, but these were not reflected in self-rated health status. The results suggest that teacher stress is not a short-lived problem, and ways of preventing or reducing stress (e.g. continuing education, counselling and co-operation) should be employed. Also, personal efforts by teacher to improve his or her well-being should be encouraged by every possible means.

4 GENERAL DISCUSSION

4.1 Main findings

“These are tough times to be a teacher.” Quotation from the opening sentence of Mark A. Smylie (1999, 59) seems to continue to hold true in the light of this study (see also, Kyriacou, 1989). Emotional stress reactions increased towards the end of the term on both terms in 1983 and, especially, in 1991 (see also, Kinnunen, 1989; Salo & Kinnunen, 1993). This trend has also been found in other teacher stress studies (Fleischut, 1985; Rajala, 1988a). In the first study phase the stress process described above manifested itself in the form of illnesses, medicine intake, anxiety, depression, sexual passivity, and partly in catecholamine excretion (Kinnunen, 1989). In the autumn of 1991 a one-week mid-term break was introduced to retard the stress process and to prevent negative stress accumulation. The break (from October 28th to November 1st) did not entirely prevent an increase in stress during the autumn term, although this organizational solution did have the effect of lowering the angle of the escalating stress curve. Despite the earlier findings and the changes introduced, the increase in teacher stress was surprisingly strong during the autumn term of 1991. All the emotional and motivational stress indicators studied (anxiety, depression, exhaustion and job satisfaction) were expressed as a statistically significant increase in the stress curve. Anxiety was clearly more common than depression and exhaustion in the work of teachers. On average the sample of teachers, as a whole, was only fairly anxious during the autumn term. Work satisfaction did not decrease as much as stress increased. The present study confirmed that teacher stress had an identifiable tendency to increase during the autumn term. Of course, this perceived increase in the level of stress reactions may equally be typical of other occupations. Alternative solutions to cope with the stress process, which was identified as hazardous to health, are needed. Individual control over the job stressor itself is essential, as merely raising the level of control in the organization or in general will often make matters worse (see, Spector, 1998).

The predictability of the stress process turned out to be high in many ways. Large interindividual differences in stress among teachers were found similarly between the study phases, over the 8-year period, and during the autumn term 1991. During the autumn term of 1991 four different teacher groups emerged according to the type of stress reported: (1) teachers who were only moderately stressed; (2) those not at all stressed; (3) teachers who were exhausted throughout the term; and (4) those whose stress increased strongly during the term. From the temporal point of view, time did not spare any of the groups of teachers during the autumn 1991. The main rule was that stress increased more or less in every group (see, Salo & Kinnunen 1993, 79).

It seems that personal efforts made by the teacher at improving his or her well-being are of the greatest importance, and hence this kind of active coping should be encouraged in the future, even as early as during the teacher education. Despite the increase in teacher stress, ways of coping did not vary during the autumn term. Subjective stress and ways of coping showed no direct interaction. In accordance with earlier studies (Dewe & Quest, 1990; Jenkins & Calhoun, 1991; Kinnunen, 1989) teachers favoured problem-oriented coping. This could partly be explained by the social desirability effect. Even if problem-oriented ways of coping have usually been evaluated as more effective and desirable, in this study teachers' considerable use of problem-oriented ways of coping and social support did not have any effect on stress. The results of the study supported earlier findings (Haney & Long, 1989; Rajala, 1988b) that the effectiveness of coping on stress in the teaching profession is generally quite low. Rajala has characterized middle-aged and experienced teachers' coping methods as rather stable in quality and effectiveness. These results showed middle-aged teachers' coping to be stable over the autumn term.

Teachers' appraisals of their coping resources and different stress processes were linked. Teachers without stress gave the most positive assessments of their working abilities and were most satisfied with their lives, while teachers with exhausting stress assessed their working abilities as decreased and rated their life as only fairly satisfactory. Stress damages well-being and stimulates coping in a great variety of ways, which underlines the importance of efforts to improve well-being in different life domains, and not only in work (see, Edwards, 1998; Edwards, Caplan & Van Harrison, 1998). Of the different potential stressors only teachers' assessments of pupils' motivation and conduct varied between the stress process groups during the autumn term. Teachers without stress assessed pupils' motivation, and particularly conduct, more positively than those in the other groups. Once the dynamic, ongoing process of the stress and appraisal mechanism of teachers are taken together with student evaluation in a study the public at large may become interested in teacher stress.

Even if the stress moods fluctuated widely over time (see, Carayon, 1993), longitudinal stability was found. During three measurements out of four, the different stress sources and indicators were significantly connected in the following way: anxiety with problems in relations with colleagues; depression with low pupil motivation; and exhaustion with disturbing pupil conduct. Of

the different ways of coping, the ability to devote oneself to free-time activities was observed to be the most important way to cope successfully with anxiety, while heavy use of food, drinks or tobacco was connected with depression. As these results showed, stress was connected with different ways of coping, coping resources and potential stressors. In all, work stress seems to have effects on many aspects of life (health, life satisfaction, social relations) and work (work abilities, pupil appraisals, colleague relations), and even on specific ways of coping.

The results showed a drop in the teachers' well-being over the 8-year period. In particular, teachers over 55 years of age had more emotional stress reactions, and they evaluated their social relations with pupils as worse, in 1991 compared to 1983. Moreover, 57 % (40) of the teachers stated in the interviews that school work had become more stressful, because of an overall increase in duties and tasks as well as negative changes in pupil behaviour. Finnish research has shown that the quality of national working life deteriorated during the interval from 1984 to 1990 (Kolu, 1991; Lehto, 1991). In addition, there was evidence that occupational well-being among teachers seems to decline with advancing age (Kinnunen et al., 1994). Age alters teachers' resources and makes the job stressful. The effect of age in teachers' work emerged in this study together with 1) wide changes in the information society and job profiles (new technology), 2) the requirements of a pupil-centered teaching orientation (post-modern individualism and pedagogics and client orientation), and 3) expansion of the mass media (competitor). Also, difficulties in 4) the economic situation of schools (local authorities), and 5) problems in families (parenthood and child education) have grown during the interval from 1984 to 1990 in Finland. Similar negative changes have happened all over Europe (see, Levi, 2001).

The results suggest that teacher stress is not a short-lived problem, and ways of preventing and reducing stress should be employed. According to the results this is very important among teachers over 55 years old. Variation between the groups was small during the eight-year period. These findings speak on behalf of different stable variables which are connected with stress, like personality and the basic meaning of work. Emotional stress reactions were reflected simultaneously in work ability and psychosomatic health. The high emotional reaction group had more problems in work ability and health than the other two groups over the autumn term 1991. Long-term stress was seen to lead to various psychosomatic complaints, but these were not reflected in self-rated health status. These results are run parallel with the findings in previous research.

Moreover, the use of emotional stress reactions as a stress indicator connects this research issue to seasonal mood changes. Common sense dictates that autumn and winter are the most favoured seasons for experiencing moods of depression. Evidence of seasonal change in the mood and behavioural variables over the course of the year in a general population indicates (Rosen & Rosenthal, 1991) that winter problems are greater with increasing distance from the equator – as in Finland. However, seasonal affective disorder (SAD) is so

rare that it could not have had any significant statistical effect on the study (Rosen et al., 1990).

Different hypothetical models of teacher stress have been empirically tested since the early 1980's (see, Kinnunen, 1989). These models are mainly based on cross-sectional data. Comparisons of the present study with other cross-sectional and even longitudinal studies of teachers stress are difficult, as the main interest here was in the longitudinal and temporal process nature of teacher stress. On the basis of the present findings as well as on other current research results, practical development work in longitudinal modelling (e.g. action research) has increasing justification in the case of teacher stress.

4.2 Methodological evaluation

The measurement of teachers' work-related emotional reactions enables discussion of the meaning, definition and assessment of the terms used and the complex relationships (models) among these variables (see, Carayon, 1993; Marsella, 1994). The present study was based on data gathered from questionnaires and interviews. Although a questionnaire survey is a widely used method of data gathering in stress research, it has certain limitations as discussed earlier. As a complex individual psychological process, stress deals with the individual's perception of the environment and the emotional experience of it. For the study of stress this means subjective data. Naturally the methods used to collect such data should be shown to be reliable, valid and fair.

In questionnaires, when single items are used instead of sum scales as indicators of concepts, the reliability of the indicators can be expected to vary a great deal. Estimating the reliability of the individual questions is also problematic in questionnaires because parallel questions are often missing. The main outcome of this problem is that the statistical estimates of the relationships among variables remain rather low, and the variables cannot be corrected for their reliability effects. In this study underestimation was quite clearly demonstrated by comparing the correlations of the perceived stress variables between the measurements. On the other hand, in the article by Elo et al. (1999) single item measure of perceived stress was found feasible in different measurement contexts. It also proved to be valid on the group level, even if diagnostic conclusions should not be made on an individual's stress level on the basis of one question. Longitudinal research was seen as indispensable both in the light of validation and of stress process development from the viewpoint of both the working community and the individual.

More longitudinal or multimethod research is needed to clearly specify the job-stress process (e.g. Chen, Spector & Jex, 1996). The longitudinal nature of this study was its advantage: the process of teacher stress over the autumn term was revealed. New information on the causal connections in the stress-emotions relationship was obtained. Although the causal connections in the stress-illness

relationship were not clear, the same interaction in stress processes as that which happened eight years ago in the first phase of the study was demonstrable. A very long research period was not enough to find out how stress contributes to ill health. Long-term stress was not reflected in self-rated health status. The aims of the study were not diagnostic, and in the case of the teacher stress process the difference between the concepts of well-being and of health were clearly manifested in the study.

According to the recommendations by Zapf, Dormann and Frese (1996) with regard to methodological issues of longitudinal stress research, the present study was systematically planned and realised, although reverse causal hypotheses or a series of third variable explanations were not objects of the study. Schonfeld, Rhee and Xia (1996) outlined a number of methodological strategies and advised on how to operationalize the teacher stress process and study it longitudinally. Familiarity with the article by McGrath & Beehr (1990) about the temporal issues in the conceptualization and measurement of stress and coping is highly recommended in the case of both cross-sectional and longitudinal research.

Longitudinal studies face problems concerning mortality and the test-retest effect (Nesselroade & Baltes, 1979). There were problems in sample selectivity also in this phase of the study. The original study attracted middle-aged teachers in particular, which means that young teachers who had recently completed their professional education were largely absent from the sample examined. Systematic differences were not found in the background variables between those who were absent on some measurements occasions and those who participated regularly in the first phase of the study. The background variables were also controlled in the second phase of the study: teachers from Jyväskylä were poorly and teachers from Tampere well represented. Teachers from the upper comprehensive school were best represented in the study. The stress groupings from the first phase of the study suggested that there was to some degree selectivity in a group of teachers. The most stressed teachers in 1983 seemed to drop out more than others between the study phases. According to the 1991 data, stress evaluations did not separate those teachers who agreed and those who refused to participate the study. None of these analyses have statistical significance (Salo & Kinnunen, 1993).

The methodological problems of this study are related to the nature of self-report data and to the differences in the measures used in 1983 and 1991. Because of the nature of self-report data, alternative hypotheses as to the relationship between stress and psychosomatic complaints cannot be completely ruled out. Shared methods variance (Kasl, 1987) for example, can contribute in particular to simultaneous relationships. Negative affectivity (Brief, Burge & George, 1988; Watson & Clark, 1984), which results from a tendency to exaggerate everything negative about one's job and one's health, may also underlie the results of the two different research occasions. In addition unfortunately, psychosomatic symptoms and work ability were not measured in 1983. This is a problem because it was impossible to control the level of complaints at the beginning of the study.

On the whole, stress was a well-known phenomenon to the teachers examined. The ways in which continuous participation influenced the stress ratings can only be assumed. As public performers it should be easier for teachers to express feelings of stress. Because of the first phase of the study and information shared at the beginning of the second phase, they knew beforehand what would happen in the study. However, these factors do not mean that the defence mechanisms remained unused in interviews. A great deal of stress and coping processes are unconscious and weakly organized (Dewe, 1985).

The statistical analyses used were numerous and they contained both descriptive and explanatory analyses. The analyses of the reliability coefficients were done by Cronbach's alpha. MANOVA was conducted to determine changes in the stress and coping variables over time. Interindividual differences in stress were analyzed by cluster analysis (Wishart, 1978). Because cluster analysis requires list-wise deletion of cases, the data was completed by mean estimates from an incomplete sample. Statistical comparisons among the four stress groups of teachers were made by one-way analyses of variance and Student's t-test. The predictive power of the examined stress variables for teacher stress was analyzed by regression analyses. First, multiple regression analyses were carried out for each of the different explanatory factor group variables, and second for those variables with repeated significant relationships to the observed stress variables. The small size of the sample limited the statistical methods used. For example, structural equation models were inapplicable in spite of numerous attempts. As a whole the design of the study and the methods used were functional and successful.

4.3 Theoretical conclusions

The following conclusions are based on a review of the teacher stress literature and the author's experiences as a student and teacher at various school levels. I hope that these conclusions will be of use to other researchers in their work on this field.

Interest in occupational stress research and the experience of psychological burnout and coping in work settings continues to grow (see, Cassidy, 1999). Stress has become a central variable in organizational behaviour research (Burke, 1992; Cooper, 2001; Cooper, Dewe & O'Driscoll, 2001). In the field of health psychology stress is seen as core concept (Cassidy, 1999). In addition, popular books and articles offer almost exhaustingly long lists of guiding principles and other advices on how to manage stress in the teaching profession. However, these scientific studies do not seem to have a strong preventive effect on teacher stress. More effectiveness is needed in this field. Academic studies seem to have little to offer in the face of teachers' occupational stress. These studies commonly end by repeating the same phrases about teachers' coping and stress like:

“Early symptoms of stress and early exploitation of coping methods are beneficial.”

“Both individual and organizational methods should be taken advantage of.”

“Versatility and flexibility of coping methods are beneficial.”

Even if stress seems' to be quite complicated phenomenon, in the studies of stress and health many of the psychological tenets as well as common sense still work. School environments should be made as health promoting as possible from the psychological, technical, geographic, social, developmental, and economic points of view (Taylor et al., 1997). School facilities should provide safety, opportunities for social integration, and the ability to predict and control aspects of that environment for teachers and students. If emotionally secure children are better able to regulate their emotions in the face of stress and therefore cope more effectively with daily problems (Davies & Cummings, 1994), this is likely to be true in the case of teachers as well.

On the other hand, teachers and parents who suffer from severe stress may have difficulties in managing the quality of the social climate, teacher/parent-child relationships and teaching/parenting. The effects of social support by peers are similar: less adult attention and stability at school means more conflict with and less acceptance by peers (Taylor et al., 1997). Stress experiences have significant consequences for individuals (e.g. lower satisfaction, poor emotional well-being) and organizations (absenteeism, low motivation, lower performance) and the phenomena themselves are both pervasive and intensifying. As in other organizations, increasing competitive and economic pressures are also known in schools, where children spend their days.

In sum, approximately one third of teachers would seem to have serious stress-related problems in their work and among one third these problems are moderate, while one third have no problem at all. For example, in the cluster analysis three teacher groups were found by Aronsson and Svensson (1997): “lively” 14%, “middle group” 65% and “tired and troubled” 21%. Compared with the study results here the size of the indisposed group of teachers was exactly the same and the amount of teachers who were not at all stressed (=“lively”) was double (30%). A third of Australian teachers reported a high level of job stress in the study by O'Connor & Clarke (1990). Of course, from study to study, these numbers change. In the Second Survey of Working Conditions, Paoli (1997) reports that 28% of the 147 million workers in the EU Member States have stress, from which one can conclude that teachers are not alone with this problem. Intervention funding for teachers is needed. This requires adequate understanding of the ways in which psychosocial work characteristics shape employees' well-being at work.

Many demonstrations and studies have indicated that problems in teacher's well-being at work lie in quality of interpersonal relationships: problems with colleagues, supervisors and pupils, working conditions and poor ethos in the school. Role conflict, ambiguity and overload are common stressors for teachers (e.g. Haney & Long, 1989). Supervisor and management responsiveness and support are beneficial for employees (Aryee, Luk & Stone, 1998; Bowen, 1998;

Milliken, Martins & Morgan, 1998) and affect employees work attitudes (e.g. Scandura & Lankau, 1997). In a recent longitudinal study low organizational justice was found to be an independent risk factor for the health of employees (Kivimäki et al., 2002). Especially when the size of these effects was comparable to the psychosocial determinants of morbidity, the managerial procedures as well as decision-making procedures and treatment of individuals in organizations should emerge as a focus of stress studies in the future. Studies from the Programme for International Student Assessment (PISA) express this same concern. Finnish students reach excellent level, while Finnish principals' views of their working community quality were surprisingly negative (Väljjarvi, 2002; Väljjarvi, Linnakylä, Kupari & Reinikainen, 2002). Interventions to improve the quality of colleague and leadership relations could be done in many ways. O'Connor and Clarke (1990) found that women teachers need male strength and power to cope with the demands of students and propose practically oriented courses in the development of interpersonal skills. Daniels (1996) discovered that very few managers consider stress to be a real risk to the organization. Also, Finnish laws concerning safety at work call for psychosocial health aspects to be concerning in organizations (e.g. Työterveyshuoltolaki, 2001). Vulkko (2001) has propositions along the same lines based on her study of decision-making in school organization as experienced by teacher community.

School as a social environment has both taxes and supports the teacher. Teachers spend their life in schools, voluntarily. Throughout life, one's family and friends serve as the social context within which events are appraised and coping strategies are evaluated and initiated. The social environment also serves as a source of learning and reinforcement for attitudes and behaviours that affect health. Supportive relationships in the social environment appear to serve a stress-reducing, health-promoting function, enhancing psychological functioning and reducing physiologic arousal. In addition, the social environment can impact directly and importantly on health behaviours and health-care utilization. Social support has been extensively studied in the work environment, and its effects are generally beneficial. Those who report being unable to develop satisfying relationships report more negative affect at work (Buunk et al., 1993) and poorer physical and mental health (Repetti, 1993). In teachers' work this social functioning is essential. While stress experiences increased towards the end of the autumn term teachers got more critical in their student evaluations. I would assume that the consequences of this finding would be borne out by students' marks, but it was not possible to investigate this aspect within this study.

As a teacher and researcher it sometimes seems to me that stress already has a special place in some teachers' hearts. Case-by-case stress seems to have a special role as a repeated concept (cultural factor in a work community or even in a profession). The fact is that Finnish teachers are to a great extent, municipal employees and hold an office, but they don't share blue-collar workers' common sense, and tend to behave like workaholics, even if they are high-quality ethical professionals (see Niemi, 2000). In the studies of teacher profession the versatility

and all-inclusiveness of the job make it possible to understand also the stress processes at hand. The Finnish studies of teachers' entrance examination (e.g. Kari, 2001; Riihinen, 2002), education (e.g. Niemi, 1999; Niemi, Syrjälä & Viilo, 1998), personality and profession (e.g. Kari, 1996; Kari & Heikkinen, 2002) and work (e.g. Korkeakoski, 1997; Kämäräinen & Rainerma, 2001) include valuable analysis when the stress processes of teachers are under examination. In quantitative studies these effects are very difficult to separate from "real" stress. This effect could partly explain the differences in the magnitude of teacher stress. This does not mean that teachers as guarantors of the cohesion of this post-modern individual-risk-information society should not feel stressed or confused. This is more like a presentiment which may have methodological value. What kind of teacher cohort was represented by the sample and what effects does it have on the analysis of the results? This study was done at a time when organizational and administrative changes were being introduced, e.g. the coming of the comprehensive school and bigger education units. Another observation on stress research concerns the simplification of stress emotions and the mechanistic way the concept of coping is used, which underestimate the defence mechanisms and other levels in the processes of control in work (see Horowitz, 1988; Lazarus, 1991). Positively charged stress studies are still very rare, depending on definitions of the concepts, but fortunately, do exist. Flow (Csikszentmihalyi, 1991), sense of coherence (Antonovsky, 1987) and job engagement (Hakanen, 2002) could all be considered positively charged stress concepts.

Social environments influence health in a complex and interactive fashion. Psychosocial predictors of health outcomes do not occur and should not be studied in an economic, ethnic, developmental, and social vacuum. With respect to interventions, the implications of such a viewpoint are complex. On the one hand, considering multiple levels of analysis simultaneously suggests multiple intervention points ranging from the individual through the family to the community. On the other hand, any intervention focus must acknowledge the interrelatedness of these environments and the fact that change induced at one level may have modest long-term effects, if corresponding changes do not occur at other levels.

Psychology core concepts concerning the stress process (behaviour, experience, emotions, cognitions and attitudes), is the most important factor in health and illness today (Cassidy, 1999). Psychological distress or negative affectivity is implicated in the relation between work load and physical health (e.g. Antonovsky, 1987). Work stress research has especially focused on the effects of a high-strain work environment defined as one with a high level of demands and a low level of decision latitude (Karasek & Theorell, 1990). At the same time the role of coping strategies in moderating the relation between chronic work stress and adverse health outcomes is still an understudied area. In addition, understanding how people cope with job stress may necessitate the examination of coping strategies specific to a particular job (Dewe & Guest, 1990). Nonetheless, active coping strategies and control have been associated

with more effective coping in a variety of situations (for a review, see Haidt & Rodin, 1999), and the Karasek model of work strain is consistent with such an argument in positing that the degree to which individuals have decision latitude reduces work strain. Nonetheless, under conditions of high psychological demands, decision latitude may also have negative effects.

More attention should be paid to stress management and coping at the individual level. This is imperative in the Ancient Greek ethos of Lazarus (1999) where stress is an emotion, the stress emotion. The implementation of possible methods at all organizational levels needs special skills and sensitivity from the managers. The individual level should be the main causal connection, even if it is hard to achieve and even costly. Teachers' feelings of personal control and tolerance of ambiguity should be enhanced to enable individuals to exploit them. This means honest dialogue and fairness in implementing organizational changes and development projects already during the planning phase as well as in looking to the general future prospects of the personnel. More attention should be given to the (innovative) potential of individuals to change workplace stressors as well as themselves (Bunce & West, 1994). Greater attention also needs to be paid to the development of more effective coping strategies or to changing the system so that teachers do not feel that stressors are beyond their personal control (O'Connor & Clarke, 1990). How amenable the organization and social environment are to the implementation and effectiveness of a particular coping strategy affect how often that coping strategy is chosen (Heaney et al., 1995).

Longitudinal research designs are a powerful tool with which to examine the temporal dimensions of work stressors, stress, and the relationship between stressors and stress, as Carayon (1996) pointed out. The temporal nature of stress and stressors together with quite stable stress process groups, which the results of this study indicate, give us the possibilities to understand the stress phenomenon in a wider connection than merely that in the case of teachers. From philosophical perspective one informative detail is that stress need to be met in a psychological way. Several potential and relevant stress factors on the individual level alone, make it possible for a person to come into contact with matters of both major (life) and minor (single conflict) magnitude. In order to understand the maladaptive effects of a stressor and moderating effects of the adaptive capacity of a person, measurement of the stress responses must extend over time (e.g. Houtman & Bakker, 1991).

Teacher's job satisfaction seems to be coincided with feelings of stress and thoughts of occupational change. The main psychosocial pathway from the work environment to poor health that has been variously studied involves chronic stress. Other potential routes, such as mental health or emotional distress, coping strategies, and health habits, have been studied, not as pathways but as outcomes in their own right. The research on occupational stress could clearly profit from a consideration of more complex and multiple causal routes in relating chronic stress to adverse health outcomes.

The results of different teacher stress studies should be exploited in teachers' education and guidance using individual and practical methods in coping with work stress. Working with individuals and groups are two different things. The reality at school cannot be based on too many facts. Teachers should find their own positive soothing and ways of coping thinking which suit their personality. "Emotions depend on what is important to us – in effect, our individual goal hierarchies" (Lazarus, 1991, 125). Single taxing conflict situations in schools are numerous, a fact which underlines the importance of the approach taken. Understanding stress processes would prevent teachers and other professionals from making negative generalizations about individuals, the work community or the teaching profession.

Knowledge of teachers' internal cognitive and emotional causes of stress and coping methods is essential when attempting to understand the nature of stress. All the study findings indicate that teachers think and feel in varying and idiosyncratic ways, at different points of time. They do not seem to cope with stress well, even if they are teachers and they have had eight years time to learn that stress is a negative feeling. According to the external social demands on them teachers should always be smiling, lively and enthusiastic (Jackson, Boostrom & Hansen, 1993). Teachers' work includes a lot of emotion work, which in the long run is very demanding (see Hochschild, 1993; Rajala, 2001).

Job insecurity, time demands at work and productivity requirements have increased enormously during the 1990s in working life (e.g. Lehto & Sutela, 1998). People in higher-level jobs report significantly less depression than workers in lower-level jobs, but also significantly more job-related anxiety (Warr, 1994). Teaching is one of the most stressful occupations in Finland (Kalimo & Toppinen, 1997). In a longitudinal study over the years 1977 to 1989 in the Netherlands teachers did not belong to an at-risk group (Houtman & Kompier, 1996). Various resource cuts were made during the recession of the early 1990s in the public sector which still have an unfavourable influence on schools and teachers' work. Finnish school buildings have serious air conditioning (dust) and mold problems. At the same time the Finnish school administration has computerized schools quite effectively during the last decade. A good example of the problems caused by blinkered development work will next be seen in the use of technology in teaching and learning, which is a fashion industry at the moment.

Finnish family life has also changed in many respects in the last few decades. The number of dual-income families has increased, which means more children need day-care services. Women perform domestic duties and are also career-oriented, many occupying jobs in the educational field. The constant juggling of work-load and family life creates great amounts of stress (Barnett & Shen, 1997; Mauno, 1999; Melkas, 1998). These changes in society and the working environment in schools have both direct and indirect effects on teachers' and pupils' work and well-being. For teachers this has added contradictory roles: friend, colleague, companion, helper, parent, psychologist, selector, evaluator, social worker and policeman (see, Esteve, 1989).

4.4 Practical conclusions

In this section the changes for the better are looked at from the point of view of education professionals, mainly in Finnish education environments. I put forward some slogans in the hope that those who work in teaching administration or in psychological welfare in the workplace might try them out. It is time to ask what we can do in practice.

Finnish government: "People are the most important in the information society."

Finnish education administration: "Give up control and waste – give teachers' intelligence a chance."

Finnish education ministry: "Stop building walls - demand balls?"

Finnish teacher's trade union: "Better and equal salaries - workplaces promoting health and well-being."

Finnish teacher's education: "Give up the missionary way of thinking – give teacher's differences a chance."

Finnish teacher: "Look in the mirror and praise yourself."

What could Finnish students do? "Get clever faster."

What can I do? "Leave off splitting hairs."

Let us not just stand here and sit there, let's do something everywhere!

Improvements in working life are called for. In recent studies of developmental operations, with no teachers in the samples, the results have been contradictory or diversified. It has been shown that changing the work environment has a direct impact on employees' psychological well-being (Rose, Jones & Fletcher, 1998). Both increasing managerial support (Moyle, 1998), and counselling (Reynolds, 1997) have enhanced employees' psychological well-being. It is possible to put these actions into practice in the form of national projects in which different Finnish public authorities enhance well-being at work. For example, in the study of McCormick (1997) Australian teachers attributed greater responsibility for their occupational stress to the Government and the employing educational authority. On the other hand the individual nature of stress and coping and their processes enable some psychologists to specialize in these phenomena. Knowledge of schooling will be best advanced by overcoming existing disciplinary boundaries and linking levels of analysis.

Methodological improvements should be done to get the manifestations of stress in student and teacher interaction into focus. Teacher knowledge and demands (What is best for the students?) should be changed into a more permissive form: What is good for me, students and teachers, learning and teaching? Finnish teachers' ethical principles include the acceptance of fallibility (Opetusalan ammattijärjestö, 2002). Teachers' own needs and abilities to take care of their work should be supported. Both professional involvement and intrinsic motivation play important roles in teacher stress and coping. Teachers have a lot of possibilities to do their work in a way that suits them, but changes in their working life have been quite small. Things around teachers are changing all the time (from pedagogical methods to students). This forces

choices and gives options, but how the individual teacher takes a stand each time is very important from the stress emotions perspective. How motivation and attitudes emerge in teacher-student interaction is crucial when work stress is in question.

On the regulated markets of teacher education the requirements for primary school teachers are very high and without gender quotas there is a trend towards produce more and more female teachers. One third of these teachers suffer stress at work to the end of their lives. This is the end product of present practice. These agreeable and intelligent young people easily make a favourable impression in the tests, and some of them pay with the rest of their life to this weak vocational choice. According to Savolainen (2001) teachers enjoy one's stay in schools (71% of female teachers and 64% of male teachers) more than pupils (47% of girls and 34% of boys). Among other things she recommends including genuine collaboration between students and teachers. Activities maintaining teachers' working ability should focus on developing strategies supporting psychological coping.

Organizational factors are a relatively new phenomenon in the occupational-stress and health literature (see, Cox, 1997). The school organisation level is likely to be the best level to operate against work stress (McCormick, 1997). The four research-action paradigms: job stress-burnout, work redesign-organizational development, health promoting corporate policies and social-psychodynamics, are integrating in both theory and in real life. The more an organization supports security, personal growth, participation and involvement, and meaning, the healthier the organization will be (Jaffe, 1996). In a sample of teachers a direct relationship between organizational climate and stress has been reported by Michela, Lukaszewski and Allegrante (1996): the empirical findings were solid in the case of the empowerment climate dimension and promising for the affiliation and achievement climate dimensions.

Finnish school organizations have tried to develop teachers' work essentially by mainly exploiting different kinds of quantitative methods (e.g. salary, autumn break). The development of qualitative phenomena in schools has unfortunately been torpedoed with bureaucratic systems and scientific methods. Schools as organizations have been overlooked in stress research even if the work and stressors of teachers are highly social in their nature (e.g. Berg, 1982). The existing projects as well as the practical methods used (see, Elo, 1986; Leiter & Maslach, 2000) are good starts to an overall programme for teachers' stress studies and OD in schools. May school psychologists expand their role to help teachers in their work? The design and implementation of stress management interventions should be based on the following key elements: (see Cassidy, 1999; Griffiths, 1996; Israel, Schurman & House, 1991; Karasek, 1991; Levi, 1994; Maslach, Schaufeli & Leiter, 2001; Rose et al., 1998):

- System oriented: occur during and within the context of general stress abatement efforts, health-related interactions and work methods in the worker-work environment, physical x psychological x social ramifications

- Problem solving-oriented: longitudinal interdisciplinary field studies and interventions for everyday life
- Model-oriented: be model-based, evaluated and progressively improved; be recurring and cyclic
- Health and positive psychological-oriented: focus on stress rather than other associated factors, promote good health and positive feelings in work and elsewhere
- Intersectorial: family, housing, nutrition, traffic, education
- Participatory: integration of different social actors, (principals, teachers, pupils etc.)
- Individual, organizational, areal, national and international models: be tied to support groups and change projects; facilitating transcultural, collaborative and complementary projects
- Human-based and ICT utilization: is it reasonable to do and by whom
- Trust-oriented: everybody does the best they can at the moment, empowering process
- Resource-oriented: increase in individual social and environmental resources to cope successfully with stress

YHTEENVETO

Opettajien stressiprosessi

Väitöskirjatutkimus on osa opettajien stressitutkimusta, jota Jyväskylän yliopistossa on jo 1980-luvun alusta lähtien tehty pääasiassa Raimo Mäkisen ja Ulla Kinnusen toimesta (Kinnunen, Mäkinen & Vihko, 1985; Mäkinen, 1982; Kinnunen, 1989; Salo & Kinnunen, 1993). Tämän väitöskirjatutkimuksen päätavoitteena oli (1) tutkia opettajien työstressin etenemistä syyslukukauden 1991 aikana kuormittumis- ja elpymisprosessina, (2) selvittää stressin kokemisessa ja käsittelyssä ilmenviä yksilöllisiä eroja ja (3) selittää stressiprosessin kulkua opettajien taustamuuttujien, voimavarojen, selviytymiskeinojen ja stressoreiden avulla. Tutkimus on raportoitu kolmena artikkelina sekä käsillä olevana yhteenvetona.

Tutkimuksen teoreettisena lähtökohtana oli stressin ymmärtäminen työssä tapahtuvana yksilö-ympäristö -vuorovaikutuksesta syntyvänä prosessina. Stressiprosessin käsite kattaa tällöin työtilanteiden vaatimukset, mahdollisuudet ja rajoitukset (stressorit) sekä yksilön erilaiset voimavarat, kuten terveys, työkyky, kognitiiviset havainto- ja arviointiresurssit, stressin käsittelykeinot, sosiaalisen tuen ja psyykkiset, biologiset ja toiminnalliset stressireaktiot. Stressi-tutkimuksissa prosessilla tarkoitetaan ajallisesti tavallisesti erittäin lyhyttä jaksoa, jossa tilanne havaitaan ja arvioidaan negatiivisesti siten, että lopputuloksena on stressireaktio. Pidemmällä aikavälillä stressiprosessin nähdään johtavan sairastumiseen. Tutkimus rajautuu tarkastelemaan opettajien psykologista kuormittumis- ja elpymisprosessia sekä pitkällä aikavälillä 1983 – 1991 että syyslukukaudella 1991. Painopiste on vuoden 1991 syyslukukauden tarkastelussa.

Opettajia seurattiin sekä syyslukukauden 1983 että 1991 ajan toistetuin kyselyin, syyslukukaudella 1983 tehtiin kuusi ja syyslukukaudella 1991 neljä kyselyä. Osa kyselyistä koski työviikkoja ja osa perjantai – aamupäivän tapahtumia. Lisäksi opettajat haastateltiin vuoden 1991 keväällä.

Tutkimuksen perusjoukko koostui ensimmäisessä vaiheessa (1983–84) aktiivisesti mukana olleista opettajista. Viiden kunnan alueelta eri kouluasteiden opettajia (ala-aste, yläaste, lukio) osallistui tutkimuksen toiseen vaiheeseen vuonna 1991 yhteensä 70. Jo tutkimuksen ensimmäisessä vaiheessa lukuvuonna 1983–1984 katoa koskeneiden analyysien mukaan tutkimukseen osallistuneet opettajat olivat jossain määrin valikoituneita eivätkä tutkitut muodosta täten edustavaa otosta. Vuoden 1991 arviot koetussa työn kuormittavuudessa eivät erotelleet suostuneita ja kieltäytyneitä opettajia toisistaan.

Ensimmäisen tutkimusvaiheen tulosten perusteella (Kinnunen, 1989) opettajien psyykkisen kuormittuneisuuden todettiin lisääntyvän selvästi syyslukukauden aikana. Tutkimustulosten myötä Suomeen yleistyivät syyslomat, joiden tarkoituksena oli katkaista opettajien syyslukukauden aikana tapahtuva työssä kuormittuminen. Tutkimuksen toisessa vaiheessa syyslomien vaikuttavuutta oli mahdollista arvioida.

Elinikäisen oppimisen tavoin opettajan työssä on kysymys elinikäisestä stressistä. Opetustyö koettiin yhä antoisana, mutta kuormittavana. Opetustyö oli kuormittavampaa syyslukukaudella 1991 kuin 1983. Myös opettajien subjektiivinen kuormittuneisuus lisääntyi syyslukukauden 1991 loppua kohti syyslomasta huolimatta. Kuormittuneisuuden hallintatapojen todettiin vaihtelevan tilanteittain, mutta pysyvän jokseenkin muuttumattomina syyslukukauden aikana. Vuoden 1983 kuormittuneisuus ennusti vuoden 1991 kuormittuneisuutta. Vuonna 1983 subjektiivisten stressituntemusten perusteella muodostetut opettajaryhmät olivat erittäin merkittävästi yhteydessä vuoden 1991 vastaaviin ryhmiin.

Kuormittuneisuusprosessin analysointi osoitti, että opettajien stressin kokemisessa on yksilöllistä vaihtelua. Vuoden 1991 syyslukukauden neljä erilaista prosessityyppiä nimettiin seuraavasti: 1) Keskimäärin kuormittuneet, 2) Hyvävoimaiset, 3) Uupuneet ja 4) Syyslukukaudella voimakkaasti kuormittuvat. Ryhmittely oli yhteydessä vuoden 1983 subjektiivisten tuntemusten mukaan tehtyihin ryhmittelyihin. Pääsääntöisesti vuoden 1983 kuormittuneet olivat myös vuonna 1991 kuormittuneita ja hyvävoimaiset hyvävoimaisia. Opettajien voimavaroitekijöiden, coping -mekanismien ja stressoreiden todettiin olevan yhteydessä erilaisiin stressin ilmenemismuotoihin (ahdistuneisuus, masentuneisuus, uupuneisuus). Lisäksi eri stressoreiden (perheen ilmapiiri, opettajakunnan ilmapiiri, oppilaiden motivaatio ja käyttäytyminen) todettiin vaihtelevan kuormittuneisuusprosessin edetessä eri stressin ilmenemismuotojen välillä.

Tutkimus nosti esiin useita opettajiin kohdistuvan stressitutkimuksen heikkouksia ja ongelmia. Stressi ja coping käsitteet sekä teoriat kärsivät runsauden pulasta. Tutkimusperinne on poikkileikkauksellinen, kvantifioiva ja itseään toistava, kun taas tutkittava ilmiö on dynaaminen, yksilöllinen ja inhimillinen.

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