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Job stress in the nursing profession

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Job Stress in the Nursing Profession

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Florence Nightingale in the Military Hospital at Scutari by J.A. Benwell, 1855.
Courtesy of the Florence Nightingale Museum Trust.

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Job Stress in the Nursing Profession

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Prof. dr. A.J.W. van der Does
Prof. dr. N. Ellemers
Dr. A.L. Francke, NIVEL

*The antidote to exhaustion is not necessarily rest,
it is wholeheartedness*

David Whyte 'Crossing the Unknown Sea'

*ter nagedachtenis van mijn vader
Edzard Sipko Gelsema 1937-2000*

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Chapter 1

Introduction

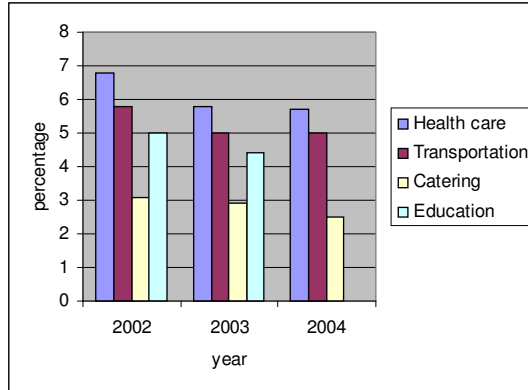
Introduction

1.1 Job stress in nurses

Job stress in the nursing profession has been a persistent global problem for many years now. It has been associated with a variety of adverse attitudinal, behavioral, physical and emotional health consequences. Among attitudinal and behavioral consequences are a diminished job satisfaction, turnover intentions, and actual turnover or absenteeism (Blegen, 1993, Borda & Norman, 1997). Among adverse physical and emotional health consequences are hypertension, cardiovascular disease, immune disorders, obesity, depression, and burnout (Karasek & Theorell, 1990; Maslach & Zimbardo, 1982).

Health care workers are at a higher risk for the development of stress or strain related illnesses. The Dutch Central Bureau of Statistics has shown that absence rates among hospital personnel are among the highest of all sectors and higher than absence rates in other stressful occupational settings such as catering industry, transport, or education (see figure 1). As a result of the occupational burden of health care workers, stress among nurses is widely studied. The number of studies on stress or strain among nurses has grown considerably in the last decades. The entries appearing in psychological abstracts after a search on the keywords “nurses” and “stress” have grown from 21 publications in the period before the 1970s to 57 in the 70s, 429 in the 80s and 754 in the 90s. From the year 2000, already 585 studies have appeared on this topic.

Figure 1 Absence rates in Health care, Transportation, Catering and Education



Source: Central Bureau of Statistics, the Netherlands

1.2 Occupational stress: definitions and models

A difficulty in conducting stress research is that stress is defined and operationalised in many ways. For instance, the concept of stress has variously been defined as both an independent and a dependent variable, and as a process. Consequently there are numerous models and theories on stress. However, these theories are composed of the same general elements. Beehr and Newman described a general model of occupational stress in which these common elements are shown (Beehr & Newman, 1978). It lists the classes of variables in which researchers on occupational stress are usually interested and it arranges the variables in a way that shows the typical thinking used by most researchers and theoreticians. Beehr describes the core relationship of occupational stress, by which he means: the relationship between an environmental facet and a human (health) consequence facet (Beehr, 1995). This relationship is mediated by psychological processes. The variability in definitions of stress is a consequence of different conceptualisation of this last facet (the process facet).

In this introduction Beehr's core facets of occupational stress and the process facet are viewed from different theoretical perspectives. This chapter concludes with the description of the perspectives from which job stress is studied in this thesis.

1.2.1 Stressor

Stress is derived from the Latin word *stringere*, meaning ‘to draw tight’. In the 17th century the word was used to describe affliction. Early definitions of strain and load used in physics and engineering eventually were adopted in the first psychological theories on the concept of stress and its effect on individuals. Under the meaning of this concept, external forces are seen as exerting pressure upon an individual, causing strain (Cartwright & Cooper, 1997). Stimulus-based definitions of stress have as a central theme to identify potential sources of stress (Goodell, Wolf, & Rogers, 1986).

Theories on occupational stress focus on a range of different stressors. One of the most well-known occupational stress theories is the job Demand Control Support model (Karesek, 1979; Johnson, Hall & Theorell, 1988). It states that three job characteristics (stressors) are crucial in explaining adverse health: high demands, low control, and low social support. A situation in which work pressure is high, and control and support are low is hypothesized to be most detrimental for the employee (the iso-strain hypothesis).

A category of other occupational stress models are the Person-Environment (PE) fit models. In these models, the source of stress defined as a misfit between a person and his environment, such as a misfit of the individual’s needs with the organization’s or job’s provision of rewards and supplies or a misfit of the individual’s skills and abilities with the job’s demands and requirements (Harrison, 1985). PE fit models thus define a stressor as a combined effect of personal and environmental variables. PE fit models generally have an objective fit element as well as a subjective fit element. The objective fit element contains objective person elements which are attributes of the person as they exist irrespectively of his or her self-identity or self-concept, and analogously objective environment elements (Harrison, 1978). These elements can be categorized on the “stressor” side of Beehrs’ core relationship of occupations stress (Beehr, 1995).

A third influential stress theorist states that “a person is under stress if what happens defeats or endangers important goal commitment and situational intentions, or violates expectations.” (Lazarus, 1999, p.60). Here, the impact of the stressor on the individual is totally dependent upon personal variables: the person’s goals, intentions and expectations. Contemporary definitions point to the idea that no one variable can be said to be a stressor, because only the person experiencing the variable or the event can label it as stressful (Lazarus, 1966; 1990).

1.2.2 Stress reaction

The work of Cannon introduced the idea that environmental pressures can cause disease rather than just short time ill effects and that people have a natural tendency to resist such forces (Cannon, 1929). Cannon studied the effects of stress on animals and people and, in particular, studied the fight-or-flight reaction (the physical reaction to either fight or flight when confronted with a stressor). He saw that people react physically to stressors: when confronted with a stressor, their physiological balance changes, for example, they show increased adrenaline secretions. Cannon described these individuals as being “under stress”.

Hans Selye (1946) distinguished three stages in a stress reaction in his description of the General Adaptation Syndrome (GAS). The first stage is that of an alarm reaction: the initial phase of lowered resistance, followed by counter-shock, during which the individual’s defence mechanisms become active. The second stage is that of resistance: maximum adaptation and, ideally, successful return to equilibrium for the individual. If adaptation mechanisms are not effective or stress continues, the individual moves to the last phase of exhaustion, where adaptive mechanisms collapse. Critique on this model has to do with its simplicity. The model does not account for the fact that different stressors evoke different physical reactions. For example, anxiety producing situations are associated with adrenalin-secretion, whereas aggression producing events are associated with noradrenalin secretion. Also, the GAS does not address the issue of psychological responses to stress (Cooper, Dewe, & O Driscoll, 2001). In the 1970s and ’80s stress researchers started to study the emotional responses to stress by examining burnout and emotional exhaustion. It has long been recognized that health care workers by definition are at high risk of becoming ill or burned out. Burnout is a response to the chronic stress of dealing with individuals, particularly when these individuals are troubled or having problems (Maslach & Zimbardo, 1982). When people describe themselves as experiencing burnout, they are most often referring to the experience of emotional exhaustion (Maslach, Schaufeli, & Leiter, 2001). Emotional exhaustion refers to feelings of being emotionally overloaded and depleted of one’s emotional resources.

In occupational stress research, stress reactions are often categorized into psychological, physical (health) and behavioural responses. Examples of psychological responses include anxiety and depression (House and Rizzo, 1972; Kaufman & Beehr, 1989) and burnout (Maslach & Zimbardo, 1982).

The most cited critique on stimulus and response based models of stress is that they are too simplistic. They do not account for individual differences in

responses to stressors. Two individuals exposed to exactly the same stressor might have completely different stress reactions. Stimulus and response based models of stress however are important in identifying and categorizing events that have the potential for causing stress and their responses, in order to provide optimal working conditions.

1.2.3 Individual differences, interaction and transaction: the process facet

Over time, stress theorists began to investigate the individual differences in the impact of outside stressors. Next to the nature and strength of the stressor and the stress reaction, cognitive processes that account for individual differences in the strength of the stressor-stress reaction relationship became of importance. There is great variability in theoretical outlines of this process facet.

One of the chief proponents of the psychological view of stress was Lazarus, who introduced the psychological concepts of appraisal and coping (Lazarus & Folkman, 1984). Lazarus (1966) suggested that an individual's stress reaction depends on how that person interprets or appraises the significance of a harmful, threatening or challenging event. After the first appraisal of the event, the individual makes a secondary appraisal in which one's coping resources and options to overcome the possible harm and threat are evaluated. By taking into account these personal variables, scientists began to understand why one person seems to flourish in a certain setting, while another suffers. The so-called transactional stress models are concerned with the dynamics of the psychological mechanisms that underpin a stressful encounter. The term "transaction" implies that stress is neither in the person, nor in the environment, but in the dynamic transaction between the two (Lazarus, 1990). The transactional definition points to three important themes: a dynamic cognitive state, a disruption or imbalance in normal functioning, and the resolution of that disruption or imbalance. P-E fit models of stress have defined the process facet as the subjective misfit between the person (abilities or values) and the environment (demands, supplies). The individual perceives the encounter in the light of his or her abilities to manage the encounter. This perception is conceptualized in terms of values, supplies, demands and abilities. However, the definition of the exact nature of misfit and appropriate measure of the constructs is problematic in empirical research (Edwards & Cooper, 1988).

Because of this difficulty with defining and measuring psychological processes, empirical research on occupational stress has predominantly been conducted from an interactional perspective. The interactional approach focuses on the statistical interaction between stimulus and response. Work stress models that best characterize the interactional framework postulate that the perceived presence of certain stressors may be associated with a number of stress responses. Various organizational characteristics, situational factors, and individual differences can influence (moderate) the strength of stimulus-response relationship. Although with the interactional approach differences in reactions to stimuli can be partly explained, these attempts to explain the complexity of such a relationship are limited to structural manipulations such as the influence of a third (moderator) variable, which again do not provide an explanation of the psychological process associated with stress (Cooper, Dewe, O Driscoll, 2001).

The gap between transactional theory and interactional empirical research could be due to a lack of detail in which psychological processes are defined. Recently, these processes associated with stress are described more and more detailed. Self Regulation Theory refers to the process in which people seek to align their behavior and self-conceptions with appropriate goals and standards and stress results from difficulties in the achievement of goals.

Higgins (1997, 1998) proposed two distinct self-regulatory systems, one in which people have a promotion focus, and the other in which they have a prevention focus. Peoples' regulatory foci are composed of three factors which serve to illustrate the differences between a promotion focus and a prevention focus: (a) the needs that people are seeking to satisfy, (b) the nature of the goal or standard that people are trying to achieve or match, and (c) the psychological situations that matter to people. In people that are promotion focused, the needs of growth and development predominate; they seek to attain goals that are associated with their ideal self, and positive outcomes are salient for them. People that are prevention focused are driven by security needs; they seek to attain goals or standards associated with the ought self, and salient emotions center around the presence or absence of negative outcomes. The use of Self Regulation frameworks seems to be promising in the context of empirical occupational stress research as it can help to define the process facet that explains the stressor-stress reaction relationship.

1.3 Outline of the thesis

This thesis makes use of different viewpoints of stress. It contains elements of stimulus and response based models, but also of interactional and transactional viewpoints. Chapter two contains a review that describes the literature on studies to the causes of job stress among nurses from 1990-2005. It describes direct relationships between external stressors and reactions in health and wellbeing. Next to direct relationships, this chapter also reviews moderating variables that have been studied. This chapter thus has a stimulus-response based viewpoint and an interactional viewpoint, and is meant to outline common stressors, stress reactions and moderating variables studied in recent stress research among nurses.

Chapter three describes a cross-sectional study that elaborates on how these stressors relate in their prediction of health and wellbeing outcomes. This chapter also has a stimulus-response based viewpoint on stress. These two chapters have an organizational perspective and give answers to questions such as: what can hospital managers do to provide optimal working conditions?

The study described in chapter four examines the reciprocity of the stressor-stress reaction relationship. It studies both the influence of work stressors on health, and the reciprocal relationship, that of health on the (judgment of) the work environment. Reciprocity of influences suggests a dynamic relationship, which is a characteristic of transactional stress models.

The last study, which is described in chapter five, focuses on an underlying process of the stressor-stress relationship. In an attempt to bridge environment, inner psychological processes and health, this final chapter attempts to describe relationships between the nurses' work environment and their health and uses elements of Regulatory Focus Theory to explain these relationships.

In chapter six, the results of the studies are summarized and discussed. This chapter attempts to integrate the findings and different viewpoints.

References

- Beehr, T.A. & Newman, J.E. (1978). Job stress, employee health and organizational effectiveness: a facet analysis, model and literature review. *Personnel Psychology, 31*, 665-699
- Beehr, T.A. (1995). *Psychological Stress in the Workplace*. London: Routledge.
- Blegen, M.A. (1993). Nurses' job satisfaction: a meta-analysis of related variables. *Nursing Research, 42*, 1, 36-41.
- Borda, R.G., and Norman, I.J. (1997) Factors influencing turnover and absence of nurses: a research review. *International Journal of Nursing Studies, 34*, 6, 385-394.
- Cannon, W. B. (1929). *Bodily Changes in Pain, Hunger, Fear and Rage: An Account of Recent Research into the Function of Emotional Excitement*, 2nd ed. New York: Appleton.
- Cartwright, S. & Cooper, C.L. (1997). *Managing workplace stress*. Thousand Oaks: Sage Publications.
- Cox, T. & McKay, C. (1981). A transactional approach to occupational research. In E.N. Corlett & J. Richardson (Eds.). *Stress, work design and productivity*. (pp. 91-115). New York: John Wiley.
- Dewe, P.J. (1991). Primary appraisal, secondary appraisal and coping: their role in stressful work encounters. *Journal of Occupational Psychology, 64*, 331-351.
- Edwards, J.R. & Cooper, C.L. (1988). The impact of positive psychological states on physical health: A review and theoretical framework. *Social Science and Medicine, 27*, 1447-1459.
- Goodwell, H., Wolf, S., & Rogers, F.B. (1986). Historical perspective. In S. Wolf & A.J. Finestone (Eds.), *Occupational stress, health and performance at work*. Littleton, MA: PSG Inc.
- Harrison, R.V. (1978). Person-Environment Fit and job stress. In: C.L. Cooper and R. Payne (Eds.). *Stress at Work*. New York: Wiley, 175-205.
- Harrison, R.V. (1985). The Person-Environment Fit model and the study of job stress. In: T.A. Beehr and R.S. Bhagat (Eds.). *Human Stress and Cognition in Organizations*. New York: Wiley, 23-55.
- Higgins, E.T. (1997). Beyond pleasure and pain. *American Psychologist, 52*(12): 1280-1300.

- Higgins, E.T. (1998). Promotion and prevention: Regulatory Focus as a motivational principle. *Advances in Experimental Social Psychology*, 30, 1-46.
- House, R.J. & Rizzo, J.R. (1972). Role conflict and ambiguity as critical variables in a model of organizational behaviour. *Organizational Behavior and Human Performance*, 7, 467-505.
- Karasek, R. & Theorell, T. (1990). *Healthy work: stress, productivity, and the reconstruction on working life*. New York: Basic Books.
- Kaufmann, G.M. & Beehr, T.A. (1989). Occupational stressors, individual strains and social supports among police officers. *Human Relations*, 42, 185-97.
- Lazarus, R.S. (1966). *Psychological stress and the coping process*. New York: Mc Graw-Hill.
- Lazarus, R.S. (1990). Theory based stress measurement. *Psychological Inquiry*, 1, 3-13.
- Lazarus, R.S. & Folkman, S. (1984). *Stress, Appraisal and Coping*. New York: Springer.
- Maslach, C. & Zimbardo, P.G. (1982). *Burnout, the cost of caring*. Englewood Cliffs, NJ : Prentice-Hall.
- Maslach, C., Schaufeli, W.B. & Leiter, M.P. (2001). Job burnout. *Annual Review of Psychology*, 52: 397-422.
- Schaufeli, W.B., Keijsers, G.J. & Miranda, D.R. (1995). Burnout, Technology use and ICU performance. In: *Organizational risk factors for job stress*. S.L. Sauter and L.R. Murphy (Eds). Washington DC: American Psychological Association.
- Selye, H. (1946). The general adaptation syndrome and the diseases of adaptation. *Journal of Clinical Endocrinology and Metabolism*, 6, 2: 117-230.

Chapter 2

Determinants of Job Stress in the nursing Profession: a Review

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Determinants of Job Stress in the Nursing Profession: a Review

Abstract

This review discusses the determinants of job stress in the nursing profession. It summarizes the results of 51 studies published between 1990 and 2005. The present review includes psychological, attitudinal and behavioral stress indicators, and in this way focuses on a variety of outcomes: job satisfaction, health complaints, burnout, absenteeism and turnover. The dimensions of the Job Demands, Control, Support (JDCS) model were found to be important determinants, as well as other job characteristics such as communication, home-work conflict and task- and role clarity. Challenging work, supervisor support, control and coping have the potential to buffer the detrimental effects of a stressful work environment. Challenging or meaningful work however can work out in opposite ways. The commitment to take care of others can be an important buffer in the stressor-strain relationship, but also can lead to burnout, when going on too long. Providing a comprehensive review of the existing literature is complicated by the enormous diversity of work stressors and the differences in their operationalizations. This review calls for more consensus in operationalizations of independent as well as dependent variables. The present study extends previous research on occupational stress in nursing by simultaneous examination of direct effects of work conditions on a variety of stressors, and moderators of the stressor-strain relationship.

2.1 Introduction

Stress in the nursing profession has been a major worldwide problem for quite some time now. A study among a large sample of Swedish nurses revealed that more than 80% of the nurses reported high to very high job strain (Pettersson et al., 1995). A study among personnel of a UK health authority reported that nurses were under the greatest pressure among all health care personnel (Rees & Cooper, 1992).

Typically, absence rates in health care sectors are rising worldwide (Institute for Work and Health). The problem of high turnover and absence in nursing is of great concern, because it leads to increasing pressure on the personnel not (yet) ill, and in turn, more illness and burnout due to this increasing pressure. Moreover, stress-related absenteeism and turnover are costly. Cartwright and Cooper (1996) estimated that almost 10 percent of the Gross National Product in European countries is lost because of stress related absenteeism and turnover. To break through this negative vicious circle, it is necessary to understand which specific aspects of the work environment play a role in occupational stress processes. This research can lay the foundation of effective intervention programs to reduce the tension in the work environment of nurses.

Earlier reviews have summarized the research on causes and consequences of stress in nursing, conducted in the eighties and early nineties in relation to behavioral reactions, such as absenteeism and turnover (Borda & Norman, 1997), attitudinal reactions, such as job satisfaction and intention to quit/stay (Blegen, 1993; Irvine & Evans, 1995), or adverse health reactions, such as distress (Mc Vicar, 2003). In a meta-analytic study on job satisfaction research in nurses, Blegen (1993) found relationships between job satisfaction on the one hand and stress, commitment, social support supervisor, autonomy, recognition, routinization, fairness, locus of control, age, years of experience, education and professionalism on the other hand. Another meta-analytic study on the causal relationship between job satisfaction, behavioral turnover intentions and turnover behavior showed that job dissatisfaction was strongly related to intent to leave, which in turn was strongly related to actual turnover (Irvine & Evans, 1995). Interestingly, this review study also revealed that both work content and work environment explained more variance in job satisfaction than individual or economic variables. A third review (Borda & Norman, 1997) confirmed Irvine and Evans' conclusions, identifying intent to stay as the variable most strongly associated with turnover and job satisfaction. A recent review by Mc Vicar (2003) identified workload, professional conflict and the emotional burden of

caring, pay and shift working as the main sources of job stress in the nursing profession. The above described reviews restrict themselves to the description of one, or a few outcome measures. In the present review, we will examine the influence of work conditions on a variety of outcomes. Because the present review includes psychological, attitudinal and behavioral strain indicators, it thereby allows examination of common and different determinants of these reactions, and the relationships between them.

In the present review, the term stress is used to describe a process that incorporates stressors, individual reactions and strain-outcomes. A job stressor has been typically defined as an antecedent condition within ones job or the organization that requires an adaptive response on the part of the employee. The negative reaction to a stressor is called “distress” or “strain”, and has been operationalized in terms of affective outcomes (e.g. emotional exhaustion), in more job-specific terms (e.g. job (dis) satisfaction), and more objective organizational terms (e.g. absenteeism and turnover).

One of the most influential models concerning occupational stress is the Job Demand Control model (Karasek, 1979) and its extended version, the Job Demand Control Support model (Johnson & Hall, 1988). Job Demands refer to the workload or time pressure (Karasek, 1979). The job control dimension is composed of the concept of skill discretion (the breath of skills used by the employee) and decision authority (the employees authority to make decisions on the job). High job demands will generally increase stress (or strain); high control will lead to diminished strain. The model states that the situation of high demands and low control is particularly damaging to the health of the worker. This conjecture is referred to as the “strain hypothesis”. About a decade after the development of the JDC model, social support was added to the JDC model as a third dimension (Johnson, Hall & Theorell, 1989; Johnson & Hall, 1988), suggesting that a situation of high demand, low control and low social support causes the most strain to the worker (the iso-strain hypothesis). Studies using the JDCS model have considered the buffering effect control or social support might have on job demands. For an extended review of the model see Van der Doef and Meas (1998) and Van der Doef and Maes (1999).

The JDC(S) model has two limitations. Firstly, individual characteristics (like coping behavior) are not taken into account. While stress is the result of the interaction between an individual and the environment, the model neglects individual characteristics. This omission could explain the relatively low proportion of explained variance in stress related outcomes (Pomaki & Maes, 2002). A second limitation is that Demand, Control and Support are the only dimensions

of the working environment that are described in the model. Including other factors of the work environment such as communication or role conflict will give a more complete understanding of the causes of job stress.

2.1.1 Review Questions

Our literature search was directed specifically at those studies examining (1) sources of strain in nursing and their relationship to job satisfaction, burnout, health problems, turnover and absenteeism, and (2) the moderating role of situational and individual characteristics in the stressor-strain relationship.

2.2 Studies included in the review

Databases Psychlit and Medline were searched for studies published after 1990 containing the keywords “hospital” and “nurses”, with one of the following independent variables: “work* conditions”, “work* environment”, “work* stress(ors)”, “job conditions”, “job environment” or “job stress(ors)” and with one of the following dependent variables: “job satisfaction”, or “health*”, or “burnout”, or “absenteeism”, or “turnover”. Studies were included if the following criteria were met: (1) the subjects under study should be nurses working in a medical hospital. (2) The focus of the study should include the relationship between work-related factors and an outcome variable, possibly taking moderating factors into account. Studies not meeting these criteria were excluded, leaving 51 studies relevant for this review.

2.2.1 Categorization of the studies

The studies were first categorized on the basis of their outcome variable(s). A distinction was made in studies on attitudinal reactions (job satisfaction), psychological and psychosomatic reactions (emotional exhaustion, somatic complaints), and behavioral reactions (absenteeism and turnover). The second part of this review focuses on the role of moderating factors such as control or coping.

2.3 Results

In general, the reviewed studies had a cross sectional design and made use of self report questionnaires. Five studies had a longitudinal design (Davidson et al., 1997; Bradley & Cartwright, 2002; Schaefer & Moos, 1993; Eastburg et al., 1994; Bourbonnais, Comeau, & Vézina, 1999). Two studies used biomedical health measures such as blood pressure and cholesterol levels (Fox, Dweyer & Ganster, 1993; Riese et al., 2000). One study performed interviews in addition to the questionnaire measures (Kennedy & Grey, 1997). In general, nurses from different departments participated in the studies. Several studies examined a specific hospital department, such as oncology departments (Papadatou, Anagnostopoulos, & Monos, 1994), psychiatric care departments (Fielding & Weaver, 1994; Parkes & von Rabenau, 1993), acute care (Tovey & Adams, 1999; Maurier & Northcot, 2000; Sjöberg, 1997; Bourbonnais, Comeau, & Vézina, 1999), intensive care (Ehrenfeld, 1991; Reilly, 1994; De Rijk, Le Blanc & Schaufeli, 1998), child care (Van Yperen & Baving, 1999) and elderly care (Matrunola, 1996; Parker & Kulik, 1995).

2.3.1 Work environment and attitudinal reactions: Job satisfaction

Of the reviewed studies, 16 examined the relationship between job demands (task requirements or workload) and job satisfaction. Among these, nine showed significant negative relationships with job demands. More specifically, relationships were found between job satisfaction on the one hand and work overload (Davidson et al., 1997; De Jonge & Schaufeli, 1998; De Jonge, Schaufeli, & Furda, 1995; Bradley & Cartwright, 2002), work, or time pressure (Bennet et al., 2001; Landeweerd & Boumans, 1994; Robinson, Roth, & Brown, 1993; Seo, Ko, & Price, 2004), and system stressors (a.o. workload and scheduling) (Schaefer & Moos, 1993) on the other hand. However, in each of these studies the strength of the associations was moderate. One study found a positive relationship between the number of professional activities and job satisfaction (Ehrenfeld, 1991).

The results further show the ability to control work activities as an important predictor of job satisfaction. Of the 11 studies investigating the relationship between autonomy and job satisfaction, eight found significant relationships (Ehrenfeld, 1991; De Jonge & Schaufeli, 1998; De Jonge et al., 1995; Landeweerd

& Boumans, 1994; Parkes & Von Rabenau, 1993; Tonges, Rothstein, & Carter, 1998; Tumulty, Jernigan, & Kohut, 1994). Associations were found with control over management decisions, as well as with control over patient care (Mc Gilton & Pringle, 1999). The influence of skill discretion (the other component of job control) on nurses' job satisfaction was examined in five studies. Two studies found a significant association (Chu et al., 2003; Seo, Ko, & Price, 2004).

Social support is a very important factor influencing nurses' well-being. Most studies made a distinction between support received from a supervisor and support received from colleagues. All 15 studies that examined the relationship between support and job satisfaction found a significant positive relationship. Significant associations were found with general, or overall support (not specified from whom, or a mean score) (Smith & Tziner, 1998; Tovey & Adams, 1999), support from colleagues (Chu et al., 2003; Decker, 1997; Parkes & Von Rabenau, 1993; Robinson, Roth, & Brown, 1993), supervisor support, or relation with head nurse (Bennet et al., 2001; Decker, 1997; De Jonge & Schaufeli, 1998; De Jonge, Schaufeli, & Furda, 1995; Landeweerd & Boumans, 1994; Parkes & Von Rabenau, 1993; Robinson, Roth, & Brown, 1993; Seo, Ko, & Price, 2004; Tumulty, Jernigan, & Kohut, 1994), organizational support (Kirkcaldy & Martin, 2000; Bradley & Cartwright, 2002) and support from a confidante (Bradley & Cartwright, 2002). Job satisfaction is related to relations with physicians (Decker, 1997). Interpersonal conflict and relationship stressors are negatively related to job satisfaction (Bennet et al., 2001; Schaeffer & Moos, 1993; Tumulty, Jernigan, & Kohut, 1994).

Other job characteristics besides the job demand control support dimensions, that are related to job satisfaction, are clarity / role ambiguity (clarity of tasks and roles), job complexity (or difficulty, routinization, skill variety), communication, work-home conflict, and promotion / growth opportunities, and pay. These factors however, were not examined as regularly as the JDACS constructs and thus allow less firm conclusions. The influence of task / role clarity on job satisfaction was investigated in six studies, of which five found significant relationships (Landeweerd & Boumans, 1994; Robinson, Roth, & Brown, 1993; Tovey & Adams, 1999; Tumulty, Jernigan, & Kohut, 1994; Chu et al., 2003). Two studies investigating the influence of communication (formal transmission of information within the organization (Davidson et al., 1997), or communication with medical staff, patients and relatives (Ehrenfeld, 1991)) found small, but significant relationships with job satisfaction. Work-home conflict is significantly related to job satisfaction in three of four studies (Bennet et al., 2001; Kirkcaldy & Martin, 2000; Bacharach, Bamberger, & Conley, 1991) Growth op-

portunities and promotional chances were related to job satisfaction in four studies, of which one found a significant association (Landeweerd & Boumans, 1994). Finally, pay is associated with job satisfaction in one of three studies (Seo, Ko, & Price, 2004).

2.3.2 Work environment and psychosomatic reactions: Health complaints and Burnout

Health complaints

Of the 10 studies that examined the relationship between demand and health complaints, eight found significant effects. Main effects were found of objective measures of workload in terms of % patient contact (Fox, Dweyer, & Ganster, 1993), large number of dependants (Kennedy & Grey), as well as of subjective measures of work pressure and workload (Barnett et al., 1991; De Jonge, Janssen, & Van Breukelen, 1996; Hillhouse & Adler, 1997; Lambert, Lambert, & Ito, 2004; Landeweerd & Boumans, 1994; Parkes & Von Rabenau, 1993).

Nine studies examined the relationship of control, autonomy or decision authority with health complaints, of which three found significant results (Fielding & Weaver, 1994; Fox, Dweyer, & Ganster, 1993; Landeweerd & Boumans, 1994).

The influence of social support on health complaints was examined in eleven studies, of which six found significant associations. Relationships were found between health complaints on the one hand, and lack of support from or conflict with others (other nurses, head nurse or physicians) on the other hand (Decker, 1997; Budge, Carryer, & Wood, 2003; Hillhouse & Adler, 1997; Kennedy & Grey, 1997; Lambert, Lambert, & Ito, 2004; Landeweerd & Boumans, 1994).

Other job characteristics besides Demand, Control and Support were also investigated. Significant correlations between health complaints and hazardous exposure / physical comfort, (Barnett et al., 1991; Kennedy & Grey, 1997), home-work conflict (Butterworth et al., 1999; Decker, 1997), task orientation (Fielding & Weaver, 1994), clarity / uncertainty about treatment (Fielding & Weaver, 1994; Landeweerd & Boumans, 1994; Lambert, Lambert, & Ito, 2004) and innovation (Fielding & Weaver, 1994) were found. Health complaints were not associated with confidence / competence in role (Butterworth et al., 1999; Maurier & Northcott, 2000) or with schedule (Decker, 1997; Maurier & Northcott, 2000).

Burnout

With the exception of one study, all reviewed studies on causes of burnout used the Maslach Burnout Inventory (Maslach & Jackson, 1981) to measure burnout. This construct contains three aspects: emotional exhaustion, depersonalization and reduced personal accomplishment. In this review only the relationships between work stressors and emotional exhaustion is examined, as this appears to be the major aspect of occupational burnout among human service professionals, including nurses (Buunk, Schaufeli & Ybema, 1994) and most studies include for this reason the emotional exhaustion scale only.

Of 13 studies that examined the relationship between emotional exhaustion and demands, 11 found significant results. Main effects were found of workload (Bacharach, Bamberger, & Conley, 1991; Bourbonnais, Comeau, & Vézina, 1999; De Jonge & Schaufeli, 1998; De Jonge, Janssen, & Van Breukelen, 1996; De Rijk, Le Blanc, & Schaufeli, 1998; Janssen, De Jonge, & Bakker, 1999; Papadatou, Anagnostopoulos, & Monos, 1994; Turnipseed, 1994; Van Yperen & Baving, 1999), patient contact (Demerouti et al., 2000; Kennedy & Grey, 1997), and exposure to death and suffering (Hillhouse & Adler, 1997).

Four of ten studies found main effects of control on emotional exhaustion (Bourbonnais, Comeau, & Vézina, 1999; De Jonge & Schaufeli, 1998; De Rijk, Le Blanc, & Schaufeli, 1998; Fielding & Weaver, 1994).

All thirteen studies that examined the relationship between support (whether from supervisor or from colleagues), or conflict, and emotional exhaustion, found a significant negative relationship. Associations were found with support from or conflict with other colleagues (Eastburg et al., 1994; Hillhouse, & Adler, 1997; Janssen, De Jonge, & Bakker, 1999; Turnipseed, 1994; Van Yperen & Baving, 1999), with supervisor support (Eastburg et al., 1994; Fielding & Weaver, 1994; Kennedy & Grey, 1997; Papadatou, Anagnostopoulos, & Monos, 1994; Turnipseed, 1994), with nurse-doctor relation (Vahey et al., 2004) and with general support, or a mean score (Bourbonnais, Comeau, & Vézina, 1999; De Jonge, & Schaufeli, 1998; De Jonge, Janssen, & Van Breukelen, 1996; Hillhouse & Adler, 1997; Kennedy & Grey, 1997; Smith & Tziner, 1998). Support from a supervisor generally has higher correlations with emotional exhaustion than support from colleagues. Four studies examined the relationship between task variety and emotional exhaustion, but no relationship was found. One of three studies found a relationship between emotional exhaustion and task clarity (Turnipseed, 1994), and two of three studies associated emotional exhaustion to task orientation (emphasis on planning of work/efficiency) (Fielding & Weaver, 1994; Kennedy & Grey, 1997). Finally, environmental conditions and physical

comfort are also associated with emotional exhaustion; two of four studies found a significant relationship (Demerouti et al., 2000; Kennedy & Grey, 1997).

2.3.3 Work environment and behavioral reactions: Turnover and Absenteeism

Turnover

Two organizational related outcomes are considered in this review: nurses' turnover and absenteeism. Studies on nurses' turnover or absenteeism differ from studies on health and wellness outcomes in the kinds of determinants that are under study. Common factors that are examined on their influence on nurses' turnover and absenteeism are job satisfaction, intent to stay and emotional exhaustion. Direct effects of work environmental factors are seldom studied. Models on nurse turnover reveal that turnover intention (or intent to stay / leave) is the most strongly related factor to actual turnover (Irvine & Evans, 1995; Borda & Norman 1997; Lucas, Atwood, & Hagaman, 1993). This is confirmed by the studies under consideration in this review; all studies that examined the relationship between intent to leave / stay and turnover found significant associations (Davidson et al., 1997; Sjöberg, 1997; Cavanagh & Coffin, 1992). Intent to leave / stay was on its turn most often linked to job satisfaction (Borda & Norman, 1997; Cavanagh & Coffin 1992; Sourdif, 2004). Job satisfaction was also directly related to actual turnover (Davidson et al., 1997), although the direct relationship with turnover was less strong than the relationship between job satisfaction and turnover intention or between turnover intention and actual turnover, indicating that turnover intention mediates between job satisfaction and turnover. Other factors that were associated with turnover intention are job stress (Shader et al., 2001; Parker & Kulik, 1995), lack of group cohesion (Lucas, Atwood, & Hagaman, 1993; Shader et al., 2001), lack of social support (Parker & Kulik, 1995; Lambert, Lambert, & Ito, 2004), conflict with nurses and physicians (Lambert, Lambert, & Ito, 2004), job involvement (Sjöberg, 1997), and emotional exhaustion (Parker & Kulik 1995; Janssen, De Jonge, & Bakker, 1999).

Absenteeism

Only five studies examined the determinants of nurses' absenteeism. Relationships were found with job satisfaction (Borda & Norman, 1997; Matrunola, 1996), kinship responsibility (Borda & Norman, 1997), intent to stay (Borda & Norman, 1997), emotional exhaustion (Parker & Kulik, 1995) social support (Bourbonnais & Mondor, 2001; Parker & Kulik, 1995), strain (Bourbonnais

& Mondor, 2001) and physical demands (Trinkoff, Storr, & Lipscomb, 2001). Models on absenteeism and turnover assume that job satisfaction and turnover intention mediate the relationship between work related factors and turnover or absenteeism. The reviewed studies concerning the nursing profession clearly support this assumption.

2.3.4 Moderators in the stressor – stress reaction relationship

In studies on stress in the nursing profession, not only direct effects of environmental factors are of importance, but also the moderating or buffering effects certain factors can have. In some studies, possible moderators were taken into account, such as control, social support, commitment, working relationship with physician, preference for autonomy, and number of patients. Control moderated between demand and job satisfaction (Parkes & Von Rabenau, 1993). A buffering effect of control on the relationship between demands and emotional exhaustion was found in four out of five studies (Bourbonnais, Comeau, & Vézina, 1999; De Jonge, Janssen, & Van Breukelen, 1996; De Jonge, Schaufeli, & Furda, 1995; Papadatou, Anagnostopoulos, & Monos, 1994). De Rijk, Le Blanc, and Schaufeli (1998) found such an effect only for a group of nurses that scored high in active coping. In a study by Furda (1995) for the outcome "health complaints", control acted as a buffer, but only for nurses that had a high need for control (nurses that normally react by actively doing something about an unpleasant situation). It seems that the moderating effect of control depends on the individual's coping style. Nurses with a coping style that is merely avoiding instead of active, would benefit less from a high amount of control. A buffering effect of control was also found in two other studies on the relationship between workload and health complaints (Fox, Dweyer, & Ganster, 1993; Marshall & Barnett, 1993).

A buffering effect of social support on workload was found in one out of two studies (van Yperen & Baving, 1999). The buffering effect of social support (as predicted by the JDCA model) on health complaints was examined in only one study (Bourbonnais, & Mondor, 2001), but was found to be non-significant. Possibly a specific aspect of social support has a buffering effect. One of the reviewed studies, examining the causes of burnout, made a distinction in different kinds of social support (appreciation, friendship, instrumental support), and found only a buffering effect of instrumental support and appreciation on emotional exhaustion (Van Yperen & Baving, 1999). A study by Hillhouse and

Adler (1997) concluded that better relations with physicians could buffer the negative effect of demanding aspects of the nursing job.

The use of emotion-focused as well as problem-focused coping strategies were also found to act as a buffer between workload and negative outcomes in a study of Florio, Donnely and Zevon (1998). Boey (1998) also found a buffering effect of approach coping methods (i.e., problem-focused coping) in the relationship between work stress and job satisfaction.

Reilly (1994) found an interaction effect of demand and commitment in relation to emotional exhaustion. Commitment was found to buffer the influence of a demanding job, but only up to a certain point. When demands were very high, commitment was found to strengthen the demand - burnout relationship. Finally, the number of patients one has to take care of can act as a buffer for emotional exhaustion (Kennedy & Grey, 1997). Paradoxically, patient care (more patients) can buffer against emotional exhaustion. Interestingly, a comparable result was found for health complaints. Marshall and Barnett (1993) found a buffering effect from "helping others" for psychological distress, but not for physical health. The same authors also found that "helping others at work" was the most consistent work reward factor that buffered the effects of overload on health complaints (Marshall & Barnett, 1993).

2.4 Discussion

Most studies on stress in the nursing profession focus on either attitudinal outcomes or psychosomatic outcomes. Only in about a quarter of the studies, the focus is on behavioral outcomes. Instead of taking job characteristics as the independent variable, in studies predicting behavioral outcomes like turnover or absenteeism, the focus is on attitudinal variables (like job satisfaction or turnover intention) instead. From these studies it can be hypothesized that the relationship between work-related factors and behavioral outcomes (turnover or absenteeism) is mediated by attitudinal variables (job satisfaction and turnover intentions). To keep nurses in the nursing profession or in the organization means finding ways to keep nurses satisfied with their jobs. Job characteristics are most strongly related to job-related outcomes, such as job satisfaction and emotional exhaustion. The associations with somatic complaints are in general less strong, possibly because this outcome is more influenced by variables outside the work environment.

2.4.1 Attitudinal & Psychosomatic outcomes

Demands

There are several work conditions that need consideration in preventing or handling stress in general, because they are related to attitudinal as well as to psychosomatic outcomes. The dimensions of the JD-CS-model: job Demands, Control and Social support for example, are work conditions that are linked to both types of outcomes. For demands, it seems useful to make a distinction between two different aspects of it in the nursing profession: demands from patient contact and demands from other aspects of the job (e.g., too great a variety of tasks, or too little time for the job). Demands from patient contact do not necessarily have to result in negative stress reactions. The stressful demanding aspects of the nursing job have to do with time pressure. Two recent studies reported that the major stressor reported by nurses was “too little time to perform duties to their satisfaction” (McGrath, Reid, & Boore, 2003; Bianchi, 2004). The perceived quality of professional service, and the lowered standards of care due to lack of time, is considered important in the prediction of job satisfaction (Adams & Bond, 2000; Tonges, Rothstein, & Carter, 1998; Tovey & Adams, 1999). These stressors can be changed through effective management, for example, by scheduling sufficient staff with the right mix of skills to cope with the workload (Adams & Bond, 2000). Patient contact can in some situations even be beneficial for nurses’ health and well-being. It can buffer the negative effect of the demanding aspects of the nursing job.

Control

The relationship between control and attitudinal and psychosomatic outcomes is ambiguous. In roughly half of the reviewed studies, a relationship is found, with more control leading to fewer complaints. This could be due to different operationalizations of control. For job satisfaction and burnout, the relationship with control is stronger when control is made operational conform the Job Content Inventory (Karasek, 1985) than when other operationalizations are used. For health complaints, it is opposite. The operationalization of control conform the JCI differs from other operationalizations in the component of “skill discretion”. While predicting job satisfaction and burnout, the skill discretion component is more important, in predicting health complaints, decision authority is more important. However, although for a different reason, both decision authority and skill discretion should thus deserve attention from an intervention perspective.

Support

Of the dimensions of the JDCS model, the link between social support and stress-related outcomes is most clear. Social support has a direct relationship with job satisfaction, emotional exhaustion and health complaints. Social support from supervisor is distinguished from social support from colleagues in most studies. Social support from a supervisor seems to be the most important of these two for nurses. However, it is not only important to have a supportive supervisor: support from colleagues is also related to job satisfaction and burnout or health complaints. Since the nursing profession requires working in teams to provide the best quality of care, and since social support is a coping strategy nurses use frequently (Bianchi, 2004), healthy work relationships are important. To promote this, efforts aimed at team building to increase involvement are recommended. A study by Bradley and Cartwright (2002) showed that next to support from supervisor and colleagues, recognition from the organization is also important. The extent to which nurses feel that the organization is supportive and values the profession of nurses contributes to an enhanced job satisfaction.

Other work- and organizational characteristics

Literature on nursing research shows a great variety of stressors, although the influence of some characteristics is examined only ones or twice. Improvement in instrumental communication throughout the organization could enhance nurses' satisfaction (Davidson et al., 1997). In addition, Adams and Bond (2000) showed that the perceptions of nurses of the balance between number of available staff, skill mix, care organization (i.e. roster) and the ward's workload also has a major influence on their job satisfaction. Since nursing predominantly is a female profession, the issue of conflicts between the home- and work situation is more apparent than in other professions (Decker, 1997). Task-role clarity is an important factor in reducing psychological distress. Development of programs that encourage the delineation of clear expectations of responsibilities and roles within the (emergency) department is needed. Recent studies have stressed the importance of financial reward in the contribution to job satisfaction. Perhaps financial rewards contribute to a feeling of being respected as a nurse. A recent study reported that more than half of the nurses felt that more pay would alleviate stress (McGrath, Reed, & Boore, 2003).

Moderators

Different factors can have a buffering effect in the workload-job stress relation-

ship. Schaefer and Moos (1993) found that challenging work could compensate for a poor work climate. Next to challenging work, work environments with supportive supervisors, clear expectations and consistent policies may serve as resources that help to minimize the confronted stressors. Control over ones work can also be an important buffer against work stress, although the preferred amount of control can be dependent on personality characteristics. Nurses with a high preference for autonomy respond positively to jobs containing autonomy and jobs that are embedded in a patient oriented nursing care system. Certain coping strategies may buffer stress. For example, problem solving may buffer stress by focusing attention on controllable sources of stress and attracting support from colleagues (Tyson, Pongruengphant & Aggarwal, 2002). Avoidance coping strategies were found to directly increase distress (Boey, 1998; Tyler & Cushway, 1992, 1995) and burnout (Simoni & Paterson, 1997).

A thread in studies on stress in the nursing profession is the importance of the meaningfulness of the job. To help other people get better plays in many different ways a role in the profession. It is the biggest reward intrinsic to the job, and for the majority of nurses the most common reason for their choice of profession (Petterson et al., 1995). Satisfaction with patient care can be important through it's influence on nurses' self perception (Dodds, Lawrence & Wearing 1991). On the other hand, the value of "helping others" could also be a frustration when the environment doesn't allow nurses to take care of people, because of other tasks that need to be done, or because of the time pressure. Commitment to the profession and to the patients can however also cause nurses to keep on going too long, until the line finally breaks. Reilly (1994) explored the paradox of commitment as a buffer for emotional exhaustion when the frequency of stressors is low, and commitment as a kind of burnout-katalysator when the frequency of stressors is high. A possible explanation is that a nurse who highly values the goals of the profession is more tolerant to stressors. But when the work situation is distracted greatly from the nurses' ideals the stress reaction of the more committed nurses is stronger (Reilly, 1994).

2.4.2 Methodological issues

Several methodological issues should be considered in future research. Ninety percent of the reviewed studies have cross sectional designs, which do not provide a firm basis to draw causal inferences. Future research should focus more on longitudinal designs, especially if the causal pathway of "work conditions" – "attitudinal and psychosomatic variables" – "behavioral variables" is to be

examined. Moreover, there is a lack of stress intervention studies in this population. Little is known about effective organization-level stress interventions in the nursing profession. No such studies were found in our literature search. Intervention studies are of particular importance, especially intervention studies with a quasi-experimental design, for such studies provide a solid base for practical recommendations as well as for theoretical suggestions.

Stress is a multidimensional construct, which covers several different aspects, such as diminished job satisfaction, turnover intention, burnout or psychosomatic complaints. Future studies should include attitudinal as well as psychosomatic or behavioral outcomes to be able to compare the relationships with the different outcomes.

The vast majority of studies makes use of self-report questionnaires and therefore has a danger of subjectivity. Moreover, if two or more variables are measured by the same method, there could be a correlation because of shared method variance (Campbell & Fiske, 1959). Some studies take efforts to minimize this bias, by controlling for a personality trait such as negative affectivity (Parker & Kulik, 1995). Other studies use additional methods of measurement, such as interviews (Kennedy & Grey, 1997) or biomedical measures (Fox, Dweyer, & Ganster, 1993; Riese et al., 2000).

Providing a comprehensive review of the existing literature is complicated by the enormous diversity of work stressors and the differences in their operationalizations. Furthermore, the level of specification of the stress factors varies considerably. Some studies reveal that work related factors influence an outcome variable, without specifying exactly which factor is the villain. In function of interventions however, it is important to know exactly which factor is the cause of negative outcomes. The different definitions researchers use for the same concepts, and the different way's these concepts are made operational in a questionnaire makes comparison between studies difficult or even impossible. Recommendation for future study is to find more consensus in the instruments used.

Finally, future studies should better reflect the job conditions, which evolved over time. New measurement tools should be developed to tap the rapidly changing environment of nurses, including pressures associated with new roles, lack of job security and using new technology (Tovey & Adams, 1999).

References

- Bacharach, S.B., Bamberger, P., and Conley, S.C. (1991) "Work-home conflict among nurses and engineers: mediating the impact of role stress on burnout and satisfaction at work", *Journal of Organizational Behavior*, Vol 12, pp. 39-53.
- Barnett, R.C., Davidson, H., and Marshall, N.L. (1991) "Physical symptoms and the interplay of work and family roles", *Health Psychology*, Vol 10 No 2, pp. 94-101.
- Bennet, P., Lowe, R., Matthews, V., Dourali, M., and Tattersall, A. (2001) "Stress in nurses: coping, managerial support and work demand", *Stress and Health*, Vol 17, pp. 55-63.
- Bianchi, E.R.F. (2004) "Stress and coping among cardiovascular nurses: a survey in Brazil", *Issues in Mental Health Nursing*, Vol 25, pp. 737-745.
- Blegen, M.A. (1993) "Nurses' job satisfaction: a meta-analysis of related variables". *Nursing Research*, Vol 42 No 1, pp. 36-41.
- Boey, K.W. (1998) "Coping and family relationships in stress resistance: a study of job satisfaction of nurses in Singapore", *International Journal of Nursing Studies*, Vol 35, pp. 353-361.
- Borda, R.G., and Norman, I.J. (1997) "Factors influencing turnover and absence of nurses: a research review", *International Journal of Nursing Studies*, Vol 34 No 6, pp. 385-394.
- Bourbonnais, R., Comeau, M., and Vézina, M. (1999) "Job strain and evolution of mental health among nurses", *Journal of Occupational Health Psychology*, Vol 4 No 2, pp. 95-107.
- Bourbonnais, R., and Mondor, M. (2001) "Job strain and sickness among nurses in the province of Québec", *American Journal of Industrial Medicine*, Vol 39, pp. 194-202.
- Bradley, J.R., and Cartwright, S. (2002) "Social support, job stress, health, and job satisfaction among nurses in the United Kingdom", *International Journal of Stress Management*, Vol 9 No 3, pp. 163-182.
- Budge, C., Carryer, J., & Wood, S. (2003) "High correlates of autonomy, control, and professional relationships in the nursing work environment", *Journal of Advanced Nursing*, Vol 42 No 3, pp. 260-268.

- Butterworth, T., Carson, J., Jeacock, J., White, E., and Clements, A. (1999) "Stress, coping, burnout and job satisfaction in British nurses: findings from the clinical supervision evaluation project", *Stress Medicine*, Vol 15, pp. 27-33.
- Buunk, B.P., Schaufeli, W.B., and Ybema, J.F. (1994) "Burnout, Uncertainty, and the desire for social comparison among nurses", *Journal of Applied Social Psychology*, Vol 24 No 19, pp. 1701-1718.
- Campbell, DT, and Fiske, DW (1959) "Convergent and discriminant validation by the multitrait-multimethod matrix", *Psychological Bulletin*, Vol 56, pp. 81-105.
- Cartwright, S., and Cooper, C.L. (1996) "Public policy and occupational health psychology in Europe", *Journal of Occupational Health Psychology*, Vol 1 No 4, pp. 349-361.
- Cavanagh, S.J., and Coffin, D.A. (1992) "Staff turnover among hospital nurses", *Journal of Advanced Nursing*, Vol 17 No 11, pp. 1369-1376.
- Chu, C.I., Hsu, H.M., Price, J.L., & Lee, J.Y. (2003) "Job satisfaction of hospital nurses: an empirical test of a causal model in Taiwan", *International Nursing Review*, Vol 50 No 4, pp. 242-250.
- Davidson, H., Folcarelli, P.H., Crawford, S., Duprat, L.J., and Clifford, J.C. (1997) "The effects of health care reforms on job satisfaction and voluntary turnover among hospital-based nurses", *Medical Care*, Vol 35 No 6, pp. 634-645.
- Decker, F.H. (1997) "Occupational and nonoccupational factors in job satisfaction and psychological distress among nurses", *Research in Nursing and Health*, Vol 20, pp. 453-464.
- De Jonge, J., Schaufeli, W.B., and Furda, J. (1995) "Werkkenmerken: psychologische arbeidsvitamines?" *Gedrag en Organisatie*, Vol 8 No 4, pp. 231-247.
- De Jonge, J., Janssen, P.P.M., and Van Breukelen, G.J.P. (1996) "Testing the Demand-Control-Support model among health-care professionals: a structural equation model", *Work and Stress*, Vol 10 No 3, pp. 209-224.
- De Jonge, J., and Schaufeli, W.B. (1998) "Job characteristics and employee well-being: a test of Warr's vitamin model in health care workers using structural equation modelling", *Journal of Organizational Behavior*, Vol 19, pp. 387-407.
- Demerouti, E., Bakker, A.B., Nachreiner, F., and Schaufeli, W.B. (2000) "A model of burnout and life satisfaction amongst nurses", *Journal of Advanced Nursing*, Vol 32 No 2, pp. 454-464.

- De Rijk, A., Le Blanc, P., and Schaufeli, W.B. (1998) "Active coping and need for control as moderators of the job demand-control model: effects on burnout", *Journal of Occupational and Organizational Psychology*, Vol 71, pp. 1-18.
- Dodds, A.E., Lawrence, J.A., and Wearing, A.J. (1991) "What makes nursing satisfying: a comparison of college students' and registered nurses' views", *Journal of Advanced Nursing*, Vol 16 No 6, pp. 741-753.
- Eastburg, M., Williamson, M., Gorsuch, R., and Ridley, C. (1994) "Social support, personality, and burnout in nurses", *Journal of Applied Social Psychology*, Vol 24 No 14, pp. 1233-1250.
- Ehrenfeld, R.N. (1991) "Social correlates of satisfaction and stress among Israeli nurses within Intensive Coronary Care Units (I.C.C.U.s)" *International Journal of Nursing Studies*, Vol 28 No1, pp. 39-45.
- Fielding, J., and Weaver, S.M. (1994) "A comparison of hospital- and community-based mental nurses: perceptions of their work environment and psychological health", *Journal of Advanced Nursing*, Vol 19, pp. 1196-1204.
- Florio, G.A., Donnely, J.P., and Zevon, M.A. (1998) "The structure of work-related stress and coping among oncology nurses in high-stress medical settings: a transactional analysis", *Journal of Occupational Health Psychology*, Vol 3 No 3, pp. 227-242.
- Fox, M.L., Dwyer, D.J., and Ganster, D.C. (1993) "Effects of stressful job demands and control on physiological and attitudinal outcomes in a hospital setting", *Academy of Management Journal*, Vol 36 No 2, pp. 289-318.
- Furda, J. (1995), *Werk, persoon en welzijn: een toetsing van het Job Demand-Control model*, Enschede: Copyprint 2000.
- Hillhouse, J.J., and Adler, C.M. (1997) "Investigating stress effect patterns in hospital staff nurses: results of a cluster analysis", *Social Science and Medicine*, Vol 45 No 12, pp. 1781-1788.
- Irvine, D.M., and Evans, M.G. (1995) "Job satisfaction and turnover among nurses: integrating research findings across studies", *Nursing Research*, Vol 44 No 4, pp. 246-253.
- Janssen, P.P.M., De Jonge, J., and Bakker, A.B. (1999) "Specific determinants of intrinsic work motivation, burnout and turnover intentions: a study among nurses", *Journal of Advanced Nursing*, Vol 29 No 6, pp. 1360-1369.
- Johnson, J.V., and Hall, E.M. (1988) "Job strain, work place social support, and cardiovascular disease: a cross-sectional study of a random sample of the

- Swedish working population”, *American Journal of Public Health*, Vol 78, pp. 1336-1342.
- Johnson, J.V., Hall, E.M., and Theorell, T. (1989) “Combined effects of job strain and social isolation on cardiovascular disease morbidity and mortality in a random sample of the Swedish male working population”, *Scandinavian Journal of Work, Environment and Health*, Vol 15, pp. 271-279.
- Karasek, R.A. (1979) “Job demands, job decision latitude and mental strain: implications for job redesign”, *Administrative Science Quarterly*, Vol 24, pp. 285-308.
- Karasek, R.A. (1985), *Job Content Instrument: Questionnaire and User’s Guide*, Los Angeles, CA: University of South California.
- Kennedy, P., and Grey, N. (1997), “High pressure areas”, *Nursing Times*, Vol 93 No 29, pp. 26-28.
- Kirkcaldy, B.D., and Martin, T. (2000), “Job stress and satisfaction among nurses: individual differences”, *Stress Medicine*, Vol 16, pp. 77-89.
- Lambert, V.A., Lambert, C.E., & Ito, M. (2004) “Workplace stressors, ways of coping and demographic characteristics as predictors of physical and mental health of Japanese hospital nurses”, *International Journal of Nursing Studies*, Vol 41, pp., 85-97.
- Landeweerd, J.A., and Boumans, N.P.G. (1994) “The effect of work dimensions and need for autonomy on nurses’ work satisfaction and health”, *Journal of Occupational and Organizational Psychology*, Vol 67, pp. 207-217.
- Lucas, M.D., Atwood., J.R., and Hagaman, R. (1993) “Replication and validation of anticipated turnover model for urban registered nurses”, *Nursing Research*, Vol 42 No 1, pp. 29-35.
- Maurier, W.L., and Northcott, H.C. (2000) “Job uncertainty and health status for nurses during restructuring of health care in Alberta”, *Western Journal of Nursing Research*, Vol 22 No 5, pp. 623-641.
- Matrunola, P. (1996) “Is there a relationship between job satisfaction and absenteeism?”, *Journal of Advanced Nursing*, Vol 23, pp. 827-834.
- Marshall, N.L., and Barnett, R.C. (1993) “Variations in job strain across nursing and social work specialties”, *Journal of Community and Applied Social Psychology*, Vol 3, pp. 261-271.
- Maslach, C., and Jackson, S.E. (1981) “The measurement of experienced burnout”, *Journal of Occupational Behavior*, Vol 2 No 2, pp. 99-113.

- McGilton, K.S., and Pringle, D.M. (1999) "The effects of perceived and preferred control on nurses' job satisfaction in long term care environments", *Research in Nursing and Health*, Vol 22, pp. 251-261.
- McGrath, A., Reid, N., & Boore, J. (2003) "Occupational stress in nursing", *International Journal of Nursing Studies*, Vol 40, pp. 555-565.
- McVicar, A. (2003) "Workplace stress in nursing: a literature review", *Journal of Advanced Nursing*, Vol 44 No 6, pp. 633-642.
- Papadatou, D., Anagnostopoulos, F., and Monos, D. (1994) "Factors contributing to the development of burnout in oncology nursing", *British Journal of Medical Psychology*, Vol 67, pp. 187-199.
- Parkes, K.R., and von Rabenau, C. (1993) "Work characteristics and well-being among psychiatric health-care staff", *Journal of Community and Applied Social Psychology*, Vol 3, pp. 243-259.
- Parker, P.A., and Kulik, J.A. (1995) "Burnout, self- and supervisor-rated job performance, and absenteeism among nurses", *Journal of Behavioral Medicine*, Vol 18 No 6, pp. 581-599.
- Petterson, I.L., Arnetz, B.B., Arnetz, J.E., and Hörte, L.G. (1995) "Work environment, skills utilization and health of Swedish nurses - results from a national questionnaire study", *Psychotherapy and Psychosomatization*, Vol 64, pp. 20-31.
- Pomaki, Y., and Maes, S. (2002), "*Predicting quality of work life: from work conditions to self-regulation*", in Gullone, E. and R.A. Cummins (Eds.), *The universality of subjective wellbeing indicators. A multi-disciplinary and multi-national perspective*, Kluwer Academic Publishers, Dordrecht, pp. 151-173.
- Rees, D., and Cooper, C.L. (1992) "Occupational stress in health-service workers in the UK", *Stress Medicine*, Vol 8 No 2, pp. 79-90.
- Reilly, N.P. (1994) "Exploring the paradox: commitment as a moderator of the stressor-burnout Relationship", *Journal of Applied Social Psychology*, Vol 24 No 5, pp. 397-414.
- Riese, H., van Doornen, L.J., Houtman, I.L., and de Geus, E.J. (2000) "Job strain and risk indicators for cardiovascular disease in young female nurses", *Health Psychology*, Vol 19 No 5, pp. 429-440.
- Robinson, S.E., Roth, S.L., and Brown, L.L. (1993) "Morale and job satisfaction among nurses: what can hospitals do?", *Journal of Applied Social Psychology*, Vol 23 No 3, pp. 244-251.

- Schaefer, J.A., and Moos, R.H. (1993) "Relationship, task and system stressors in the health care Workplace", *Journal of Community and Applied Social Psychology*, Vol 3, pp. 285-298.
- Seo, Y., Ko, J., & Price, J.L. (2003) "The determinants of job satisfaction among hospital nurses: a model estimation in Korea", *International Journal of Nursing Studies*, Vol 41, pp. 437-446.
- Shader, K., Broome, M.E., Broome, C.D., West, M.E., and Nash, M. (2001) "Factors influencing satisfaction and anticipated turnover for nurses in an academic medical center", No 4, pp. 10-216.
- Simoni, P.S., and Paterson, J.J. (1997) "Hardiness, coping, and burnout in the nursing workplace", *Journal of Professional Nursing*, Vol 13 No 3, pp. 178-185.
- Sjöberg, A. (1997), *Predicting turnover among nurses: the role of job involvement and organizational commitment*. Stockholm University: Department of Psychology, Stockholm, Sweden, Rep. No. 827.
- Smith, D., and Tziner, A. (1998) "Moderating effects of affective disposition and social support on the relationship between person-environment fit and strain", *Psychological reports*, Vol 82, pp. 963-983.
- Sourdif, J. (2004) "Predictors of nurses' intent to stay at work in a university health center" *Nursing and Health Sciences*, Vol 6, pp. 59-68.
- Tonges, M.C., Rothstein, H., and Carter, H.K. (1998) "Sources of satisfaction in hospital nursing practice", *Journal of Nursing Administration*, Vol 28 No 5, pp. 47-61.
- Tovey, E.J., and Adams, A.E. (1999) "The changing nature of nurses' job satisfaction: an exploration of sources of satisfaction in the 1990s", *Journal of Advanced Nursing*, Vol 30 No 1, pp. 150-158.
- Trinkoff, A.M., Storr, C.L., and Lipscomb, J.A. (2001) "Physically demanding work and inadequate sleep, pain medication use and absenteeism in registered nurses", *Journal of Occupational and Environmental Medicine*, Vol 43 No 4, pp. 355-363.
- Tumulty, G., Jernigan, I.E., and Kohut, G.F. (1994) "The impact of perceived work environment on job satisfaction of hospital staff nurses", *Applied Nursing Research*, Vol 7 No 2, pp. 84-90.
- Turnipseed, D.L. (1994) "An analysis of the influence of work environment variables and moderators on the burnout syndrome", *Journal of Applied Social Psychology*, Vol 24 No 9, pp. 782-800.

- Tyler, P., and Cushway, D. (1992) "Stress, coping and mental well-being in hospital nurses", *Stress medicine*, Vol 8, pp. 91-98.
- Tyler, P., and Cushway, D. (1995) "Stress in nurses: the effects of coping and social support", *Stress Medicine*, Vol 11, pp. 243-251.
- Tyson, P.D., Pongruengphant, R., and Aggarwal, B. (2002) "Coping with organizational stress among hospital nurses in Southern Ontario", *International Journal of Nursing Studies*, Vol 39 No 4, pp. 453-459.
- Vahey, D.C., Aiken, L.H., Sloane, D.M., Clarke, S.P., and Vargas, D. (2004) "Nurse burnout and patient satisfaction" *Medical Care*, Vol 42 No 2, pp. 57-66.
- Van der Doef, M, and Maes, S. (1998) "The job demand-control(-support) model and physical health outcomes: A review of the strain and buffer hypotheses", *Psychology and Health*, Vol 13 No 5, pp. 909-936.
- Van der Doef, M., and Maes, S. (1999) "The Job Demand-Control (-Support) model and psychological well-being: A review of 20 years of empirical research", *Work and Stress*, Vol 13 No 2, pp. 87-114.
- Van Yperen, N.W., and Baving, H.H. (1999) "Burnout symptomen bij verpleegkundigen: de relatie met werklast, regelruimte en sociale steun", *Gedrag and Gezondheid*, Vol 27 No 4, pp. 174-187.

Chapter 3

Job Stress in the Nursing Profession: The influence of Organizational and Environmental Conditions and Job Characteristics

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Job Stress in the Nursing Profession: The influence of Organizational and Environmental Conditions and Job Characteristics

Abstract

The aim of the present study was to examine the influence of organizational and environmental work conditions on the job characteristics of nurses and on their health and well-being. The sample consisted of 807 registered nurses working in an academic hospital. The direct influence of work conditions on outcomes was examined. Mediation of job characteristics in the relationships between work conditions and outcomes was tested by means of regression analyses. The results indicated that job characteristics, such as demands and control, mediated the relationship between work conditions, such as work agreements and rewards, and outcomes. By managing organizational and environmental conditions of work, job characteristics can be altered, and these in their turn influence nurses' job satisfaction and distress.

3.1 Introduction

3.1.1 Background

Stress in the nursing profession is an ongoing worldwide problem. Of all health care professionals, nurses have been found to have especially high levels of stress (Butterworth, Carson, Jeacock, White, & Clements, 1999; Bourbonnais, Comeau, Vézina, Guylaine, 1998). A study among a large sample of Swedish nurses revealed that more than 80% of the nurses reported high or very high job strain (Pettersson, Arnetz, Arnetz, & Hörte, 1995). Job stress in the nursing profession has been associated with decreased job satisfaction (Blegen, 1993), increased psychological and physical complaints (Hillhouse & Adler, 1997; Marshall & Barnett, 1993) and absenteeism (Borda & Norman, 1997).

Studies examining job stress can be divided into two groups: those that examine characteristics that are intrinsic to the job, such as job demands and control, and those that examine the organizational and environmental conditions of work, such as work procedures or materials and instruments. The number of studies examining the influence of job characteristics far exceeds the number of studies examining the influence of organizational and environmental conditions of work. Stress research among nurses revealed that job characteristics are predictive of job satisfaction, as well as of psychological and physical distress, and even burnout (for literature reviews, see Blegen, 1993; Irvine & Evans, 1995; Mc Vicar, 2003). The organizational and environmental conditions of work refer to the way in which the work is managed and structured (Cooper & Cartwright, 1994; Hagberg et al., 1995), and the physical work environment. Work conditions that have been associated with stress outcomes are inappropriate levels of formalization of work procedures (too much or too little formalization of work procedures), lack of adequate communication within the organization, and organizational politics (Cooper, Dewe, & O’Driscoll, 2001). Research among nurses on this topic however, is scarce. The present study examines the way in which organizational and environmental conditions and job characteristics relate to the health and well being of nurses.

3.1.2 Theoretical Foundation

The Job Demand Control Support model (Karasek, 1979; Johnson, 1989) is often used when job characteristics are studied. This model considers three job characteristics (namely job Demand, Control and Social Support) as predictors

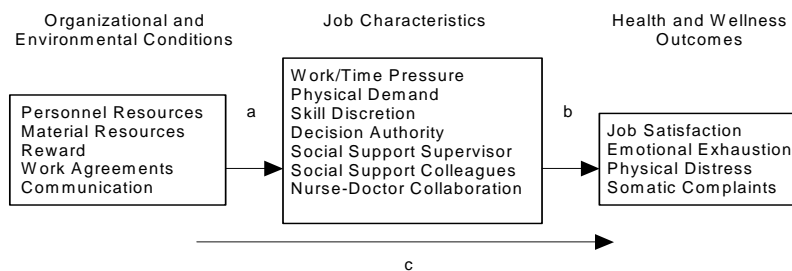
of job stress. Demand refers to time pressure, work pace and physical work load, control refers to the degree of decision authority, as well as to the degree of task variety and skill discretion, and support refers to the amount of social support received from supervisor or colleagues. The present study uses the dimensions of the JDCS to examine the influence of job characteristics.

The Tripod Accident Causation model (Wagenaar, Groeneweg, Hudson, & Reason, 1994) is used to examine the influence of organizational and environmental conditions of work. This model has its origins in studies to the determinants of human error. The model describes the way in which certain factors in the organization of work influence human error. Field studies indicate that health, just like safety can be managed by managing the organization of work (Groeneweg, 1998; Akerboom & Maes, 2004). For example, in a study among nurses, associations between stress outcomes on the one hand and bad communication (information flow), and material resources on the other hand were found (Akerboom & Maes, 2004).

3.1.3 Research Questions and Hypotheses

This study investigates three research questions. Firstly, the influence of seven job characteristics (work and time pressure, physical demand, skill discretion, decision authority, social support from supervisor, social support from colleagues, and nurse-doctor collaboration) on four stress outcomes (job satisfaction, emotional exhaustion, psychological distress, and somatic complaints) is examined. Based on conclusions of different meta-analytic studies on determinants of workplace stress in nursing (Mc Vicar, 2003; Irvine & Evans, 1995; Blegen, 1993), we expect that work and time pressure, physical demand, a lack of decision authority, lack of social support from supervisor or colleagues and a bad nurse-doctor collaboration are particularly predictive of distress (emotional exhaustion, psychological distress and somatic complaints), and that skill discretion, decision authority, social support from supervisor and colleagues and a good nurse-doctor collaboration are predictive of job satisfaction. Next, the influence of five work conditions (personnel resources, material resources, reward, work agreements, and communication) on the stress outcomes is studied. We expect that favourable conditions with regard to personnel resources, material resources, reward, work agreements, and communication will be associated with higher job satisfaction and lower distress. Finally, the nature of the relationship between the organizational and environmental conditions of work and job characteristics in predicting health and wellness outcomes is studied. We

hypothesize that the organizational and environmental conditions influence job characteristics, and that job characteristics influence the outcomes. In other words, we expect that job characteristics mediate the relationship between the organizational and environmental conditions and the outcomes. The research framework used in this study is presented in figure 1. Organizational and environmental conditions and job characteristics are measured with a questionnaire that is made specific for the nursing profession. In homogeneous samples, occupation-specific instruments are favourable over general measures, because more variance in the outcome variable is explained (Van der Doef & Maes, 2002).



3.2 Methods

3.2.1 Participants

All 1425 registered nurses (nursing managers not included) working in a large academic hospital in the Netherlands received a questionnaire and an accompanying letter in which they were invited to participate in the study. A total of 884 questionnaires were returned (a response rate of 62%) of which 807 questionnaires were complete and usable for this study. Of this population, the majority was female (85%). The mean age was 39.1 years (SD=9.0). Of the nurses, 55% had job tenures of more than 10 years and 65% had held their present position for at least 5 years. Seventy percent of the nurses worked part time (less than 36 hours per week; mean work hours per week of part time employees: 26.5, SD=6.6). Respondents were compared to non-respondents with respect to age and gender. Respondents differed from non-respondents in their age: respondents were in general older than non-respondents ($t(1423)=2.92$; $p<.01$) (mean

age non-respondents:37.6). Respondents did not differ from non-respondents with respect to gender.

3.2.2 Measures

Quality of work: Job Characteristics and Work Conditions

The Leiden Quality of Work Life Questionnaire for nurses (LQWLQn) was designed to measure the theoretical constructs of the independent variables of the research framework. Several existing questionnaires were used in this process. The scales that measure job characteristics were based on the Leiden Quality of Work Questionnaire (LQWQ; Van der Doef & Maes, 1999). This questionnaire measures among others the constructs of the JDCS model and has proven to be a reliable and valid instrument (Van der Doef & Maes, 1999). The scales measuring the organizational and environmental conditions were based on the Organizational Risk Factor Questionnaire (ORFQ; Akerboom, 1999). This questionnaire measures several constructs derived from the Tripod model. The reliability and validity of this instrument are satisfactory (Akerboom & Maes, 2004). To ensure relevance and content validity of the items of the LQWLQn, group meetings were organized with registered nurses in which items were made specific for the nursing job. The factor structure of the LQWLQn was determined by factor analyses and reliability analyses. The final instrument consisted of 12 scales measuring quality of work life, and one scale measuring the outcome job satisfaction. Responses were measured by means of a 4-point rating scale (totally disagree / totally agree). The scales measuring quality of work life are defined below.

Job Characteristics

Work and Time Demands: work pressure and time pressure (I must care for too many patients at once). Physical Demands: physical burden of work (At work I must sit in the same position for long periods of time). Skill Discretion: task variety and the extent to which the job challenges one's skills (My job gives me opportunities for self-development). Decision Authority: freedom of decision-making over one's work (I can decide for myself when I engage in patient-related versus non-patient-related tasks). Social Support Supervisor: support provided by the supervisor (I feel appreciated by my supervisor). Social Support Colleagues: instrumental and emotional support provided by colleagues (The nurses in my department work well together). Nurse-Doctor Collaboration:

interaction with doctors (In my department, the nurses and doctors work well together).

Work Conditions

Personnel Resources: amount and quality of personnel on a particular ward (In my department, there are enough nurses to provide good care). Material Resources: availability, amount and quality of materials and instruments on a particular ward (Materials and instruments are not always available when necessary). Rewards: rewards in terms of bonuses or appreciation (In this organization, there are sufficient funds and / or facilities for nurses). Work Agreements: quality and feasibility of procedures (In my department, regulations and procedures are often insufficiently defined). Communication: communication between departments, information provision (In this organization, there is effective interdepartmental communication about patients).

Outcome Measures

Job Satisfaction

Job satisfaction was assessed with the LQWLQn Job Satisfaction scale (six items; e.g. “If I had to choose now, I would take this job again”, “I am satisfied with my job”). Responses were given on a 4-point rating scale (totally disagree / totally agree) with higher scores indicating more job satisfaction.

Emotional Exhaustion

Emotional exhaustion appears to be the major aspect of occupational burnout among human service professionals, including nurses (Buunk, Schaufeli & Ybema, 1994). The validated Dutch version of the Maslach Burnout Inventory (MBI-NL, Schaufeli & van Dierendonck, 2000) was used to assess emotional exhaustion. The scale consists of nine items; (e.g. “At the end of a work day, I feel empty”). Items were scored on a 7-point rating scale, ranging from “never” to “every day / always”.

Psychological Distress and Somatic Complaints

Psychological distress and somatic complaints were assessed by means of three subscales of a validated Dutch version of the SCL-90, a 90-item inventory developed by Derogatis (1983). The Dutch version of the SCL-90 has been found to have adequate internal consistency, reliability and validity (Arrindel & Ettrema, 1986). Two subscales were used to measure psychological distress: anxiety (10 items, e.g. “feeling afraid”) and depression (16 items, e.g. “feeling lethargic”). A mean score of the two scales was calculated, because of the high correlation

between the two scales ($r=.77$). Somatic complaints was measured using a subscale of the SCL-90 (12 items, e.g. “pain in chest and heart region”). Items were scored on a 5-point rating scale ranging from “not at all” to “very much”.

3.2.3 Procedure

Data were gathered in the context of a hospital quality of work screening. The employees were informed about the purpose and content of the research by the hospital management. The questionnaires were sent to the home address of the nurses. The questionnaire consisted of 15 pages. It took the participants approximately 45 minutes to fill in the entire questionnaire. Participation in the study was on a voluntary basis. To guarantee confidentiality, an identification code was used on the questionnaires. Only the researchers had access to the key. An answering envelope could be used to return the questionnaire without costs.

3.2.4 Analyses

To check multicollinearity between the independent variables, correlation analysis was performed. Reliability analyses were performed to examine the internal consistency of the scales of the LQWLQn. To answer the first research question, regression analyses with the job characteristics predicting the outcomes were performed. The second research question was answered with regression analyses of organizational and environmental conditions on the outcome measures. Mediation of job characteristics in the relationship between organizational and environmental conditions and outcome measures was tested c.f. Baron and Kenny (1986). Mediation is a hypothesized causal chain in which one variable affects a second variable that, in turn, affects a third variable (see fig. 1). By means of regression analyses, the associations between organizational and environmental conditions and job characteristics were examined (path a). To support mediation, the effect of the initial variable on the outcome, controlling for the mediator should be 0 (or nonsignificantly different from 0). In the case of partial mediation, path b is significant after controlling for the direct effect of the initial variable, but path c is still significant after controlling for the mediating variable. This was tested with regression analysis of the organizational and environmental conditions on the outcomes, controlling for job characteristics.

As the outcomes were skewed, they were transformed. Job satisfaction was moderately negatively skewed, and therefore the square root of the reflected variable was computed. Emotional exhaustion was moderately positively skewed, and therefore the square root was computed. Psychological distress and Somatic complaints were severely positively skewed, and therefore the inverse was computed. The transformations of job satisfaction, psychological distress and somatic complaints resulted in reversed directions of the beta's. For the purpose of clarity, the direction of the beta's in the tables is presented conform the direction of the outcome. For example: a higher value on the outcome job satisfaction means "more job satisfaction", and a higher value on the outcome somatic complaints means "more somatic complaints".

3.3 Results

3.3.1 Correlation Analysis and Reliability Analysis

The correlations of the subscales of the LQWLQn were all lower than .60, indicating there is no multicollinearity between the independent variables (table 1). Cronbach's alpha's of the scales of the independent variables were all above .70, which indicated satisfactory reliability (table 1).

3.3.2 Regression Analyses

To answer the first research question, the outcome measures were regressed on job characteristics (table 2, step 2). These results showed that job characteristics explain significant amounts of variance in the outcomes, ranging from 13% in somatic complaints to 38% in job satisfaction. Low physical demand, skill discretion, decision authority and social support from supervisor predicted job satisfaction, work and time pressure and physical demand predicted emotional exhaustion, psychological distress and somatic complaints. Skill discretion was also associated with emotional exhaustion. To answer the second research question, the outcome measures were regressed on the organizational and environmental conditions (table 3). The results showed that the organizational and environmental conditions explain significant amounts of variance in all outcome measures: 4% in somatic complaints, 5% in psychological distress, 11% in emotional exhaustion and 26% in job satisfaction. Good communication, rewards, clear work agreements and sufficient personnel resources were associated with

Table 1 Descriptive Statistics and Correlation Coefficients for Study Variables

Variables	M	SD	α	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
1. Personnel Resources	2.44	.54	.75	-																
2. Material Resources	2.53	.48	.75	.27**	-															
3. Reward	1.91	.47	.78	.38**	.20**	-														
4. Work Agreements	2.81	.35	.79	.32**	.34**	.26**	-													
5. Communication	2.42	.37	.70	.28**	.30**	.38**	.37**	-												
6. Work/Time Pressure	2.51	.47	.78	-.61**	-.29**	-.35**	-.33**	-.25**	-											
7. Physical Demand	2.66	.48	.74	-.17**	-.27**	-.29**	-.28**	.23**	.23**	-										
8. Skill Discretion	2.77	.38	.76	.20**	.19**	.23**	.33**	.29**	-.28**	-.16**	-									
9. Decision Authority	2.66	.35	.70	.26**	.18**	.22**	.32**	.25**	-.29**	-.31**	.36**	-								
10. Support Supervisor	2.78	.51	.91	.23**	.18**	.18**	.48**	.22**	-.24**	-.23**	.35**	.34**	-							
11. Support Colleagues	2.99	.39	.84	.12**	.01	.07	.35**	.18**	-.10*	-.15**	.21**	.26**	.34**	-						
12. Nurse/Doctor Coll	2.50	.48	.77	.34**	.21**	.33**	.36**	.39**	-.23**	-.32**	.18**	.23**	.25**	.16**	-					
13. Job Satisfaction	2.60	.44	.84	.32**	.20**	.42**	.34**	.41**	-.34**	-.32**	.49**	.43**	.38**	.27**	.32**	-				
14. Em Exhaustion	12.02	7.91	.88	-.23**	-.17**	-.24**	-.23**	-.15**	.41**	.26**	-.29**	-.28**	-.27**	-.18**	-.13**	-.39**	-			
15. Psych. Distress	16.48	4.71	.93	-.11*	-.15**	-.09*	-.21**	-.12**	.25**	.22**	-.21**	-.23**	-.23**	-.19**	-.08	-.24**	.59**	-		
16. Som Complaints	16.16	4.23	.75	-.12**	-.17**	-.08	-.15**	-.11**	.25**	.25**	-.18**	-.19**	-.16**	-.15**	-.10*	-.17**	.48**	.59**	-	

* $p < .01$

** $p < .001$

Table 2 Summary of Hierarchical Regression Analysis: Job Characteristics and Organizational and Environmental Conditions as Predictors of Outcomes

IV	Job Satisfaction		Emotional Exhaustion		Psychological Distress		Somatic Complaints	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Gender	.02*	.12*	.01	.02	.00	.04	.01	.08
Age		.06		-.10		-.02		.02
Work/Time Pressure	.38**	-.11	.25**	.31**	.14**	.16**	.13**	.18**
Physical Demand		-.12**		.13**		.14*		.21**
Skill Discretion		.30**		-.12**		-.09		-.09
Decision Authority		.17**		-.09		-.08		-.04
Support Supervisor		.12**		-.09		-.09		-.03
Support Colleagues		.07		-.07		-.10		-.06
Nurse/Doctor Collaboration		.11		.04		.05		.05
Personnel Resources	.04**	.04	.00	.04	.01	.07	.01	.04
Material Resources		.02		-.01		-.04		-.09
Reward		.17**		-.06		.03		.04
Work Agreements		-.05		.01		-.03		.03
Communication		.12**		.05		.03		.05
Full model	AdjustedR ² =	.44	AdjustedR ² =	.25	AdjustedR ² =	.14	AdjustedR ² =	.13
	F(14,682)		F(14,691)		F(14,687)		F(14,689)	
	=38.74**		=18.21**		=8.43**		=8.84**	

* $p < .01$

** $p < .001$

higher job satisfaction. Low personnel resources, poor work agreements and low reward were predictive for emotional exhaustion. Nurses experiencing poor work agreements also reported psychological distress, and finally, somatic complaints were associated with poor material resources. Mediation was tested with two additional regression analyses: first, the organizational and environmental conditions were regressed on the job characteristics (table 4). These analyses showed that organizational and environmental conditions explain significant amounts of variance in job characteristics, ranging from 14% in social support colleagues to 41% in workload. Poor personnel and material resources, low rewards and poor work agreements were associated with work and time pressure. Poor work agreements, low reward and poor material resources were associated with physical demand. Nurses who reported good work agreements and good communication also experienced skill discretion. Good work agreements and sufficient personnel resources were associated with the experienced decision authority. Good work agreements were associated with social support from a supervisor and social support from colleagues. Moreover, good communication was associated with social support from colleagues, but was negatively related to material resources. Finally, the nurses who reported good communication, good work agreements, sufficient personnel resources and rewards also experienced good nurse-doctor collaboration. In the second series of regression

Table 3 Summary of Hierarchical Regression Analysis: Organizational and Environmental Conditions as Predictors of Outcomes

IV	Job Satisfaction		Emotional Exhaustion		Psychological Distress		Somatic Complaints	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Gender	.02*	.12*	.01	.02	.00	.03	.01	.08
Age		.04		-.10*		-.02		.03
Personnel Resources	.26**	.13**	.10**	-.15**	.05**	-.05	.05**	-.07
Material Resources		.01		-.06		-.08		-.14**
Reward		.23**		-.14**		-.02		-.02
Work Agreements		.14**		-.14**		-.16**		-.08
Communication		.20**		.03		-.01		.01
Full model	AdjustedR ² =	.27	AdjustedR ² =	.11	AdjustedR ² =	.05	AdjustedR ² =	.05
	F(7,715)		F(7,732)		F(7,727)		F(7,729)	
	= 38.89**		= 13.73**		= 5.97**		= 5.61**	

* $p < .01$

** $p < .001$

analyses, outcome measures were regressed on both job characteristics and organizational and environmental conditions in hierarchical regression analyses to test full mediation (table 2). In the first step, job characteristics were entered to control for their influence. In the second step, organizational and environmental conditions were added. The effect of organizational and environmental conditions on outcomes, when job characteristics are controlled for, should be 0 to support full mediation (table 2, step 3). As predicted, the proportion explained variance of the outcome measures by organizational and environmental conditions diminishes when job characteristics are controlled for. In three of the four outcome variables, the amount of explained variance by work conditions even is not significant anymore ($p < .01$). Only in the prediction of job satisfaction, the conditions reward and communication explain a significant, although very reduced amount of variance. We also tested mediation of organizational and environmental conditions on the relationship between job characteristics and outcomes by repeating the former regression analysis but changing the order of entrance in the analysis. Job characteristics still predicted significant amounts of variance, ranging from 18% of job satisfaction to 10% in somatic complaints. Moreover, significant regression weights of the job characteristics remained significant after correction for organizational and environmental conditions. The results indicate full mediation of job characteristics in the relationship between personnel resources and work agreements on the one hand and job satisfaction on the other hand, and partial mediation of job characteristics in the relationship between reward and communication on the one hand and job satisfaction on the other hand. The results also support the hypothesized full mediation of job characteristics in the relationship between organizational and environmen-

Table 4 Summary of Hierarchical Regression Analysis: Work Conditions as Predictors of Job Characteristics

IV	Work/Time pressure		Physical Demand		Skill Discretion		Decision Authority	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Gender	.00	.01	.04**	-.10*	.00	.02	.00	-.02
Age		-.02		-.18**		-.06		-.00
Personnel Resources	.41**	-.51**	.15**	.00	.15**	.06	.15**	.14**
Material Resources		-.12**		-.13**		.04		.03
Reward		-.11**		-.17**		.09		.08
Work Agreements		-.11**		-.17**		.22**		.21**
Communication		.03		-.08		.13**		.09
Full model	Adjusted $R^2 = .41$ F(7,727) = 73.22**		Adjusted $R^2 = .18$ F(7,738) = 24.01**		Adjusted $R^2 = .14$ F(7,733) = 18.65**		Adjusted $R^2 = .14$ F(7,735) = 18.15**	

Table 4 Continued

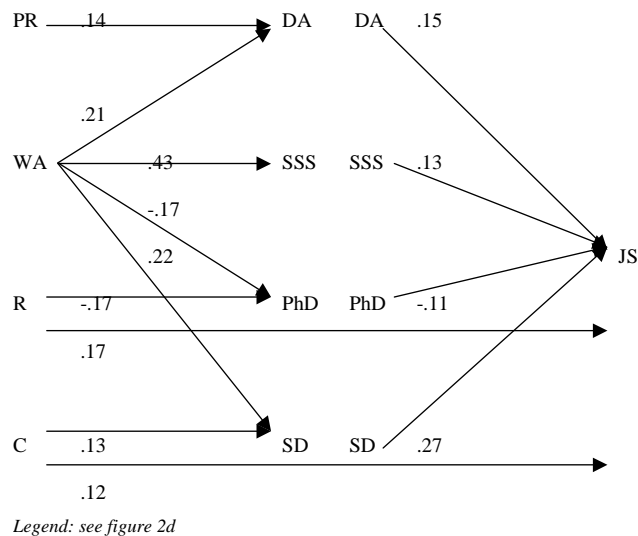
IV	Social Support Supervisor		Social Support Colleagues		Nurse/Doctor Collaboration	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
Gender	.00	.03	.02**	.07	.01	.06
Age		-.01		-.12**		-.05
Personnel Resources	.23**	.08	.14**	.02	.24**	.16**
Material Resources		.01		-.12**		.02
Reward		.02		-.05		.14**
Work Agreements		.43**		.35**		.18**
Communication		.03		.10		.21**
Full model	Adjusted $R^2 = .23$ F(7,727) = 31.82**		Adjusted $R^2 = .15$ F(7,732) = 19.30**		Adjusted $R^2 = .24$ F(7,733) = 34.38**	

* $p < .01$

** $p < .001$

tal conditions on the one hand and emotional exhaustion, psychological distress and somatic complaints on the other hand. In figures 2a-2d, an overview of the above described relationships is drawn for each of the outcomes.

Figure 2a. Summary of regression analyses, showing the relationships between Organizational and Environmental Conditions, Job Characteristics and Job Satisfaction

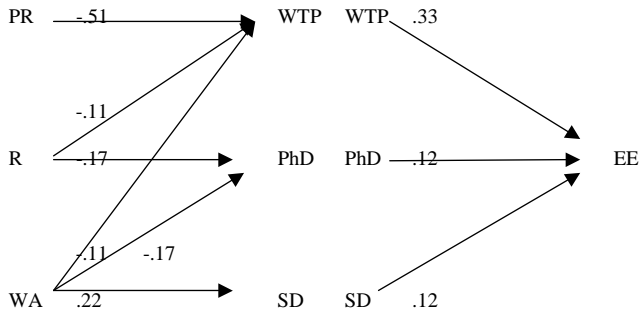


3.4 Discussion

This study confirms results from earlier studies on the determinants of job stress in the nursing profession (for reviews, see Blegen, 1993; Irvine & Evans, 1995; Mc Vicar, 2003): Characteristics of the job and work conditions are predictive of stress-related outcomes. These occupational stressors together predict important parts of the variance in the outcome measures, especially in job satisfaction (44%) and emotional exhaustion (25%).

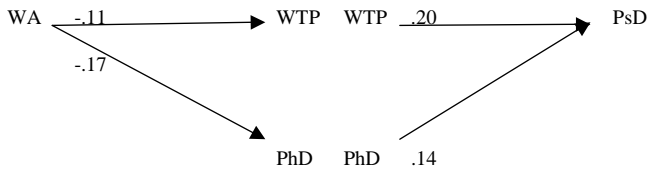
With regard to our first research question, the results suggest that distress outcomes (emotional exhaustion, psychological distress, and somatic complaints) are most strongly influenced by job demands, such as work and time pressure,

Figure 2b. Summary of regression analyses, showing the relationships between Organizational and Environmental Conditions, Job Characteristics and Emotional Exhaustion



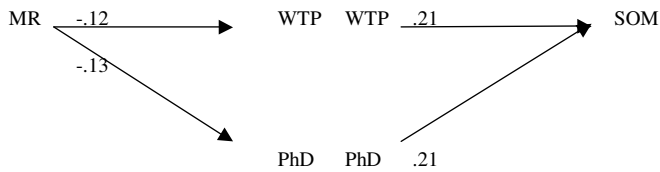
Legend: see figure 2d

Figure 2c. Summary of regression analyses, showing the relationships between Organizational and Environmental Conditions, Job Characteristics and Psychological Distress



Legend: see figure 2d

Figure 2d. Summary of regression analyses, showing the relationships between Organizational and Environmental Conditions, Job Characteristics and Somatic Complaints



Legend:

PR= Personnel Resources, MR= Material Resources, R=Reward, WA=Work Agreements, C=Communication, WTP=Work-Time Pressure, PhD=Physical Demand, SD=Skill Discretion, DA=Decision Authority, SSS=Social Support Supervisor

and physical demands. In contrast to our expectations, social support was unrelated to distress outcomes. It is possible that a different aspect of social support than those we measured accounts for the relationships found in other studies. Our study (as most studies) did not measure specific aspects of social support separately. In a study that did make a distinction between instrumental support, appreciation and companionship, in the relation to burnout symptoms, only a relation was found with instrumental support (van Yperen & Baving, 1999). Job satisfaction was not found to be related to work and time pressure in our study. This is in line with some studies among nurses (Irvine & Evans, 1995), but in contrast to others (Tummers, Landeweerd & van Merode, 2002; Bradley & Cartwright, 2002; Jonge & Schaufeli, 1998). Differences in operationalisation of the concept of either work pressure or job satisfaction could account for these differences in findings. We found that the job control dimensions were the strongest predictors of job satisfaction. This is in line with results from other studies (de Jonge & Schaufeli, 1998; Irvine & Evans, 1995; Tonges, Rothstein, & Carter, 1998). Only weak associations were found between job satisfaction and the social support dimensions. Again, perhaps a specific kind of social support or a specific aspect of it is related to the outcome. With regard to our second research question, the results show that the organizational and environmental conditions examined in this study (communication, work agreements, personnel and material resources, and reward) explain substantial parts of the variance in the outcome measures, especially in job satisfaction (26%) and emotional exhaustion (10%). Our results suggest that nurses' job satisfaction is positively influenced by good organization of patient information, and by good communication between departments about patient information. Furthermore, a greater number of nurses on the ward, as well as a higher percentage of experienced nurses could enhance job satisfaction and lower the chance of emotional exhaustion. Our results further suggest that financial rewards, and a feeling of being valued in the organization is important, especially in the prediction of job satisfaction, which was also found in other studies (Mc Vicar, 2003; Tyson & Pongruenphant, 2004). Our results furthermore suggest that structuring the tasks and a good planning of work is beneficial for the nurses health. Finally, our results suggest that the availability and better quality of equipment, materials and instruments could lower somatic complaints, which is a sound association. One would expect for example, that back pains are reduced when nurses use good equipment to lift patients.

The results of our study partly confirm our third hypothesis. Only the direct relationships between communication and reward on the one hand and job satis-

faction on the other hand remain significant in the mediation analysis. All other relationships between the organizational and environmental conditions and the outcomes are mediated by job characteristics. For example, personnel and material resources are associated with decreased work pressure and physical demands. A decrease in demands is in its turn associated with a reduction in stress-related problems, such as emotional exhaustion or psychological or somatic complaints. Interestingly, the Tripod theory, (as outlined in the introduction of this article) describes how human error can be controlled through organization of work. Factors at the root of the business process influence the environment employees work in. By controlling the environment, the organization management can control the accident-proneness of the employees. Our results suggest that the environment of nurses and their occupational stress can also be controlled. The organization of work influences the health and well-being of nurses through job characteristics.

The results suggest that one organizational or environmental condition can influence more than one outcome at the same time through different mechanisms. For example, when tasks are clearly described and procedures are known to the personnel, and there is a clear planning of work, precious time could be gained on the work floor, possibly because nurses could work more effectively. Less work and time pressure, in its turn, can enhance job satisfaction and lower emotional exhaustion. At the same time, the more work agreements are properly organized, the more freedom the nurses experience in their job, and the more skill discretion (their skills are challenged more). A possible explanation for this result is that good knowledge of procedures allows nurses to feel safer to take authority in decisions themselves and to feel more secure to apply a variety of skills. More decision authority and more skill discretion can in their turn enhance job satisfaction and lower emotional exhaustion. Finally, work agreements can also positively influence the perceived social support from a supervisor. Perhaps the support of a supervisor is less needed when tasks are clearly described. Less need of social support could influence the perceived social support. Better (evaluation of) social support of supervisors is associated with more job satisfaction. Next to proper personnel and material resources and clear work agreements, rewards are also found to play an important role in the stress process. The results of this study indicate that rewards influence the way nurses appraise their workload and even their physical demands. This can be explained in terms of effort-reward imbalance. This theory states distress is caused by an imbalance of high effort (demand) and low rewards (Siegrist, 1996). Assuming that effort and reward are related in the prediction of out-

comes, rewards can compensate for the effort invested. Demerouti, Bakker, Nachreiner, and Schaufeli (2000) found that a low salary was a source of stress, and low salary was even a greater source of stress when work pressure was high. Demand and reward thus seem to be related in the prediction of job stress.

Because of the cross-sectional nature of this study, only suggestions on causality can be derived from this study. The results of this study are therefore suggestive in nature and are meant to give first indications. Because of the cross-sectional design of the study, the results should be interpreted with caution, and longitudinal studies are needed to verify the results.

The results of our study have theoretical implications. They suggest that it is important to look beyond the dimensions of the Karasek model to detect organizational and environmental conditions that underlie these dimensions. This study shows that the Tripod model is a good theoretical supplement when it comes to the understanding of occupational stress. It appears that stress, as human error, can be controlled to a certain extent, by controlling work conditions. However, longitudinal studies need to further examine this model in its relation to the job characteristics and outcomes. The sequence of events as suggested by this study can only be thoroughly investigated with longitudinal data. Therefore, we call for longitudinal studies to further examine the relationships between organizational and environmental work conditions, job characteristics, and stress outcomes among nurses.

References

- Akerboom, S.P. (1999). The Organizational Risk Factor Questionnaire (ORFQ). Cognitive Psychology, Leiden University, Leiden, The Netherlands.
- Akerboom, S.P., & Maes, S. (2004). *Predicting work stress in health care employees: from a job to an organizational perspective*. Manuscript submitted for publication.
- Arrindel, W.A., & Ettema, J.H.M. (1986). Symptom Checklist-90, SCL-90, een multidimensionele psychopathologie-indicator, handleiding [Symptom Checklist-90, SCL-90, a multidimensional psychopathology-indicator, manual]. Lisse, the Netherlands: Swets Test Services.
- Baron, R.M., & Kenny, D.A. (1996). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of personality and Social Psychology*, *51*, 1173-1182.
- Blegen, M.A. (1993). Nurses' job satisfaction: a meta-analysis of related variables. *Nursing Research*, *42*, 36-41.
- Borda, R.G., & Norman, I.J. (1997). Factors influencing turnover and absence of nurses: a research review. *International Journal of Nursing Studies*, *34*, 385-394.
- Bourbonnais, R., Comeau, M, Vézina, M., & Guylaine, D. (1998). Job strain, psychological distress and burnout in nurses. *American Journal of Industrial Medicine*, *24*, 20-28.
- Bradley, J.R., & Cartwright, S. (2002). Social support, job stress, health, and job satisfaction among nurses in the United Kingdom. *International Journal of Stress Management*, *9*, 163-182.
- Buunk, B.P., Schaufeli, W.B., & Ybema, J.F. (1994). Burnout, uncertainty, and the desire for social comparison among nurses. *Journal of Applied Social Psychology*, *24*, 1701-1718.
- Butterworth, T., Carson, J., Jeacock, J., White, E., & Clements, A. (1999). Stress, coping, burnout and job satisfaction in British nurses: findings from the clinical supervision evaluation project. *Stress Medicine*, *15*, 27-33.
- Cooper, C.L., & Cartwright, S. (1994). Healthy mind, healthy organization: A proactive approach to occupational stress. *Human Relations*, *47*, 455-471.

- Cooper, C.L., Dewe, P.J., & O'Driscoll, M.P. (2001). *Organizational stress: A review and critique of theory, research, and applications*. CA, US, Thousand Oaks, Sage Publications.
- De Jonge, J., & Schaufeli, W.B. (1998). Job characteristics and employee well-being: a test of Warr's vitamin model in health care workers using structural equation modeling. *Journal of Organizational Behavior*, *19*, 387-407.
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2000). A model of burnout and life satisfaction amongst nurses. *Journal of Advanced Nursing*, *32*, 454-464.
- Derogatis, L.R. (1983). *SCL-90-R: Administration, Scoring & Procedures Manual-II* (2nd Ed.). Baltimore: Clinical Psychometric Research.
- Groeneweg, J. (1998). *Controlling the controllable*, DSWO-press, Leiden.
- Hagberg, M., Silverstein, B., Wells, R., Smith, M.J., Hendrick, H.W., Carayon, P., & Peruse, M. (1995). *Work-related musculoskeletal disorders (WMSDs): A reference book for prevention*. London, Taylor & Francis.
- Hillhouse, J.J., & Adler, C.M. (1997). Investigating stress effect patterns in hospital staff nurses: results of a cluster analysis. *Social Science & Medicine*, *45*, 1781-1788.
- Irvine, D.M., & Evans, M.G. (1995). Job satisfaction and turnover among nurses: integrating research findings across studies. *Nursing Research*, *44*, 246-253.
- Johnson, J.V. (1989). Control, collectivity and the psychosocial work environment. In S.L.Sauter, J.J. Hurrell, & C.L. Cooper (Eds), *Job control and worker health*. (pp. 55-74). Chichester: Wiley.
- Karasek, R.A. (1979). Job demands, job decision latitude and mental strain: implications for job redesign. *Administrative Science Quarterly*, *24*, 285-308.
- Marshall, N.L., & Barnett, R.C. (1993). Variations in job strain across nursing and social work specialties. *Journal of Community & Applied Social Psychology*, *3*, 261-271.
- McVicar, A. (2003). Workplace stress in nursing: a literature review. *Journal of Advanced Nursing*, *44*, 633-642.
- Petterson, I.L., Arnetz, B.B., Arnetz, J.E., & Hörte, L.G. (1995). Work environment, skills utilization and health of Swedish nurses - results from a national questionnaire study. *Psychotherapy and Psychosomatization*, *64*, 20-31.

- Schaufeli, W. & Van Dierendonck, D. (1994). Burnout, een begrip gemeten: de Nederlandse versie van de Maslach Burnout Inventory (MBI-NL). [Burnout, a concept measured: the Dutch version of the Maslach Burnout Inventory (MBI-NL)]. *Gedrag en Gezondheid, Tijdschrift voor Psychologie en Gezondheid*, 22, 153-172.
- Schaufeli, W. & Dierendonck, D. van (2000). *UBOS Utrechtse Burnout Schaal: Handleiding*. Lisse: Swets & Zeitlinger.
- Siegrist J. (1996). Adverse health effects of high-effort/low-reward conditions. *Journal of Occupational Health Psychology*, 1, 27-41.
- Tonges, M.C., Rothstein, H., & Carter, H.K. (1998). Sources of satisfaction in hospital nursing practice. *Journal of Nursing Administration*, 28, 47-61.
- Tummers, G.E.R., Landeweerd, J.A., & Van Merode, G.G. (2002). Work organization, work characteristics, and their psychological effect on nurses in the Netherlands. *International Journal of Stress Management*, 9, 183-206.
- Tyson, P.D., & Pongruengphant, R. (2004). Five-year follow-up study of stress among nurses in public and private hospitals in Thailand. *International Journal of Nursing Studies*, 41, 247-254.
- Van der Doef, M. & Maes, S. (1999). The Leiden Quality of Work Questionnaire: its construction, factor structure, and psychometric qualities. *Psychological Reports*, 85, 954-962.
- Van der Doef, M. & Maes, S. (2002). Teacher-specific quality of work versus general quality of work assessment: A comparison of their validity regarding burnout, (psycho)somatic well-being and job satisfaction. *Anxiety, Stress and Coping*, 15, 327-344.
- Van Yperen, N.W., & Baving, H.H. (1999). Burnout symptomen bij verpleegkundigen: de relatie met werklust, regelruimte en sociale steun. *Gedrag & Gezondheid*, 27, 174-187.
- Wagenaar, W.A., Groeneweg, J., Hudson, P.T.W., & Reason, J.T. (1994). Promoting safety in the oil industry. *Ergonomics*, 37, 1999-2013.

Chapter 4

A Longitudinal Study of Job Stress in the Nursing Profession: Causes and Consequences

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A Longitudinal Study of Job Stress in the Nursing Profession: Causes and Consequences

Abstract

This study examines the influence of changes in work conditions on stress outcomes as well as influence of changes in stress outcomes on work conditions. As such, it answers questions still open in literature regarding causality of work environmental characteristics and the health of nurses. A complete, two wave panel design was used with a time interval of three years. The sample consisted of 381 hospital nurses in different functions, working at different wards. Changes in work conditions are predictive of the outcomes, especially of job satisfaction and emotional exhaustion. The strongest predictors of job satisfaction were social support from supervisor, reward, and control over work. The strongest predictors of emotional exhaustion were work and time pressure and physical demands. Reversed relationships were also found for these outcomes. The results of this study are consistent with transactional models of stress that indicate that stressors and stress outcomes mutually influence each other. To prevent nurses from a negative spiral, it seems of importance to intervene early in the process.

4.1 Background

Job stress in the nursing profession has been studied extensively in the last two decades. Many studies have examined the influence of occupational stressors on the health and well-being of hospital nurses. For example, the influence of the dimensions of Karasek's Job Demand Control Support (JDCS) model on nurses' health and well being has been examined abundantly. Job demands, lack of job control, and lack of social support from supervisors and colleagues are associated with burnout and health problems in this occupational group. Next to the JDCS dimensions, other (less frequently studied) work conditions are associated with the health and well-being of nurses. For example, a good reward system is an important factor in the organization of work that is related to job satisfaction (Demerouti et al. 2000). Another important organizational work condition is the structure of communication flow in the hospital (Decker 1997) (for review articles on the influence of JDCS dimensions as well as on other dimensions, see Irvine et al. 1995; Mc Vicar 2003).

The majority of studies on job stress among nurses have cross-sectional designs. Studies with cross sectional designs have several limitations. Firstly, such studies assume a causal relationship of work environmental characteristics predicting stress outcomes. However, the opposite (stress outcomes predicting the (perception of) the work environment), is also plausible (Zapf et al. 1996). The assumption of causality can not be confirmed, nor falsified with a cross sectional design. The second limitation of cross sectional designs is that conclusions on processes, such as the influence of changes in the work environment on the development of job stress, cannot be drawn. Thirdly, cross sectional studies can not rule out the influence of third variables or background variables on the relationship between work conditions and outcomes for example, through mood variables or personality traits such as negative affectivity (Zapf et al. 1996). A longitudinal study in which independent and dependent variables are measured at all times (a complete panel design) can control for these variables. However, existing longitudinal studies on job stress in the nursing profession also have limitations. Firstly, almost all longitudinal studies on job stress among nurses examine the influence of occupational stressors on a stress reaction at a later point in time. Such designs assume that the work environment is static. The work environment is however dynamic and susceptible of changing influences. The influence of changing occupational stressors on stress outcomes has scarcely been examined (van der Doef 2000). Secondly, though earlier studies have suggested that health or stress can influence (the perception of) the work

environment, few studies have actually examined reversed causation (de Lange et al. 2003). The present study attempts to fill in these gaps. We will examine the influence of changes in work conditions on changes in the health and well-being of nurses. Furthermore, reversed causal relationships are tested.

Two studies among nurses that did examine the consequences of changes in demands, control and support, found that a decrease in control and a decrease in support resulted in emotional exhaustion and psychological and somatic complaints, and diminished job satisfaction (de Jonge et al. 1998; van der Doef 2000). Moreover, an increase in demands over time resulted in emotional exhaustion (de Jonge et al. 1998).

As the job demand control support model is considered as an important occupational stress model, most longitudinal studies among nurses focus on these three dimensions in relation to various stress related outcomes. Job demands (such as workload and meeting deadlines, involvement in life and death situations, daily hassles) have been longitudinally associated with emotional exhaustion (Bourbonnais et al. 1999; de Lange et al. 2004;), depression (de Lange et al. 2002; de Lange et al. 2004), health problems (Bradley et al. 2002), and decreased job satisfaction (Davidson et al. 1997; de Jonge et al. 2001). However, other studies among nurses found no relationship between job demands and job satisfaction (Bradley et al. 2002; de Lange 2004; Tyson et al. 2004). It could be that the relation between time demands and work pressure and job satisfaction is in some cases moderated by other factors, such as pay or job commitment or satisfaction of helping others. Job control (participation in decisions, ability to make decisions on the job) has been longitudinally associated with enhanced well-being (Mikkelsen et al. 2000) and job satisfaction (de Lange et al. 2004), and with diminished psychological distress and emotional exhaustion (Bourbonnais et al. 1999; de Lange et al. 2002). Social support (being taken seriously, feeling appreciated, peer cohesion) is beneficial for nurses' well-being and job satisfaction (Mikkelsen, et al. 2000; de Jonge et al. 2001). Through social support, nurses gain better health (Bradley et al. 2002), and their emotional exhaustion and distress diminishes (Firth et al. 1989; de Lange et al. 2004).

Inclusion of other job stressors besides the Job Demand Control Support dimensions improves the prediction of health and well-being (van der Doef 2000). Few longitudinal studies have considered the influence of environmental conditions or organizational conditions on the health and well being of nurses. Organizational conditions can be described as: the way the work is managed and structured (Cooper et al. 1994). Environmental conditions refer to the physical work environment, such as the design of the workplace, tools and equipment. Studies

among nurses reveal that the way in which the work is organized is related to nurses' job stress. For example, associations are found between the amount and quality of personnel, work agreements and planning of work, and the availability and quality material and medical equipment on the one hand, and stress outcomes on the other hand. Furthermore, the importance of financial reward is recognized in studies among nurses (Demerouti et al. 2000; Tyson et al. 2004). Finally, good communication between departments on patient information is beneficial for the job satisfaction of nurses (Davidson et al. 1997). In line with the above described studies, we hypothesize that decreases in job demand and increases in control and support, as well as more favorable conditions with regard to personnel and material resources, rewards, work agreements and communication will result in higher job satisfaction and lower emotional exhaustion and less psychological and physical health problems (hypothesis one).

A review of longitudinal studies in organizational stress research revealed that the problem of reversed relationships is not discussed in many cases (Zapf et al. 1996). Longitudinal studies in general assume normal causal relationships. However, half of the studies that do explore reversed causation find significant associations (Zapf et al. 1996). In some cases, this reversed relationship is even dominant over the normal causal relationship. For example, a longitudinal study among health care workers revealed that increases in emotional exhaustion were related to increases in (perceived) demands, and that this association was dominant over the normal causal relationship (de Jonge et al. 2001). Another study among nurses found the same reversed association, but did not find causal dominance of the reversed relationship over the normal causal relationship (de Lange et al. 2004). We hypothesize that increases in job satisfaction and decreases in emotional exhaustion and psychological and physical health problems will result in less (perceived) job demand and higher (perceived) job control and social support, as well as (a) better (perception of) work conditions with regard to personnel resources, material resources, rewards, work agreements and communication (hypothesis two). Because of unequivocal results of earlier research, we had no prior expectations concerning the dominance of causal or reversed relationships.

4.2 Methods

4.2.1 Design and Participants

We used a complete panel design for this study (see for example Zapf et al. 1996). All independent and dependent variables (see the “measures” section) were measured two times with an interval of three years. This time interval is long enough for changes in work conditions to occur. The research sample consisted of 1267 registered nurses working within an academic hospital in the Netherlands. A total of 807 questionnaires were returned at the first measurement time (Time 1, or T1), which is a response rate of 64%. All 621 nurses still holding their position three years later (at Time 2 or T2) were sent a second questionnaire, of which 381 (61%) responded. The analyses within this article are based on the data of these nurses. Of these respondents, the majority was female (84%). The mean age was 38.8 years (S.D. 8.6; range 20-57 years). About half of the nurses worked 30 hours per week or more. Of the nurses, 60% had job tenures of more than 10 years and 40% had held their present position for at least 5 years. We examined the selectivity of the final sample, by comparing T1 scores for a) nurses that still held their position at T2 versus those that had not held their position at T2, and b) for those nurses that were still employed at T2, we compared responders versus non responders at T2. For the instruments used, see the section measures. The nurses who still worked in their position scored lower on their T1 emotional exhaustion ($t(750) = 3.58, p < .001$), psychological distress ($t(748) = 2.65, p < .01$) and physical demand ($t(750) = 2.30, p < .05$) and higher on decision authority ($t(746) = -2.10, p < .05$) than the nurses who had quit their job between T1 and T2. Furthermore the respondents at T2 had a higher T1 job satisfaction than the non-respondents at T2 ($t(745) = -4.28, p < .001$). The respondents of T2 did not differ significantly from the non respondents of T2 on the work conditions measured at T1.

4.2.2 Measures

Socio-demographic variables

Data were collected on age, gender, and years of employment.

Quality of work: Work Conditions

The Leiden Quality of Work Life Questionnaire for nurses (LQWLQ-N; Maes et al. 1999) was used to measure the theoretical constructs of the independent variables of the research model. This questionnaire is based on the Leiden Quality of Work Questionnaire (LQWQ; van der Doef et al. 1999) and on the Organizational Risk Factor Questionnaire (ORFQ; Akerboom 1999). The items of the LQWLQ-N are occupation specific. All items are formulated as statements that had to be rated on a 4 point rating scale, ranging from totally disagree to totally agree. The scales are defined below and for each scale the cronbach's alpha is given at T1 and T2, as well as the number of items and an item-example.

Work and Time Demands

($\alpha=.77/.81$, 6 items): workload, and time pressure (I must care for too many patients at once).

Physical Demands

($\alpha=.70/.83$, 5 items): physical burden of work (At work I must sit in the same position for long periods of time).

Skill Discretion

($\alpha=.70/.80$, 6 items): task variety and the extent to which the job challenges one's skills (My job gives me opportunities for self-development).

Decision Authority

($\alpha=.70/.73$, 7 items): freedom of decision-making over one's work (I can decide for myself when I engage in patient-related versus non-patient-related tasks).

Social Support Supervisor

($\alpha=.92/.94$, 7 items): support provided by the supervisor (I feel appreciated by my supervisor).

Social Support Colleagues

($\alpha=.80/.87$, 7 items): instrumental and emotional support provided by colleagues (The nurses in my department work well together).

Nurse-Doctor Collaboration

($\alpha=.77/.74$, 5 items): interaction with doctors (In my department, the nurses and doctors work well together).

Personnel Resources

($\alpha=.73/.78$, 4 items): amount and quality of personnel on a particular ward (In my department, there are enough nurses to provide good care).

Material Resources

($\alpha=.77/.78$, 4 items): availability, amount and quality of materials and instruments on a particular ward (Materials and instruments are not always available when necessary).

Rewards

($\alpha=.80/.82$, 6 items): rewards in terms of salary, bonuses or appreciation (In this organization, there are sufficient funds and / or facilities for nurses).

Work Agreements

($\alpha=.80/.87$, 7 items): quality and feasibility of procedures (In my department, regulations and procedures are often insufficiently defined).

Communication

($\alpha=.70/.75$, 6 items): communication between departments, information provision (In this organization, there is effective interdepartmental communication about patients).

Outcome measures

Job Satisfaction

Job satisfaction was assessed with the LQWLQ-N Job Satisfaction scale (6 items; e.g. “If I had to choose now, I would take this job again”, “I am satisfied with my job”, $\alpha= .82/.86$). Statements were rated on a 4 point rating scale, ranging from totally disagree to totally agree.

Emotional Exhaustion

Emotional exhaustion appears to be the major aspect of occupational burnout among human service professionals, including nurses (Buunk et al. 1994). The validated Dutch client version of the Maslach Burnout Inventory (MBI-NL, Schaufeli et al. 1994) was used to assess emotional exhaustion. The scale consists of eight items; (e.g. “At the end of a work day, I feel empty”). Items were scored on a seven-point rating scale, ranging from “never” to “every day / always”.

Psychological Distress and Somatic Complaints

Psychological distress and somatic complaints were assessed by means of three subscales of a validated Dutch version of the SCL-90, a 90-item inventory developed by Derogatis (1983). This inventory measures the presence of physical and psychological complaints, scored on a five point rating scale ranging from “not at all” to “very much”. The Dutch version of the SCL-90 has been found to have adequate internal consistency, reliability and validity (Arrindel et al.

1986). Two subscales were used to measure psychological distress: anxiety (10 items, e.g. “feeling afraid”) and depression (16 items, e.g. “feeling lethargic”). A mean score of the two scales was calculated, because of the high correlation between the two scales ($r=.77$). Somatic complaints were measured using a subscale of the SCL-90 (12 items, e.g. “pain in chest and heart region”).

4.2.3 Data Collection

The questionnaires were sent to the home address of the nurses. Participation in the study was on a voluntary basis. To guarantee confidentiality, an identification code was used on the questionnaires. Only the researchers had access to the key. An answering envelope could be used to return the questionnaire without costs.

4.2.4 Data analyses

In the hierarchical regression analyses, we corrected for the T1 scores of both the independent and the dependent variables. In this way, we controlled for regression towards the mean, ceiling- and floor effects, which are the most important artifacts of change-score analyses (Finkel 1995; Campbell et al. 1999; Taris 2000). A series of regression analyses was performed to test hypothesis one concerning the causal effects of changes in work environment on job stress outcomes. The variables were entered in several steps: in step 1, and step 2, the corresponding T1 outcome and T1 work conditions were entered. In step 3, the changes in the work conditions were entered ($T2-T1$) into the equation. This set of analysis was repeated for each outcome variable. The reversed relationships (hypothesis 2) were tested with hierarchical regression analyses in which we controlled for the corresponding T1 work condition and T1 outcomes. We performed separate regression analyses for each outcome, because the change scores of the outcomes were highly correlated (Pearson’s r of .26 to .52).

4.3 Results

Analysis of the change scores revealed that nurses experience considerable changes in all job conditions and outcomes over time. Depending on the job condition,

24% to 33% of the nurses showed an improvement in the score on the job conditions of more than .5 SD difference between T1 and T2, and 24% to 35% of the nurses showed a worsening in the score on the job conditions of more than .5 SD difference. The variability of the outcomes is somewhat lower: depending on the outcome measure, 12% to 33% of the nurses showed substantial improvements in the health and well-being outcomes (more than .5 SD difference between the T1 and T2 scores), and 18% to 23% showed a change for the worse in the outcomes. The correlations between the changes in job conditions and the changes in outcomes on the one hand and the T2 scores on the job conditions and the outcomes on the other hand, are presented in table 1. At the left half below the diagonal, correlations between changes in work conditions and the outcomes at T2 (normal causation) are presented. At the right half above the diagonal, correlations between changes in outcomes and work conditions at T2 (reversed causation) can be found. The diagonal presents the correlations between the change scores and T2 scores for each variable. The pattern of correlations between change scores and T2 scores (table 1) suggests that there are indications for normal as well as reversed relationships between work conditions and outcomes. More specifically, significant correlations are found between changes in work conditions and T2 job satisfaction and emotional exhaustion, as well as significant correlations between changes in job satisfaction and emotional exhaustion and T2 work conditions. The results concerning our first hypothesis are summarized in table 2. The corresponding outcome, entered in the first step of the regression analysis, explains 23 to 29% of the variance of the outcome at T2. The job conditions at T1 do not predict significant proportions of the variance in the outcomes at T2, though there are two significant betas: material resources at T1 predict job satisfaction at T2, and physical demands at T1 predict emotional exhaustion at T2. Changes in job conditions predict 8%, 11%, 16% and 35% of variance of respectively somatic complaints, psychological distress, emotional exhaustion and job satisfaction. More specifically, increases in skill discretion, decision authority, social support supervisor, reward, and communication, are associated with an increase in job satisfaction over time. Increases in work and time pressure and physical demand, result in more emotional exhaustion over time. Decreases in decision authority are associated with increases in psychological distress. And finally, an increase in physical demand over time is associated with an increase in somatic complaints. Regarding our second hypothesis, our results show that the job conditions at T1 explain 6% to 39% of the variance in the corresponding job condition at T2 (table 3). The proportions of explained variance at T2 show some variation. In general the job conditions are more subject to changes over time than the out-

Table 1 Correlation Coefficients for Study Variables^{1,2}

T2 score	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Personnel Resources	.56**	.13	.19**	.31**	.19**	-.35**	-.17**	.14*	.26**	.24**	.06	.19**	.30**	-.15*	-.08	-.11
2. Material Resources	.15*	.47**	.13	.14*	.21**	-.09	-.22**	.04	.03	.00	.06	.08	.14	-.12	-.01	-.08
3. Reward	.06	.05	.53**	.07	.17**	-.04	-.10	-.06	.00	.04	-.06	.05	.21**	-.09	-.11	-.12
4. Work Agreements	.17**	.10	.05	.65**	.13	-.11	-.18**	.21**	.25**	.30**	.30**	.11	.27**	-.14*	-.03	-.05
5. Communication	.12	.16*	.15*	.17**	.55**	-.12	-.11	.05	.10	.07	.01	.09	.21**	-.16*	-.08	-.06
6. Work/Time Pressure	-.24**	.01	-.15*	-.26**	-.13	.57**	.15*	-.14*	-.22**	-.21**	-.04	-.17**	-.24**	.18**	.09	.09
7. Physical Demand	-.12	-.19**	-.12	-.11	-.14*	.07	.53**	-.16*	-.14*	-.12	-.05	.03	-.17*	.22**	.07	.21**
8. Skill Discretion	.12	.03	.06	.22**	.02	-.15*	-.15*	.67**	.22**	.26**	.12	.01	.23**	-.11	-.02	.00
9. Decision Authority	.24**	.07	.10	.29**	.09	-.17**	-.12	.21**	.61**	.22**	.17**	.09	.25**	-.19**	-.12	-.10
10. Social Support Supervisor	.14*	.00	.07	.36**	.06	-.15*	-.21**	.19**	.18**	.68**	.29**	-.02	.28**	-.16*	-.08	-.11
11. Social Support Colleagues	.11	.08	.04	.38**	-.04	-.09	-.08	.15*	.12	.30**	.61**	.01	.14*	-.11	.02	-.02
12. Nurse/Doctor Collaboration	.26**	.13	.15*	.17**	.14*	-.10	-.17**	.08	.12	.05	.01	.51**	.22**	-.12	-.03	-.07
13. Job Satisfaction	.21**	.09	.24**	.28**	.22**	-.26**	-.17*	.21**	.25**	.24**	.07	.11	.56**	-.23**	-.17*	-.16*
14. Emotional Exhaustion	-.12	-.05	-.08	-.15*	-.15*	.17**	.08	-.12	-.17**	-.15*	-.09	-.09	-.24**	.46**	.22**	.22**
15. Psychological Distress	-.10	-.06	-.11	-.08	-.15*	.06	.00	-.13	-.18**	-.07	-.01	-.09	-.25**	.30**	.43**	.30**
16. Somatic Complaints	-.14*	-.00	-.08	-.04	-.09	.12	.07	-.14*	-.10	-.03	-.02	-.08	-.18**	.28**	.22**	.48**

¹ Correlations between changes in work conditions and T2 outcomes (normal causal relationships) can be found at the lower left half of the diagonal. Correlations between changes in outcomes and T2 work conditions (reversed causal relationships) can be found at the upper right half of the diagonal. The diagonal presents correlations of change scores with T2 scores of the corresponding work condition and outcome.

² * $p < .01$; ** $p < .001$

Table 2 Summary of Hierarchical Regression Analysis for differences in Organizational and Environmental Conditions and differences in Job Characteristics predicting Outcomes on t2

IV	Job Satisfaction		Emotional Exhaustion		Psychological Distress		Somatic Complaints	
	ΔR^2	β	ΔR^2	β	ΔR^2	B	ΔR^2	B
Gender	.01	.06	.00	.03	.01	.08	.01	.09
Age		.07		-.02		-.02		.04
Outcome t1	.23**	.48**	.29**	.54**	.26**	.51**	.28**	.53**
Work Time Pressure t1	.05	.09	.05	.00	.04	.06	.05	.00
Physical Demands t1		-.03		.16*		.07		.12
Skill Discretion t1		.00		.09		.09		.00
Decision Authority t1		-.04		-.09		-.08		-.11
Support Supervisor t1		.03		.04		.00		.04
Support Colleagues t1		.12		.04		-.05		.04
Nurse-Doctor Collaboration t1		.03		.05		.02		.06
Personnel Resources t1		.03		.06		.10		.11
Material Resources t1		.17*		.00		-.11		-.04
Reward t1		.02		.00		.00		.12
Work Agreements t1		-.06		-.08		-.02		-.12
Communication t1		.07		-.06		.06		-.04
Δ Work Time Pressure	.35**	-.06	.16**	.31**	.11**	.17	.08**	.17
Δ Physical Demands		-.04		.14*		.04		.16*
Δ Skill Discretion		.18**		.03		.01		-.05
Δ Decision Authority		.19**		-.15		-.22**		-.05
Δ Support Supervisor		.22**		-.10		-.09		.04
Δ Support Colleagues		-.04		-.06		-.04		-.09
Δ Nurse-Doctor Collaboration		.08		-.07		-.09		.00
Δ Personnel Resources		.06		.16		.13		.02
Δ Material Resources		.03		-.01		.09		-.05
Δ Reward		.21**		-.03		-.08		-.04
Δ Work Agreements		.04		.01		.09		.08
Δ Communication		.15**		-.09		-.14		-.07
Full model		Adjusted R ² =.60		Adjusted R ² =.46		Adjusted R ² =.35		Adjusted R ² =.37
		F(27,282)=		F(27,288)=		F(27,283)= 7.27		F(27,284)= 7.70
		18.11		10.82				

* $p < .01$

** $p < .001$

come measures. The outcome measures at T1 predict up to four percent of the job conditions at T2. Changes in outcomes predict up to 17% of the variance of (perceived) changes in the job conditions. An increase in job satisfaction over time is related to changes in (ratings of) all occupational stressors. A change in emotional exhaustion also predicts changes in (ratings of) all occupational stressors, though the betas are all smaller than those for job satisfaction. Nurses that develop more somatic complaints over time, also experience more work and time pressure, higher physical demands, and less decision authority, less personnel resources and less reward over time. Finally, an increase in psychological distress over time is related to more (experienced) work and time pressure, less decision authority, and with poorer evaluation of quality of work agreements and procedures, and less well rated communication. We performed separate regression analyses for each work condition predicting each outcome, to be able to make a comparison between the proportions of explained variance and beta's of the normal causal relationships and the reversed causal relationships. The results are summarized in tables 4a (comparison of R^2) and table 4b (comparison of betas). The results show different patterns for job satisfaction and emotional exhaustion on the one hand and psychological distress and somatic complaints on the other hand. For psychological distress and somatic complaints, the work conditions explain more variance in the outcomes than vice versa. Similarly, all betas are higher in case of the normal causal relationships compared to the reversed causal relationships. For job satisfaction and emotional exhaustion, there is no clear dominance of normal or reverse causality.

4.4 Discussion

The present study extends previous research on occupational stress by simultaneous examination of normal causal relationships (the influence of job conditions on health and wellbeing outcomes) and reversed causal relationships (the influence of health and wellbeing outcomes on job conditions). Furthermore, where most longitudinal studies focus on the influence of static work conditions on health and well-being at later point in time, the present study examines the influence of changes in job conditions on changes in health and well-being (and vice versa). Generally, the results indicate that changes in work conditions and changes in health and well being mutually influence each other.

The results partly confirm our first hypothesis: Changes in work conditions are related to changes in health and well-being of nurses. Changes in work con-

Table 3 Summary of Hierarchical Regression Analysis for differences in Outcomes predicting Organizational and Environmental Conditions t2 and Job Characteristics t2. Separate regression analyses for each outcome

IV	WTP		PhD		SD		DA	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Gender	.00	.07	.03	-.05	.01	-.06	.01	-.03
Age		-.03		-.16*		-.11		.06
Outcome t1	.11**	.33**	.39**	.63**	.07**	.26**	.06**	.40**
Job Satisfaction t1	.02	-.13**	.00	.00	.03**	.20**	.02	.14
Em Exhaustion t1	.02*	.15*	.00	-.07	.00	-.06	.02*	-.13*
Som Complaints t1	.01	.10	.00	-.07	.04**	-.22**	.01	-.08
Psych Distress t1	.00	.05	.00	-.05	.04**	-.20**	.01	-.10
Δ Job Satisfaction	.13**	-.40**	.05**	-.26**	.15**	.43**	.17**	.46**
Δ Em Exhaustion	.12**	.39**	.04**	.23**	.04**	-.21**	.09**	-.34**
Δ Som Complaints	.03**	.19**	.03**	.18**	.01	-.11	.03**	-.18**
Δ Psych Distress	.02*	.16*	.00	.06	.02	-.14	.05**	-.25**

IV	SSS		SSCO		NDC		PR	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Gender	.01	-.06	.02	-.02	.01	.11	.00	.02
Age		-.11		-.15*		-.02		.01
Outcome t1	.09**	.29**	.18**	.43**	.13**	.36**	.07**	.26**
Job Satisfaction t1	.02*	.15*	.00	.02	.00	.03	.01	.10
Em Exhaustion t1	.01	-.07	.00	.00	.00	-.04	.00	-.04
Som Complaints t1	.00	.02	.00	.00	.00	-.02	.00	.03
Psych Distress t1	.01	-.07	.00	-.06	.00	-.01	.00	-.01
Δ Job Satisfaction	.18**	.48**	.04**	.24**	.09**	.34**	.17**	.46**
Δ Em Exhaustion	.06**	-.28**	.03**	-.19**	.03**	-.20**	.05**	-.26**
Δ Som Complaints	.01	-.12	.00	-.06	.01	-.11	.02*	-.17*
Δ Psych Distress	.01	-.13	.00	-.05	.00	-.07	.01	-.11

IV	MR		R		WA		CO	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Gender	.04*	.06	.02	.11	.00	.02	.01	.10
Age		.19**		.10		.00		.07
Outcome t1	.17**	.41**	.23**	.49**	.13**	.36**	.25**	.50**
Job Satisfaction t1	.02**	.16**	.01	.12	.02*	.14*	.01	.13
Em Exhaustion t1	.00	-.03	.01	-.07	.02*	-.14*	.00	-.07
Som Complaints t1	.00	-.03	.00	.06	.01	-.08	.00	-.05
Psych Distress t1	.00	.02	.00	.00	.01	-.12	.00	-.02
Δ Job Satisfaction	.05**	.25**	.11**	.29**	.15**	.44**	.12**	.39**
Δ Em Exhaustion	.03**	-.19**	.02**	-.17**	.06**	-.28**	.04**	-.21**
Δ Som Complaints	.01	-.12	.02*	-.15*	.01	-.09	.01	-.12
Δ Psych Distress	.00	.00	.01	-.13	.02*	-.15*	.02**	-.17**

* $p < .01$

** $p < .001$

Table 4a R² for each pair of regression analyses. Left: normal causal regression. Right: reverse causal regression

	Job Satisfaction		Emotional Exhaustion		Psychological Distress		Somatic Complaints	
	Normal R ²	Reverse R ²	Normal R ²	Reverse R ²	Normal R ²	Reverse R ²	Normal R ²	Reverse R ²
Personnel Resources	.13**	.17**	.04**	.05**	.02**	.01	.02**	.02**
Material Resources	.04**	.05**	.03**	.03**	.00	.00	.02*	.01
Reward	.12**	.11**	.02**	.02**	.03**	.01	.02**	.02**
Work Agreements	.12**	.15**	.05**	.06**	.02**	.02**	.01	.01
Communication	.11**	.12**	.04**	.04**	.03**	.02**	.02*	.01
Work/ Time Pressure	.11**	.13**	.10**	.12**	.04**	.02**	.03**	.03**
Physical Demand	.07**	.05**	.06**	.04**	.01*	.00	.04**	.03**
Skill Discretion	.12**	.15**	.03**	.04**	.02*	.02	.02**	.01
Decision Authority	.15**	.17**	.07**	.09**	.05**	.05**	.03**	.03**
Support Supervisor	.15**	.18**	.05**	.06**	.02*	.01	.01*	.01
Support Colleagues	.04**	.04**	.02**	.03**	.01	.00	.01	.00
Nurse-Doctor Collab	.08**	.09**	.02**	.03**	.02**	.00	.01*	.01

* $p < .01$

** $p < .001$

Table 4b Beta's for each pair of regression analyses. Left: normal causal regression. Right: reverse causal regression

	Job Satisfaction		Emotional Exhaustion		Psychological Distress		Somatic Complaints	
	Normal β	Reverse β	Normal β	Reverse β	Normal β	Reverse β	Normal β	Reverse β
Personnel Resources	.48**	.46**	-.27**	-.26**	-.20**	-.11	-.20**	-.17**
Material Resources	.27**	.25**	-.23**	-.19**	-.06	.00	-.17*	-.12
Reward Work	.39**	.29**	-.17**	-.17**	-.18**	-.13	-.16**	-.15**
Agreements	.40**	.44**	-.26**	-.28**	-.16**	-.15**	-.12	-.09
Communication	.38**	.39**	-.23**	-.21**	-.19**	-.17**	-.14*	-.12
Work/ Time Pressure	-.41**	-.40**	.39**	.39**	.25**	.16**	.21**	.19**
Physical Demand	-.27**	-.26**	.26**	.23**	.10*	.06	.22**	.18**
Skill Discretion	.42**	.43**	-.20**	-.21**	-.15*	-.14	-.18**	-.11
Decision Authority	.44**	.46**	-.30**	-.34**	-.26**	-.25**	-.19**	-.18**
Support Supervisor	.45**	.48**	-.27**	-.28**	-.16*	-.13	-.14*	-.12
Support Colleagues	.22**	.24**	-.17**	-.19**	-.09	-.05	-.11	-.06
Nurse-Doctor Collab	.35**	.34**	-.19**	-.20**	-.19**	-.07	-.15*	-.11

* $p < .01$

** $p < .001$

ditions are most strongly related to changes in job satisfaction and emotional exhaustion. The influence of changes in work conditions on somatic complaints and psychological distress is much weaker, which is in accordance with other studies that examine multiple stress related outcomes (van der Doef, Maes, & Diekstra, 2000). It seems that somatic complaints and psychological distress outcomes are more influenced by variables outside the work environment. The results of our study suggest that changes in different work conditions are responsible for changes in job satisfaction and changes in emotional exhaustion. Emotional exhaustion is most strongly influenced by increases in job demands, which is in accordance with other longitudinal studies among nurses (Bourbonnais et al. 1999; de Lange et al. 2004). This means that lowering the work pressure or giving nurses more time to be able to provide good care may prevent serious health consequences for nurses. Physical demands could be lowered by good equipment, such as mechanical lifts. The results of our study suggest that nurses' job satisfaction can be increased by giving nurses more control over their job. Increases in support from a supervisor and rewards can also contribute to an increase in job satisfaction. The results of our study furthermore underline the importance of financial reward in relation to job satisfaction, as is found in recent studies among nurses (Demerouti et al. 2000; Mc Vicar 2003; Tyson et al. 2004). Finally, our results suggest that a better communication flow between departments and a good structure of patient information can also increase job satisfaction, which confirms results of cross sectional studies (Davidson et al. 1997). We did not find that changes in demand or personnel resources were related to job satisfaction. The results in studies that examine the relationship between job demands and job satisfaction are inconsistent: some find a relationship (de Jonge et al. 2001), whereas others do not (de Lange et al. 2004). This difference could be due to differences in operationalizations of either the concept of job demands or the concept of job satisfaction. The study of de Jonge et al. (2001) used a wide range of qualitative and quantitative demanding aspects, whereas de Lange et al. (2004) only measured work and time pressure, as we did. It could be that more qualitative aspects of job demands (exposure to death and dying or dealing with emotions of patients and relatives) are more related to job satisfaction than the quantitative aspects (time pressure).

The results partly confirm our second hypothesis. Again, a distinction can be made in the results concerning job satisfaction and emotional exhaustion on the one hand and somatic complaints and psychological distress on the other hand. Changes in job satisfaction and in emotional exhaustion have an influence on all job conditions. Changes in somatic complaints and psychological distress

predicted changes in some of the job stressors, and the proportion of explained variance was considerably lower. Similarly, de Lange et al. (2004) found that job satisfaction and emotional exhaustion, but not depression influenced job stressors. Daniels and Guppy (1997) found that only extreme psychological distress lead to higher reported intensity of stressors. Reversed associations between emotional exhaustion and work conditions were found in other studies as well, for example for job demands (Leiter et al. 1996; de Jonge et al. 2001; de Lange et al. 2004), and social support (de Lange et al. 2004). It thus seems that mainly changes in the work related outcomes (job satisfaction and emotional exhaustion) have an influence on the work conditions. Zapf et al. (1996) give two possible explanations for these reverse relationships. Firstly, a change in health and well being can result in a real change in work environment. For example, workers that feel less healthy or less satisfied over time, possibly have less chance of promotion than their healthy and satisfied co-workers. It is also plausible that the pressure and responsibilities are temporarily lowered for someone with physical or mental health problems. Although this seems a plausible explanation, the results do not point in that direction: for example a reduction in job satisfaction and an increase in emotional exhaustion lead to more work pressure. A second possible explanation for reversed causal relationships is that a decrease in satisfaction and the development of physical or psychological complaints has an influence on nurses' perceptions of their work environment and tasks (Zapf et al. 1996). It could be that more exhausted and less healthy workers experience the demands as more heavy, because their resources are already at an end. Or perhaps they simply recall more negative situations. Future research should examine these mechanisms underlying the effect of health on work conditions.

For job satisfaction and emotional exhaustion, the proportion of explained variance and the betas of the normal and reversed associations are comparable. There appears to be no dominance of the normal causal relationship over the reversed causal relationship. For psychological distress and somatic complaints, there is a trend of normal causal relationships being dominant over reversed causal relationships. Other studies have found evidence for dominance of normal causal relationships (de Lange et al. 2004) as well as for dominance of reversed causality (de Jonge et al. 2001). More longitudinal research is needed to examine the relative strength of normal causal relationships and reversed causal relationships for different work conditions and outcomes.

The present study has some limitations that should be noted. A common bias in longitudinal occupational research concerns the healthy worker effect: un-

healthy workers are more likely to have quit their jobs at a second measurement time; hence the healthy workers are overrepresented in the sample of workers that respond both times. The nurses who still worked in their position at T2 experienced less emotional exhaustion and psychological distress at T1 than those who had quit their job. Furthermore, the respondents at T2 had a higher T1 job satisfaction than the non-respondents. It appears that the participants in our study were healthier and more satisfied than the non-participants. This has implications for the generalization of our results. The results of our study apply especially to the more healthy and satisfied subpopulation. A second limitation concerns the design of our study. We used a two-wave panel design with a time interval of three years. The choice of a time interval should be based on how the effect of work conditions on outcomes evolves over time. For example, it is not likely that a change in work conditions will lead to emotional exhaustion in a few months time. Burnout is a chronic stress reaction that usually becomes manifest after exposure to stressors of more than one year (Bakker et al. 2003). We suggest that future studies explore the influence of changes in multiple waves with different time intervals so that the time process underlying the mutual influence of work conditions and different health outcomes becomes clearer.

In conclusion, the results of this study are consistent with transactional models of stress, which indicate that stressors and stress outcomes mutually influence each other. This study confirms the mutual influence of stressors and stress reactions, at least for the stress outcomes of job satisfaction and emotional exhaustion. Future study on the underlying mechanisms is needed.

Because of this mutual influence, the question of cause and consequence becomes more of a discussion on the chicken or the egg. However, the findings do have large consequences in the light of interventions. Because of the mutual influence of nurse's health and environment, it seems of even bigger importance to prevent nurses from a negative spiral where adverse work conditions and reduced health and well being negatively influence each other. For hospital management, it is therefore to intervene early in this process by improving the work environment. The findings of this study can be a point of departure for the focus of such interventions.

References

- Akerboom, S. (1999) The Organizational Risk Factor Questionnaire (ORFQ). Cognitive Psychology, Leiden University, Leiden, The Netherlands.
- Arrindel, W.A., & Ettema, J.H.M. (1986) Symptom Checklist-90, SCL-90, een multidimensionele psychopathologie-indicator, handleiding [Symptom Checklist-90, SCL-90, a multidimensional psychopathology-indicator, manual]. Lisse, the Netherlands: Swets Test Services.
- Bakker, A., Taris, T. and de Jonge, J. (2003) Onderzoek in de psychologie van arbeid en gezondheid. In *De psychologie van arbeid en gezondheid* (Schaufeli, W., Bakker, A., & Schreurs, P.J.G. eds), Bohn Stafleu Van Loghum, Houten, pp. 217-240.
- Bourbonnais, R., Comeau, M. and Vezina, M. (1999) Job strain and evolution of mental health among nurses. *Journal of Occupational Health Psychology* 4, 95-107.
- Bradley, J.R. and Cartwright, S. (2002) Social support, job stress, health, and job satisfaction among nurses in the United Kingdom. *International Journal of Stress Management* 9 (3), 163-182.
- Buunk, B.P., Schaufeli, W.B. and Ybema, J.F. (1994) Burnout, Uncertainty, and the desire for social comparison among nurses. *Journal of Applied Social Psychology* 24(19), 1701-1718.
- Campbell, D.T. and Kenny, D.A. (1999) *A primer on regression artifacts*. The Guilford Press: New York.
- Cooper, C.L. and Cartwright, S. (1994) Healthy mind, healthy organization: A proactive approach to occupational stress. *Human Relations* 47, 455-471.
- Daniels, K. and Guppy, A. (1997) Stressors, locus of control, and social support as consequences of affective psychological wellbeing. *Journal of Occupational Health Psychology* 2, 156-174.
- Davidson, H., Folcarelli, P.H., Crawford, S., Duprat, L.J. and Clifford, J.C. (1997) The effects of health care reforms on job satisfaction and voluntary turnover among hospital-based nurses. *Medical Care* 35(6), 634-645.
- Decker, F.H. (1997) Occupational and nonoccupational factors in job satisfaction and psychological distress among nurses. *Research in Nursing and Health* 20, 453-464.

- De Jonge, J., Dormann, C., Janssen, P.P.M., Dollard, M., Landeweerd, J.A. and Nijhuis, F.J.N. (2001) Testing reciprocal relationships between job characteristics and psychological well-being: a cross-lagged structural equation model. *Journal of Occupational and Organizational Psychology* 74, 29-46.
- De Jonge, J., Le Blanc, P.M., Schaufeli, W.B. and van der Linden, S. (1998) Veranderingen In werkkenmerken in relatie tot verandering in burnout en arbeidstevredenheid. *Gedrag en Organisatie* 11, 121-134.
- De Lange, A.H., Taris, T. W., Kompier, M. A. J., Houtman, I. L. D. and Bongers, P. M. (2002) Effects of stable and changing demand-control histories on worker health. *Scandinavian Journal of Work Environment and Health* 28(2), 94-108.
- De Lange, A. H., Taris, T. W., Kompier, M. A. J., Houtman, I. L. D. and Bongers, P. M. (2003) "The very best of the millenium": Longitudinal research and the demand-control-(support) model. *Journal of Occupational Health Psychology* 8, 282-305.
- De Lange, A. H., Taris, T. W., Kompier, M. A. J., Houtman, I. L. D. and Bongers, P. M. (2004) The relationships between work characteristics and mental health: examining normal, reversed and reciprocal relationships in a 4-wave study. *Work and Stress* 18(2), 149-166.
- Demerouti, E., Bakker, A. B., Nachreiner, F. and Schaufeli, W. B. (2000) A model of burnout and life satisfaction amongst nurses. *Journal of Advanced Nursing* 32, 454-464.
- Derogatis, L.R. (1983) *SCL-90-R: Administration, Scoring & Procedures Manual-II* (2nd Ed.). Baltimore: Clinical Psychometric Research.
- Finkel, S.E. (1995) *Causal analysis with panel data*. Sage Publications: Thousand Oaks, California.
- Firth, H., & Britton, P. (1989) Burnout, absence and turnover amongst British nursing staff. *Journal of Occupational Psychology* 62(1), 55-59.
- Irvine, D.M. and Evans, M.G. (1995) Job satisfaction and turnover among nurses: integrating research findings across studies. *Nursing Research* 44(4), 246-253.
- Leiter, M.P. and Durup, M.J. (1996) Work, home, and in-between: A longitudinal study of spill-over. *Journal of Applied Behavioral Science* 32, 29-47.
- Maes, S., Akerboom, S., Van der Doef, M., and Verhoeven, C. (1999) De Leidse Arbeids Kwaliteits Schaal voor Verpleegkundigen (LAKS-V) [The Leiden

Quality of Work Life Questionnaire for Nurses (LQWLQ-nurses)]. Health Psychology, Leiden University, Leiden, The Netherlands.

McVicar, A. (2003) Workplace stress in nursing: a literature review. *Journal of Advanced Nursing* 44(6), 633-642.

Mikkelsen, A., Saksvik, P.O. and Landsbergis, P. (2000) The impact of a participatory organizational intervention on job stress in community health care institutions. *Work & Stress* 14(2), 156-170.

Schaufeli, W. and Van Dierendonck, D. (1994) Burnout, een begrip gemeten: de Nederlandse versie van de Maslach Burnout Inventory (MBI-NL). [Burnout, a concept measured: the Dutch version of the Maslach Burnout Inventory (MBI-NL)]. *Gedrag en Gezondheid, Tijdschrift voor Psychologie en Gezondheid* 22(4), 153-172.

Taris, T.W. (2000) *A primer in longitudinal data analysis*. London: Sage.

Tyson, P.D and Pongruengphant, R. (2004) Five-year follow-up study of stress among nurses in public and private hospitals in Thailand. *International Journal of Nursing Studies* 41, 247-254.

Van der Doef, M. (2000) *The Job Demand-Control(-Support) model: from the past to the future*. Unpublished doctoral dissertation, Leiden University, Leiden, the Netherlands.

Van der Doef, M. and Maes, S. (1999) The Leiden Quality of Work Questionnaire: its construction, factor structure, and psychometric qualities. *Psychological Reports* 85, 954-962.

Van der Doef, M., Maes, S. and Diekstra, R. (2000) An examination of the Job Demand-Control-Support model with various occupational strain indicators. *Anxiety, Stress and Coping*, 13, 165-185.

Zapf, D., Dormann, C. and Frese, M. (1996) Longitudinal studies in organizational stress research: A review of the literature with reference to methodological issues. *Journal of Occupational Health psychology* 1, 145-169.

Chapter 5

Goal Orientation and Health and Wellbeing outcomes in Nurses

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Goal Orientation and Health and Well-being outcomes in Nurses

Abstract

The present study distinguishes between two sources of predictors of job strain in nurses: the psychosocial work environment and nurses' work related goal orientation. Regulatory Focus Theory stresses the importance of goal orientation by distinguishing between a prevention focus and a promotion focus. The first aim of this study is to investigate the influence of prevention and promotion oriented goals on nurses' job satisfaction, emotional exhaustion, psychological distress and somatic complaints, over and above the influence that job stressors have on these stress indicators. The second aim was to explore the interactions between job stressors and goal orientation in the explanation of stress outcomes. The goals of 575 nurses were categorized into a "prevention focus", a "promotion focus" or "other" category. Hierarchical regression analyses were performed to examine the relative influence of work environmental variables, goal orientation and interactions between work environment and goal orientation on the stress outcomes. Goal orientation added to the prediction of job stress over and above work environmental variables. Interaction effects were found. The results of the present study suggest that it is worthwhile for future strain research to incorporate regulatory processes such as goal orientation

5.1 Introduction

Job strain in the nursing profession is a persisting worldwide problem. Recent publications from the World Health Organization state that health care workers are among the most stressed occupational groups (di Martino, 2003). Within the health care sector, nurses are at high risk for strain-related health problems (Bertolote & Fleischmann, 2001). Job strain among nurses has been associated with decreased job satisfaction (Blegen, 1993), increased psychological and physical complaints (Hillhouse & Adler, 1997; Mc Vicar, 2003), and burnout (Bertolote & Fleischmann, 2001). It is thus important to understand the factors that can explain the prevalence of job strain in this high risk population. The present study distinguishes between two sources of predictors of job strain in nurses: the psychosocial work environment and nurses' work related goal orientation.

5.1.1 Work Environment

To date, there is a wealth of empirical evidence regarding the types of stressors that have been found to consistently predict job strain in nursing populations. Literature reviews demonstrate clear associations between job characteristics, the social work environment, and variables regarding the organization of work on the one hand, and strain outcomes on the other (Blegen, 1993, Irvine and Evans, 1995, Mc Vicar, 2003). More specifically, a recent review indicated that workload, leadership / management style, emotional costs of caring and professional conflict are main sources of job strain among nurses (Mc Vicar, 2003). Work characteristics, such as workload, job control and social support, and characteristics regarding the organization of work, such as reward and communication or information flows have also been found to predict job satisfaction (Blegen, 1993; Irvine and Evans, 1995), burnout (Maslach, Schaufeli, and Leiter, 2001; Gelsema, van der Doef, Maes, Verhoeven, Akerboom, 2005), and other indicators of job strain (Mc. Vicar, 2003). In a meta-analysis, Blegen (1993) found that job stress was strongly associated with reduced job satisfaction. Regarding variables related to job satisfaction, Blegen (1993) found moderate correlations with supervisor communication, autonomy, routinization, and communication with peers. Irvine and Evans (1995) found similar relationships between job satisfaction and these job characteristics. Although job stressors consistently predict strain, there is still a significant amount of variance left unexplained because of individual differences in the response to job stressors.

5.1.2 Goal Orientation

Research on the individual's response to job stressors has, until recently, been dominated by models that emphasize the role of stable personality traits such as affective dispositions (Smith et. al, 1998), commitment (Reilly, 1994), hardiness (Papadatou, 1994) or type A behavior (Bourbonnais, 1999), and the use of coping strategies (de Rijk, le Blanc, Schaufeli, & de Jonge, 1998; Tyler & Cushway, 1995). More recently, researchers have begun to focus on motivational processes and more specifically on the pursuit of goals at work (Pomaki, Maes & ter Doest 2004). One way in which we can study how goals relate to employee outcomes is by looking at goal orientations. Regulatory Focus Theory (Higgins, 1997, 1998) stresses the importance of goal orientation by distinguishing between a prevention focus and a promotion focus. The foci differ in both the needs people seek to satisfy as well as the psychological state they seek to experience. In people with a promotion focus, the fundamental needs are concerned with growth and development, and the psychological state is defined in terms of absence or presence of positive outcomes. In a prevention focus the underlying needs are concerned with safety and protection, and the psychological state is described as the presence or absence of negative outcomes. There are two potential ways of expressing a certain regulatory focus, and getting closer to needs and desired psychological end states: one is through behaviour, the other is through setting goals. Goals can be particularly instrumental to need satisfaction (Kasser & Ryan, 1996).

In laboratory experiments, it became clear that people's regulatory focus influences the nature and magnitude of their emotional experience (Higgins, Shah, & Friedman, 1997). Dependent on goal attainment, people with a promotion focus vary along the absence or presence of a positive outcome. People with a prevention focus vary along the absence or presence of a negative outcome. Research in the field of work motivation and job satisfaction suggests that people are more satisfied when their emotional experience at work is positive rather than negative (Weiss & Cropanzano, 1996). In a recent article, Brockner and Higgins (2001) suggest that work attitudes such as job satisfaction may be experienced more intensely when people succeed on the job with a promotions focus than with a prevention focus. People with a promotion focus are more motivated by positive incentive systems that give the opportunity to attain the goal through gains and advancement. People in a prevention focus however are more motivated by negative incentive systems that give the opportunity to attain the goal by being careful. This reasoning could have implications for the

relationship that regulatory focus may have with both job stressors and strain outcomes. Regulatory focus – as a means of appraising one’s goals – could influence the relationship that job stressors have with strain indicators. More specifically, it can be hypothesized that nurses whose goals are focused on safety and protection (i.e., prevention focus) will experience job stressors that threaten those goals as more relevant to their health and well being. Thus, in addition to the main effects of goal orientation on health and well being, interaction models may also hold promise for explaining daily variations in health and well being. The present study examines the influence of two types of goal orientation, prevention- vs. promotion-focused goals, based on Regulatory Focus Theory. Main effects as well as interaction effects with job stressors are examined in the explanation of health and well being outcomes.

5.1.3 Aims and Research Questions

The first aim of this study is to investigate the influence of prevention and promotion oriented goals on nurses’ job satisfaction, emotional exhaustion, psychological distress and somatic complaints, over and above the influence that job stressors have on these stress indicators. We investigated a large array of job stressors, namely work and time pressure, physical demands, skill discretion, decision authority, social support from supervisor and colleagues, nurse-doctor collaboration, and organizational characteristics, such as personnel and material resources, (financial) reward, work procedures, and communication. We expected that goal orientations would influence stress outcomes over and above the influence of job stressors. More specifically, we expected that nurses with promotion focused goals would have higher job satisfaction, and lower levels of emotional exhaustion, psychological distress and somatic complaints than nurses with prevention focused goals.

The second aim was to explore the interactions between job stressors and goal orientation in the explanation of stress outcomes. We hypothesized that nurses with a prevention focus would evaluate the negative influence of job stressors (eg. work and time pressure, physical demands, and a lack of skill discretion, decision authority, social support from supervisor and colleagues, nurse-doctor collaboration, personnel and material resources, (financial) reward, work procedures, and communication) as more relevant to their health and well-being than nurses with a promotion focused goal.

5.2 Method

5.2.1 Sample

The research sample consisted of 1425 registered nurses working within an academic hospital in the Netherlands. A total of 884 questionnaires were returned (a response rate of 62%) of which 575 questionnaires were complete and usable for this study. Of this population, the majority was female (85%). The mean age was 39.1 years (SD=9.0). 55% of the nurses had job tenures of more than 10 years, with 65% working in their present position for at least 5 years. 70% of the nurses worked part time. Respondents were compared to non-respondents with respect to age and gender. Respondents differed from non-respondents in their age: respondents were in general older than non-respondents ($t(1423)=2,92$; $p<.01$) (M age non-respondents:37.6). No differences were found with respect to gender.

5.2.2 Measures

Socio-demographic variables

Data were collected on age and gender.

Job stressors

The Leiden Quality of Work Life Questionnaire for nurses (LQWLQn) was used to assess job stressors (Maes, Akerboom, van der Doef & Verhoeven, 1999). It measures the following job characteristics: work and time pressure, physical demands, skill discretion, decision authority, social support supervisor, social support colleagues, nurse-doctor collaboration, and the following work conditions: personnel resources, material resources, reward, work procedures, and communication.

Goal elicitation

To explore the nurses' work goals, an open goal elicitation procedure was employed based on the assessment of personal projects (Karoly and Ruehlman (1995); Little (1983). We asked nurses to write down their most important

work goal for the coming 12 months. Examples of midlevel goals were given. Nurses were asked to think of possible goals and were instructed to select the most important goal for them personally with respect to the work domain.

Outcome measures

Job satisfaction

Job satisfaction was assessed with the LQWLQn Job Satisfaction scale (6 items; e.g. “If I had to choose now, I would take this job again”, “I am satisfied with my job”, $\alpha = .84$). Responses were given on a 4 point rating scale (totally disagree / totally agree) with higher scores indicating more job satisfaction.

Emotional Exhaustion

Emotional exhaustion appears to be one of the main components of occupational burnout among human service professionals, including nurses (Buunk, Schaufeli & Ybema, 1994). The validated Dutch version of the Maslach Burnout Inventory (MBI-NL, Schaufeli & van Dierendonck, 1995) was used to assess emotional exhaustion. The scale consists of 9 items; (e.g. “At the end of a work day, I feel empty”). Items were scored on a 7-point rating scale, ranging from “never” to “every day / always”.

Psychological Distress and Somatic Complaints

Psychological distress and somatic complaints were assessed by means of three subscales of a validated Dutch version of the SCL-90, a 90-item inventory developed by Derogatis (1983). The Dutch version of the SCL-90 has been found to have adequate internal consistency, reliability and validity (Arrindel & Ettema, 1986). Two subscales were used to measure psychological distress: anxiety (10 items, e.g. “feeling afraid”) and depression (16 items, e.g. “feeling lethargic”). A mean score of the two scales was calculated, because of the high correlation between the two scales ($r=.77$). Somatic complaints was measured using a subscale of the SCL-90 (12 items, e.g. “pain in chest and heart region”). Items were scored on a 5-point rating scale ranging from “not at all” to “very much”.

5.2.3 Procedure

The questionnaires were sent to the home address of the nurses. Participation in the study was on a voluntary basis. Respondents could return the questionnaire without costs and anonymously.

5.2.4 Analyses

Regulatory focus

The goals were classified according to their regulatory focus. Following Higgins' definition, a goal was classified as a "promotion focused goal" if it was concerned with growth and development. It was classified as a "prevention focused goal" if it was concerned with safety and protection. If the goal was not concerned with growth/development or safety/ protection, it was rated as "other".

The goals were classified by three psychologists individually. Each goal was classified according to its degree of conceptual match with the definition of the goal orientation categories. An initial agreement rate was calculated. The three researchers received an overview of their own scores, compared to those of the other two raters. The goals of which the categorization deviated from that of the other two raters were considered a second time and each researcher considered revision of their individual score. Hereafter, the interrater reliability was calculated a second time.

Regression Analysis

To answer the research questions, hierarchical regression analyses were performed. For each outcome (job satisfaction, emotional exhaustion, psychological distress and somatic complaints) we controlled for gender, age, and job stressors in the first two steps of the regression analyses. In the third step goal orientation (prevention-promotion focus) was entered. In the fourth step, the interactions between goal orientation and job stressors were entered stepwise.

5.3 Results

5.3.1 Regulatory focus

In total, 811 goals were classified according to regulatory focus. The initial agreement rate between the goal classifications of three independent raters was 54%. The raters differed in their categorization with respect to several types of goals: 1) goals that had to do with finding another job (could be out of a prevention or a promotion focus), 2) goals that had to do with learning to say "no" (learning something seems promotion focus, but underlying, the focus is

on prevention of work overload), 3) goals that were concerned with development of the ward, in stead of development of oneself, such as providing better patient care or teambuilding, 4) getting a raise, 5) finding a balance between home and work. The raters discussed the categorization of these types of goals and each of the raters reconsidered classification of goal classifications that deviated from that of the other two raters. After reconsideration of the classification, the interrater agreement was 71%. Table 1 gives an overview of the percentage of goals in each category. Promotion focused goals concerned e.g. ‘improve

Table 1 Interrater agreement of goal classifications and percentages of goals

	agreement	percentage ¹
Regulatory focus (575 goals)	71%	
Promotion focused goal		71%
Prevention focused goal		17%
Other		12%

¹ percentage of agreed goals

my knowledge and skills’, or ‘improve the communication and organization of work on the ward’, whereas a prevention focus was expressed as e.g. ‘prevent becoming ill’ or ‘learn to say “no”’. The “other” category of the regulatory focus categories concerned goals such as ‘have fun in my job’ and ‘find a new job’.

5.3.2 Regression analyses

Before we performed the regression analyses, we checked if there was a relationship between regulatory focus and outcomes, by means of t-tests. The scores on the outcomes were compared between nurses with a promotion focused goal and those with a prevention focused goal. Nurses with a promotion focused goal experienced more job satisfaction ($t(432) = 4.66$, $p < .001$), less emotional exhaustion ($t(116.90) = 5.40$, $p < .001$), less psychological distress ($t(113.18) = -4.68$, $p < .001$) and fewer somatic complaints ($t(432) = -4.37$, $p < .001$) than nurses with a prevention focused goal. Regression analyses revealed that after controlling for age, gender and job stressors, regulatory focus explained unique and significant amounts of variance in emotional exhaustion, psychological distress and somatic complaints (see table 2). Regulatory focus adds to the proportion of explained variance in the outcomes: it adds 3% explained variance of emotional exhaustion, 3% of psychological distress, and 1% of somatic complaints. In addition, the regression analyses revealed several significant interaction effects. These effects additionally explained 1% of the variance in job

Table 2 Summary of hierarchical regression analysis: work environment, nurses' work goals and interactions as predictors of outcomes

IV	Job Satisfaction		Emotional Exhaustion	
	ΔR^2	β	ΔR^2	β
Gender	.00	.06	.01	.02
Age		.06		-.11
Work/Time Pressure	.46**	-.12*	.32**	.34**
Physical Demand		-.09*		.12**
Skill Discretion		.23**		-.08
Decision Authority		.15**		-.08
Social Support Supervisor		.16**		-.11*
Social Support Colleagues		.10*		-.05
Nurse/Doctor Collaboration		.05		.06
Personnel Resources		.01		.03
Material Resources		-.03		.03
Reward		.16**		-.10*
Work Agreements		-.04		-.01
Communication		.14**		.05
Goal: prevention/promotion	.00	-.06	.03**	.19**
Interactions			n.s.	
i. Physical Demand*Goal				
i. Skill Discretion*Goal				
i. Decision Authority*Goal				
i. Personnel Resources*Goal	.01*	-.11*		
i. Work Agreements*Goal				
Full model		Adjusted R ² = .45 F(16,388) = 21.78**		Adjusted R ² = .34 F(15,400) = 15.08**

IV	Psychological Distress		Somatic Complaints	
	ΔR^2	β	ΔR^2	β
Gender	.00	.03	.01	.03
Age		.01		.06
Work/Time Pressure	.16**	.23**	.19**	.25**
Physical Demand		.18**		.22**
Skill Discretion		-.04		-.12*
Decision Authority		-.05		-.11*
Social Support Supervisor		-.09		.01
Social Support Colleagues		-.05		-.07
Nurse/Doctor Collaboration		.03		.01
Personnel Resources		.09		.10
Material Resources		.00		-.11*
Reward		.03		.07
Work Agreements		-.01		.06
Communication		.01		.07
Goal: prevention/promotion	.03**	-.17**	.01*	.10*
Interactions	n.s.			
i. Physical Demand*Goal	.01*	.13*		
i. Skill Discretion*Goal	.01*	-.14*		
i. Decision Authority*Goal			.02**	.18**
i. Personnel Resources*Goal			.02**	-.16**
i. Work Agreements*Goal	.01*	.16*		
Full model		Adjusted R ² = .16 F(15,399) = 6.28**		Adjusted R ² = .21 F(17,397) = 7.57**

* $p < .05$

** $p < .01$

satisfaction, 3% in psychological distress and 4% in somatic complaints. With regard to job satisfaction, there is a significant interaction effect of regulatory focus and personnel resources. The influence of low personnel resources on job satisfaction is greater for nurses that focus on a prevention oriented goal. Moreover, regulatory focus also moderated the relationship between physical demand, skill discretion and work agreements on the one hand and psychological distress on the other. Nurses with a prevention focused goal experience more psychological distress due to physical demands and a lack of skill discretion. Nurses with a promotion focused goal benefit more from work agreements with respect to their psychological distress. Finally, regulatory focus moderated the relationship between personnel resources and decision authority on the one hand and somatic complaints on the other. The relationship between personnel resources and somatic complaints is stronger for nurses that have set a promotion focused goal. In a situation in which personnel resources are relatively high, nurses with a prevention focus have more somatic complaints. In other words, they do not benefit from good personnel resources as much as those nurses with a promotion focused goal. The relationship between decision authority and somatic complaints is stronger for nurses that have a prevention oriented goal. When confronted with low decision authority, nurses with a promotion focused goal have fewer somatic complaints.

5.4 Conclusion

In the present article, we examined the influence of two types of goals on strain outcomes among nurses: goals in which the focus was on growth and development (promotion focused goals) and goals in which the focus was on safety and protection (prevention focused goals). This distinction is based on Regulatory Focus Theory (Higgins, 1997). The first aim of the study was to examine the relationship between prevention and promotion focused goals on the one hand and health and wellbeing outcomes on the other in a sample of nurses working in an academic hospital. More specifically, we investigated whether these types of goals added to the prediction of health and well being outcomes, over and above job stressors such as workload, control, social support, communication and procedures. The second aim of this study was to investigate the interaction effects of promotion v.s. prevention focused goals and job stressors on health and well being outcomes.

With regard to our first research question, the results of our study demonstrate

that goal orientation adds to the explained variance in emotional exhaustion, psychological distress and somatic complaints over and above variance explained by job stressors. Although the additional variance explained by goal orientation is low (about 1-3%), the results of this study indicate that nurses that are oriented towards safety and protection indicate higher levels of emotional exhaustion and psychosomatic health complaints than nurses that are oriented towards growth and development. Regulatory Focus Theory states that people with a prevention focus are sensitive to the absence or presence of negative outcomes (Higgins, 1997). It could be that when attention is aimed towards negative outcomes, more negative emotions like emotional exhaustion or health complaints are triggered and experienced.

With regard to our second research question, we found significant interaction effects of goal orientation (towards prevention or promotion) and some of the job stressors in the prediction of job satisfaction and somatic complaints. The relationship between personnel resources and job satisfaction is stronger among nurses that have a promotion focused goal. Nurses with a prevention focused goal do not benefit from personnel resources as much as nurses that have promotion focused goals. The impact of decision authority on somatic complaints is also stronger among nurses with a prevention focus. These nurses benefit more from high control, but experience more complaints in a situation in which control is low. The interaction effects explain a relatively small amount of variance in the outcomes, which is typical for field experiments (Wall, Jackson, Mullarkey, & Parker, 1996). However, the effects do have theoretical and practical meaning. As Wall et al (1996) suggested, for a substantial portion of the sample, the independent variable does not explain variance in the outcome, whereas for the other part of the sample, variance is explained. Additional analyses revealed that this difference was the largest for the relationship between decision authority and somatic complaints. Decision authority accounted for 2% of the variance in somatic complaints for nurses with a promotion focus, but for 16% of the variance for nurses with a prevention focus. For this last group, low decision authority is a strong predictor of somatic complaints. This is a relevant finding, because it means that for a group of nurses, the amount of complaints could be reduced, and possibly sick leaves could be avoided by giving nurses a say in the organization and execution of their tasks and in decisions that involve their work.

5.4.1 Practical implications

Our results suggest that not all nurses benefit as much from certain job resources (personnel resources, control). From an intervention point of view it seems therefore worthwhile to pay attention to the work goals of nurses. Whether people adopt more of a promotion focus or prevention focus is a function of situational and dispositional factors (Brockner & Higgins, 2001). Perhaps nurses can be stimulated to focus more on growth and advancement, for instance, by stimulating professional development and training. In laboratory experiments, a promotion focus is stimulated by different reward systems (one focused on gains / nongains, the other on nonlosses / losses). Laboratory experiments are far more simple and controllable than a real life work environment. However, a reward system in which rewards (gains) for hard work are more explicitly emphasized in stead of non losses may have some effect on the types of goals nurses set and the focus of those goals.

5.4.2 Theoretical consequences

Transactional and interaction models of stress agree on the fact that stress or strain is always a combined effect of personal and environmental variables. Over the years, the influence of a wide range of stressors and personality characteristics on strain outcomes has been examined. More recently, also the role of personal work goals has come into play. Stress theorists like Lazarus attribute a central role to goals in the stress process: "A person is under stress if what happens defeats or endangers important goal commitment and situational intentions, or violates expectations." (Lazarus, 1999, p.60). The influence of different types of goals has not been examined that much. A number of studies have shown that the existence of a goal or need increases the selective responsiveness to goal or need-relevant stimuli (see Allport, 1955; Bruner & Krech, 1950). This goal related selective responsiveness determines the type of incentive most likely to motivate action (Shah, Higgins, & Friedman, 1998). Likewise, selective responsiveness could also determine the type of job resource or stressor that elicits an attitudinal (job satisfaction) or health related (somatic complaints) reaction. By demonstrating associations between goal orientation, the work environment, and strain outcomes, the present study shows that it is worthwhile to incorporate goal variables based on regulatory focus theory in studies on job strain.

5.4.3 Limitations of the present study and suggestions for further research

The present study has some limitations that should be noted. Firstly, the study has a cross sectional design. Therefore, only suggestions on causality can be derived from this study. We suggest that the type of goals nurses set, determines an emotional, attitudinal, or health related response. There could however also be a reversed causality. It is thinkable that nurses that have low job satisfaction are less likely to formulate a goal that is aimed at growth and advancement compared to nurses with high job satisfaction. Future (longitudinal) studies should give definite answers on questions concerning causality. A second limitation concerns the generalisability of the results. The study sample consisted of nurses working in an academic hospital. It could be that the effects found in this study only apply to this specific population, or to this work environment. For instance, it could be that nurses working in an academic environment are more committed towards advancement. Such a characteristic of the sample could have an influence on the results. The study should be done in other nursing populations to be able to pronounce upon the generalisability of the results.

The results of the present study suggest that it is worthwhile for future strain research to incorporate regulatory processes such as goal orientation. It is important to mention that the present study concentrates on goal orientation only, and ignores other goal processes such as goal commitment or goal frustration. Nurses have to do with numerous interests: those of patients, of a supervisor or doctor, of the hospital, of colleagues and of themselves. A regulatory process such as goal conflict or goal frustration could also play an important role in the explanation of job strain among this population. We suggest that these goal-related cognitive and emotional processes should be investigated in order to add to the understanding to the relationship between work environment and health.

References

- Allport, F.H. (1955). *Theories of perception and the concept of structure*. New York: Wiley.
- Arrindel, W.A., & Ettema, J.H.M. (1986). *Symptom Checklist-90, SCL-90, een multidimensionele psychopathologie-indicator, handleiding* [Symptom Checklist-90, SCL-90, a multidimensional psychopathology-indicator, manual]. Lisse, the Netherlands: Swets Test Services.
- Bertolote, J.M., & Fleischmann, A. (2001). Staff Burnout. *The Global Occupational Health Network*, 2, 5-7.
- Blegen, M.A. (1993). Nurses' job satisfaction: a meta-analysis of related variables. *Nursing Research*, 42(1), 36-41.
- Bourbonnais, R., Comeau, M, Vézina, M, & Guylaine, D. (1998). Job strain, psychological distress and burnout in nurses. *American Journal of Industrial Medicine*, 24, 20-28.
- Bourbonnais, R., Comeau, M., & Vézina, M. (1999). Job strain and evolution of mental health among nurses. *Journal of Occupational Health Psychology*, 4(2), 95-107.
- Brockner, J. & Higgins, E.T. (2001). Regulatory focus theory: Implications for the study of emotions at work. *Organizational Behavior and Human Decision Processes*, 86, 1: 35-66.
- Bruner, J.S., & Krech, D. (1950). *Perception and Personality: A symposium*. Durham, NC: Duke University Press.
- Buunk, B.P., Schaufeli, W.B., & Ybema, J.F. (1994). Burnout, Uncertainty, and the desire for social comparison among nurses. *Journal of Applied Social Psychology*, 24(19), 1701-1718.
- Derogatis, L.R. (1983). *SCL-90-R: Administration, Scoring & Procedures Manual-II* (2nd Ed.). Baltimore: Clinical Psychometric Research.
- De Rijk, A., Le Blanc, P., & Schaufeli, W.B. (1998). Active coping and need for control as moderators of the job demand-control model: effects on burnout. *Journal of Occupational and Organizational Psychology*, 71, 1-18.
- Di Martino, V. (2003). Workplace violence in the health care sector: relationship between work stress and workplace violence in the health sector. ILO/WHO report, Geneva, ILO, WHO, 2003.

- Emmons, R.A. (1989). The personal striving approach to personality. In L.A. Pervin (Ed.), *Goal concepts in personality and social psychology* (pp. 87-126). Hillsdale, NJ: Erlbaum.
- Gelsema, T.I., Maes, S. & Akerboom, S. (submitted). Determinants of job stress in the nursing profession, a review.
- Higgins, E.T. (1997). Beyond pleasure and pain. *American Psychologist*, *52*(12): 1280-1300.
- Higgins, E.T. (1998). Promotion and prevention: Regulatory Focus as a motivational principle. *Advances in Experimental Social Psychology*, *30*, 1-46.
- Higgins, E.T., Shah, J. & Friedman, R. (1997). Emotional responses to goal attainment: Strength of regulatory focus as moderator. *Journal of Personality and Social Psychology*, *72*, 3: 515-525.
- Hillhouse, J.J., & Adler, C.M. (1997). Investigating stress effect patterns in hospital staff nurses: results of a cluster analysis. *Social Science & Medicine*, *45*(12), 1781-1788.
- Irvine, D.M., & Evans, M.G. (1995). Job satisfaction and turnover among nurses: integrating research findings across studies. *Nursing Research*, *44*(4), 246-253.
- Karoly, P. & Ruehlman, L.S. (1995). Goal cognition and its clinical implications: Development and preliminary validation of four motivational assessment instruments. *Assessment*, *2*, 113-129.
- Kasser, T. & Ryan, R.M. (1996). Further examining the American dream: Differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin*, *28*, 826-835.
- Lazarus, R. S. (1999). *Stress and emotion: A new synthesis* New York: Springer.
- Little, B.R. (1983). Personal Projects – a rationale and method for investigation *Environment and Behavior*, *15*, 3: 273-309.
- Maes, S., Akerboom, S., Van der Doef, M., and Verhoeven, C. (1999) De Leidse Arbeids Kwaliteits Schaal voor Verpleegkundigen (LAKS-V) [The Leiden Quality of Work Life Questionnaire for Nurses (LQWLQ-nurses)]. Health Psychology, Leiden University, Leiden, The Netherlands.
- Maslach, Schaufeli, and Leiter (2001). Job Burnout. *Annual Review of Psychology*, *52*, 397-422.
- McVicar, A. (2003). Workplace stress in nursing: a literature review. *Journal of Advanced Nursing*, *44*, 6, 633-642.

- Papadatou, D., Anagnostopoulos, F., & Monos, D. (1994). Factors contributing to the development of burnout in oncology nursing. *British Journal of Medical Psychology, 67*, 187-199.
- Pomaki, G., Maes, S., & ter Doest, L. (2004). Work conditions and employees self set goals: goal processes enhance prediction of psychological distress and well-being. *Personality and Social Psychology Bulletin, 30(6)*, 685-694.
- Reilly, N.P. (1994). Exploring the paradox: commitment as a moderator of the stressor-burnout relationship. *Journal of Applied Social Psychology, 24(5)*, 397-414.
- Schaufeli, W. & Dierendonck, D. van (1994). Burnout, een begrip gemeten: de Nederlandse versie van de Maslach Burnout Inventory (MBI-NL). [Burnout, a concept measured: the Dutch version of the Maslach Burnout Inventory (MBI-NL)]. *Gedrag en Gezondheid, Tijdschrift voor Psychologie en Gezondheid, 22(4)*, 153-172.
- Schaufeli, W. & Dierendonck, D. van (2000). *UBOS Utrechtse Burnout Schaal: Handleiding*. Lisse: Swets & Zeitlinger.
- Smith, D., & Tziner, A. (1998). Moderating effects of affective disposition and social support on the relationship between person-environment fit and strain. *Psychological reports, 82*, 963-983.
- Tyler, P., & Cushway, D. (1995). Stress in nurses: the effects of coping and social support. *Stress Medicine, 11*, 243-251.
- Wall, T.D., Jackson, P.R., Mullarkey, S. & Parker, S.K. (1996). The demands-control model of job strain: A more specific test. *Journal of Occupational and Organizational Psychology, 69*: 153-166.
- Weiss, H.M. & Cropanzano, R. (1996). Affective events theory: a theoretical discussion of the structure, causes and consequences of affective experiences at work. *Research in Organizational Behavior, 18*: 1-74.

Chapter 6

General Discussion

General discussion

The central issue in this thesis is occupational strain among nurses. From the results of this thesis, conclusions can be drawn for theory as well as practice. From a theoretical point of view, the results can be interpreted against the background of transactional stress models, and answers can be sought regarding the role of the environment and the individual in this relationship. Regarding practice, the core question is whether the work environment of nurses can be organized in such a way that nurses will have greater job satisfaction and occupational strain is reduced. The first part of this chapter will summarise and discuss the results from the studies presented in this thesis. More specifically, a distinction will be made between the findings concerning the attitudinal outcome (job satisfaction) and health and well-being outcomes (emotional exhaustion and psychological and somatic complaints). Then these results will be discussed against the background of prominent stress theories. The results of this thesis must be interpreted against the background of the soundness of the methodology used. Therefore, in the third part of this chapter several methodological issues will be discussed. In the fourth part, implications regarding practice will be addressed. And finally, recommendations will be given for future studies on job stress research in the nursing profession. The thesis studies distinguish two types of stressors: *characteristics of the job* (it's demand, control opportunities and social characteristics) and *characteristics of the organization and environment* of the nursing job (such as communication, protocols and instruments).

6.1 Conclusions and discussion of results

The review study showed that of all occupational characteristics, the influence of the dimensions of Karasek's Demand Control Support model (Karasek, 1979)

on strain outcomes have been studied most extensively in the last two decades in occupational stress research among nurses. Results of the two studies described in chapter three and four confirm the importance of the JDCS model: the strongest relationships are found with the job characteristics it describes. The results differ for the attitudinal outcome (job satisfaction) and the emotional and health outcomes (emotional exhaustion and psychological and somatic complaints) as will be discussed below.

6.1.1 Predictors of job satisfaction

A consistent finding across the chapters of this thesis is that the control dimension (task variation and the possibility to develop one's skills, as well as control over the organization, planning and execution of one's tasks) predicts job satisfaction. In the review study (chapter two), as well as in the cross-sectional study (chapter three) and in the longitudinal study (chapter four), associations with this dimension are found. The second consistent finding is that good working relationships, especially with the head nurse, positively influence nurses' job satisfaction. Social support from colleagues seems of less importance: the review study indicated that support from colleagues has a smaller influence on job satisfaction than support from a supervisor. In the cross-sectional study and the longitudinal study, no significant relationships were found between job satisfaction and support from colleagues.

6.1.2 Predictors of ill health

Predictors of health outcomes are of another nature. The studies show that the findings agree most in that these outcomes (emotional exhaustion, psychological distress and somatic complaints) are strongly predicted by workload. In contrast to what might be expected from research on emotional exhaustion, it seems not to be the emotional demand of patient contact that burdens nurses. Results of the review indicated that patient contact can be a motivator, and that helping others is an intrinsic reward of the profession, which can buffer the impact of adverse job conditions. The stress reaction on job demands seems more to result from the fact that nurses have little time to do their job, too many different tasks, and too many patients to be able to give each patient the attention and care they want to give. Besides job demands, the amount of decision authority also influences nurses' health. The consistent results regarding these outcomes are thus very much in line with the Job Demand Control model: the core

elements in the prediction of job stress are a high time or work pressure and little control over decisions regarding the organization and execution of one's work. However, in addition to these job characteristics, the influence of organizational and environmental conditions is important. The results of chapter 2 of this thesis suggest that job Demand Control and Support are to some extent predicted by environmental and organizational conditions of work. For instance, work agreements (which characterise the organisation) appear to be associated with workload and decision authority. Work agreements concern protocols: that what is written about the way in which the work is executed on the ward. When protocols are available, clearly described and up to date, nurses experience less workload and more decision authority. In addition to this positive effect, good work agreements will by definition also have a direct effect on task and role clarity. The significance of task- and role clarity was acknowledged in the review study.

6.1.3 Consistencies and inconsistencies of thesis studies

When the results of the different chapters are compared, some consistencies and inconsistencies between them become apparent. Skill discretion and growth opportunities are shown to be important by the results of all experimental studies: the cross sectional study (chapter three), the longitudinal study (chapter four) and the study concerning work goals (chapter five). All explain nurses job satisfaction in relation to their possibility to develop a variety of skills or be able to grow in their work by taking larger responsibilities. Although this association was also found in studies described in the review (chapter two), it was relatively smaller. In the job Demand Control Support model, skill discretion is part of the control dimension (Karasek, 1979). Generally, studies use a broad conceptualization of control, in which skill discretion and decision authority are combined in one concept: decision latitude. When a relationship is found in such a study, this could be due to both aspects. When no relationship is found, it could be because the noise of one concept distorts the effect of the other. In the studies performed in this thesis, skill discretion and decision authority were measured separately. This could explain the difference in the strength of the associations found in the experimental studies of this thesis, compared to those of the review study. The stronger associations of skill discretion with job satisfaction in the results of the studies of this thesis could also have to do with the fact that this was a sample from of nurses working within an academic hospital. Nurses that work within such an environment might value growth opportunities

more than nurses working within a peripheral hospital. This assumed greater value of growth opportunities could account for the difference in strength of the associations.

Next, some results of the cross sectional study are not confirmed by those of the longitudinal study. This concerns the relationships between job satisfaction and communication and reward and between emotional exhaustion and personal resources, work agreements and reward, and material resources and somatic complaints. Some associations between the outcomes and environmental and organizational work conditions were not found longitudinally. This could be due to the mediation effect of job characteristics in the relationship between work conditions and outcomes (chapter three). In the cross sectional study, job characteristics and organizational and environmental conditions were regressed on the outcomes stepwise (separately). In the longitudinal study, all job characteristics and work conditions were put in the regression analyses at the same time. The relationships between work conditions and outcomes could be suppressed by job characteristics that have a direct effect on outcomes.

6.2 Theoretical considerations

The results of this thesis suggest two theoretical considerations. Firstly, stress theories could extend by taking into account other potential stressors, such as the organization of work. As was concluded above, the results of this thesis confirm Karasek's JDCA model. But the results of chapter three suggest that it is worthwhile to look beyond the dimensions of the Karasek model to detect organizational and environmental conditions that underlie these dimensions. The Tripod Accident Causation model (Wagenaar, Groeneweg, Hudson, & Reason, 1994) was used to examine the influence of organizational and environmental conditions of work. This model has its origins in studies to the determinants of human error. The model describes the way in which certain factors in the organization of work influence human error. The results of chapter three suggest that the Tripod model is a good theoretical supplement when it comes to the understanding of occupational stress. It shows that the daily stressors nurses are confronted with (such as workload and limited control over important work-related decisions) influencing their health and well-being can to some extent be controlled or managed by the way in which the work is organized. Although the direct influence of these latent conditions on nurses' health and well-being might be smaller than that of Demands and Control, the indirect influence is evident.

A second way in which stress theories could extend, is by focusing on psychological (cognitive) processes that are active in stressful situations. As outlined in the introduction of this thesis, stressmodels have shifted from a focus on stimulus and response to an interactional and transactional one. Transactional and interactional models both define stress or strain as a combined effect of personality and environment. Over the years, studies using interactional models have examined the moderating influence of a variety of relatively *stable* personality characteristics such as affective dispositions (Smith, 1998) or job commitment (Reilly, 1994) on the stressor-response association. In contrast, transactional models focus on the *dynamic* interaction between person and environment. Recently, the roles of personal work goals and psychological goal processes have come into play. Stress theorists like Lazarus attribute a central role to personal goals in the stress process: “A person is under stress if what happens defeats or endangers important goal commitment and situational intentions, or violates expectations (Lazarus, 1999, p. 60)”. The results of chapter five of this thesis suggest that it is worthwhile to incorporate goal characteristics such as goal orientation in stress research. The existence of a goal increases the person’s selective responsivity to goal-relevant stimuli (Allport, 1955; Bruner & Krech, 1950). Goals focus attention to what someone is attempting to accomplish (Locke & Latham, 1990). Selective attention and responsivity to goal-relevant stimuli could determine the type of job stressor or resource that elicits a reaction or the strength of this association, as the results of chapter five suggest. Goal orientation could function as windows through which the world is perceived. Goal orientation involves not only a goal characteristic, but defines a cognitive state of mind, in which fundamental needs and strivings are incorporated. The results of this thesis imply that the study of goal orientation in stress research is a valuable addition to the study of the work environment.

6.3 Methodological considerations

Almost 10 years ago, Buunk, de Jonge, Ybema, and de Wolff (1998) described the most uttered methodological criticisms on occupational stress research, based on the work of Kasl (1978, 1987, 1996). Unfortunately, the research that underlies this thesis is at some points also subject to the same methodological constraints, more specifically, to issues regarding common method variance, the issue of cause and effect and that of self-selection (the healthy worker effect).

6.3.1 Common method variance and self-report bias

When data are collected subjectively (by means of questionnaires), as was the case in the studies performed in this thesis, they are subject to self-report bias such as common method variance. Many symptoms that are usually considered as strains basically reflect a negative affectivity characteristic of neurotic individuals. Neurotic individuals also tend to perceive and report more stressors. Hence, variance in the independent and dependent variables is partly due to third variables such as personality variables (negative affectivity or neuroticism). Research has shown however that associations remain when negative affectivity is controlled for (Schonfeld, 1996; Moyle, 1995), though these associations do become weaker (Semmer, 1996). The implications for the results would be that the strength of the associations could be overestimated.

6.3.2 Cause / effect

Cross sectional occupational stress research assumes that certain characteristics of the work environment cause health related problems. Although the question of cause and effect is not solved in this thesis, the results of chapter four indicate that stress is the product of a reciprocal relationship between person and environment. This would make the cause-effect discussion less of an issue. However, from the viewpoint of interventions and practical solutions, it remains interesting to find out at which point can be intervened best in this process. What is the influence of changes in the work environment on changes in the stress process? Studying a changing process requires repeated assessment. Processes can be described by associating separate measurements, a process similar to describing the separate images making up a moving picture. This thesis shows that these separate measurements need not be too far apart in time. The time lag between the first and second measurement was three years in the longitudinal study, which appeared to be too large to find associations. There were too many possible ways in which the one static picture could have lead to the other. The time interval of the measurements needs to be tuned to the speed at which changes in the process occur. A weakness of the thesis study (chapter four) is the few measurement points and the long time interval between those two points. If we want to film the whole stress process, we need to make far more measurements, following each other more closely.

6.3.3 Self selection, healthy worker effect, and drop out

An issue for the validity of survey research is the potential for sampling bias. In the thesis studies, participation was voluntary, raising concerns about the representativeness of the sample, since 65% filled in the questionnaire at the first measurement time, and of those nurses still holding their position at the second measurement, 61% responded. Although there is some evidence that volunteers may differ from non-volunteers in factors such as education (Rosenthal & Rosnow, 1991) this is unlikely to be a major factor in this relatively homogeneous sample. In stress research, the likelihood of responding may be increased due to concerns about stress, or decreased due to too many demands. This issue has not yet been resolved in the literature (Bradley & Cartwright, 2002). The healthy worker effect means an underrepresentation of the dissatisfied employees, or those with adverse health reactions (Frese, 1985). The result of such an underrepresentation would be a restriction in the variance in the outcome variables, which would eventually lead to an underestimation of the relationship between work conditions and outcomes. Considering the variance in job conditions as well as in the outcomes, this problem does not seem to be present in the studies of this thesis. Moreover, in the thesis sample, there was no difference in measured levels of health and well being of nurses who responded the second time compared to those who chose not to respond (health and well being outcomes compared on T1), suggesting that experienced stress did not affect the likelihood of responding.

6.4 Practical considerations

On the basis of the results of the studies described, taking into account the methodological considerations, what can be done to decrease the adverse health effects that arise from occupational burdens? The results of this thesis suggest that to prevent nurses from becoming ill clearly is a matter of lowering job demands. Hospital management should keep nurses' physical workload as well as their time and work pressure under control. However, this is not necessarily a matter of quantity (lowering patient numbers), but rather of quality (making sure there is enough time for the emotional aspect of 'caring'). The demanding aspect of the job seems to be a matter of insufficient time to provide care. Tasks could be organized differently so that nurses have more time for each patient. This could not only result in enhanced job satisfaction, but could act as a buffer

in the stressor-strain relationship, as was pointed out in studies described in the review (chapter two).

To improve nurses job satisfaction, it is important to increase their control over their work. The results of this thesis not only stress the importance of control over the organization of tasks and influence in important decisions with respect to the job, but also show the positive influence of the possibility to develop and maintain nursing skills, although this second component of control could very well be more important in an academic setting. The positive influence of skill discretion is even more evident for nurses that are focused towards development (chapter five). Development of skills could be made possible through broadening or deepening of tasks, for instance by providing opportunities for training or specialization.

Finally, the results underline the positive influence of social support on job satisfaction. Social support from a supervisor can be enhanced by clear work agreements as was described in chapter three. Clear procedures and responsibilities could enhance the feeling of instrumental support. When tasks and responsibilities are circumscribed, nurses possibly feel more secure to execute those tasks in their own way.

6.5 Future research

There still remains a wide field open for exploration with regard to stress among nurses. How can we capture the ever-changing person-environment relationship? Which factors need to match in this transaction and how can they be assessed? What are the psychological processes that underlie this relationship? Elaborating on the results of chapter five, part of the answer could lie in the role of personal work goals. The concept of goals has its origin in the study on motivation. Motivational Systems Theory is an integrative framework that describes “how motivational processes interact with biological, environmental, and non-motivational psychological and behavioural processes to produce effective and ineffective functioning in the person as a whole” (Ford, 1992, p.12). In MST, the central construct is that of personal goals. Ford has defined goals as thoughts about desired consequences that the individual would like to achieve, or undesired consequences that the individual would like to avoid. Personal goals can be seen as a set of intrinsic demands that are posed on the individual or that the individual poses on him/herself. What this theory adds to existing stress

models is that it is a process approach. It allows including internal psychological processes such as evaluative thoughts, feed forward and feedback cognitions and goal orientation. Recent research on job stress recognizes that MST and personal goals do add to the understanding and the prediction of job stress (Pomaki, Maes & ter Doest, 2004; Latham & Pinder, 2005).

The fact that behavior is aimed at a reduction from deviations from a specific goal state is not new in psychology. Psychologists have recognized for a long time that a major determinant of the perceived value of an event is the extent to which it fulfills the perceivers goals (e.g. James, 1948; Lewin, 1935; Roseman, 1984; for a review, see Brendl & Higgins, 1996). In this line of thought a number of theories around self regulation have emerged, among which Regulatory Focus Theory (Higgins, 1997, 1998). In chapter five, the influence of regulatory focus (either a prevention or a promotion focus) was explored and it appeared that a difference in goal orientation accounts for differences in associations between job stressors and stress reactions. For example, the association between decision authority and somatic complaints is stronger among nurses with a prevention focus. These nurses benefit more from high control, and experience more complaints in a situation in which control is low.

Apart from prevention and promotion focus, other goal orientations could be of importance in the study of stress among nurses. Studies on goal pursuit in patient-samples revealed that pursuing affiliation goals (being other directed) is associated with good quality of life (Emmons, 1996). Personal goals associated with the Big Three motive dispositions (Mc Adams, 1994): achievement, affiliation / intimacy and power are related to subjective well-being (Emmons, 1996). Positive relationships are found with strivings for affiliation or intimacy goals (Emmons, 1996). In particular, pursuing affiliation / intimacy goals such as “giving oneself to others” and “having influence on future generations” were positively related to life satisfaction and positive affect. Social interaction and “giving oneself to others” is a core element in nursing. Social orientation could also influence the way in which the work environment is perceived and the kind of stressors that have a negative load. A suggestion for future research is to explore the moderating influence of the social orientation of nurses’ goals.

In addition to goal orientation, other regulatory processes play a part in the stress process (Pomaki, Maes & ter Doest, 2004). Nurses face interests of numerous parties: those of patients, doctors, colleagues, the hospital, and themselves. Research on work goals has shown that employees who work in an environment in which they can fulfill their goals are more committed and more satisfied (Meyer, & Allan, 1997; Brunstein, 1993). In the review study one major stres-

sor reported by nurses is that they have too little time to perform duties to their satisfaction. One personal work goal (to provide good-quality care) could be frustrated by lack of time. Goal conflict and goal frustration could very well be other important variables in the explanation of health and well-being outcomes.

References

- Allport, F.H. (1955). *Theories of perception and the concept of structure*. New York: Wiley.
- Bradley, J.R., and Cartwright, S. (2002) "Social support, job stress, health, and job satisfaction among nurses in the United Kingdom", *International Journal of Stress Management*, Vol 9 No 3, pp. 163-182.
- Brendl, C.M. & Higgins, E.T. (1996). Principles of judging valence: What makes events positive or negative? *Advances in Experimental Social Psychology*, 28: 95-160.
- Bruner, J.S. & Krech, D. (1950). *Perception and personality: A symposium*. Durham, NC: Duke University Press.
- Brunstein, J.C. (1993). Personal goals and subjective well-being: a longitudinal study. *Journal of Personality and Social Psychology*, 65, 1061-1070.
- Buunk, B.P., De Jonge, J., Ybema, J.F., & De Wolff, C.J. (1998). Psychosocial aspects of occupational stress. In P. J. Drenth, H. Thierry, & C.J. de Wolff (Eds.), *The Handbook of Work and Organizational Psychology* (2nd ed., vol. 2, pp.145-182). Brighton: Psychology Press.
- Emmons, R.A. (1996). *Striving and Feeling: Personal goals and subjective well being*. In P.M. Gollwitzer & J.A. Bargh (Eds.), *The psychology of action: Linking cognition and motivation to behavior* (pp 313-337). New York: The Guilford Press.
- Ford, M. (1992). *Motivating humans: Goals, emotions and agency beliefs*. Newbury park. CA: Sage Publications.
- Frese, M. (1985). Stress at work and psychosomatic complaints: A causal interpretation. *Journal of Applied Psychology*, 70, 2: 314-328.
- Higgins, E.T. (1997). Beyond pleasure and pain. *American Psychologist*, 52(12): 1280-1300.
- Higgins, E.T. (1998). Promotion and prevention: Regulatory Focus as a motivational principle. *Advances in Experimental Social Psychology*, 30, 1-46.
- James, W. (1948). *Psychology*. New York: World Book.
- Karasek, R.A. (1979). Job demands, job decision latitude and mental strain: implications for job redesign, *Administrative Science Quarterly*, Vol 24, pp. 285-308.

- Kasl, S.V. (1978). Epidemiological contributions to the study of work stress. In: C.L. Cooper & R. Payne (Eds.). *Stress at work*. Chichester: John Wiley & Sons, pp 3-48.
- Kasl, S.V. (1987). Methodologies in stress and health: past difficulties, present dilemmas, future directions. In S.V. Kasl, & C.L. Cooper (Eds.). *Research Methods in Stress and Health Psychology* (pp 307-317). Chichester: John Wiley & Sons.
- Kasl, S.V. (1996). The influence of the work environment on cardiovascular health: A historical, conceptual and methodological perspective. *Journal of Occupational Health Psychology*, 1, 42-56.
- Latham, G.P. & Pinder, C.C. (2005). Work motivation theory and research at the dawn of the twenty-first century. *Annual review of psychology*, 56: 485-516.
- Lazarus, R. S. (1999). *Stress and emotion: A new synthesis* New York: Springer.
- Lewin, K. (1935). *A dynamic theory of personality*. New York: McGraw-Hill.
- Locke, E.A. & Latham, G.P. (1990). *A theory of goal setting and task performance*. Englewood Cliffs, NJ: Prentice Hall.
- McAdams, D.P. (1994). *The person: An introduction to personality psychology*. (2nd ed.). Fort Worth (TX): Hartcourt, Brace.
- Meyer, J.P. & Allen, N.J. (1997). *Commitment in the workplace: Theory, research and application*. Thousand Oaks, CA: Sage.
- Moyle, P. (1995). The role of negative affectivity in the stress process: tests of alternative models. *Journal of Organizational Behavior*, 16, 647-668.
- Pomaki, G., Maes, S., & ter Doest, L. (2004). Work conditions and employees self set goals: goal processes enhance prediction of psychological distress and well-being. *Personality and Social Psychology Bulletin*, 30(6), 685-694.
- Reilly, N.P. (1994) "Exploring the paradox: commitment as a moderator of the stressor-burnout Relationship", *Journal of Applied Social Psychology*, Vol 24 No 5, pp. 397-414.
- Roseman, I.J. (1984). Cognitive determinants of emotion: A structural theory. *Review of Personality and Social Psychology*, 5, 11-36.
- Rosenthal, R. and Rosnow, R. L. (1991). *Essentials of Behavioral Research : Methods and Data Analysis*, (2 nd edition), McGraw-Hill, New York: NY.

Schonfeld, I.S. (1996). Relation of negative affectivity to self-reports of job stressors and psychological outcomes. *Journal of Occupational Health Psychology*, 1, 397-412.

Semmer, N. (1996). Individual differences, work stress, and health. In: *Handbook of Work and Health Psychology*, MJ Schabracq, JAM Winnubst, CL Cooper (Eds.). Chichester: John Wiley & Sons.

Smith, D., and Tziner, A. (1998) "Moderating effects of affective disposition and social support on the relationship between person-environment fit and strain", *Psychological reports*, Vol 82, pp. 963-983.

Wagenaar WA, Groeneweg J, Hudson PTW, Reason JT. Promoting Safety in the Oil Industry. *Ergonomics* 1994, 37: 1999-2013.

Summary

Job stress in the nursing profession has been a global problem for years now. Job stress can have adverse mental and physical health consequences and can lead to decreased satisfaction with ones job. For a small group of nurses it can even lead to a burnout and (temporal) sick leaves. Job stress thus has not only negative consequences for nurses themselves, but also for the hospitals they work in and for society. Estimates are that 10% of the Gross National Product in European countries is lost due to stress related absenteeism and turnover. Although absenteeism in health care is declining the last years, it is still high compared to other stressful occupational settings such as education, catering industry or transport.

The central issue in this thesis is the work related causes and consequences of job stress among nurses. The relationships between a wide range of work characteristics and characteristics of the organization and environment on the one hand and different outcomes (such as diminished job satisfaction, burnout, psychological and psychosomatic health complaints, turnover and absenteeism) on the other hand are explored in four studies. The studies described in chapter three, four and five are carried out among nurses working in the Leiden University Medical Centre (LUMC). The data were gathered by means of a questionnaire that was spread among all nurses in 2000 and in 2003. The studies described in chapter three and chapter five made use of the data of the first measurement. The study described in chapter four made use of data of both measurements.

Chapter one describes the theoretical framework within which the studies are performed. It describes the different angles from which the concept of stress has been studied. In the nineteen thirties and fourties, the focus was on describing stress reactions and the stimuli that evoked stress reactions. In the

nineteen seventies the attention shifted to the influence of the individual in this stressor - stress reaction relationship. Interactional stress models described the interaction between the environment and (relatively stable) personality characteristics in their relationship with health outcomes. In the last decennia stress researchers are beginning to incorporate psychological processes in order to explain the dynamic person-environment relationship. The transactional stress models describe stress as a process of continuous mutual influence of person and environment.

Chapter two is a review study that summarizes the results of 51 articles on job related causes of stress among nurses, published between 1990 and 2005. It describes relationships between work characteristics (stressors) and stress reactions such as diminished job satisfaction, emotional exhaustion and other health complaints, and absenteeism and turnover. A central conclusion was that the influence of Karasek's job Demand Control Support model on these outcomes is studied most often. Job (dis)satisfaction is associated most strongly to the extent to which colleagues support each other and the amount of control nurses have over the organization and content of job tasks. Health complaints and emotional exhaustion appeared to be related to the job's demands. Objective work load (too many patients) as well as subjective work load (the experienced workload) are related to adverse health outcomes. Social support, especially that of the supervisor, also influences health. The second chapter also summarizes the results of articles regarding the work related causes of absenteeism and turnover. Models and theories on turnover and absenteeism suggest that job satisfaction, emotional exhaustion and turnover intention mediate the relationship between work related variables and absenteeism and actual turnover. The results of chapter two underline this thought. Some of the studies described in chapter two examine factors that could strengthen or weaken the relationship between stressors and stress reactions. Among the buffers are: the amount of control over one's tasks, social support and coping strategies (emotion focused coping as well as problem focused coping). The number of patients one has to take care of can also moderate the stressor-stress relationship, probably because "caring" or "helping others" is intrinsically rewarding. A higher commitment to one's work appeared to strengthen the negative reaction on workload.

Chapter three distinguishes between the influence of work characteristics and the influence of the conditions under which the work is carried out (such as characteristics of the organization of work or the physical work environment) on a number of stress related outcomes. By the term work characteristics are meant the dimensions of Karasek's Demand Control Support model: work pressure

and (physical) workload, skill discretion, decision authority, support of supervisors and colleagues and the communication with doctors. By work conditions are meant: personal resources, quality of materials and instruments, quality and understandability of protocols, communication structures and availability of patient information, and (financial) rewards. The relative influence of these two categories of stressors on job satisfaction, emotional exhaustion, psychological and psychosomatic complaints was examined in this chapter. Work characteristics and work conditions appeared to be important categories of predictors of job satisfaction and emotional exhaustion. The explained variance in these outcomes was 25% (emotional exhaustion) to 44% (job satisfaction). Work conditions appeared to have a direct effect as well as an indirect effect on stress related outcomes. Indirectly the relationships were mediated by work characteristics. For example: the relationship between the quality and clarity of protocols on the one hand and stress related complaints on the other hand was mediated by work pressure, the amount of control over ones work and the support of the supervisor. The most important conclusion of chapter three is that next to job characteristics, conditions of work also determine stress reactions. Secondly, the influence of the DCS job characteristics can be (partly) controlled by good work management.

Chapter four describes a longitudinal study in which the mutual influence of changes in occupational stressors and changes in health and well-being outcomes is examined. Normal causal relationships (work influences health) as well as reversed causal relationships (health influences (the perception of) work) were found. As in chapter three, the occupational stressors were most strongly associated with job satisfaction and emotional exhaustion. Emotional exhaustion was predicted by an increase in work pressure and physical workload. Satisfaction with ones work was determined by an increase of control (the extent to which nurses can bring into practice their skills and knowledge as well as the extent to which they have a say in decisions regarding the organization of their work), increases of support of a supervisor, improvements of work agreements and protocols and better communication and information structures. Conversely, changes in job satisfaction and emotional exhaustion also appeared to influence the occupational characteristics. This reversed influence of wellbeing and health on job stressors can be interpreted in a number of ways. On the one hand a change in health or well being could evoke an actual change in work: the workload of less satisfied or less healthy workers could be lowered temporarily to give these employees time to recover. On the other hand a change in health and well being can influence the perception of work. Less satisfied and more exhausted

nurses could appraise the same workload as a greater burden than their satisfied or healthy colleagues. The most important conclusion of chapter four was that work environment and health and well being mutually influence each other.

Chapter five examines the influence of two goal orientations (goals that are oriented towards development and goals that are oriented towards prevention, cf Higgin's Regulatory Focus Theory) on stress related outcomes. A 'promotion' focus is characterized by a fundamental need for growth and development. A 'prevention' focus is characterized by a fundamental need for safety and protection. Not only the direct influence of these goal orientations on stress outcomes were studied, but also the interaction between goals and work environment. Nurses that were focused on safety and protection (for example, those who formulated the goal: 'to prevent becoming ill') appeared to have more health problems than nurses focused on growth and development, although the difference between those groups of nurses was small. Next to this direct influence, goal orientation appeared to moderate the relationship between work related factors and stress outcomes. The negative influence of a lack of control over ones work appeared to be greater for nurses that were focused on safety and protection than nurses that were focused on development. In contrast, nurses that focused on prevention benefited more than nurses with a promotion focus in a work environment with high control opportunities. For those nurses that are focused on protection (for example, of their health), it is of extra importance to provide them with control over their work.

The last chapter integrates and discusses the results of the foregoing chapters. This chapter also discusses some methodological limitations of the studies of this thesis and finally, considerations for future study are formulated. The results of this thesis can be interpreted as a confirmation of Karaseks Job Demand Control Support model. The results of the different studies have shown that nurses' job satisfaction and their health are negatively influenced by work and time pressures and positively influenced by opportunities to control ones tasks and by support from a supervisor. But the results of chapter three indicate that these job characteristics are in their turn (partly) determined by the conditions under which nurses work: the organization of work and the physical work environment. In practice this means that the job characteristics (Demand Control Support) can be controlled or managed (partly) by managing the organization and environment. Next to this result, chapter three indicated that elements of the organization of work and work environment also have a direct relationship with stress related health outcomes and well being. The most important conclusion of chapter three is that it is worthwhile to take organizational and en-

vironmental variables such as personal resources, communication structures and information provision, the quality of protocols and the availability and quality of materials and instruments into account when studying job stress.

A returning methodological issue in the study of job stress, in particular in cross sectional studies, is that of causality. Do adverse occupational stressors lead to health problems and lower job satisfaction, or does an adverse health or well being lead to a more negative (view of the) work environment? The results of chapter four, in which the influences of changes in occupational stressors on health and changes in health on occupational environment were studied, suggest that the issue of causality is a discussion of the chicken or the egg. Person and environment mutually influence each other. However the issue of causality remains relevant for practical reasons. When interventions are developed it is crucial to know where in the process of mutual influence of person and environment can at best be intervened. Future study should focus on that for instance by measuring health and occupational stressors at various points in time. The interval between measurements should be tuned to the speed in which these processes evolve.

A different question in occupational stress research is: what needs to be "fitted" between person and environment? In this context a study to goal orientation was performed, which was described in chapter five. The fact that goals and goal processes such as goal orientation or goal frustration or goal conflict influence health, is evident. Research to the relationship between health and goal processes was up until now predominantly performed among patient populations. However, nurses also have to deal with a number of goals: those of patients, doctors, the hospital management, and on top of that, their own work goals. The results of chapter two showed that a lack of time to perform their job to their own satisfaction is a large source of stress among nurses. A personal work goal (providing patients high quality care) conflicts with a lack of time. Goal conflict and goal frustration could be important variables in the understanding and explanation of stress related health problems among nurses. Therefore, a recommendation for future study is to take such variables into account in the study of job stress among nurses.

Samenvatting

Werkstress bij verpleegkundigen is al jaren wereldwijd een probleem. Werkstress kan negatieve gevolgen hebben voor de geestelijke en lichamelijke gezondheid en kan het plezier in het werk erg doen afnemen. Voor een (gelukkig kleine) groep verpleegkundigen kan de problematiek zo groot worden dat ze tijdelijk opgebrand raken en zich ziek moeten melden. Werkstress heeft zo niet alleen negatieve gevolgen voor de verpleegkundigen zelf, maar ook voor ziekenhuizen en voor de maatschappij. Geschat wordt dat 10% van het Bruto Nationaal Product in Europese landen verloren gaat door stress gerelateerd absentisme en verloop. Hoewel het ziekteverzuim in de zorg in Nederland de laatste jaren afneemt, blijft het ten opzichte van andere sectoren met een hoog risico op stress gerelateerde klachten (zoals onderwijs, horeca of transport) relatief hoog.

Dit proefschrift richt zich op de (werkgerelateerde) oorzaken en gevolgen van werkstress bij verpleegkundigen. De relaties tussen een breed scala aan werkkenmerken, maar ook kenmerken van de organisatie en omgeving enerzijds en verschillende uitkomstmaten (zoals arbeids(on)tevredenheid, burnout, psychologische en psychosomatische gezondheidsklachten en turnover en absentisme) anderzijds worden in vier studies onderzocht, waarbij in elke studie een andere invalshoek wordt genomen. De studies beschreven in hoofdstuk 3, 4 en 5 zijn uitgevoerd onder alle verpleegkundigen werkzaam in het Leids Universitair Medisch Centrum (LUMC). Het onderzoek bestond uit de afname van een vragenlijst in 2000 en in 2003. De studies beschreven in hoofdstuk 3 en 5 maakten gebruik van de data van meting 1, en voor de studie beschreven in hoofdstuk 4 zijn beide meetmomenten gebruikt.

Alvorens de studies worden beschreven, wordt in hoofdstuk 1 het theoretische kader geschetst. Het geeft een beschrijving van het concept “stress” en de verschillende invalshoeken van waaruit het concept in het verleden is benaderd. In

de jaren 30-40 van de vorige eeuw lag de focus op de beschrijving van stressreacties en onderzoek van de (karakteristieke van) stimuli die een stressreactie opwekten. In de jaren 70 van de vorige eeuw verschoof de aandacht van de invloed van stressoren naar de rol van het individu in deze reactie. Interactionele stresstheorieën en -modellen beschreven de interacties tussen de omgeving en (relatief stabiele) persoonskenmerken in de relatie tot gezondheid. In de laatste decennia lijkt er een verschuiving gaande van de invloed van relatief stabiele persoonskenmerken, naar de invloed van dynamische cognitieve processen. De transactionele stressmodellen beschrijven stress als een proces dat continu in beweging is.

Hoofdstuk 2 is een overzichtsstudie waarin de resultaten van 51 artikelen over werk gerelateerde oorzaken van werkstress bij verpleegkundigen, gepubliceerd tussen 1990 en 2005, worden samengevat. Het beschrijft de relaties die gevonden zijn tussen werkkenmerken (stressoren) en stressreacties zoals verminderde arbeidssatisfactie, emotionele uitputting en andere gezondheidsklachten en absentieïsme en verloop. Een algemene conclusie was dat de invloed van de dimensies van Karasek's job Demand Control Support model op deze uitkomstmaten het vaakste is onderzocht. Arbeids(on)tevredenheid wordt het meeste geassocieerd met de mate waarin collega's elkaar steunen, en met de mate van controle over de organisatie en inhoud van het werk. Gezondheidsklachten en emotionele uitputting bleken sterk gerelateerd aan de werklust. Zowel de objectieve last (veel patiënten om voor te zorgen) als de subjectieve werklust (de ervaren werkdruk) is gerelateerd aan gezondheidsklachten en met emotionele uitputting. Ook gebrek aan sociale steun, in het bijzonder die van de leidinggevende, heeft een belangrijke invloed op gezondheidsklachten. In het tweede hoofdstuk worden naast artikelen over werkgerelateerde oorzaken van gezondheidsklachten en (verminderd) welbevinden, ook de artikelen over werkgerelateerde oorzaken van verloop en absentieïsme samengevat. Modellen en theorieën over verloop en absentieïsme suggereren dat arbeidssatisfactie, emotionele uitputting en verloopintentie de relatie tussen werk gerelateerde factoren en verloop en absentieïsme mediëren. De resultaten van de studies van hoofdstuk 1 onderschrijven dit. Enkele van de in hoofdstuk 1 samengevatte studies onderzochten factoren die de relatie tussen stressoren en stressreacties kunnen versterken of verzwakken. Als buffers (verzwakkers) van de stressor-stressreactie zijn gevonden: de mate van controle over werk, sociale steun en vormen van coping (zowel emotie gerichte coping als probleem gerichte coping). Ook het aantal patiënten om voor te zorgen kan als een buffer werken, waarschijnlijk door de intrinsieke beloning die het 'zorgen' of kunnen helpen van anderen, geeft. Hogere betrokkenheid bij het werk bleek

juist de negatieve reactie op de werkdruk te versterken.

In hoofdstuk 3 wordt een onderscheid gemaakt tussen de invloed van werkkenmerken en de invloed van de condities waaronder het werk wordt uitgevoerd (karakteristieken van de organisatie en omgeving) op een aantal stress gerelateerde uitkomstmaten. Onder werkkenmerken worden de dimensies van Karaseks Demand Control Support model verstaan: werkdruk en (fysieke) werklast, ontwikkelingsmogelijkheden, regelmogelijkheden, steun van leidinggevende en collegae en de communicatie met artsen. Onder werkcondities worden verstaan: personele bezetting, kwaliteit van materialen en instrumenten, kwaliteit, begrijpbaarheid en werkbaarheid van protocollen, communicatiestructuren en beschikbaarheid van patiëntinformatie, en (financiële) waardering. De relatieve invloed van deze twee groepen stressoren op arbeidssatisfactie, emotionele uitputting, psychologische- en psychosomatische klachten werd in dit hoofdstuk onderzocht. Werkkenmerken en werkcondities bleken belangrijke groepen van voorspellers van (voornamelijk) arbeidssatisfactie en emotionele uitputting. De variantie in deze uitkomstmaten werd voor 25% (emotionele uitputting) en 44% (arbeidssatisfactie) verklaard. Werkcondities bleken zowel een direct als een indirect verband te hebben met de stress gerelateerde uitkomstmaten. Indirect werden de relaties gemedieerd door werkkenmerken. Bijvoorbeeld: de relatie tussen de kwaliteit en helderheid van protocollen enerzijds en stress gerelateerde klachten anderzijds werd gemedieerd door zowel de hoogte van de werkdruk, de mate van controle over het werk, en de steun van de leidinggevende. De belangrijkste conclusie van hoofdstuk twee is dat naast belangrijke werkkenmerken (Demand Control en Support) ook kenmerken van de organisatie en de omgeving de stress reactie bepalen. Daarnaast is een belangrijke conclusie dat de invloed van de DCS werkkenmerken deels in de hand kan worden gehouden door een goede inrichting en planning van het werk.

In hoofdstuk 4 worden in een longitudinale studie zowel normale causale relaties als ook omgekeerde causale relaties tussen veranderingen in werkkenmerken en werkcondities enerzijds en veranderingen in welbevinden en gezondheid anderzijds onderzocht. Zowel normale causale relaties (werk beïnvloedt gezondheid) als omgekeerde causale relaties (gezondheid beïnvloedt de (perceptie van het) werk) werden gevonden. In deze studie werden net als in het vorige hoofdstuk, de sterkste relaties gevonden met arbeidstevredenheid en emotionele uitputting. Emotionele uitputting werd het meeste bepaald door verhogingen van tijdsdruk en werkdruk en fysieke belasting. Tevredenheid met het werk werd bepaald door veranderingen in de controle variabelen (zowel de mate waarin verpleegkundigen hun kennis en vaardigheden kunnen gebruiken en uitbreiden in hun werk, als

de mate van controle over beslissingen over de organisatie en inhoud van het werk), verhoging van de sociale steun van de leidinggevende, verbeteringen van de werkafspraken en protocollen, en betere communicatie en patiëntinformatie. Omgekeerd beïnvloedden veranderingen in arbeidstevredenheid en emotionele uitputting alle werkkenmerken en werk condities in meer of mindere mate. Deze invloed kan op verschillende manieren worden geïnterpreteerd. Enerzijds kan een verandering in gezondheid of welbevinden een werkelijke verandering in het werk tot gevolg hebben: minder tevreden of minder gezonde werknemers zouden een lagere kans op promotie kunnen hebben, of de werkdruk zou tijdelijk kunnen zijn verlaagd om de gezondheidsklachten het hoofd te bieden. Anderzijds kan gezondheid en tevredenheid ook de perceptie op het werk beïnvloeden. De ontevreden en meer uitgeputte werknemers zouden bijvoorbeeld dezelfde werkdruk als een grotere belasting kunnen ervaren dan hun tevreden en gezonde collega's. De belangrijkste conclusie van hoofdstuk 4 was dat omgeving en welbevinden en gezondheid elkaar wederkerig beïnvloeden.

In hoofdstuk 5 wordt de invloed van twee verschillende doeloriëntaties (focus gericht op ontwikkeling of focus gericht op preventie, naar de theorie van Higgins) op de stress gerelateerde uitkomstmaten onderzocht. Een 'promotion focus' wordt gekenmerkt door een fundamentele behoefte aan groei en ontwikkeling. Een 'prevention focus' wordt gekenmerkt door een fundamentele behoefte aan veiligheid en bescherming. Naast de invloed van deze doeloriëntaties op welbevinden en gezondheid, werden ook interacties tussen de doeloriëntaties en werk gerelateerde factoren. Verpleegkundigen die gericht waren op veiligheid en bescherming (die bijvoorbeeld als doel voor het komende jaar formuleerden: 'voorkomen dat ik ziek word') bleken meer gezondheidsklachten te hebben dan verpleegkundigen gericht op groei en ontwikkeling, hoewel de invloed van deze doeloriëntaties niet groot was. Naast deze directe relatie bleek doeloriëntatie van invloed op de mate van samenhang tussen werk gerelateerde factoren en welbevinden en gezondheid. Bijvoorbeeld: de negatieve invloed van een gebrek aan regelmogelijkheden bleek groter voor verpleegkundigen die gericht waren op veiligheid en bescherming dan voor verpleegkundigen die zich richtten op ontwikkeling. Maar in een situatie met veel regelmogelijkheden had de groep verpleegkundigen met een 'prevention focus' juist extra veel voordeel. Voor de groep verpleegkundigen die gericht zijn op bescherming (van hun gezondheid), is het extra van belang om voldoende regelmogelijkheden te bieden.

In het laatste hoofdstuk worden de resultaten van de voorgaande hoofdstukken geïntegreerd en worden implicaties voor theorie en praktijk besproken. Ook wordt een aantal methodologische beperkingen uiteengezet. Als laatste wor-

den overwegingen voor toekomstig onderzoek gegeven. De resultaten van dit proefschrift kunnen geïnterpreteerd worden als een bevestiging van Karasek's job Demand Control Support model. Uit de verschillende studies van dit proefschrift blijkt dat tevredenheid en gezondheid van verpleegkundigen het meeste wordt bepaald door de werk- en tijdsdruk, de mate van regelmogelijkheden in het werk, en de mate van sociale steun van de leidinggevende. Maar het verhaal houdt niet op bij deze dimensies. Uit hoofdstuk 3 blijkt dat deze werkkenmerken op hun beurt (deels) worden bepaald door de condities waaronder het werk wordt uitgevoerd: de organisatie van het werk en de werkomgeving. Voor de praktijk betekent dit dat de werkkenmerken (DCS) deels door goede organisatie van het werk in de hand kunnen worden gehouden. Daarnaast blijkt uit hoofdstuk 3 dat elementen in de organisatie van het werk en de werkomgeving ook een directe relatie hebben met welbevinden en gezondheid. Een belangrijke conclusie is dat het waardevol is om naast werkkenmerken ook kenmerken van de organisatie van het werk, zoals personele bezetting, communicatiestructuren en informatievoorziening, de kwaliteit van protocollen, en de beschikbaarheid en kwaliteit van materialen en middelen, mee te nemen in onderzoek naar werkstress.

Causaliteit is in veel studies naar werkstress een onderwerp van discussie, in het bijzonder bij cross sectioneel onderzoek. Leidt een slechte werkomgeving tot gezondheidsproblemen, of zorgen gezondheidsproblemen voor een slechtere (negatievere) kijk op de werkomgeving? De resultaten van hoofdstuk 4 lijken te suggereren dat het probleem van de causaliteit een kip-of-ei-discussie is. Persoon en omgeving beïnvloeden elkaar wederzijds. Toch is het belangrijk om te weten waar het proces van die wederzijdse beïnvloeding het beste kan worden geïntervenieerd. Bij toekomstig onderzoek hiernaar is het van belang om op verschillende momenten in het proces te meten. Het tijdsinterval tussen twee metingen zou daarbij moeten zijn afgestemd op de snelheid waarmee veranderingen in het proces zich voordoen. Alleen dan kan van de losse statische meetmomenten een logisch geheel ontstaan.

Een andere vraag bij onderzoek naar werkstress is: wat moet er precies "fit-ten" tussen persoon en omgeving? In dit proefschrift is in dit verband gekeken naar de invloed van doeloriëntatie. Dat doelen en doelprocessen (doeloriëntatie, maar ook frustratie van doelen, doelconflicten) gezondheid beïnvloeden, is evident. Onderzoek naar de relatie tussen doelprocessen en gezondheid is tot nu toe voornamelijk in patiëntenpopulaties gedaan. In de werkomgeving is hier nog niet veel onderzoek naar gedaan. Verpleegkundigen hebben te maken met veel verschillende doelen: die van patiënten, van artsen, van het ziekenhuis, en

hun eigen werkdoelen. Uit de resultaten van hoofdstuk twee bleek een grote bron van stress dat verpleegkundigen te weinig tijd hebben om hun taken naar hun tevredenheid te kunnen uitvoeren. Een persoonlijk werkdoel (om te kunnen zorgen voor hun patiënten) komt door tijdsdruk in het gedrang. Doelconflict en doelfrustratie zouden heel belangrijke variabelen kunnen zijn in de verklaring van stress gerelateerde gezondheidsklachten bij verpleegkundigen en een aanbeveling is om dit in de toekomst mee te nemen in onderzoek naar werkstress bij verpleegkundigen.

Nawoord

Het motto van dit proefschrift *The antidote to exhaustion is not necessarily rest; it is wholeheartedness* is een uitspraak uit ‘Crossing the Unknown Sea’ geschreven door David Whyte, een Engelse schrijver / dichter¹. Het boek gaat over de zoektocht naar de kern van het werk, en eigenlijk ook de kern van het leven. De uitspraak staat in een verhaal waarin Whyte uitgeput van zijn werk bij een vriend van hem, een monnik op bezoek gaat. Hij (Whyte) is op zoek naar een antwoord op de vraag waarom hij uitgeput is en wat hij moet doen. De monnik (brother David Steindl Rast) geeft als antwoord dat het in het leven gaat om te doen wat bij je past, wat bij je hoort. En niet zomaar door hoe je bent opgevoed of wat door je kennis en vaardigheden bij je past, gewoon, omdat je het ‘kunt’, nee, het gaat erom wat er past bij datgene wat leeft in je hart. Wanneer je iets doet waar je maar half met je hart bij bent, dan raak je uitgeput. Ik wil met dit verhaal en deze spreuk ook eindigen, omdat dit verhaal het proefschrift in het kort samenvat en omdat dit deel van het proefschrift waarschijnlijk het meeste gelezen zal worden, en ik dus hier kwijt moet wat ik nog zeggen wil.

Feitelijk gaat dit proefschrift hierover: dat een verpleegkundige alleen volledig tot zijn of haar recht komt wanneer hij/zij datgene kan doen waar hij/zij zijn/haar hart in kwijt kan: zorg dragen voor mensen (heel algemeen gezegd) en dat werkstress of uitputting ermee te maken heeft dat er voor die zorg te weinig ruimte is. In het groot geldt dit voor ieder mens: dat ieder tot zijn of haar recht komt door te doen wat er ten diepste in hem of haar leeft. Of dit nu zinnig is of niet, of hier nu heel veel mensen baat bij hebben, of eigenlijk niemand, of het nu heel hoogdravend is of helemaal niet bewonderenswaardig.

¹‘Crossing the unknown Sea’, Riverhead Trade; Reprint edition (april 2, 2002), p. 132.

In hetzelfde verhaal van David Whyte haalt de monnik een gedicht van Rilke aan, dat het allemaal kort samenvat ²:

Der Schwan

Diese Mühsahl, durch noch Ungetanes
schwer und wie gebunden hinzugehn,
gleicht dem ungeschaffnen Gang des Schwanes.

Und das Sterben, dieses Nichtmehrfassen
jenes Grunds, auf dem wir täglich stehn,
seinem ängstlichen Sich-Niederlassen - :

in die Wasser, die ihn sanft empfangen
und die sich, wie glücklich und vergangen,
unter ihm zurückziehn, Flut um Flut;
während er unendlich still und sicher
immer mündiger und königlicher
und gelassener zu ziehn geruht.

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²Uit de bundel: 'Neue Gedichte' Erster Teil, Rilke (1907)

Lieve papa, ik vind het heel jammer dat jij er niet meer bent. Door jou was de keuze om te promoveren heel natuurlijk. Ik ben blij dat je die keuze nog hebt meegemaakt.

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Lieve zangvrienden, wandelvrienden, filmvrienden, IKEA-vrienden, spelletjesvrienden, jullie zijn brandstof voor mijn hart.

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Curriculum Vitae

Tanya werd op 19 maart 1976 geboren in Sassenheim. Ze haalde in 1994 aan het Rijnlands Lyceum te Sassenheim haar VWO-diploma. Van januari 1995 tot oktober 1999 studeerde zij psychologie aan de Universiteit Leiden en studeerde af in de richting Functieleer en volgde daarnaast met succes alle vakken van de afstudeerrichting Klinische- en Gezondheidspsychologie en de afstudeervariant Arbeid en Gezondheid. Van april 2000 tot 2005 werkte zij bij de vakgroep gezondheidspsychologie van de Universiteit Leiden aan haar promotieonderzoek. Van maart 2005 tot april 2007 werkte zij bij het Nederlands instituut voor onderzoek van de gezondheidszorg (NIVEL) te Utrecht aan diverse onderzoeksprojecten naar de kwaliteit van zorg en veiligheid in Nederlandse ziekenhuizen. Vanaf 1 april 2007 is zij als statistisch onderzoeker werkzaam bij het Centraal Bureau voor de Statistiek in Voorburg.