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Beyond the Job Demand Control (-Support) model: explaining stress reactions in nurses

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Beyond the Job Demand Control (-Support) model: explaining stress reactions in nurses

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	Prof. dr. C. Violani, "Sapienza" University Rome

This dissertation is dedicated with love to my wife, Caterina, for her selfless sacrifice and support that made this dream a reality; and to my son, Antonio Maria, for inspiring me daily to chase my dreams and for understanding when Daddy was working hard.

One of the symptoms of an approaching nervous breakdown is the belief that one's work is terribly important.
Bertrand Russell, Conquest of Happiness (1930)

CONTENTS

List of abbreviations

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The following table explains various abbreviations and acronyms used throughout the thesis. The page on which each one is defined or first used is also given.

Abbreviation	Meaning	Page
AIC	Akaike's Information Criterion	100
AMOS	Analysis of Moment of Structure	100
CFA	Confirmatory Factor Analysis	100
CFI	Comparative Fit Index	100
CINAHL	Cumulative Index to Nursing and Allied Health Literature	29
CISS-SV	Coping Inventory for Stressful Situations – Short Version	98
CSE	Coping Self Efficacy	96
EFA	Exploratory Factor Analysis	100
JCQ	Job Content Questionnaire	45
JDC	Job Demand Control	15
JDC (-S) or JDCS	Job Demand Control Social support	15
LQoWQ-N	Leiden Quality of Work Questionnaire for Nurses	45
MANCOVAs	Multivariate ANalyses of COVAriance	80
MBI-HSS	Maslach Burnout Inventory Human Service Surveys	45
MEDLINE	Medical Literature Analysis and Retrieval System Online	29
MIs	Modification Indexes	104
OCSE	Occupational Coping Self Efficacy	17
OCSE-N	Occupational Coping Self Efficacy for Nurses	17
PGFW	Personal Goal Facilitation through Work	17
RMSEA	RootMean-Square Error of Approximation	100
SCL-90	Symptom Checklist-90	45
UWES	Utrecht Work Engagement Scale	148

Chapter 1. Introduction

1.1 Introduction

Nursing is generally considered to be a stressful profession. The nature and organization of the job make nursing inherently difficult (Clegg, 2001; McVicar, 2003: Gelsema, Maes, & Akerboom, 2007). Since the mid-1980s, however, nurses' work stress escalated due to the increasing use of technology, changes in health care, and increasing complexity of their work (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002). These structural changes have led to the *intensification* of activity within healthcare as providers seek to do more work, with fewer people, in less time, at lower costs. Dysfunctional working conditions can impact both psychological well being of health care workers and the quality of cares (Montgomery, Panagopoulou, Kehoe, & Valkanos, 2011).

European countries can differ importantly in the number of nurses per capita. This ratio is markedly different in South and North Europe For example, Italy has one of the lowest nurse per capita ratio in Europe: 5 nurses per 1000 inhabitants. In comparison, the Dutch healthcare system has one of the highest ratios: 14 nurses per 1000 inhabitants (World Health Organization, 2006). As a result, workloads of nurses are heavier in some countries than others.

There are several theoretical models that relate work conditions to stress reactions. The most popular theoretical framework is the Job Demand Control (JDC) model (Karasek, 1979) and its expanded version, the Job Demand Control Support (JDC(-S) model (Karasek & Theorell, 1990).

1.2 The Job Demand Control (Social support) (JDC(-S)) model

The JDC(S) model focuses on three dimensions of psychosocial working conditions: job demands and the two job resources: job control and social support (Karasek et al., 1998; Karasek & Theorell, 1990). Psychosocial job demands relate to the work load, and include, for example, time pressure, role conflict and quantitative workload. Job control, or decision latitude, refers to the employee's ability to control his or her work activities and skill usage. It includes two distinct but related dimensions: decision authority and skill discretion. Decision authority reflects the extent to which employees have freedom over how they do their work and have a say over what happens. Skill discretion refers to the level and variety of the skill required for the work tasks and the possibilities to acquire new skills in the job role. Although decision authority and skill variety are two distinct concepts in the job design literature, they are often combined for analytic purpose, and are referred to as job control or decision latitude. Lastly, given that a considerable body of the occupational stress literature has examined the role of different types and

sources of social support as resources that people use in response to stressful working conditions, social support was added later to the model (Johnson & Hall, 1988; Johnson, Hall, & Theorell, 1989). Social support refers to instrumental and emotional support from colleagues and superiors (Karasek & Theorell, 1990).

The original version of the model assumes two basic hypotheses of how job demand and control may combine and lead to various distress and well-being outcomes: (1) the strain hypothesis which assumes additive effects of both dimensions: high job demands precipitate job strain, as does low job control (main effects); (2) the interaction or buffer hypothesis, that states that job control has a moderating effect on the relationship between job demands and job strain (interaction effect). Later, adding social support from coworkers and supervisors as a third dimension, a crucial issue became whether job demands, job control and social support combine additively (high demands, low control and low workplace social support are associated with highest stress: iso-strain hypothesis) or interactively (social support decreases the negative impact of high demands and low control: buffer hypothesis) to explain distress and well-being (See Figure 1.1).

A number of reviews (Van der Doef & Maes, 1999; De Lange, Taris, Kompier, Houtman, & Bongers, 2003; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010) examined whether job demands, job control and social support combine additively ((iso-)strain hypotheses) or interactively to explain well-being. They indicated that the (iso-) strain hypotheses have been tested more often than the buffer hypothesis and that the (iso-) strain hypotheses have received considerable support, whereas, only limited support was found for the buffer hypothesis.

While the JDC(-S) model was a starting point for the research reported in this thesis, the chapters expand on the model for various reasons.

Firstly, the JDC(-S) model, neglects the impact of organizational variables on health-related outcomes (Van der Doef & Maes, 1999). The present thesis addresses this issue in chapter 3, where we examined in two groups of nurses (Italian and Dutch) how and to what extent various organizational variables from the Tripod accident causation model (Wagenaar, Hudson, & Reason, 1990; Wagenaar, Groeneweg, Hudson, & Reason, 1994) make an independent contribution in explaining occupational and general well-being, beyond that attributed to the JDC(-S) constructs.

Secondly, some authors (De Lange et al., 2003; Van der Doef & Maes, 2002; Gelsema, Maes, & Akerboom, 2007) indicate that the lack of support for the buffer hypotheses of the model could be attributable to the use of general scales to assess the JDC(-S) dimensions. More occupation-specific measures might be required to adequately assess the moderating effect postulated by the JDC(-S) model.

Therefore, in our studies (chapters 3, 5, 6 and 7) a specific measure developed with the purpose of assessing nurses' psychosocial job variables was adopted.

| Psychosocial Job Characteristics | Psychological Distress – Well being |
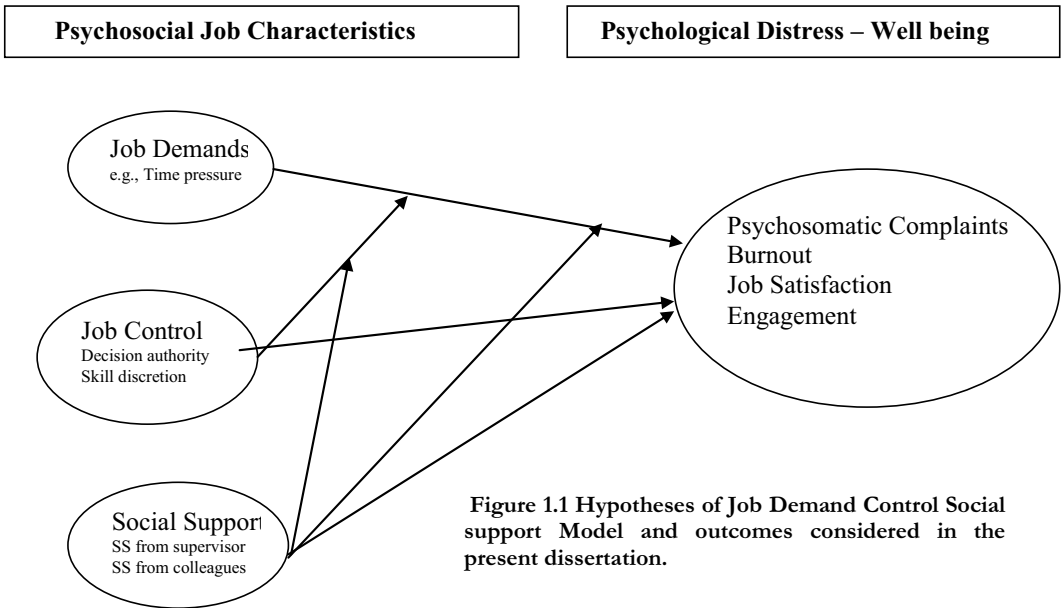
Figure 1.1 Hypotheses of Job Demand Control Social support Model and outcomes considered in the present dissertation.

A third issue regards the validity of the JDC(S) model in different countries. In chapter 3 we tested the effects of JDC(-S) characteristics on several strain reactions in two samples of academic nurses working in different European health care contexts, i.e. Italian and Dutch nurses.

Fourthly, traditionally, research on the JDC(S) model has neglected individual variables (Van der Doef & Maes, 1999; Semmer & Meier, 2009). The present thesis addresses this issue in chapters 4, and 5. In chapter 4 we described the development and psychometric qualities of the Occupational Coping Self-Efficacy for Nurses (OCSE-N) scale. The questionnaire measures the individual's beliefs about one's ability to cope with the specific occupational stressors (OCSE) of nursing profession. In the chapter 5 we examined the direct and the interactive role of OCSE in the JDC(-S) model(s). In addition, the attainment of personal goals at work may have an influence on the well being of nurses. In the chapter 6 we analyzed the mediating role of personal goal facilitation through work (PGFW), defined as perceptions of the extent to which one's job facilitates the attainment of one's personal goals (Ter Doest, Maes, Gebhardt & Koelewijn, 2006), in the association between JDCS variables and psychological distress and job-related well being.

The fifth issue concerns the design of the studies that tested the assumptions of JDC(S) model(s). The vast majority of studies that investigated the relationships between the JDC(S) model and psychological distress were based on a cross-sectional design and did not therefore permit inference of causality. Furthermore, the underlying assumption in many longitudinal studies is that psychosocial job dimensions remain fairly stable over time, allowing researchers to make causal inferences regarding the observed differences in psychological strain over time. However, as suggested by several authors (e.g., Roe, 2008) the work environment is not a static phenomen, it is dynamic and susceptible to change. In chapter 7 we examined the across-time effects of *changes* in JDC(S) variables on burnout indicators.

1.3 Outline of thesis

The studies included in this thesis focus on the relationships between occupational stressors and job resources, operationalized on the basis of the JDC(-S) model, and psychological well being and distress in nurses (See Figure 1.2).

Chapter 2 contains a state of the art review of 43 studies conducted among nurses and based on the Job Demand Control (Support) (JDC(-S)) model. The review addresses the different hypotheses of JDC(-S) model(s), investigating the effects of the JDC(-S) variables on general psychological distress and well being (e.g., depression, anxiety, somatic complaints, mental health) and job related well being (namely burnout and job satisfaction).

Chapter 3 presents the results of a cross national study conducted in two samples of Italian (N = 609) and Dutch (N = 873) academic nurses. The purpose of the study was to compare psychosocial job characteristics, organizational conditions, and specific outcomes (namely somatic complaints, burnout, and job satisfaction) in Italian and Dutch nurses; and to explore whether determinants of specific outcomes are different in both countries.
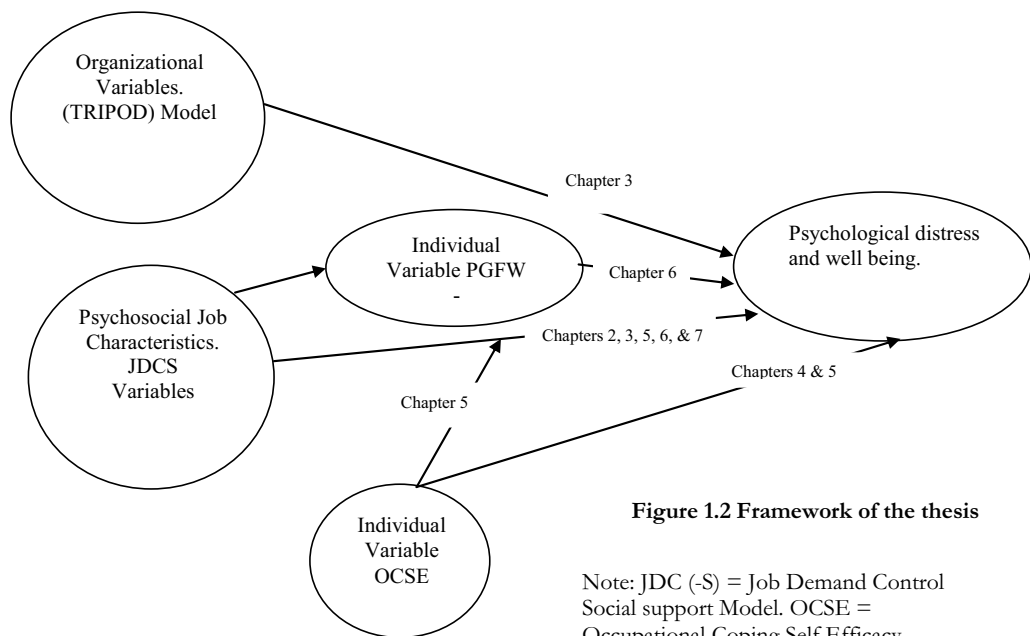
Figure 1.2 Framework of the thesis

Note: JDC (-S) = Job Demand Control Social support Model. OCSE = Occupational Coping Self Efficacy. PGFW = Personal Goal Facilitation through Work

Chapter 4 addresses one of the instruments used in this dissertation. Since occupational coping self efficacy can function as a moderator in the JDC(-S) model(s), the main purpose of this study was to develop and evaluate the psychometric properties of the Occupational Coping Self Efficacy for Nurses (OCSE-N) scale in a large sample of nurses.

Chapter 5 describes a cross sectional study conducted in a sample of 1479 Italian nurses. The aims of the study were: a) to test the core hypotheses of the Job Demand Control Support - JDC(-S) – model(s); and b) to extend the model analyzing the direct and moderating role of OCSE of nurses on relevant outcomes, such as psychological distress, somatic complaints, burnout and job satisfaction.

Chapter 6 reports on a cross sectional study that examined in a group of 217 Italian nurses whether personal goal facilitation through work mediated the association between JDC(-S) dimensions and specific outcomes such as somatic complaints, burnout, job satisfaction and work engagement.

The last study, which is described in chapter 7, is a longitudinal study on the relation between psychosocial job dimensions and burnout. This 14-months follow up study provides a longitudinal test of the JDCS model and aims to analyze whether changes in the job characteristics are related to (changes in) burnout in a sample of Italian nurses (N = 217).

The thesis concludes with a general conclusions and discussion (chapter 8). The major results of the studies described in this thesis, the strengths and limitations of the studies, and suggestions for further research are discussed. Finally, indications for practice are formulated.

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Chapter 2. The Job Demand Control (-Support) model and psychological well being in nurses: a review.

Abstract

Occupational stress is a widespread problem in nurses. The present paper provides a review of 43 studies on the Job Demand Control (-Support) Model (JDC(-S)) in relation to psychological distress and well-being, involving nurses and published in English language journals from 1979 to 2010 (inclusive). According to the central tenets of the model(s), we examined two hypotheses: a) the (iso) strain hypothesis, stating that the highest level of psychological distress is expected when employees perceive high demands and low control (and low social support), and b) the buffer hypothesis, predicting that control (and social support) can buffer the potential negative effects of high demands on psychological distress. We focused our attention on two types of well being outcomes: general distress-well being (i.e., psychological distress and well being) and job related distress-well being (namely burnout and job satisfaction).

The review shows that the (iso)strain hypothesis is more intensively studied than the buffer hypotheses, and results are more supportive for the (iso)strain hypothesis than for the buffer hypotheses. In line with previous reviews, support for both hypotheses is mainly found in cross-sectional studies.

Buffering effects of job control in the relationship between demands and outcomes were found in 9% of the tests. The most important difference between supportive and non supportive studies was the operationalizations of demands and control. Supportive studies more often used more focused and specific measures of job demands (quantitative overload, monitoring demands, role stressors) and job control (e.g. influence on the pace of work). The limited number of studies that investigated the three way interaction hypothesis of the JDCS model did not permit any conclusions about the validity of this hypothesis.

Based on these review results, suggestions for future research, practical implications and theoretical development are proposed.

Key words: Nurses, Job Demand Control Model; Job Demand Control Social Support Model; General Psychological distress, Job satisfaction, Burnout.

2.1. Introduction

Occupational stress in nurses is a widespread problem and therefore has received a lot of research attention. A plethora of studies has shown that burnout, job dissatisfaction, depression, anxiety and physical health consequences are prominent in today's nurses (Bourbonnais, Comeau, & Vezina, 1999; Lambert & Lambert, 2001; McVicar, 2003).

While existing reviews try to identify determinants of these outcomes, most studies are not driven by a theoretical model (Lambert & Lambert, 2001; Hayes, Bonner, & Pryor, 2010; Lu, While, & Barriball, 2005: McVicar, 2003; Richards et al., 2006). For example, McVicar (2003) identified six main areas for the sources of workplace distress for nurses: a) workload/inadequate staff cover/time pressure, b) relationship with other clinical staff, c) leadership and management style/poor locus of control/poor group cohesion/lack of adequate supervisory support, d) coping with emotional needs of patients and their families/ poor patient diagnosis/death and dying, e) shift working, and f) lack of reward, but there is no underlying theory.

In another narrative review, Hayes, Bonner, & Pryor, (2010) examined data from 17 studies on job satisfaction among nurses employed in acute hospital settings. They identified 44 dimensions contributing to job satisfaction that were grouped in three clusters: a) intra-personal variables (e.g. background dimensions and individual coping strategies), b) inter-personal variables (e.g. autonomy, providing direct patient care, professional relationships, leadership, and professional pride), and c) extra-personal variables (e.g., pay, organizational policies and job resources). However, also in this case the authors do not refer to a theoretical background to explain the relationship with job satisfaction.

Almost all existing reviews are based on a stressor-strain approach. This approach is broadly characterized by the assumption that strain arises when adverse work experiences contribute to poor psychological and physical health (Beehr, 1995). Adverse work experiences or "occupational stressors" are assumed to cause nurses strain, which manifests in negative psychological and physiological responses. Hence, researchers working with this approach have typically attempted to correlate various negative work experiences with indices of psychological distress. However, several researchers (Clegg, 2001; Cohen-Mansfield; 1995; Gelsema, Maes, & Akerboom, 2007, Lambert & Lambert, 2001; Lu, While, & Barriball, 2005) have emphasized the need for studies on nurses' stress that are theoretically based and move away from simplistic investigations of innumerable and various stressors.

Occupational stress theories are organized core constructs and conceptualizations that attempt to reduce the complex reality into more comprehensive and parsimonious models, in order to explain job related well being. One of the most important models that has guided occupational health research is the Job Demand-Control Model (JDC, Karasek, 1979) and its extended version, the Job Demand-Control-Social support Model (JDCS model; Karasek & Theorell, 1990). Although a substantial amount of research has been published considering both JDC(-S) indicators and nurses as subjects, a detailed review evaluating those studies is lacking. Moving toward a knowledge-based theory of occupational stress, the present paper tries to fill this gap by presenting a review of empirical studies conducted among nurses, testing the assumptions of the JDC(-S) model(s).

The Job Demand Control Support model and psychological well being outcomes.

The JDC(-S) model focuses on three dimensions of psychosocial working conditions: job demand and two job resources: job control and social support (Karasek & Theorell, 1990). Psychosocial job demands relate to the work load, and include, for example, time pressure, role conflict and quantitative workload. Job control, or decision latitude, refers to the person's ability to control his or her work activities. It includes two distinct but related dimensions: skill discretion and decision authority. Skill discretion refers to the level and variety of the skill required for the work tasks and the possibilities to acquire new skills in the job role; decision authority reflects the extent to which people have freedom over how they do their work and have a say over what happens. The third dimension, added later to the model, social support refers to instrumental and emotional support from colleagues and superiors (Johnson & Hall, 1988; Johnson, Hall, & Theorell, 1989; Karasek & Theorell, 1990).

The original version of the model assumes two basic hypotheses of how job demands and control may combine and lead to various distress and well-being outcomes: (1) the strain hypothesis which assumes additive effects of both dimensions: high job demands precipitate job strain, as does low job control (main effects); (2) the interaction or buffer hypothesis, that states that job control has a moderating effect on the relationship between job demands and job strain (interaction effect). Later, adding social support from coworkers and supervisors as a third dimension, a crucial issue became whether job demands, job control and social support combine additively (high demands, low control and low workplace social support are associated with highest distress: (iso)strain hypothesis); or interactively (social support decreases the negative impact of high demands and low control: buffer hypothesis) to explain distress and/or well-being.

In literature some reviews (De Lange, Taris, Kompier, Houtman, & Bongers, 2003; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; Van der Doef & Maes, 1999a) examined whether job demands,

job control and social support combine additively ((iso)strain hypothesis) or interactively to explain psychological distress and well-being. In a review that considered 63 studies published in the period 1979-1997, Van der Doef & Maes (1999a) found that the strain hypothesis was supported in 67% of the studies conducted, whereas the iso-strain hypothesis was supported in 53% of cases. Design, the sample and the measurement of JDC(-S) variables were key factors in discriminating supportive from non supportive studies. Cross sectional studies that used predominantly male samples and self report measures provided more support for the (iso) strain hypothesis. The buffer hypotheses have been tested less often than the additive hypotheses (Van der Doef & Maes, 1999a). In addition, on the basis of the review of Van der Doef & Maes (1999), Taris (2006) concluded that statistical interactions were fully supported in only 10% of the studies conducted to test the demands X control interaction, little more than chance level. Supportive studies were characterized by using more focused measures of job demands (e.g. time and job pressures, role ambiguity) and job control (e.g. influence on amount and pace of work, decision authority) (Van der Doef & Maes, 1999a). Furthermore, in the supportive studies the job control assessed more adequately the amount of control the employee could exert over the demands experienced (*match principle*). In their review, De Lange et al. (2003) considered five criteria for evaluating methodological quality. They reviewed 45 longitudinal studies of which 19 were identified as high quality studies, obtaining acceptable ratings on all criteria; they found that high-quality studies did not provide consistent support both for the (iso) strain hypothesis of the JDC(-S) model and for the interaction effect. They concluded that high quality studies did not differ notably in their support for the JDC(- S) model(s) from the mixture of high-quality and lower-quality studies included in Van der Doef and Maes' (1999) review. Häusser et al. (2010) updated the Van der Doef and Maes' review considering 83 studies published between 1998 and 2007. They found robust support for additive effects in cross sectional studies. With regard to the interactive hypotheses, the conclusions of the previous reviews were confirmed: they found weak support for the buffer hypotheses of the JDC(- S) model(s), and mainly in the few studies where the type of demands match with the type of job control.

The principal reason to discriminate between the (iso)strain and buffer hypotheses in examining well being relates to the implications for job redesign. A buffer effect of control and social support would lead to recommendations to focus on the enhancement of job control and social support, to reduce the detrimental impact of job demands. However, if the `iso-strain' hypothesis is valid and this would be the result of additive effects of demands, control and social support, this strategy would not be effective, as high demands would maintain their unfavourable effects on employees' well-being. Given the importance of these implications also for health care organizations and quality of working life of nurses (e.g. Garman, Corrigan, & Morris, 2002), we will carry out a review considering only studies conducted on nurses

samples. More specifically, we will focus our attention on two types of well being outcomes: general distress-well being and job related distress-well being.

In the first group we included psychological distress and somatic complaints. Some form of *psychological distress* is often used to assess the outcomes of work-related stress (Van der Doef & Maes, 1999). Psychological distress includes depression and anxiety as well as the physiological symptoms associated with those moods. Nursing is emotionally and physically demanding and its essence is an intense interaction with a difficult client group; nursing is therefore one of the occupational groups that is most frequently affected by psychological distress symptoms (Eriksen, Tambs, & Knardahl, 2006). Somatic complaints refer to complaints (such as headache, stomach ache, back pain), which are considered to be influenced by psychological distress. We considered somatic health complaints, as previous studies found that psychosomatic complaints among nurses are well above average (Chan & Chan, 2004).

In the second group we considered burnout and job satisfaction. *Burnout* is described as a combination of emotional exhaustion, depersonalisation, and diminished personal accomplishment that may occur among individuals "who work with other people in some capacity" (Maslach, 1993). There is a growing body of evidence (e.g. Garman, Corrigan, & Morris, 2002) that burnout among nurses is associated with reduced quality of care. In addition, we considered *job satisfaction* because previous studies (Lu, While, & Barriball, 2005) had identified it as a key factor in nurses' recruitment and retention. Job satisfaction could be defined as "a positive (or negative) evaluative judgment one makes about one's job or job situation" (Weiss, 2002, p. 175).

Review Hypotheses .

The present review will focus on the following hypotheses regarding the JDC model:

H1a) nurses perceiving a "high strain" condition (high demands and low control) experience the highest level of psychological distress and the lowest level of psychological well being ("strain" hypothesis);

H2a) job control interacts with job demands, indicating a moderating effect of control on the negative impact of high demands on psychological distress and well being ("buffer" hypothesis).

And, reformulating these hypotheses for the JDCS model:

H1b) the highest level of psychological distress is experienced by nurses in an "iso-strain" condition, combining high demands, low control and low social support ("iso strain" hypothesis);

H2b) social support interact with job demands and job control, indicating a moderating effect of support on the negative impact of high strain on psychological distress and well being.

2.2. Method

A preliminary inspection of the JDC(-S) studies showed that most studies used (hierarchical) regression analyses in which variables are examined in a particular composition (for instance including socio-demographic variables), which complicates revealing the unique contribution of the JDC(-S) variables (as would be necessary for a quantitative review). As many studies would have to be excluded for a meta-analysis, a review of a narrative nature was preferred.

The search engine used was EBSCOHost which accesses a range of databases, including Medline, PsychInfo, PsycArticles, and CINAHL. These were supplemented by hand searches of contents of journals, and reviews of reference lists of identified papers. Various combinations of the following keywords were used: *nurses, job demands, control, support, autonomy, skill discretion, job strain, psychosocial stressors, work environment, job stress(ors), job conditions, burnout, job satisfaction, (psycho)somatic complaints, and psychological distress.*

Inclusion Criteria.

Criteria for inclusion were as follows: 1) studies involving nurses published in English language journals from 1979 to 2010 (inclusive); 2) in the cases of mixed samples we considered only papers where it was possible to detect the results in the nurses sample, or where the vast majority of sample (at least 60%) was made up by registered nurses; 3) inclusion of at least the two core dimensions of the model: job demands and job control; 4) studies were included if they were published empirical quantitative research reports examining the predictions of JDC(-S) variables on psychological well being in nurses. Therefore, descriptive/theoretical papers on the JDC(-S) model were not included in the review; and 5) studies were published in peer reviewed scientific journals (hence paper presentations, personal communications, and unpublished papers were excluded).

Categorization of the Studies.

The studies were first categorized on the basis of studies examining the "(iso-) strain hypotheses and /or the "buffer" hypotheses. Studies examining the `(iso)strain' hypothesis were defined as those

comparing the high (iso)strain group to a reference group (e.g. the low (iso)strain group); those examining product terms or ratios of demands and control (and support) as predictors without taking main effects into account; and those reporting on additive effects of demands and control (and support). Studies examining the "buffer" hypotheses were defined as those studies that explicitly included multiplicative effects between demands, control (and support), in addition to the main effects of these variables.

Secondly, studies were categorized according to their outcome variables, such that a distinction has been made between 1) general measures of psychological distress and well being, and 2) job related psychological distress, and well being. General psychological distress/well being includes measures as depression, anxiety, physical symptoms and mental health. Job related psychological distress and well being indicators include job satisfaction, and burnout.

2.3. Results

<u>Overview of the studies.</u>

Study characteristics.

On the basis of these criteria, reports on 43 samples were included in this review. The results are presented in two sections to highlight the key outcomes identified within the research: general psychological distress and well being and job related psychological distress and well being.

Nine studies were based in the Netherlands, 7 in Sweden, 6 in Canada, 4 in USA, 3 in Belgium, 2 in Australia, Germany, Korea and Taiwan; and 1 in Spain, Finland, Denmark, Norway, UK, China and one study was conducted in 12 EU countries.

Given that some studies include several outcomes and/or different measures of JDCS dimensions, and/or consider more subsamples (e.g. intensive and general nurses) we made a distinction between fully supportive, partially supportive and non supportive studies. The studies were classified as fully supportive when the results confirmed the hypotheses under study, all significant main effects for all JDC(-S) variables and /or the predicted buffer effects were found, in all circumstances (in all outcomes and in the various subsamples). The studies were grouped as partially supportive when the hypothesis was supported under specific condition(s), namely for (a) a specific subsample, for (b) a specific independent variable (e.g., social support from colleagues and not social support from supervisors), or (c) a specific outcome. Studies were classified as non supportive when for all outcomes and all subsamples the hypotheses were not supported, i.e. in the case of the additive hypotheses when not all main effects reached statistical

significance, and regarding the buffer hypotheses, when the interactive effects were either not significant or not in line with the expected buffer effect.

Previous reviews (Van der Doef and Maes, 1999a; Häusser et al. 2010) analyzed the distinctions between supportive, partial supportive and non supportive studies on the basis of characteristics such as: gender of employees, method adopted to analyze hypotheses (linear *vs* non linear), type of occupation, design of the study, generality vs specificity of instruments, and the sample size. Given the specific characteristics of the samples of our review (nurses populations largely female) supportive and non supportive studies were compared taking into account the following study characteristics: design of the study, method adopted to analyze hypotheses (linear vs non linear), specificity of the instruments, sample size, type of wards, and country of study.

Measurements of JDCS dimensions.

Regarding the operationalization of *job demands*, almost all authors were inspired by the original definition of job demands: "psychological stressors involved in accomplishing the work load, stressors related to unexpected tasks (Karasek 1979; pag. 291)", and measured the degree of *psychological* demands as hectic work and work overload. Besides the original concept, 5 studies (Gelsema, et al., 2005; Gelsema, et al., 2006; Munro et al., 1998; Rodwell et al., 2009; Yang et al., 2004) included an indicator of physical demands (e.g., "*working in a bending position*"), 3 studies (Aust et al., 2009; Escriba-Aguir & Perez Hoyos, 2007; Fillion et al., 2007) considered an additional scale of emotional demands (e.g., "….*have to face and carry much of the patients worries/burdens/destinies of life*"). Elovaino and Kivimaki (1996) assessed job demands via a measure composed by five subscales: demanding patients, time pressure, quantitative work overload, high levels of responsibility, and conflicts in occupational collaboration or cooperation, analogously, the studies of Fox et al. (1993), Landeweerd and Boumans (1994), used broader conceptualizations of job demands that included specific stressor items for nurses, such as quantitative (e.g. patient load, time pressure) and qualitative (e.g. high demands on concentration, high complexity of tasks) workload scales. Finally, McLaney & Hurrel (1998) included a scale of interpersonal conflict (intergroup and intragroup).

As concerns *job control*, almost all studies based their measures on the decision authority construct: the influence that the employee has over how the work is done (control over tasks). Twelve studies out of 43 (Amick, et al., 1998; Bakker, et al., 2005; Bourbonnais, et al., 1998; 1999; Bourbonnais, Bourbonnais, Brisson, Malenfaut, & Vezina, 2005; De Gucht, Fischler, & Heiser, 2003; Evans & Steptoe, 2002; Fillion et al., 2007; Gelsema, et al., 2005; 2006; Jansen et al., 1996; Landsbergis, 1988; Laschinger, Finegan, Shamian, & Almost, 2001; & Shen, Cheng, Tsai, Lee, & Guo, 2005), included also the original concept of skill discretion: the level and variety of the skill required for the work tasks and the possibilities to acquire

new skills in the job role. Beside the original construct (decision authority and skill discretion), two studies (De Gucht, et al., 2003; McLaney & Hurrell; 1998) included a scale of task control (e.g., "*I can determine my work pace.*"). McLaney & Hurrel, (1998) adopted a scale developed by Greenberger (1988) that was composed by 4 subscales: task control, decision control, control over physical environment, and resource control factor. Finally, in one study (Verhaeghe, Vlerick, De Backer, Van Maele, & Gemmel, 2008) job control was assessed via two scales (Wall, Jackson, & Mullarkey, 1995) referring to timing control ("*Do you have full authority in determining how much time you spend on particular tasks?*") and method control ("*Can you choose the methods to use in carrying out your work?*").

Social *support* was considered in 29 of the 43 studies. In 14 of them (48%), social support was assessed in line with the original definition (Karasek & Theorell; 1990) via one scale composed by two sub-dimensions indicating instrumental and emotional social support from supervisors and colleagues. In 10 studies the two sub-dimensions indicating support from colleagues and supervisors were considered separately (De Gucht et al., 2003; Escribà-Agüir & Pérez-Hoyos, 2007; Gelsema et al., 2005; 2006; Hansen et al., 2009; Jourdain & Chenevert; 2010; Lee & Akhtar, 2007; Proost et al., 2004; Rodwell et al., 2009; Seo et al., 2004; Zangaro & Johantgen; 2009).

Verhaeghe and coll. (2008), included in their research only a scale of supervisor support. Finally, two studies (Hansen et al., 2009; Testad et al., 2009) operationalized social support using a more comprehensive measure of quality of social interactions (with colleagues, supervisors, and other professionals) at workplace.

Table 2.1. Summary of papers under review.

	Author (Year) Origin	Population	Design	Measurement of DCS variables	Main outcomes measure(s)	Hypotheses tested DC Model Strain	Hypotheses tested DC Model Buffer	Hypotheses tested DCS Model Iso strain	Hypotheses tested DCS Model Buffer	Remarks
1	Amick, Kawachi, Coakley, Lerner, Levine, and Colditz (1998) USA	33,689 Nurses 100% ♀	CS	JCQ	Mental Health (SF 36)	S	N	S	N	High-strain condition (high D and low C) was associated with lower mental health than active work. Iso-strain work (high strain and low work-related social support) increased the risks further.
2	Aust, Rugulies, Skakon, Scherzer, and Jensen (2007) Denmark	281 Patient health care workers ♀	CS	D and C were measured by scales of COPSOQ-I S was measured by a scale devised by the authors.	Mental Health (SF 36)	R	N	R	N	Logistic regression analyses showed that high levels D and low levels and problematic interpersonal relations at work were associated with lower self-rated mental health.
3	Bakker, Le Blanc, and Schaufeli (2005) 12 European countries	1849 intensive care unit nurses 79.5% ♀	CS	JCQ	Emotional exhaustion (MBI-HSS) Depersonalization ; (MBI-HSS) Personal accomplishment (MBI-HSS).	S R R	R R R	N N N	N N N	Both D and C (Decision Latitude) were significantly associated with Emotional exhaustion. C was a significant predictor of depersonalization and personal accomplishment.
4	Bourbonnais, Comeau, Vezina, and Dion (1998) Canada	1891 nurses. 94% ♀	CS	JCQ	Emotional exhaustion (MBI-HSS) Psychological distress (PSI)	S S	N N	S S	N N	High (iso) strain index (high D and low C and S) was associated with emotional exhaustion and psychological distress. However authors revealed that the strength of the association was not the same across hospitals.
5	Bourbonnais, Comeau, and Vezina (1999) Canada	1741 Female nurses	LG LT3	JCQ	Emotional exhaustion (MBI-HSS) Psychological distress (PSI)	S S	N N	S S	N N	Results are consistent with previous reported findings. The same associations were found between D, C, and a combination of the two with both psychological distress and emotional exhaustion for current exposure (at T1 and T2) and for cumulative exposure. S had a direct effect on these psychological symptoms.

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Table 2.1. (Continued)

	Author (Year) Origin	Population	Design	Measurement of DCS variables	Main outcomes measure(s)	Hypotheses tested				Remarks
						DC Model		DCS Model		
						Strain	Buffer	Iso strain	Buffer	
5	Bourbonnais, Brisson, Malefant, and Vezina (2005) Canada	2006 female nurses	CS	Changes of JDCS variables after restructuring. (JCQ) (Items in Appendix of article)	Psychological Distress (PSI)	S	N	S	N	Authors compared the results with two reference populations. Findings showed an increase in psychological risk factors at work among nurses after restructuring of the health care sector and a higher prevalence of high D, low C, and low S.
6	De Gucht, Fischler, and Heiser (2003) Belgium	202 Nurses ♀ 79%	CS	LQoWQ	Functional dyspepsia / Irritable bowel syndrome / Idiopatic chronic fatigue / measured by various scales	R R R	N N N	R R R	N N N	Hypotheses were tested with logistic regression analyses, including in each equation some measures of individual differences (alexithymia and neuroticism) and psychological distress (anxiety and depression).
7	de Jonge, van Breukelen, Landeweerd, and Nijhuis (1999) The Netherlands	895 registered nurses ♀ 84%	CS	D was assessed by a scale developed by de Jonge, Landerweed & Nijus (1993); C was measured by MAQ.	Emotional exhaustion (MBI-HSS) / Job related anxiety (VOS) / Job satisfaction: one item (de Jonge, 1995)	R R S	R R R	N N N	N N N	D was associated with all outcomes.
8	de Rijk, Le Blanc, Schaufeli, and de Jonge (1998) The Netherlands	367 intensive care nurses. 56%♀	CS	D was assessed by a workload scale developed by de Jonge (199); C was measured as decision authority.	Emotional exhaustion (MBI-HSS) / Depersonalization (MBI-HSS)	R R	PS R	N N	N N	Buffer effect was supported in emotional exhaustion only among nurses with active coping strategies.
9	Doncevic, Romelsjo, and Theorell (1998) Sweden	236 Swedish female district nurses; 69 Croatian female district nurses	CS	D and C were measured by JDC S was measured by two general items	Job satisfaction (one item)	R	N	R	N	D was not associated with job satisfaction in any sample. C and S were associated with job satisfaction only in the Swedish sample.

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#	Study	Design	Measures of D and C	Outcome measure	D	C	S	Findings
10	Elovaino, & Kivimaki. (1996) Finland	433 nurses. 56%♀	CS	D assessed by 5 subscales: troublesome patients, time pressure; quantitative work overload, high levels of responsibility, and conflicts; C was measured by a scale of Ganster (1984)	Strain (OSQ)	S	R	N	Job strain was significantly and positively related to D and negatively related to C. C did not moderate the stress-strain relationship.
11	Escribà-Agüir, and Pérez-Hoyos. (2007) Spain	279 nurses 56%♀	CS	Items adapted from Job Content Questionnaire. It was included a scale that measured emotional demands	Emotional exhaustion (MBI-HSS) Mental health (SF36)	R R	N N	N N	Exposure to high psychological demands increased the probability of bad mental health and high emotional exhaustion among nurses. C did not show any significant effect on the outcomes of the study.
12	Evans, and Steptoe. (2002) UK	233 nurses 74%♀	CS	D and C were assessed by a scale devised by Cropley, Steptoe, & Joekes (1999); S was measured by a scale devised by Unden, Orth-Gomer, and Elofsson (1991)	Anxiety (HADS)	S	N	N	After adjusting for age, sex, paid work hours and a measure of social desirability bias, risk of elevated anxiety was independently associated with higher job strain and lower job social support.
13	Fillion, Tremblay, Truchon, Cote, Struthers, and Dupuis. (2007) Canada	209 palliative-care nurses 92.3%♀	CS	French adaption of JCQ.	Job satisfaction (JDS) Emotional distress (POMS).	R R	N N	R R	D was related to both outcomes.

Table 2.1. (Continued)

	Author (Year) Origin	Population	Design	Measurement of DCS variables	Main outcomes measure(s)	Hypotheses tested				Remarks
						DC Model		DCS Model		
						Strain	Buffer	Iso strain	Buffer	
14	Fox, Dwyer, and Ganster. (1993) USA	136 Nurses ♀	CS	D: workload (Caplan et al; 1980) and stressful events (Motowidlo, and coll. 1986) C: scale of Dwyer & Ganster (1991)	Job satisfaction Illness and somatic complaints (Ganster, 1985)	PS R	S R	N N	N N	With regards job satisfaction, strain hypothesis was supported only in the case of stressful events, buffer effect was supported with both measures: workload and stressful events. As regards to Illness and somatic complaints, strain hypothesis was supported.
	Ganster, Fox, and Dwyer, (2001) USA	101 Nurses ♀	LG1	D: workload (Caplan et al; 1980) and stressful events (Motowidlo, and coll. 1986) C: scale of Dwyer & Ganster (1991)	Illness and somatic complaints (Ganster, 1985) + Mental Health (MHI)	R	R	N	N	Results showed that none of the demands and control variables, or their interactions, were significantly related with Mental health (a composite mental health variable that combined the items from the Mental Health Index and the somatic complaints scales, with high scores indicating more positive mental health).
15	Gelsema, van der Doef, Maes, Akerboom, and Verhoeven. (2005) The Netherlands	807 hospital nurses 85% ♀	CS	Leiden Quality of Work Questionnaire for Nurses (LQoWQ-N)	Job satisfaction (LQoWQ-N) Emotional exhaustion (MBI-HSS) Psychological distress (SCL-90) Somatic complaints (SCL-90)	R R R R	N N N N	R R R R	N N N N	D resulted correlated with all outcomes except with job satisfaction. Another measure of D (physical demands) resulted correlated with all outcomes. Both measures of C (skill discretion and decision latitude) were positively associated with job satisfaction. Skill discretion was negatively associated with emotional exhaustion. S from sup. showed a positive association with job satisfaction. S from coll. did not show any significant effect.

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No.	Authors (year) country	Sample	Design	Work environment instrument	Outcome measures					Results / conclusions
	Gelsema, van der Doef, Maes, Janssen, Akerboom, and Verhoeven. (2006) The Netherlands	381 hospital nurses 84%♀	LG3	Leiden Quality of Work Questionnaire for Nurses (LQoWQ-N)	Job satisfaction (LQoWQ-N)	R	N	R	N	The most important result regarded the longitudinal changes in work conditions. These were predictive of the outcomes, especially of job satisfaction and emotional exhaustion.
					Emotional exhaustion (MBI-HSS)	R	N	R	N	
					Psychological distress ((SCL-90))	R	N	R	N	
					Somatic complaints (SCL-90)	R	N	R	N	
16	Hansen, Sverke, and Naswall (2009) Sweden	Hospital nurses. 279 from Private for profit hospital 91%♀; 562 from Private non-profit hospital 97%♀; 261 from Public hospital 96%♀	CS	D: 3 scales : workload, role conflict, job insecurity. C: job autonomy (Sverke & Sjooberg, 1994); S: work group support, supervisor support (Ekvall & Arvonen (1994).	Emotional exhaustion (MBI - HSS);	PS	N	R	N	As regards emotional exhaustion strain hypothesis was confirmed only among nurses from private non-profit hospital.
					Depersonalization (MBI-HSS)	R	N	R	N	
17	Hochwälder (2006) Sweden	694 nurses 91%♀	CS	Work environment scale (Theorell, Michelsen, & Nordemar, 1991).	Emotional exhaustion (MBI-HSS)	S	N	S	N	All JDCS variables showed significant associations with outcome variables except relationship between D and personal accomplishment and between C on the one hand, and all mental ill health variables on the other hand.
					Depersonalization (MBI-HSS)	S	N	S	N	
					Personal accomplishment (MBI-HSS)	R	N	R	N	
					Somatic symptoms (GHQ)	R	N	R	N	
					Anxiety and insomnia (GHQ)	R	N	R	N	
					Severe depression (GHQ)	R	N	R	N	
18	Hochwälder (2007) Sweden	838 registered nurses 95% ♀	CS	Work environment scale (Theorell, Michelsen, & Nordemar, 1991).	Emotional exhaustion (MBI-HSS)	S	N	S	N	JDCS variables showed significant associations with burnout variables, except relationship between D and personal accomplishment.
					Depersonalization (MBI-HSS)	S	N	S	N	
					Personal accomplishment (MBI-HSS).	R	N	R	N	
19	Jansen, Kerkstra, Abu-Saad, and van der Zee,, (1996) The Nertherlands	402 community nurses 93%♀	CS	Algera questionnaire (Algera et al, 1986)	Emotional exhaustion (MBI-HSS)	S	N	S	N	D was associated with job satisfaction. C (autonomy) was associated with depersonalization and personal accomplishment.
					Depersonalization (MBI-HSS)	R	N	R	N	
					Personal accomplishment (MBI-HSS)	R	N	R	N	
					Job satisfaction (Boumans, 1990)	R	N	R	N	

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Table 2.1. (Continued)

Author (Year) Origin	Population	Design	Measurement of DCS variables	Main outcomes measure(s)	Hypotheses tested DC Model		DCS Model		Remarks
					Strain	Buffer	Iso strain	Buffer	
20 Jourdain and Chenevert (2010) Canada	1636 nurses (92% ♀)	CS	D measured by quantitative overload (Caplan et al, 1980) and role stress (Rizzo et al, 1970) variables. and stressful events (Motowidlo, and coll. 1986) C measured by a scale of decision authority; S measured by a scale of Eisenberger et al. (1986)	Emotional exhaustion (MBI-HSS) Depersonalization (MBI-HSS)	R R	N N	R R	N N	Both D variables were associated with emotional exhaustion. S. supervisor was associated with depersonalization.
21 Kowalski, Ommen, Driller, Ernstmann, Wirtz, Kohler and Pfaff (2010) Germany	959 nurses (88% ♀)	CS	D was operationalized as workload (Richter et al. 2000); C was assessed as decision latitude (Richter et al. 2000).	Emotional exhaustion (MBI-GS)	S	N	N	N	D was positively associated with emotional exhaustion, whereas decision latitude was inversely associated with emotional exhaustion.

No.	Study	Sample	Design	Measures	Outcomes	D	C	S	Findings
22	Landeweerd, and Boumans (1994) The Netherlands	561 trained staff nurses 76%♀	CS	D and C measured by scales of Hackman & Oldham (1975) and Algera and coll., (1986)	Job satisfaction (Boumans, 1990)	R	R	N	Strain hypotheses were confirmed when authors did partial correlations, controlling for gender, job level, full/part time and length of service. After stepwise regression, strain hypothesis was supported only in the case of health complaints.
					Health complaints (VOS)	S	R	N	
23	Landsbergis (1998) USA	289 hospital and nursing home employees 95% ♀	CS	D and C were measured by JCS	Job satisfaction (JCS)	S	R	N	D correlated with all outcomes, except with personal accomplishment. C was inversely associated with depression, physical strain, sleeping problems, emotional exhaustion and depersonalization, and was positively associated with job satisfaction and personal accomplishment.
					Depression (JCS)	S	R	N	
					Physical strain (JCS)	S	R	N	
					Sleeping problems (JCS)	S	R	N	
					Emotional exhaustion (MBI-HSS)	S	R	N	
					Depersonalization (MBI-HSS)	S	R	N	
					Personal accomplishment (MBI-HSS)	R	R	N	
24	Laschinger, Finegan, Shamian, and Almost. (2001) Canada	404 nurses 48 % ♂	CS	D and C were measured by scales adapted by JDC questionnaire.	Job satisfaction (Hackman & Oldham's scale (1975))	S	N	N	There was a significant difference on job satisfaction between high strain groups and active groups.
25	Lee, and Akhtar (2007) China	2267 nurses 89 % ♀	CS	D was measured with workload scale of JDC; role conflict (Rizzo et al., 1970), tensions in professional work relationships (NSS). C was measured by scale of Dwyer & Ganster (1991) S was measured by scale of Caplan et al., (1980)	Emotional exhaustion (MBI-HSS)	R	N	N	D was associated with all three outcomes. Iso-Strain hypothesis was confirmed only in the case of personal accomplishment; this outcome was related with supervisory support, but not with coworker support.
					Depersonalization (MBI-HSS)	R	N	N	
					Personal accomplishment (MBI-HSS)	S	PS	N	

Table 2.1. (Continued)

#	Author (Year) Origin	Population	Design	Measurement of DCS variables	Main outcomes measure(s)	Hypotheses tested DC Model Strain	DC Model Buffer	DCS Model Iso strain	DCS Model Buffer	Remarks
26	Lee, Song, Cho, Lee, and Daly. (2003) Korea	178 nurses ♀	CS	D was measured by: role overload; role conflict (Rizzo et al., 1970); role ambiguity (Rizzo et al., 1970). C was measured globally by a single-item Visual Analogue Scale.	Emotional exhaustion (MBI-HSS) Depersonalization (MBI-HSS) Personal accomplishment (MBI-HSS)	R R R	N N N	N N N	N N N	Role conflict and role overload were positively related to emotional exhaustion. Role conflict was positively associated with depersonalization. Role ambiguity was inversely related with personal accomplishment. C did not correlate with any outcome.
27	McLaney, and Hurrell (1998) Canada	675 nurses 96% ♀	CS	D: task demands (Caplan et al., 1975; Hurrell et al., 1985); role demands (Rizzo et al., 1970); interpersonal conflict (Rahim, 1983) C: scale developed by Greenberger (1983)	Job satisfaction (Caplan et al., 1975)	PS	N	N	N	Additive effects for nearly all combinations of D and C were significant, except decision control.

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#	Study (Country)	Design	Sample	Predictors	Outcomes	D	C	S	Comments
28	Munro, Rodwell and Harding (1998). Australia	CS	60 Psychiatric nurses 73%♀	D (Workload) (Caplan et al., 1980) C (decision latitude) (Dwyer & Ganster, 1991) S (in and outside the workplace; Etzion, 1984)	Job satisfaction (Warr et al., 1979) Worker Health (GHQ)	R R	R R	N N	D was not associated with any outcome. C and S correlated positively with both outcomes.
29	Petterson, Arnetz, and Arnetz (1995) Sweden	CS	2566 nurses 85%♀	JDC	Job satisfaction	S	Z N	N	Lower levels of D and higher levels of C were associated with high job satisfaction.
30	Proost, De Witte, De Witte, and Evers (2004) Belgium	CS	2075 nurses. 84%♀	Scales adapted from JDCS measures. D time pressure C decision authority S Suport from coll and superv	Emotional exhaustion (MBI-HSS) Depersonalization (MBI-HSS) Personal accomplishment (MBI-HSS).	R R R	R R R	R R PS	D and S had a significant effect on the three dimensions of burnout in line with the theory of the JDCS model. No effect was found of decision authority on any of the three dimensions of burnout. With respect to the interactive effects, authors found a small but significant interaction effect between D and C on emotional exhaustion, but not in the expected direction. Finally there was also a small but significant three-way interaction effect between job demands, job control and support of colleagues on personal accomplishment. Nurses working in high strain jobs benefited most from receiving S from colleagues.
31	Rodwell, Noblet, Demir, and Steane (2009) Australia	CS	168 nurses working with elderly patients 93%♀	D: physical and psychological demands (Caplan et al, 1980); C: (Karasek, 1985); S: SS supervisor, colleagues at work, and life outside work	Job satisfaction (Brayfield et al.,) Psychological health (GHQ) Psychological distress (K10, Kessler & Mroczek, 1994)	R R R	R R R	R R R	D was associated with, psychological distress and health. C and S were significant predictors of job satisfaction. Coworker support and support outside the work were not associated with any outcomes. Buffer hypotheses were not supported in any case.

Table 2.1. (Continued)

	Author (Year) Origin	Population	Design	Measurement of DCS variables	Main outcomes measure(s)	Hypotheses tested DC Model Strain	DC Model Buffer	DCS Model Iso strain	DCS Model Buffer	Remarks
32	Schaufeli, and Janczur (1994) The Netherlands	200 Polish nurses ♀ 183 Dutch nurses 100% ♀	CS	D was assessed by 3 items of work stressors; C was measured by 2 items.	Emotional exhaustion (MBI-HSS) Depersonalization (MBI-HSS) Personal accomplishment (MBI-HSS)	R R R	N N N	N N N	N N N	Relationships were tested with logistic regression analyses, including in each equation measures of other job dimensions (e.g., uncertainty) and individual differences (self esteem). JDC variables were not associated with any burnout variable.
33	Seo, Ko, and Price (2004) Korea	353 acute care nurses ♀	CS	D Workload (Rizzo et al., 1970); C autonomy (Breaugh, 1985) S assessed by two scales from House (1981): co-worker support and supervisor support.	Job satisfaction	R	N	R	N	Structural equations analyses showed that workload and supervisory support had significant effects on hospital nurses' job satisfaction.
34	Shen, Cheng, Tsai, Lee, and Guo (2005) Taiwan	408 psychiatric nurses ♀	CS	JCQ	General Health (Sf36) Mental Health (SF 36)	S S	N N	R S	N N	Strain hypothesis was supported in both outcomes. Iso strain hypothesis was supported in the case of mental health.
35	Testad, Mikkelsen, Ballard, and Aarlsand (2009) Norway	197 nurses working in dementia wards 95% ♀	CS	JDCS variables were measured by QPSNordic D: workload C: Control and mastery at work; SS social interactions	Psychological stress (HScl) Somatic and psychosocial complaints SHC	R R	N N	R R	N N	Among JDCS variables, only C correlated with psychological distress. In the case of somatic and psychosocial complaints, authors did not find any significant association between JDCS variables on the one hand, and outcome on the other hand.

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36	Thomsen, Arnetz, Nolan, Soares, and Dallender (1999) Sweden	1016 psychiatric nurses from Sweden and England 78% ♀	CS	D and C were measured by scales developed by Arnetz (1997)	Mental Health Professional fulfilment (items described in the paper) Work-Related Exhaustion. (Thomsen et al. 1998)	R R	N N	N N	C correlated with professional fulfilment. D correlated with mental health and work related exhaustion.
						R	N	N	
37	Thomsen, Soares, Nolan, Dallender, and Arnetz (1999) Sweden	1, 051 psychiatrists and mental health nurses 74% ♀	CS	D and C were measured by scales developed by (Petterson & Arnetz, 1997)	Professional fulfilment (items described in the paper) Work-Related Exhaustion. (Arnetz, 1997)	R	N	N	C correlated with professional fulfilment. D correlated with work related exhaustion.
						R	N	N	
38	Tummers, Janssen, Landerweerd, and Houkes (2001) The Netherlands	196 student and general nurses (88% ♀) 175 mental health nurses (85% ♀)	CS	Demands (workload) was measured by a scale of De Jonge et al., 1995; Control was assessed by the MAQ; Social support was measured by VOS-D.	Emotional exhaustion (MBI-HSS)	R	N	R	Emotional exhaustion was associated with workload and social support in both samples.
39	Tummers, Landeweerd, and van Merode (2002) The Netherlands	1,253 Nurses; 85% ♀	CS	D (workload, De Jonge et al; 1995); C (MAQ). S (from colleagues and senior nursing officer) was assessed by VOS-D..	Emotional exhaustion (MBI-HSS), Psychosomatic complaints (Voeg) Job satisfaction (Landerweed et al., 1996)	R R S	R R R	R R S	D and S revealed significant associations with all outcomes. C correlated only with job satisfaction. Buffer hypotheses were not supported in any case.

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Table 2.1. (Continued)

	Author (Year) Origin	Population	Design	Measurement of DCS variables	Main outcomes measure(s)	DC Model Strain	DC Model Buffer	DCS Model Iso strain	DCS Model Buffer	Remarks
40	van den Berg, Vrijhoef, Tummers, Landerweed, and van Merode (2008). The Netherlands	2 samples: 1204 Hospital nurses 85% ♀; 350 Diabetes Specialist Nurse (DSN) 93% ♀	CS	D(workload) was measured by a scale of De Jonge et al, 1995); Control was assessed by the MAQ; Social support was measured by VOS-D.	Emotional exhaustion (MBI-HSS) Job satisfaction Psychosomatic health	R PS R	N N N	R PS R	N N N	Additive hypotheses were supported only in the case of job satisfaction in hospital nurses subsample. D. correlated with emotional exhaustion and psychosomatic health in both samples.
41	Verhaeghe, Vlerick, De Backer, Van Maele, and Gemmel (2008) Belgium	416 (Intensive Care Units) Nurses 678 (medical and surgical wards) 84%♀	CS	D: negative appraisal of recurrent changes in the work environment; C: timing and method control (Wall, 1995) S was assessed by items referring support from supervisor	SPPN ("Stress Professionnel Positif et Né gatif") questionnaire (De Keyser and Hansez, 1996)	PS	PS	R	R	D (negative appraisal of changes (i.e. threat)) was positively related to the perception of distress in both samples. Both C dimensions related negatively only in medical and surgical sample. With regard buffer effects S from supervisors was not related in any sample. Timing and method control', moderated the relation between threat and distress only among medical and surgical nurses.
42	Yang, Pan, and Yang, (2004) Taiwan	925 nurses ♀	CS	D and C were measured by JSQ (Yang et al, 1997) S was assessed by ISEL (Cohen et al, 1985)	Psychiatric morbidity (CHQ, Chong & Wilkson, 1989)	S	N	S	N	Multiple logistic regression revealed that high job strain, poor social support, were the significant factors for nurses to have minor psychiatric disorder.

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| 43 | Zangaro and Johantgen (2009) USA | 213 Civilian nurses 93% ♀ 283 Military nurses 67% ♀ | CS | D was assessed by a scale of role ambiguity; C was assessed by a scale of job autonomy and a measure of routinization S was measured by two scales of supervisor support and coworker support | Job satisfaction | R | N | R | N | Among civilian nurses job satisfaction was predicted by role ambiguity, routinization and coworker support; whereas among military nurses job satisfaction was predicted by routinization and supervisory support. |

Note: D: Job demands; C: Job control; S: Social support; Strain: additive hypothesis (JDC Model); (Iso)strain: additive hypothesis (JDCS Model); Buffer: Interactive hypothesis (JDC Model); Buffer: Interactive hypotheses (JDCS Model); CS: cross sectional; ♀: female participants; CS: cross-sectional; LG: longitudinal; LG1: examines impact of T1 JDC/JDCS dimensions on T2 outcome variables; LG2: examines impact of changes in JDC/JDCS dimensions on outcomes; LG3: examines impact of stable levels of JDC/JDCS dimensions over time on outcomes (cumulative exposure to job characteristics); S: Hypothesis supported; R: Hypothesis refuted; PS Hypothesis partially supported; N:Hypothesis not tested or results not reported.

GHQ: General Health Questionnaire (Golderberg & Williams, 1988).
HADS: Hospital Anxiety and Depression Scale (Zigmond & Snaith, 1983).
K10: Kessler 10 (Kessler & Mroczek, 1994)
LQoWQ-N: Leiden Quality of Work Questionnaire for nurses (Maes, Van der Doef, & Verhoeven, 1993).
COPSOQ-I: Copenhagen psychosocial questionnaire, version I (Aust *et al.*, 2007).
JCQ: Job Content Questionnaire (Karasek, 1985).
JCS: Job Content Survey (Landsbergis, 1998).
JDS: Job Diagnostic Survey (Hackman & Oldham, 1975).
MAQ: Maastricht Autonomy Questionnaire (de Jonge, Landeweerd, & Nijhuis, 1993).
MBI-HSS: Maslach Burnout Inventory Human Service Surveys (Maslach, Jackson, and Leiter 1996).
MHI: Mental Health Index (Veit, & Ware, 1983).
NSS: Nursing Stress Scale (Gray-Toft, & Anderson, 1981).
OSQ: Occupational Stress Questionnaire developed by the Institute of Occupational Health of Finland (Elo, Leppanen, Lindstrom, & Ropponen, 1992).
PSI: Psychiatric Symptom Index (Preville et al., 1992).
POMS: Profile of Mood States (Shacham, 1983).
Scl-90: Symptom Checklist-90 (Arrindel & Ettema, 1986).
SHC: Subjective health Complaints (Ursin Health Inventory; Ursin et al., 1988).
SF36: Short Form (36) Health Survey (Ware et al., 1993).

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General psychological distress.

A total of 24 studies (56%) explored the relation between the JDC(-S) model and general psychological distress. Outcomes were assessed by general psychological distress measures as the General Health Questionnaire (GHQ, Goldberg & Williams, 1991), the MOS 36-ltem Short-Form Health Survey (SF-36; McHorney, Ware, & Raczek, 1993), and by more specific measures mostly focusing on depression, anxiety and fatigue. Studies were quite similar with respect to statistical analyses (hierarchical regression analyses) and design (cross sectional). Six studies (1, 4, 5, 12, 23 and 42; numbers refer to the studies in Table 2.1.) adopted a non-linear approach to test the strain hypothesis. In these studies, authors defined the high strain group and compared with the low strain group or with all non high strain groups. Five studies (11, 28, 31, 34, and 42) were not conducted in North Europe and North America countries. In terms of design, the studies of Bourbonnais et al., (2005), Ganster et al., (2001); and Gelsema et al., (2006) were notable exceptions, since they used longitudinal prospective designs.

The strain hypothesis of the Job Demand-Control model.

In the 24 studies (1, 2, 4, 5, 6, 7, 10, 11, 12, 13, 14, 15, 17, 22, 23, 28, 31, 34, 35, 36, 39, 40, 41, 42) numbers refer to the studies in Table 2.1.) that considered the additive effects of job demands and control (H1a) on general psychological distress variables, the strain hypothesis was tested 39 times. Support for the additive effects of demands and control was found in 14 tests (36%), whereas in the remaining 25 tests (64%) the strain hypothesis was not significant. Nineteen studies (79%) were conducted in North America and North Europe, whereas 5 studies (21%) were conducted in Australia, and in South European and Asian countries (11, 28, 31, 34, 42). Supportive studies tend to be the ones that used a non-linear approach to test the strain hypothesis. In the larger part of non supportive studies job demands was the significant predictor. Moreover, several supportive studies (10, 14, 22, 34, 41) were characterized by using more comprehensive measures of psychological distress. For example, Elovaino and Kivimaki (1996) measured psychological distress adopting a comprehensive inventory which was composed by a scale of subjective stress and strain symptoms. Analogously, the studies of Fox et al. (1993), Landeweerd and Boumans (1994), used broader conceptualizations of psychological distress.

In the only study that has found partial support for additive effects of JDC model, the effect was found only in the subsample of nurses employed in surgical and medical wards, whereas in the subsample of nurses employed in intensive care units the additive effect of demands and control was not significant (Verhaeghe et al., 2008).

In the larger part of non supportive studies (13 out 15) job demands was the only significant predictor.

There were no differences among supportive and non supportive studies regarding the sample size and the design of the studies. Regarding the country of study the two studies conducted in Taiwan (34 and 42) were both supportive.

The buffer hypothesis of the Job Demand-Control model.

The buffer hypothesis of the JDC model was tested 13 times in 9 studies (7, 10, 14, 22, 23, 28, 31, 39, 41). All studies were cross sectional except one study (14). Full support for the moderating effect of control on demand (H2a) was found in one test, whereas in the remaining 12 tests the hypothesis was rejected. In a cross sectional study, Verhaeghe and coll. (2008) found moderating effects of either "timing control" and "method control' on job demands, that was measured as appraisal of stressors due to the changes in the work environment of nurses (i.e. changing hours, tasks, colleagues, etc). The authors found a significant buffer effect only in the subsample of nurses employed in surgery/medical wards (N = 678); meanwhile in nurses employed in intensive care units (ICU; N = 416) they did not find significant effect. The two studies (28 and 31) that were not carried out in North America and North Europe were both not supportive.

The iso-strain hypothesis of the Job Demand-Control-Support model.

Eighteen studies (1, 2, 4, 5, 6, 11, 12, 13, 15, 17, 28, 31, 34, 35, 39, 40, 41, 42) tested the additive effects of job demands, job control and social support (H1b). In these studies, the iso strain hypothesis was tested 31 times. Eight tests provided full support for the additive effects of demands, control and social support (26%), whereas in the remaining 23 tests (74%) the hypothesis was rejected. A more detailed examination of supportive studies revealed that out of 6 supportive studies, 5 (1, 4, 5, 12, 42) examined the iso-strain in a non linear way. Also in this case five studies (11, 28, 31, 34, and 42) were not conducted in North Europe and North America countries, and the two studies conducted in Taiwan gave support to the hypothesis 1b. However, in the study of Shen and colleagues (2005), the iso strain hypothesis was supported for the mental health outcome under study, but not for their general health outcome. In the only longitudinal study (4) the iso-strain hypothesis was significant.

There were no differences among supportive and non supportive studies regarding the sample size and the specifity of the measures adopted in the studies.

The buffer hypothesis of the Job Demand-Control-Support model.

The conjunctive moderating effect of both control and social support on job demands (H2b) was tested in 2 studies (31, 41). Of the total 4 tests, none revealed a significant three-way interaction term.

Summary.

With respect to additive effects of the JDC model, comparisons between supportive and non-supportive studies revealed a tendency for supportive studies to use more comprehensive measures of psychological distress, than non supportive studies. Moreover, for both additive hypotheses the larger part of supportive studies adopted a non-linear approach. As regards the iso strain hypothesis we did not find any further distinctive differences between supportive and non supportive studies.

Regarding interactive effects of demand and control (H2a), the study of Verhaeghe et al. (2008) found buffering effects of control on the negative impact of job demands. This study is the only one to assess job control by means of a specific measure of control, covering two facets of behavioral control: timing control as a nurse's opportunity to determine the scheduling of work, and method control referring to the choice on how to perform a given task.

In the case of hypothesis 2b we did not find any evidence for conjunct moderating effects of control and social support on the job demands – distress relationship.

Job related psychological distress and well-being.

A total of 33 studies was identified that considered the psychological impact of JDC(-S) dimensions on variables concerning job related psychological distress/well-being, namely job satisfaction and burnout dimensions.

Job satisfaction.

A total of 19 studies (44%) (7, 9, 13, 14, 15, 19, 22, 23, 24, 27, 28, 29, 31, 33, 36, 37, 39, 40, 43) was identified that considered the effects of JDC(-S) variables on job satisfaction. Only three studies were not carried out in North America and North Europe (28, 31, and 33). One study (24) adopted a non-linear approach to test the strain hypothesis. In terms of design all the studies were cross-sectional, except the study of Gelsema et al. (2006).

The strain hypothesis of the Job Demand-Control model.

Full support for the hypothesis 1a was found in 7 of 22 tests (32%). Two studies revealed partial support for the additive hypothesis of JDC model: in the cross sectional study of Fox et al. (1993) authors found that the hypothesis 1a was supported when an occupational specific measure was taken into account (Motowidlo and coll. 1986) whereas when authors considered a general workload scale (Caplan et al., 1975) the association was not significant; and in another cross sectional study of van den Berg et al., (2008) conducted in two samples of nurses working in 15 general hospitals and in a specific health care setting (diabetes wards; van den Berg et al., 2008), the authors found the additive effect only in the sample employed in the general hospitals. In the three studies that were not conducted in North America and North Europe the hypothesis was not significant.

Furthermore, the three studies characterized by the largest sample size, i.e. more than 1200 participants (29, 39, 40) revealed supportive results.

With regard to sample composition, most non supportive studies were composed of nurses employed in specific wards (e.g., psychiatric and palliative wards), whereas the supportive studies were composed by nurses employed in various health care settings.

The only longitudinal study (Gelsema et al., 2006) did not show support for additive effects of the JDC variables measured at time 1 on job satisfaction measured 3 years later.

In the larger part of non supportive studies (8 out 13) job control was the only significant predictor.

The buffer hypothesis of the Job Demand-Control model.

The interaction of demands and control with respect to job satisfaction was tested in 7 (7, 14, 22, 23, 28, 31 and 39) studies. Only the study of Fox et al., (1993) showed evidence for a buffering effect of control on the relationship between demands and well-being. Substantial differences regarding the measurement of JDC dimensions were found in this study despite the non supportive studies. Fox et al., (1993) adopted a more focused inventory of job demands and a comparable scale in terms of specificity of job control: the scale developed by Dwyer and Ganster (1991), covering some work domains, including control over the variety of tasks performed, order of task performance, pacing, scheduling of rest breaks, procedures and policies in the workplace, and arrangement of the physical environment. In the two studies (28 and 31) that were not conducted in North America and North Europe the hypothesis was not significant.

The iso strain hypothesis of the Job Demand-Control-Support model.

Nine out of 19 studies (9, 13, 15, 28, 31, 33, 39, 40, 43) examined the iso-strain hypothesis (H1b), that was tested 12 times. The study of Tummers et al. (2002) found full support for linear additive effects of demands, control and support on job satisfaction. The research of Van den Berg et al., (2008) provided partial support. Also for this outcome, they found that additive effects were present in the hospital nurses, whereas in diabetes nurses this was not the case. The two supportive tests (39, 40) were characterized by using larger (> 1200 nurses) and more heterogeneous samples than non supportive tests. Also in this case most non supportive studies were composed of nurses employed in specific wards (e.g., van den Berg et al., 2008). In most non supportive studies the hypothesis was not confirmed because job demands failed to predict job satisfaction. Again, in the three studies that were not conducted in North America and North Europe the hypothesis was not significant.

The buffer hypothesis of the Job Demand-Control-Support model.

Only the study of Rodwell et al., (2009) examined the buffer hypothesis of job demands, control and social support with respect to job satisfaction, but did not find the hypothesized effect.

Summary.

Summarizing the findings based on the JDC(-S) model with respect to job satisfaction, the additive hypotheses (H1a and H1b) were tested more frequently and received more support than the buffer hypotheses of the JDC(-S) model (H2a and H2b). Regarding the additive hypotheses, although a comparison on the basis of the design is very difficult given the paucity of longitudinal studies, the cross sectional studies tended to be more supportive. Besides, for the additive hypotheses, supportive studies were mostly carried out in more heterogeneous groups of nurses and their sample sizes tended to be larger than those of non supportive studies.

With regard to the buffering effect of job control, the most important difference between supportive and non supportive studies was the operationalization of job demands and control. The only supportive study (Fox et al., 1993) was characterized by using more focused measures for both psychosocial job dimensions.

In the case of hypothesis 2b the only study, that examined the conjunct moderating effects of control and social support on the job demands – job satisfaction relationship, did not find the hypothesized effect.

Burnout.

In a total of 22 studies (51%) the JDC(-S) model was studied in relation to measures of burnout (3, 4, 7, 8, 11, 15, 16, 17, 18, 19, 20, 21, 23, 25, 26, 30, 32, 36, 37, 38, 39, and 40). All studies considered emotional exhaustion or work exhaustion, 12 studies examined depersonalization (3, 8, 16, 17, 18, 19, 20, 23, 25, 26, 30, and 32), and 9 studies included personal accomplishment as an outcome (3, 17, 18, 19, 23, 25, 26, 30, and 32). Two studies were carried out in Asia countries (25 and 26), and one study was conducted in Spain (11), the remaining studies (N = 19; 86%) were carried out in North America and North European countries. Two studies (4, and 23) adopted a non-linear approach to test the strain hypothesis. The studies were all cross-sectional except two cases (4 and 15), and burnout was mostly assessed by the Maslach Burnout Inventory Human Service Survey (MBI-HSS; Maslach, Jackson, and Leiter 1996).

The strain hypothesis of the Job Demand-Control Model.

As regards emotional exhaustion, the strain hypothesis was tested 27 times. Additive effects of demands and control were confirmed in 7 of the 22 studies that tested this hypothesis (3, 4, 17, 18, 19, 21, and 23) (32%) and one study (16) reported partial support, whereas in the remaining 14 (64%) studies the strain hypothesis was not supported. In total 8 tests out 27 (30%) supported the hypothesis 1a. The 2 studies (4, 23) using a non linear approach found higher emotional exhaustion in the high strain condition. One longitudinal study (4), adopting a non linear approach, yielded support for the strain hypothesis, whereas in another longitudinal study (15), time pressure and job control measured at time 1 did not additively predict emotional exhaustion measured one year later). A comparison of the supportive and non supportive studies showed that a characteristic differentiating the supportive from the non-supportive tests was the measurement of job control. In most non supportive studies job control was operationalized in a more restricted way (e.g. decision authority or skill discretion: de Rijk et al., 1998; Gelsema et al., 2005, 2006; Jourdain & Chenevert, 2010; Proost et al., 2004; Schaufeli & Janczur, 1994; Thomsen et al., 1999a; Thomsen et al., 1999b), or more comprehensive inventories were adopted. In contrast, in most supportive studies job control was measured in line with Karasek' definition of control (a composite measure of decision authority and skill discretion). All three studies that were not conducted in North America and in North Europe were not supportive. Among non supportive studies job demands was the only significant predictor.

With regard to depersonalization, the strain hypothesis was tested 15 times, full support was found in 3 (25%) of 12 studies. There were no notable differences between supportive (17, 18, and 23) and non supportive studies regarding the design of the study, the sample size, and the measurement of job

characteristics. In the larger part of non supportive studies job demands was the only significant predictor of depersonalization.

Regarding personal accomplishment, full support for H1a was found only in one (10%) out of 10 tests (in 9 studies), in the cross sectional study of Lee & Akhtar (2007), carried out in China. Also in this case there were no notable differences between supportive and non supportive studies regarding the design of the study, the sample size, and the measurement of job demands and control. In all non-supportive studies, job control was the only significant predictor of personal accomplishment.

The buffer hypothesis of the Job Demand-Control model.

Regarding emotional exhaustion, the buffer hypothesis of the JDC model (H2a) was tested 6 times, in 6 (3, 7, 8, 23, 30, and 39) of the previous 22 studies (27%). All studies were carried out in North Europe and North America countries. In one study (8) the hypothesis 2a was significant under a specific condition. In this cross sectional study, De Rijk et al. (1998), found that decision authority moderated the negative effects of job demands on emotional exhaustion only in the subsample of nurses of intensive care units that scored higher on active coping.

As regards depersonalization, the buffer hypothesis of the JDC model was tested in 4 out of 12 (3, 8, 23 and 30) studies (33%). In all tests the interactive term Demands X Control was not significant. Thus, in the case of depersonalization, H2a was not supported in our review.

With regard to personal accomplishment, the 3 studies (3, 23 and 30) out of 9 (33%) that examined the moderating effect of job control, failed to find support for the buffer hypothesis.

The iso-strain hypothesis of the Job Demand-Control-Support model.

With respect to emotional exhaustion, the iso-strain hypothesis (H1b) was tested 17 times, in 12 samples (4, 11, 15, 16, 17, 18, 20, 25, 30, 38, 39, and 40). All studies were carried out in North Europe and North America countries, except two studies (11 and 25). Full support for linear additive effects of demands, control and support on emotional exhaustion was found in 3 studies (25%) (4, 17, and 18). In one longitudinal study (4) using the non linear approach, the iso strain condition was associated with higher emotional exhaustion. We did not find any notable differences between supportive and non supportive studies regarding the sample size, the measurement of job characteristics and the country of study.

Only 6 (16, 17, 18, 20, 25, 30) studies (8 tests) have examined the hypothesis 1b for depersonalization. All studies were carried out in North Europe and North America countries, except one

study (25). Full support for additive effects of demands, control, and support was found in 2 (17, and 18) studies (33%). In 3 out 4 non supportive studies (16, 25, and 30), depersonalization was only significantly related to job demands.

Regarding personal accomplishment, hypothesis 1b was tested in 4 studies (17, 18, 25, and 30). Also in this case, all studies were carried out in North Europe and North America countries, except one study (25). In all of these studies (6 tests) no full support for the iso-strain hypothesis was found. Only the study of Lee & Akhtar (2007) (25) provided partial support for the hypothesis: personal accomplishment was negatively associated with demands, and positively related with control and supervisory support. For coworker support, this additive effect was not found. In all non supportive studies personal accomplishment showed significant associations with social support measures.

The buffer hypothesis of the Job Demand-Control-Support model.

Only in the study by Proost and colleagues (2004) among Belgian nurses, the buffer hypothesis (H2b) of the JDCS model was examined for burnout. With regard to emotional exhaustion and depersonalization no significant buffering effects were found, whereas in the case of personal accomplishment, the authors found partial support. More specifically, they found a significant three way interaction between job demands, job control and social support of colleagues: nurses working in a high strain condition benefited most from receiving social support from colleagues. This interaction was however not significant when examining social support from supervisors.

Summary:

Studies in which burnout dimensions were examined as outcome variables provided weak support for additive effects of demands and control (from 10% to 30%). Regarding emotional exhaustion, comparisons between supportive and non-supportive studies revealed a tendency for supportive studies to adopt measures of control that combine decision authority with aspects of skill discretion. With respect to depersonalization and personal accomplishment, we did not find any noteworthy differences between supportive and non supportive studies. Also for the JDCS model, the support for the additive hypothesis was weak (from 0% to 26%): no consistent differences between supportive and non-supportive studies were found with regard to design of study, sample size, measurement of the JDCS constructs, and country of study.

The interaction effect of demands and control was found in one study (de Rijk et al., 1998), and only for nurses higher on active coping. For the two other dimensions of burnout (depersonalization and

personal accomplishment) all interactions were not significant. Only one study (Proost et al., 2004) examined the three way interaction of the JDCS dimensions, finding partial support depending on the source of social support examined.

2.4 Discussion

The present paper aimed to review the studies conducted in nurses samples on the Job Demands Control (-Support) Model (JDC(-S)) in relation to psychological distress and well-being. We evaluated the results of 43 empirical studies published from 1979 up to and including 2010.

The JDC(-S) model (Karasek, 1979; Karasek and Theorell, 1990) was examined by 4 hypotheses. Firstly the strain hypothesis (H1a) which postulates that employees with high demands and low control at work will have a higher risk of poor psychological health. Secondly, the buffer hypothesis (H2a) of the JDC model that assumes the moderating effects of job control in the relationship between demands and psychological well-being. Reformulating these hypotheses taking into account social support, Karasek and Theorell (1990) hypothesized that the most negative job condition is experienced by the employees who perceive an "iso-strain" condition (H1b) namely high demands, low control, and low social support.

The buffer hypothesis (H2b) of the JDCS model states that both job control and social support moderate the detrimental impact of high demands on psychological distress and well being. A distinction was made between general psychological distress/well-being (mainly depression, anxiety, somatic complaints and mental health) and job-related psychological distress/well being (namely job satisfaction and burnout dimensions). Table 2.2. shows the partial and full confirmative rates of JDC(-S) studies for each hypothesis per outcome category.

As can be seen from Table 2.2. a total of 146 tests of the JDC model was carried out by the studies reviewed in our paper (113 tests of H1a and 33 tests of H2a). Among these, 36 (25%) were supportive and the larger part of this support was due to the studies that tested the additive hypothesis (33 over 36; 92%) With regard to the JDCS model, a total of 85 test were carried out to examine the central hypotheses of the model (74 tests of H1b and 11 tests of H2b). Of these 17 (20%) provided support, also in this case the larger part of the supportive studies (16 over 17; 94%) tested the additive hypothesis. Thus, the additive hypotheses (H1a and H1b) were more intensively studied and we found more support for these than for the buffer hypotheses.

Studies which examine the additive hypotheses in a non-continuous manner are generally supportive.

Regarding the studies on general psychological distress that examined the (iso) strain hypotheses, the assessment of job demands and psychological distress was a crucial issue in determining supportive *vs* non supportive studies. The studies that measured psychological distress with more comprehensive measures were more inclined to be supportive. The use of specific constructs assessed by specific measures (e.g., anxiety) could restrict the complexity of the outcome under analysis. Therefore, it is possible that in several studies the relationships between psychosocial job characteristics and psychological distress were not found significant. With respect to job satisfaction, the comparison between supportive and non supportive tests was in line with previous reviews (Van der Doef and Maes, 1999; Häusser et al. 2010). Studies that used larger and more heterogeneous samples of nurses employed in general settings were more inclined to yield additive effects of the JDC(-S) dimensions. Nevertheless, this finding should be considered with caution. Although large sample sizes ($N > 1200$) increase the power of the analysis, they also increase the chance of finding significant association between two variables when in fact they are indeed unrelated (Type I errors) or are low correlated.

As regards the burnout dimensions, job demands was the most significant predictor of emotional exhaustion. The results drawn from studies that tested the JDC strain hypothesis indicated differences associated with the conceptualization of job control dimensions: studies that considered the original conceptualization of Karasek and Theorell (1990) (i.e., measures of control that combine decision authority with skill discretion) showed to be the most supportive.

Furthermore, support for the additive effects of JDCS model (iso-strain hypothesis) was found in 22% of the tests, but we did not find any notable differences between design of the study, method adopted to analyze hypotheses (linear vs non linear), specificity of the instruments, sample size, type of wards, and country of study. With regard to depersonalization and personal accomplishment, the paucity of tests yielded inconsistent results in both additive hypotheses. In the larger part of non supportive studies, depersonalization was related with job demands, and personal accomplishment was associated with job control and social support.

Overall, these findings are consistent with previous studies, more specifically with a meta analysis by Lee & Ashforth (1996). According to this meta-analysis, emotional exhaustion was more strongly related to job demands than to job resources (e.g. control and social support), and depersonalization and personal accomplishment were more strongly related to job resources than to job demands.

Table 2.2.
Confirmative rate of tests with regard to the JDC(S) hypotheses, the (iso) strain hypotheses and the buffer hypotheses per outcome category. Percentage of supportive and non supportive tests.

Outcome	JDC Model				JDCS Model			
	Strain		Buffer		Iso-Strain		Buffer	
	S	NS	S	NS	S	NS	S	NS
General psy. distress/well being	14/39 (36%)	25/39 (64%)	1/13 (8%)	12/13 (92%)	8/31 (26%)	23/31 (74%)	0/4 (0%)	4/4 (100%)
Job satisfaction	7/22 (32%)	15/23 (68%)	1/7 (14%)	6/7 (86%)	2/12 (17%)	10/12 (83%)	0/1 (0%)	1/1 (100%)
Burnout								
Emotional exhaustion	8/27 (30%)	19/27 (70%)	1/6 (17%)	5/6 (83%)	4/17 (23%)	13/17 (77%)	0/2 (0%)	2/2 (100%)
Depersonalization	3/15 (20%)	12/15 (80%)	0/4 (0%)	4/4 (100%)	2/8 (25%)	6/8 (75%)	0/2 (0%)	2/2 (100%)
Personal accomplishment	1/10 (10%)	9/10 (90%)	0/3 (0%)	3/3 (100%)	0/6 (0%)	4/6 (100%)	1/2 (50%)	1/2 (50%)
Total	**33/113 (29%)**	**80/113 (71%)**	**3/33 (9%)**	**32/33 (91%)**	**16/74 (22%)**	**56/74 (78%)**	**1/11 (9%)**	**10/11 (91%)**

Legenda. S = Supportive tests; NS = Non supportive tests.

The results of our review are in line with these findings except for the relationship between job demands and depersonalization. However, among the studies reviewed, emotional exhaustion shows a stronger association with psychosocial job conditions than depersonalization and personal accomplishment. This result is in line with the general literature on burnout (Schaufeli, 2007).

Overall these results are in line with previous studies (e.g., Bakker & Demerouti, 2007; van Veldhoven et al., 2002), and suggest that job demands are primarily related with distress variables (psychological distress, emotional exhaustion and depersonalization) providing support for the health impairment process. This is basically an energetic process of wearing out in which high job demands exhaust the employees' mental and physical resources. The long term consequences of this process will be high psycho-physiological strain, which in turn will exert a negative impact on health (Karasek & Theorell, 1990). Secondly, the results of our review showed that job control and social support were stronger associated with job related-well being measures (personal accomplishment and job satisfaction) rather than job demands. These results are consistent with an autonomous motivational process of job resources (e.g., Schaufeli & Bakker, 2004). This motivational process is triggered by the perception of availability of job resources (especially job control) that are instrumental to pursue work goals, and foster employees' growth, learning and development (Schaufeli & Bakker, 2004). Therefore, job resources are not only necessary to deal with job demands but they are also important in their own right.

As regards the interactive hypotheses (H2a and H2b), buffering effects of job control in the relationship between demands and outcomes were found in 9% of all studies that tested this hypothesis. Moreover, only 1 out of 11 tests provided support for the three way interaction demands, control and social support. These findings are in line with previous reviews including studies on diverse occupational groups (van der Doef & Maes, 1999; Hausser et al., 2010; Taris, 2006). Furthermore, in our review supportive and non supportive studies on the moderating effect of control differed with respect to the level of specificity of the measurement of job dimensions. The supportive studies more often used more focused and specific measures of job demands (quantitative overload, monitoring demands, role stressors) and job control (e.g. influence on pace of work). As noted by Wall, Jackson, Mullarkey, & Parker (1996) job demands have typically been measured on a general level, using items which incorporate affective judgements. As noted by de Jonge and Dormann (2006), the inconsistencies in demonstrating interaction effects between job demands and control may also be due to a lack of match between the kind of occupational stressors examined in combination with a specific form of job control. De Jonge and Dormann (2006) argued that specific stressors and specific resources need to address similar domains of functioning (i.e., cognitive, emotional, physical) in order to interact in the prediction of domain specific strains.

Due to the limited number of studies on the moderating effect of social support on the high strain – distress/well being relationship, and their inconsistent results, conclusions regarding the buffer hypothesis of the JDCS model still seem to be premature in nurses samples. Furthermore, support for both hypotheses is mainly found in cross sectional studies. The three longitudinal studies, that have been carried out, are non supportive of both hypotheses. Thus, it seems appropriate to describe the support for the model in terms of *associations* between JDCS variables and psychological distress and well being.

Limitations and implications

This systematic review has two limitations.

First of all, because of the large number of studies available in the domain of interest, we included only studies published in peer-reviewed journals. It was beyond the scope of the review to locate unpublished research and search the 'grey literature'. Regrettably, this decision introduces a potential bias in the results, as supportive studies are more likely to be published than non-supportive studies.

Secondly, we focused on a specific group of employees: registered nurses. We excluded several studies that were carried out considering student nurses, and nursing aides. This poses certain limitations on the generalisability of the results of the review.

Based on our results, several recommendations are provided for enhancing the quality of future studies. Firstly, investigating the operationalisation of JDC(-S) variables, the review confirmed that the measures of key dimensions could be conceptually improved (e.g. van der Doef & Maes, 1999b). Several questionnaires which measure JDC(-S) variables have been developed to measure JDC(-S) model(s) across occupational groups, and/or compare levels of job demands and resources across different groups of employees. However, this can lead an important disadvantage: generic measures neglect occupation specific stressors which could be crucial in explaining differences within specific occupational groups. Therefore, in order to analyze differences between occupational groups and within single occupational groups, it would seem essential to develop occupation specific measures composed both by general items and by occupation-specific items.

Secondly, the design of the vast majority of studies was cross sectional. From a methodological point of view longitudinal research designs provide more opportunity to validate theoretically hypothesized causal relationships, by means of rejecting alternative explanations (e.g., reverse causation, reciprocal causation). In addition, several researchers have underlined the dynamic nature of the JDCS model. Karasek (1979) reported a relationship between change in job strain (i.e., high job demands and

low decision latitude) and change in mental strain symptoms for male workers in Sweden who had changed jobs over a 6-year period. In our review only two studies (Bourbonnais et al., 1999; Gelsema et al., 2006) analyzed changes in psychosocial job dimensions and psychological distress and well being. Bourbonnais et al (1999) found significant main effects of adverse changes in job strain (high demands and low control) across time on emotional exhaustion. Gelsema and colleagues (2006) found that an increase in job demands (i.e. workload and physical demands) was associated with increases in emotional exhaustion across time. A recent longitudinal study (Schaufeli, Bakker, & Van Rhenen, 2009) conducted among 201 Dutch telecom managers, found that increases in job demands (i.e., overload, emotional demands, and work-home interference) and decreases in job resources (i.e., social support, and autonomy) were associated with increases of emotional exhaustion and cynicism one year later. It would thus be recommendable for future studies to investigate the effects of changes in psychosocial job variables on changes in occupational distress and well being.

Thirdly, several authors (e.g. Semmer, 2003) argued that the JDC(-S) model is too simplistic because it assumes that only occupational demands (stressors) and job resources (job control and/or social support) underlie strain and well being. In line with Semmer (2003), individual variables may act as a moderator in the relation between psychosocial job dimensions and distress/well being: relations between job demands, control, support and distress/well being may be stronger or weaker depending on personal factors. In our review only one study (de Rijk et al., 1998) took into account the role of individual differences (active coping and need for control) as moderators in the relationship between JDC variables and well being. Thus, it would be worthwhile to explore in future studies the potential moderating role of individual variables (e.g. self efficacy, locus of control) in the relationship between JDC(-S) variables and psychological distress and well being indicators (e.g., Semmer, 2003; van der Doef & Maes, 1999a).

Fourthly, the vast majority of JDC(-S) studies of the present review (85%) have been conducted in North America and North-European countries. Notable exceptions are two Australian studies (Munro et al., 1998, and Rodwell et al., 2009), two studies from Taiwan (Shen et al. 2005; Yang et al., 2008), a Spanish study by Escribà-Agüir & Pérez-Hoyos (2007), a Chinese survey (Lee and Akhtar, 2007) and a Korean study (Lee et al., 2003). In terms of support to the hypotheses, we did not find any notable differences between the studies carried out in North America and North European countries, and the studies conducted in other countries. We only found that the strain hypothesis of the JDC model was significant in the two studies conducted in Taiwan. However, the cross-national generalizability of the model is an issue raised by several authors. For instance, a study conducted among 2796 secondary school teachers from 13 European countries (-*Euroteach*- Verhoeven, Maes, Kraaij, & Jokes, 2003)

compared the validity of the JDC(-S) model in 3 European regions (South, West, East), and found that JDC(-S) model explained most variance in outcome variables in Western Europe, and the least in Eastern Europe. This suggests that the JDC(-S) model suffers from a cultural bias.

This review stresses the importance to reduce job stressors and to enhance job resources at work. Two systematic reviews (Bambra et al., 2007; Egan et al., 2007) indicate that effective interventions are available to this end. These include changes in work procedures like task restructuring, work evaluation and supervision aimed at decreasing job demand and increasing job control.

For fostering and strengthening supportive social work environments, management can install so-called staff support groups. These are regular meetings during which care providers have the opportunity to share personal, work-related experiences and feelings with colleagues in a supportive, non-evaluative environment.

Taken together, the results of this review suggest that the JDC(-S) model represents a useful way to conceptualize how the psychosocial job dimensions and the experience of psychological well being are associated in nurses samples.

2.5. References

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Chapter 3. Job characteristics, organizational conditions, and well-being among Italian and Dutch nurses: a cross-national comparison.

Abstract

Among health care workers, nursing has been identified as particularly stressful. Several studies have shown cross-national differences in nurses' levels of occupational stress and burnout.

The purpose of the study was to compare job characteristics, organizational conditions, and strain reactions in Italian (N = 609) and Dutch (N = 873) nurses. It was also examined how and to what extent various job characteristics and organizational conditions explain occupational and general strain. The study was a cross-sectional questionnaire survey.

Based on the Job Demand-Control-Support Model and the Tripod accident causation model, respectively job characteristics and organizational conditions were assessed as independent variables. Strain was operationalized in terms of job satisfaction, burnout, and psychosomatic complaints.

Italian nurses perceived their job characteristics, organizational conditions, and well-being as more unfavourable than their Dutch colleagues. Hierarchical regression analyses showed that high job demands, low skill discretion, and low social support from supervisor were the most consistent predictors of occupational and general strain across samples. Organizational conditions added significantly to the prediction of job satisfaction and burnout. Furthermore, lack of personnel was a stronger predictor of burnout in the Italian nurses than in the Dutch nurses.

The study provides cross-national confirmation of the impact of job characteristics and organizational conditions on nurses' well-being. Differences in job characteristics partially explain the observed cross-national differences in distress/well-being. Furthermore, some evidence for cross-national differential effects of job characteristics and organizational conditions on well-being was found.

Key words: job characteristics; organizational variables; nurses; well-being; burnout; cross-national study; Italy; the Netherlands

3.1. Introduction

Health care workers are currently facing a large number of new challenges, resulting from increased workloads, on top of occupational health risks such as infectious disease, confrontation with death and suffering, poor communication and social support, shift work, and emotional demands of patients and families (Firth-Cozens, 2001; Pisanti, 2007). Among health care workers, nursing is thought to be the most stressful profession. In addition, studies indicate that mortality rates, suicide, stress related disease, burnout and psychiatric and physical illness are more prevalent among nurses than among the general population (Firth-Cozens, 2001; Tummers et al., 2002). A cross national European study indicates that nurses report high levels of occupational stress and burnout, but that there are important differences among the countries (van der Schoot et al., 2003).

The present study aims to examine whether nurses' job conditions and well-being vary depending on the health care context. To that purpose nurses working in academic hospitals in Italy and the Netherlands are compared in terms of job characteristics and organizational conditions, as well as job-related and general well-being outcomes.

A second aim is to examine how and to which extent job characteristics and organizational conditions explain nurses' well-being. Job characteristics are defined by the Job Demand-Control-Support model (Karasek and Theorell, 1990), and organizational conditions by the Tripod model (Wagenaar et al., 1990; 1994).

Cross-national differences in job conditions

Existing studies indicate that nursing is a stressful occupation, but that there are important cross national differences in terms of job demands and control over these demands, as well as in reported job stress and burnout (Gil-Monte and Schaufeli, 1992; Schaufeli and Janczur, 1994).

Italian and Dutch nurses work in very different contexts. The Italian health care context is characterized by one of the lowest nurse per capita ratios in Europe: 3 nurses per 1000 inhabitants. In comparison, the Dutch healthcare system has one of the highest ratios: 9 nurses per 1000 inhabitants (European Observatory on Health Care Systems, 2001; Salvage and Heijnen, 1997). Furthermore, the annual salary of an Italian nurse is equivalent to US $12.800, whereas in the Netherlands, the starting salary of a general nurse is equivalent to US $18.000 a year (Salvage and Heijnen, 1997). Furthermore,

nursing is considered traditionally in Italy as a low-status profession (Prandstaller, 1995) while in the Netherlands it is recognized as an independent profession (Schaufeli and Jancazur, 1994). In addition, the level of training and the opportunity for specialized training is at average higher in The Netherlands than in Italy.

On the basis of these cross national differences in nurse per capita ratio, salaries, professional status and training, we expect that Dutch nurses will have more favourable scores on job characteristics, organizational variables, and general and occupational distress/well being indicators than their Italian counterparts (hypothesis 1).

The Job Demand-Control-Social Support Model (JDCS)

Karasek and Theorell (JDCS Model; 1990) posit that work related well-being is predicted by three crucial psychosocial dimensions of the workplace: job demands, job control (skill discretion and decision authority), and social support from colleagues and supervisor. On the basis of this model, high job demands, low control and low support have been hypothesized to additively predict high stress reactions.

Studies conducted among nurses and health care workers have shown that job demands are related to emotional exhaustion (ter Doest et al., 2006), anxiety (Jeurissen and Nyklicek, 2001), depression (Jeurissen and Nyklicek, 2001) and low job satisfaction (ter Doest et al., 2006). In contrast, job control is generally found to be beneficial for nurses' well being and job satisfaction (Akerboom and Maes, 2006; Bakker et al., 2005; ter Doest et al., 2006), and is negatively associated with psychological distress and emotional exhaustion (Bakker et al., 2005; Jeurissen and Nyklicek, 2001). Similarly, social support has been negatively associated with emotional exhaustion and distress (Proost et al., 2004; van den Berg et al., 2006), and positively related with well-being and job satisfaction (van den Berg et al., 2006).

Based on this theoretical background and empirical findings, we expect that job demands, job control and social support will be associated with nurses' distress, in the sense that high demands, low control, and low social support are related to higher psychological distress and lower well being (hypothesis 2).

In many studies the JDCS constructs explain an important but limited amount of the variance in the outcome measures. One possible reason is that the model neglects the impact of the work *organization* on employee health and well-being (Akerboom & Maes, 2006; Tummers et al., 2002).

Organizational conditions

The Tripod accident causation model (Wagenaar et al., 1990; 1994) focuses on aspects of inadequate organizational functioning in the chain of events leading to unsafe acts. More specifically, it posits that unsafe acts are not random events, but are elicited by psychological precursors (e.g., attitudes, expectations, motives, emotional worry). These psychological precursors, in turn, are caused by the latent failures, namely dysfunctional aspects of the organizational environment: e.g., poor planning, a reward system or norm that stresses speed, poor communication between departments, understaffing, poor training, having to work with poor equipments. Several studies among health care workers find support for the relationship between dysfunctional organizational conditions and nurses' job stress. For example, amount and quality of personnel (Aiken et al., 2002), work agreements and planning of work (Peiro et al., 2001), availability and quality of material and medical equipment (Akerboom and Maes, 2006), and financial reward (Demerouti et al., 2000; Tyson and Pongruengphant, 2004) have been associated with nurses well-being.

Based on these findings, we predict that organizational conditions identified by previous studies to be associated with nurses' job stress (i.e. personnel resources, work agreements, material resources, and financial reward) will make an independent contribution to the well-being outcomes, beyond that attributed to the JDCS constructs (hypothesis 3).

Finally, we will explore whether the associations between independent variables and distress/well being dimensions in Italian and Dutch nurses are comparable. It seems plausible that the relation also depends on the health care context. In a suboptimal context, factors that negatively impact well-being, like demands, may exert a stronger influence, whereas in a more optimal context, well-being enhancing factors, like e.g. skill discretion may more strongly influence these outcomes.

As it has been shown that occupation-specific measurement of job conditions outperforms general measures (van der Doef and Maes, 2002), in this study we adopt a measure specifically developed to assess the job conditions of nurses (Gelsema et al., 2005). General and job-related distress/well-being was operationalized in terms of job satisfaction, psychosomatic complaints and burnout.

3.2. Method

Procedure and samples.

Data were collected in Italy and The Netherlands by means of a structured questionnaire. The Italian sample consisted of 609 nurses employed at three academic hospitals. The nurses participating in the study (response rate 66 %) were representative of the initial sample of 920 nurses with regard to gender and age. The majority of the respondents had a permanent position ($N = 565$; 93%), were female ($N = 458$; 75%) and married ($N = 361$; 60%). The mean age was 37.2 years ($SD = 8.3$). On average, the respondents had 13 years ($SD = 8.7$) of nursing experience.

The Dutch sample consisted of 884 nurses working in a large academic hospital. All 1,425 registered nurses employed at the hospital received a questionnaire and an accompanying letter. A total of 884 questionnaires were returned (a response rate of 62%), of which 873 questionnaires were complete and usable for this study. Of this population, the majority were women ($N = 750$; 86%). The mean age was 38.3 years ($SD = 8.8$). Of the nurses, 55% had job tenures of more than 10 years, and 65% had held their present position for at least 5 years.

Comparison of the Dutch and Italian sample indicated that the Dutch sample included more female nurses (86% vs 75%; $\chi^2= 26.7$, $p<.001$), and was slightly older (M age $= 38.3$ vs 37.2; $t = 2.56$, $p<.05$) than the Italian sample.

Measures

A questionnaire was compiled to assess background variables, job conditions and distress/well-being outcomes.

Background variables. Gender, age, and years of nursing experience were assessed in both samples.

Job conditions were measured with the Leiden Quality of Work Life Questionnaire for Nurses (LQWLQ-N; Maes et al., 1999). The questionnaire is based on the JDCS model and the Tripod accident causation model, and is formulated on the basis of the Leiden Quality of Work questionnaire (Van der Doef and Maes, 1999) and the Organizational Risk Factor Questionnaire (Akerboom, 1999). Responses are measured on a 4-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). Cronbach's alpha's are reported for respectively the Italian (I) and the Dutch (D) sample.

- JDCS Variables. Job demands were measured with two scales: work and time pressure (6 items; $\alpha = .74$ (I) / .78 (D); e.g. "During my shift, I am responsible for the care of too many patients.") and physical demands (5 items; $\alpha = .77$ (I) / .74 (D); e.g. "At work I must stand a lot of the time."). Control

was measured with two scales: skill discretion (5 items; α = .72 (I) / .76 (D); e.g. "My job gives me the opportunity to develop my abilities.") and decision authority (5 items; α = .76 (I) / .70 (D); e.g. "I can decide for myself when to carry out patient-related tasks and when to carry out non-patient-related tasks."). Social support was assessed with two scales: social support from supervisor (6 items; α = .94 (I) / .91 (D); e.g. "I can count on the support of my direct supervisor when I face a problem at work.") and social support from co-workers (6 items; α = .84 (I) / .84 (D); e.g. "My colleagues offer me a helping hand when I need one."). The interpretation of the scores is in line with the label of variables, e.g. a higher score on physical demands indicates higher demands, and a higher score on decision authority indicates more control.

- *Organizational Conditions* were measured with four scales: financial reward (6 items; α = .67 (I) / .78 (D); e.g. "I am paid well for the work I do."); personnel resources (6 items; α = .65 (I) / .75 (D); e.g. "In my department, there are enough nurses to provide good care."); work agreements (7 items; α = .88 (I) / .79 (D); e.g. "In my department, the division of tasks is not sufficiently defined." *Item recoded*); and material resources (5 items; α = .71 (I) / .75 (D); e.g. "I must work with materials, equipment and/or instruments that are of insufficient quality." *Item recoded*). In line with the label of variables, in the present study a higher score on an organizational condition indicates a more favourable situation.

Distress/well-being outcomes. Five distress/well-being outcomes were assessed: four job-related measures (job satisfaction and the three burnout components), and a general strain measure: psychosomatic symptoms. Job satisfaction was operationalised with the seven-item LQWQ-N scale (α = .85 (I) / .84 (D); e.g., "I am satisfied with my job."). Burnout was assessed with the Italian version (Sirigatti and Stefanile, 1991) and the Dutch version (Schaufeli and van Dierendonck, 2000) of the 22-item Maslach Burnout Inventory (MBI; Maslach et al., 1996): emotional exhaustion (9 items; α = .86 (I) / .88 (D); e.g. "I feel frustrated by my job."); depersonalisation (5 items; α = .70 (I) / .65 (D); e.g. "I don't really care what happens to some patients."), and personal accomplishment (8 items; α = .78 (I) / .77 (D); e.g. "I feel very energetic."). Respondents were asked to rate from 0 (never) to 6 (daily) how often they experienced the feelings described. Psychosomatic symptoms were assessed with three scales from the Italian version (Violani and Catani, 1995) and the Dutch version (Arrindell and Ettema, 1986) of the Symptom Checklist (SCL-90; Derogatis, 1983): anxiety (10 items, e.g. "feeling afraid."), depression (16 items, e.g. "feeling lethargic."), and somatization (12 items, e.g. "headache."). Respondents indicated to what extent they had experienced each symptom over the past week. Answers were provided on a 5-point scale (1 = *not at all*; 5 = *very much*). Due to high intercorrelations ($r > .60$), and the conceptual overlap between the psychological distress and somatic complaints variables (Simon et al., 1996) the

items comprising the three scales were combined to form a single measure of psychosomatic symptoms (38 items; α = .93 (I) / .93 (D)).

Statistical Analysis

To test the first hypothesis, multivariate analyses of covariance (MANCOVAs) were carried out using Sample (Italian/Dutch) as independent variable and job characteristics, organizational variables and distress/well being variables as dependent variables. As the two samples differed on age and gender, these variables were introduced as covariates in the MANCOVAs. Hierarchical regression analyses were conducted to examine the other hypotheses. We entered gender and age (control variables) in the first block, followed by Sample (Italian/Dutch) in the second block. The main effects of the psychosocial job characteristics were introduced in the third block, followed by the organizational conditions in the fourth block. In addition, mediation analyses were carried out conform Baron and Kenny (1986)'s approach and complemented with the Sobel test (Preacher and Hayes, 2004).

To explore the potential different impact of job characteristics and organizational conditions on outcomes in the two samples, additional moderator regression analyses were carried out. In these analyses, the interactions of job characteristics and organizational conditions with Sample (Italian/Dutch) were added in a fifth block. To avoid multicollinearity in the examination of these interaction effects, in these analyses the scores on job characteristics and organizational conditions were centred (cf. Aiken and West, 1991).

As among the outcomes, depersonalization and psychosomatic symptoms were severely positively skewed the log score for depersonalization and the inverse score for psychosomatic symptoms was used in the regression analyses. For the purpose of clarity however, the direction of the betas in the tables is presented conform the label of these outcomes. Given the sample size, a *p*-value of <.01 was taken as a criterion.

3.3. Results

The results from the MANCOVA analyses, controlling for age and gender, indcate that Italian nurses and Dutch nurses differ significantly on job characteristics and organizational conditions ($F_{(10, 1350)}$ = 29.85, *p*<.001), and on well-being/distress outcomes ($F_{(5, 1373)}$ = 203.03, *p*<.001). Univariate covariance analyses show that Italian nurses report higher work/time pressure, higher physical demands, lower social support from colleagues, lower availability and quality of material resources, lower financial

reward, and less clear and practical work agreements than their Dutch colleagues (see Table 3.1.).

Table 3.1. Comparison of the Italian nurses (N = 609) and the Dutch nurses (N = 873) on job characteristics, organizational conditions, and distress/well-being outcomes. Results of two Multivariate Analyses of Variance controlling for age and gender (MANCOVA) examining (a) job characteristics and organizational conditions, and (b) well-being / distress outcomes (entire sample: N = 1482).

	Italian nurses M (SD)	Dutch nurses M (SD)	Italian nurses Estimated M^a	Dutch nurses Estimated M^a	F(df)	p
Job characteristics and organizational conditions						
Multivariate					29.85 (10, 1350)	.000
Univariate						
Job characteristics						
Work/Time pressure	2.76 (0.60)	2.46 (0.43)	2.76	2.46	116.20 (1, 1359)	.000
Physical demand	2.95 (0.62)	2.66 (0.48)	2.94	2.66	88.43 (1, 1359)	.000
Skill discretion	2.69 (0.55)	2.74 (0.37)	2.69	2.75	5.63 (1, 1359)	.018
Decision authority	2.70 (0.61)	2.66 (0.34)	2.70	2.66	2.20 (1, 1359)	.139
Support supervisor	2.79 (0.81)	2.78 (0.55)	2.79	2.78	.04(1, 1359)	.846
Support colleagues	2.89 (0.57)	3.02 (0.40)	2.89	3.02	23.90 (1, 1359)	.000
Organizational conditions						
Personnel resources	2.46 (0.57)	2.48 (0.47)	2.47	2.47	.06 (1, 1359)	.811
Material resources	2.47 (0.60)	2.58 (0.43)	2.47	2.58	17.20 (1, 1359)	.000
Financial reward	1.78 (0.56)	1.86 (0.44)	1.79	1.86	7.44 (1, 1359)	.006
Work agreements	2.46 (0.66)	2.77 (0.36)	2.46	2.77	123.01 (1, 1359)	.000
Distress/well-being outcomes						
Multivariate					203.03 (5, 1373)	.000
Univariate						
Emotional exhaustion	20.83 (10.84)	11.84 (7.93)	20.79	11.87	306.06 (1, 1377)	.000
Depersonalization	5.70 (5.81)	4.07 (3.27)	5.58	4.16	33.47 (1, 1377)	.000
Personal.accomplishment.	33.50 (6.70)	28.83 (6.17)	33.48	28.85	172.19 (1, 1377)	.000
Psychosomatic symptoms	1.88 (0.59)	1.28 (0.31)	1.89	1.27	617.64 (1, 1377)	.000
Job satisfaction	2.53 (0.65)	2.61 (0.44)	2.54	2.61	5.90 (1, 1377)	.004

[a] estimated mean, corrected for the covariates age and gender

The Italian and Dutch nurses score comparably with regard to skill discretion, decision authority, supervisor support, and personnel resources. With regard to the outcomes, Italian nurses score higher on emotional exhaustion, depersonalization and psychosomatic complaints, and lower on job satisfaction. In contrast, the Italian nurses score higher on personal accomplishment than the Dutch nurses.

The intercorrelations among the variables under study are presented in Table 3.2. Both the intercorrelations for the entire study population and for the two samples separately are provided. Comparison of the correlations between work factors and outcomes in the Italian and Dutch nurses

show some differences. To highlight a few, physical demands, decision authority and skill discretion are more strongly related to outcomes in the Dutch nurses, whereas personnel resources show stronger correlations with outcomes in the Italian sample.

The intercorrelations of the job characteristics and organizational conditions are all lower than .60, indicating there is no multicollinearity between the independent variables. Furthermore, the intercorrelations between the outcomes (r = .02 - .63) indicate that it is worthwhile to differentiate between these outcomes. Lastly, age and gender are moderately related to job characteristics, organizational factors, and outcomes. Therefore, and because the Italian and Dutch sample differ on age and gender, we control for these demographic variables in the analyses.

The results of the regression analyses addressing Hypotheses 2 and 3 are summarized in Table 3.3.

Controlling for age and gender, Sample (Italian/Dutch) proved to be a significant predictor of the distress/well-being outcomes. Being an Italian nurse is associated with higher emotional exhaustion, higher personal accomplishment, and more psychosomatic complaints. For job satisfaction and depersonalisation, Sample is a non-significant predictor.

Results partially support Hypothesis 2. Higher demands, lower control, and lower support are associated with lower job satisfaction, higher emotional exhaustion, and more psychosomatic complaints. No full additive effects are present for depersonalisation (unrelated to social support), and personal accomplishment (unrelated to demands).

Table 3.2.: Intercorrelations among the study variables for the entire sample (*N*=1482), and for the Italian nurses (*N* = 609) and the Dutch nurses (*N* = 873) separately.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1) Sample[a]	---																	
2) Gender[b]	**.13**	---	-.05/-.03	.02/.02	-.03/-.06	.00/.00	-.01/-.02	-.05/.01	-.04/.05	-.01/-.06	.03/.01	-.03/.09	-.03/-.08	.01/.02	-.08/**-.15**	.01/-.04	**.16**/.04	-.00/.09
3) Age	.07	.03	---	-.04/-.02	.02/**-.15**	-.08/-.13	.07/-.01	.06/-.01	-.02/-.13	**.25**/-.05	-.11/.07	.13/.06	-.01/-.07	-.05/-.08	-.18/-.09	.07/.10	.04/-.00	.04/.02
4) TP	**-.30**	-.02	-.05	---	**.38**/**.24**	-.08/-.16	-.11/-.28	-.10/-.25	-.03/-.11	**-.40**/**-.55**	**-.26**/**-.30**	**-.30**/**-.30**	**-.39**/**-.33**	**.39**/**.43**	.21/.20	-.04/-.03	.24/**.26**	**-.26**/**-.37**
5) PD	**-.25**	-.08	**-.09**	**.37**	---	-.05/-.12	-.13/-.29	-.10/-.20	-.03/-.15	-.10/-.24	**-.37**/**-.29**	.07/.13	**-.34**/**-.29**	**.21**/**.27**	.10/.23	-.05/-.02	.19/.21	**-.19**/**-.32**
6) SD	.05	.01	**-.10**	**-.12**	-.09	---	**.37**/**.33**	.21/**.29**	**.27**/**.25**	.10/.13	.15/.13	.07/.13	.11/**.28**	**-.16**/**-.26**	-.11/-.23	.21/.20	-.15/**-.23**	**.37**/**.42**
7) DA	-.05	-.02	.02	**-.15**	**-.17**	**.35**	---	**.39**/**.32**	**.37**/**.25**	.19/**.26**	.15/**.21**	.03/.22	.19/**.30**	**-.19**/**-.28**	-.12/-.14	.21/.20	-.18/**-.24**	**.30**/**.41**
8) SS	-.01	-.02	.02	**-.15**	**-.14**	**.24**	**.37**	---	**.46**/**.34**	.26/**.27**	.20/**.21**	.19/**.20**	.32/**.49**	**-.23**/**-.24**	-.14/-.12	.23/.18	-.17/**-.24**	**.39**/**.37**
9) SC	**.12**	.02	-.07	**-.10**	**-.11**	**.26**	**.32**	**.41**	---	.27/**.14**	.16/.05	.07/.10	.32/**.36**	**-.16**/**-.17**	-.12/-.15	.17/.18	-.21/**-.21**	**.31**/**.27**
10) PR	.02	.03	.08	**-.46**	**-.16**	.11	**.21**	**.26**	**.21**	---	.10/**.28**	.20/**.38**	.26/**.37**	**-.33**/**-.23**	-.27/**-.13**	.17/.06	-.18/**-.13**	**.33**/**.37**
11) MR	**.12**	.03	-.01	**-.30**	**-.35**	.15	.16	**.20**	.13	**.18**	---	.24/**.23**	.33/**.35**	-.08/**-.19**	-.02/-.10	.09/.00	-.10/**-.16**	**.27**/**.24**
12) FR	**.08**	.04	**.09**	**-.32**	**-.31**	.10	.10	**.20**	.09	**.29**	**.24**	---	.21/**.25**	**-.21**/**-.24**	-.09/-.17	.05/-.03	-.10/-.10	**.33**/**.44**
13) WA	**.28**	.05	-.02	**-.42**	**-.36**	**.18**	**.20**	**.36**	**.35**	**.29**	**.35**	**.24**	---	**-.24**/**-.25**	-.21/-.24	.14/.15	-.19/**-.23**	**.34**/**.37**
14) EE	**-.44**	-.05	-.08	**.48**	**.32**	**-.21**	**-.18**	**-.21**	**-.20**	**-.27**	**-.17**	**-.24**	**-.33**	---	.40/**.52**	-.18/-.11	.48/**.59**	**-.43**/**-.43**
15) DP	**-.18**	**-.13**	**-.14**	**.24**	**.19**	**-.15**	-.12	-.13	-.15	**-.21**	-.07	-.13	**-.26**	**.47**	---	-.27/**-.16**	.30/**.33**	**-.25**/**-.32**
16) PA	**-.33**	-.06	-.05	.07	.06	.17	**.21**	**.19**	.12	.10	.01	-.02	.03	.02	-.14	---	-.27/**-.12**	**.27**/**.21**
17) PS	**-.55**	.02	-.02	**.36**	**.30**	**-.17**	-.14	-.16	**-.25**	-.14	**-.17**	-.13	**-.32**	**.63**	**.35**	.03	---	**-.26**/**-.25**
18) JS	.06	.05	.03	**-.31**	**-.25**	**.39**	**.33**	**.38**	**.30**	**.35**	**.26**	**.38**	**.35**	**-.41**	**-.28**	**.21**	**-.25**	---

Legenda: Underlined p < .01; in bold p <.001

Italian Nurses (N = 609)/ Dutch Nurses (N = 873) above the diagonal ; entire sample (N = 1493) below the diagonal.

Sample: Sample (Italian/Dutch); TP: Work/Time pressure; PD: Physical demand; SD: Skill discretion; DA: Decision authority; SS: Support supervisor; SC: Support colleagues; PR: Personnel resources; MR: Material resources; FR: Financial reward; WA: Work agreements; EE: Emotional exhaustion; DP: Depersonalization; PA: Personal accomplishment; PS: Psychosomatic symptoms; JS: Job satisfaction.

[a] Italian sample is coded as -1; Dutch sample is coded as +1.

[b] Male is coded as 1; Female is coded as 2.

In line with expectations, organizational conditions significantly add to the prediction of most distress/well-being outcomes, beyond the effects of the JDCS variables (hypothesis 3). For personal accomplishment and psychosomatic complaints, however, the organizational conditions fail to improve the explained variance. The additional variance explained by the organisational conditions varies from 1-2% for emotional exhaustion and depersonalisation to 6% for job satisfaction. Whereas personnel resources are a significant predictor across these outcomes, financial reward is only significantly associated with job satisfaction. Adequate work agreements are associated with higher job satisfaction and lower depersonalisation. Adequate material resources are only related to higher depersonalisation.

With regard to the explained variance in the outcomes, job satisfaction ($R^2 = .38$), emotional exhaustion ($R^2 = .39$), and psychosomatic symptoms ($R^2 = .45$) are the best predicted outcomes, followed by personal accomplishment ($R^2 = .20$). Depersonalisation could be least predicted by the variables under study ($R^2 = .11$). It should be noted however, that especially with regard to emotional exhaustion, personal accomplishment, and psychosomatic symptoms being an Italian or Dutch nurse is an important predictor (initial beta's ranging from -.34 to -.60, $p<.001$). Adding the job characteristics to the model substantially reduces the beta's for emotional exhaustion (from $\beta = -.44$ to $\beta = -.33$), and for psychosomatic complaints (from $\beta = -.60$ to $\beta = -.51$). This suggests that the impact of Sample on emotional exhaustion and psychosomatic complaints is partially mediated through the job characteristics. Additional mediation analyses suggest that the effect of Sample on emotional exhaustion is partially mediated through work/time pressure (Sobel $z = -9.24$, $p<.001$). The impact of Sample on psychosomatic symptoms appears to be partially mediated through work/time pressure (Sobel $z = 7.47$, $p<.001$), physical demands (Sobel $z = 6.51$, $p<.001$), and support colleagues (Sobel $z = 4.02$, $p<.001$).

Finally, it was explored whether the effects of the job characteristics and organisational conditions on the distress/well-being outcomes were similar across the two samples (results not presented). Only for emotional exhaustion and depersonalisation addition of the organizational terms improved the explained variance significantly, with respectively 1% ($p<.01$) and 2% ($p<.01$). Inadequate personnel resources emerged as a strong predictor of emotional exhaustion and depersonalisation in the Italian nurses (respectively $\beta = -.19$, $p<.001$, and $\beta = -.17$, $p<.001$), whereas in the Dutch nurses personnel resources were a non-significant predictor (for both outcomes $\beta = .04$, $p>.05$).

Table 3.3.: **Results of Hierarchical Multiple Regression Analyses: Well-being / distress outcomes regressed on age, gender, sample (Italian/Dutch), job characteristics, and organizational conditions. (N=1482).**

Predictors	JS beta[a]	EE beta[a]	DP beta[a]	PA beta[a]	PS beta[a]
Gender[b]	.06	-.05	-.13**	-.05	.00
Age	.04	-.07	-.11**	-.06	-.03
Block 1 ΔR^2 $(R^{2)}$	.005(.005)	.007*(.007*)	.027**(.027**)	.006(.006)	.000 (.000)
Gender[b]	.05	.01	-.12**	-.01	.08**
Age	.04	-.04	-.11*	-.04	.01
Sample (Italian / Dutch) [c]	.06	-.44**	-.02	-.34**	-.60**
Block 2 ΔR^2 $(R^{2)}$	.003(.008)	.185**(.192**)	.000 (.027**)	.114**(.120**)	.356** (.356**)
Gender[b]	.04	.00	-.12**	*-.01*	.09**
Age	.05	-.04	-.12*	*-.03*	.01
Sample (Italian / Dutch)[c]	-.05	-.32**	.04	*-.35**	-.51**
Work/Time pressure	-.19**	.33**	.16**	*.02*	.17**
Physical demand	-.11**	.06	.02	*.00*	.10**
Skill discretion	.26**	-.10**	-.10**	.13**	-.07*
Decision authority	.08*	-.06	-.02	.08*	-.05
Support supervisor	.20**	-.10**	-.04	.10**	-.06
Support colleagues	.10**	-.05	-.06	.07	-.08**
Block 3 ΔR^2 $(R^{2)}$	.310**(.318**)	.187**(.379**)	.059**(.087**)	.069**(.190**)	.093**(.450**)
Gender[b]	*.03*	.01	-.12**	-.01	.08**
Age	*.03*	*-.03*	-.11**	-.03	.01
Sample (Italian / Dutch) [c]	*-.04*	*-.33**	*.05*	-.35**	-.51**
Work/Time pressure	*-.06*	*.30**	.09*	.06	.17**
Physical demand	*-.04*	*.07*	*.03*	.00	.10**
Skill discretion	*.25**	*-.10**	-.11**	.13**	-.07*
Decision authority	*.08**	-.06	-.02	.08*	-.05
Support supervisor	*.13**	*-.09**	-.01	.09*	-.06
Support colleagues	*.07*	-.04	-.03	.05	-.09**
Personnel resources	*.12**	-.08*	-.09*	.06	.01
Material resources	*.06*	.06	.09**	-.02	-.01
Financial reward	*.20**	-.04	-.02	-.03	-.00
Work agreements	*.09*	*.01*	-.13**	.07	.00
Block 4 ΔR^2 $(R^{2)}$	.060**(.378**)	.009**(.388**)	.022**(.108**)	.006(.196**)	.000 (.450**)

Note: *p < .01; ** p < .001; ΔR^2: change in explained variance

[a] Beta values in last block that significantly increases the explained variance are in italics.

[b] Male is coded as 1; Female is coded as 2 [c] Italian sample is coded as -1; Dutch sample is coded as +1

JS: Job satisfaction; EE: Emotional exhaustion; DP: Depersonalization; PA: Personal accomplishment; PS: Psychosomatic symptoms

3.4. Discussion

Our first hypothesis was confirmed: In comparison to their Dutch counterparts, the Italian nurses experience higher job demands (work and time pressure, physical demands), and lower social support from colleagues. Furthermore, the Italian nurses scored more unfavourable on most organizational conditions (work agreements, material resources, and financial reward). Italian and Dutch nurses were comparable with respect to the level of supervisor support and job control. This latter result might be attributed to the similar hierarchical structure in Italian and Dutch hospitals: although organizational units include medical doctors and nurses, in both settings head nurses act as supervisors of the nursing staff. Furthermore, contrary to our expectations based on the health care situation in these countries, we did not find a significant difference in the perception of personnel resources. This might be due to the fact that the hospitals included in this study were academic hospitals, where available resources are (perceived as) more favourable than in other hospitals.

In line with our expectations, Italian nurses also report lower levels of job satisfaction, and higher levels of emotional exhaustion, depersonalization, and psychosomatic complaints than the Dutch nurses. These findings suggest that the health care context has indeed its impact on nurses' emotional exhaustion and psychosomatic complaints partly through less favourable job characteristics (high work and time pressure, high physical demands, low support from colleagues). However, existing cultural differences in the experience and expression of distress and complaints may also contribute to the cross-national differences found (Crocetti et al., 2010).

In contrast, Italian nurses score higher on personal accomplishment than the Dutch nurses. Analyses indicate that this difference in personal accomplishment is independent of the level of job characteristics and organizational conditions. This suggests that cultural differences in achievement and performance motivation may also play a role, as comparable differences were found in a European study on teachers (Pisanti et al. 2003).

Our findings partially confirm our second hypothesis, expecting significant additive effects of demands, control, and support on the distress/well-being outcomes. Significant additive effects of the JDCS variables were present for job satisfaction, emotional exhaustion, and psychosomatic symptoms. In line with findings from Halbesleben (2006), depersonalisation proved to be unrelated to the level of social support. Furthermore, personal accomplishment was unrelated to the level of demands, and only associated with higher levels of resources, i.e. control and social support. This is in line with previous research (Janssen et al., 1999).

Hypothesis 3 focuses on the additional predictive value of organizational conditions for nurses'

well-being. Organizational variables improved especially the prediction of job satisfaction, and to a lesser extent the prediction of emotional exhaustion and depersonalisation. Our results indicate that nurses' job satisfaction is mainly positively associated with adequate staffing of the ward and financial reward. These findings have also been found in other studies (Bennet et al., 2001; McVicar, 2003) and are in accordance with Siegrist (1996) effort-reward imbalance model.

Comparing the impact of the job characteristics and organizational conditions on distress/wellbeing in the Italian and the Dutch nurses indicates that personnel resources are more strongly associated with emotional exhaustion and depersonalization in the Italian nurses than in the Dutch nurses. This might be explained by the more demanding and less resourceful work environment of the Italian nurses. In such a situation, understaffing is more likely to exert its negative effects on well-being.

The results of our study have both theoretical and practical implications. From a theoretical viewpoint, the study shows that besides the key dimensions of the JDCS model, organizational conditions play a role in nurses' well-being. Furthermore, the findings suggest that the health care context exerts its effects on nurses' distress partially through less favourable job characteristics. The findings regarding the differential impact of job characteristics and organizational conditions suggest that in a less favourable work situation in terms of demands and resources, understaffing has a stronger impact on nurses' well-being.

On the basis of our findings, it is advisable to focus interventions on enhancing control (skill discretion and decision authority) and support from supervisor and colleagues, and to strive for adequate staffing. One would expect that in terms of well-being Italian nurses would profit more from improvements in staffing than Dutch nurses. Specific interventions should be directed at: training in leadership qualities for supervisors (providing feedback and support, coaching); enhancing bottom-up communication within the organization; implementation of autonomous teams; taking measures to avoid structural and incidental understaffing; providing training possibilities (e.g., specialization) (see e.g., Michie and Williams, 2003; Schalk et al., 2010).

Limitations and empirical implications

A limitation of the study regards the generalizability of the findings. The samples consisted of nurses working in academic hospitals. As a consequence, the results cannot be generalized to nurses working in other settings (e.g., community nurses, nurses in general hospitals).

A second limitation is that, due to its cross-sectional design, the study provides no basis for causal inferences. Furthermore, as this study is mainly based on self report data, common method of variance and third factors, like negative affectivity, may inflate the associations between predictors and outcomes. Future studies may benefit from the inclusion of objective indicators of the work environment (e.g., patient load, observational measures) and outcomes (e.g., absenteeism).

Our study investigated the association of four organizational conditions with job-related and general strain: financial reward, personnel resources, work agreements and material resources. Future research should include a more comprehensive assessment of organisational conditions, and also explore the role of other factors such as ergonomics, information processing, and feedback (Humphrey et al., 2007; van Beuzekom et al., 2010).

Finally, the Dutch sample was gathered in a single large academic hospital. It should be noted though that this hospital consisted of a number of relatively autonomous divisions, which differed considerably regarding factors like size and management policies. These differences are reflected in the variance in the organizational conditions and job characteristics in the Dutch nurses sample.

Our findings suggest that there are important cross national differences in job characteristics, organizational characteristics and wellness-health outcomes that should be taken into account both in research and intervention projects. However, in both samples job characteristics as well as organizational conditions are important predictors of nurses' distress. As a consequence, it is important to screen nurses regularly on both sets of predictors and intervene timely in order to prevent adverse stress outcomes.

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Chapter 4. Development and validation of a brief Occupational Coping Self-Efficacy Questionnaire for Nurses.

Abstract

This paper is a report of a study to develop and test the psychometric properties of the Occupational Coping Self-Efficacy for Nurses Scale. Coping self-efficacy beliefs are defined as self-appraisals of capabilities to cope with environmental demands. People with higher levels of coping self efficacy beliefs tend to approach challenging situations in an active and persistent way, whereas those with lower levels of coping self-efficacy beliefs tend to direct greater energy to managing increasing emotional distress.

In 2006, 1383 nurses completed the following measures: Occupational Coping Self-Efficacy Questionnaire for Nurses, Coping Inventory for Stressful Situations Short Form, and Maslach Burnout Inventory. Based on a randomized split of the data, we conducted exploratory factor analysis on group 1 data (n = 691) and confirmatory factor analysis within the framework of structural equation modeling on group 2 data (n = 692).

The exploratory results revealed two factors: Coping Self-Efficacy to cope with the occupational burden (Cronbach alpha = 0.77) and Coping Self-Efficacy to cope with the relational burden (alpha = 0.79). In the confirmatory group, the two factor structure was tested against an alternative one-factor structure and confirmed as the best solution. Correlation patterns between the Occupational Coping Self - Efficacy for Nurses Scales, and both coping and burnout variables, supported the criterion - related validity of the Occupational Coping Self - Efficacy for Nurses dimensions.

Nurses can have two basic and distinct coping self-efficacy beliefs: beliefs about occupational burden and beliefs about relational difficulties in the workplace. Research is needed into how efficacy evaluations shift as a result of specific stress management interventions.

Keywords: Coping Inventory for Stressful Situations Short Form, instrument validation, Maslach Burnout Inventory, nurses, Occupational Coping Self-Efficacy Questionnaire for Nurses

4.1. Introduction

Among healthcare workers, nursing is one of the occupations identified as particularly stressful (McVicar 2003). The research evidence from studies of nurse stress carried out in different countries not only attests to the endemic and crossnational nature of the phenomenon, but also to how serious the problem is. For example, a study on a large sample of Swedish nurses revealed that >80% of the nurses reported high- or very high-job strain (Petterson et al. 1995). Moreover, two epidemiological studies showed that approximately 25% of European nurses are affected by burnout symptoms (Landau 1992), and 28% of Canadian nurses declared suffering from high psychological distress (Bellerose et al., 1995). The implications of the problem go beyond the concern for the nurse's well-being because of the adverse effects that the prolonged experience of stress may have on his/her mental and physical health. As several authors (e.g. Garman et al. 2002) have argued, it is not unreasonable to expect nurse stress to interfere with the nurse's performance and consequently with the care process.

To study the impact of emotionally charged relationships on stress and burnout, the Lazarus cognitive-mediation theory of stress is a possible conceptual framework (Lazarus 1991). According to this model, negative reactions to chronic occupational stressors stem from cognitive appraisal, which is the process that mediates between the environment's demands, constraints and resources, and the individual's goal hierarchy and personal beliefs. Lazarus (1999) identifies two simultaneous processes of appraisal influencing individual well-being: primary and secondary appraisal. Primary appraisal involves evaluating the personal relevance of a stressful situation (its motivational relevance) and the extent to which the situation is in keeping with personal goals (its motivational congruence). The fundamental question in primary appraisal is 'whether anything is at stake'; if the answer is positive, a person will strive hard to attain the goal, despite discouragement or adversity (goal commitment). Possible appraisal outcomes are harm/loss (damage already occurred), threat (possibility of damage in the future) and challenge (an opportunity for growth, mastery or gain). Secondary appraisal refers to the evaluation of both coping options and outcomes in terms of accountability (who/what is responsible for the situation), future expectancy (likelihood of change), problem-focused coping (options for influencing the situation) and emotion-focused coping (ability to emotionally adapt to the situation). The main consequence of secondary appraisal is the type of coping strategy that an individual adopts (Lazarus 1991). Coping strategies are defined as ongoing cognitive and behavioural efforts to manage specific external and/or internal demands appraised as taxing or exceeding the resources of a person (Lazarus,1999).

This theoretical framework is consistent with Bandura's (1986) social cognitive theory, which emphasizes the relevance of self-efficacy beliefs. Both theories acknowledge the importance of self-appraisal beliefs. Indeed, appraisal may influence coping by directing attention towards certain environmental features or opportunities as well as internal resources such as coping self-efficacy (CSE) beliefs. A person's CSE, i.e. someone's self-appraisals of their ability to cope with environmental demands may influence their reaction to stress and its outcomes (Bandura et al. 1985). Efficacy beliefs can determine whether people will invest effort, and how long they will persist in their effort in the face of obstacles and aversive experiences. People with higher levels of CSE beliefs tend to approach challenging situations in an active and persistent way, whereas those with lower levels of CSE beliefs tend to direct greater energy to managing increasing emotional distress (Bandura 1986, 1997). High CSE has been related to a wide range of physiological measures including lower catecholamine responsivity during stress (Bandura et al. 1985) and reduced blood pressure response to behavioural challenge (Bandura et al. 1982). Higher CSE values were also associated with better psychological adjustment to highly stressful events such as abortion (Meuller & Major 1989) and physical assault (Ozer & Bandura 1990). Within occupational stress studies, Schwarzer (2003) showed that the stronger one's perceived efficacy, the more proactive and persistent one's efforts will be (proactive coping). Moreover, several researchers have investigated the additive, mediator and moderator role of CSE between stress and strain using both cross-sectional and longitudinal designs (e.g. Benight et al. 1999, Benight & Harper 2002, Kraij et al. 2002, Benight & Bandura 2004). Kraij et al. (2002), conducted a cross-sectional study in a community sample of 194 older people to evaluate the impact of CSE and coping strategies on stress. They demonstrated that CSE may have both a direct and an indirect effect on emotional well-being, as it influences distress levels as well as coping strategies: respondents with higher CSE used statistically significantly more task-oriented coping strategies and less emotion- and avoidance-oriented strategies. The authors suggest including self-beliefs of ability to cope with environmental demands when studying stress-coping processes. Benight et al. (1999) showed that perceived CSE works as a key mediator between disastrous events and traumatic, enduring distress symptoms. In addition to resource loss, the self-efficacy to cope with the aftermath of a hurricane was included as a second factor, as both a direct and mediating determinant of posttraumatic stress. Self-efficacy beliefs are domain-specific (Bandura 2001), i.e. they are very likely to differ depending on the activity to which they are related. That is why it is essential to include a sample of relevant cues in the development of a self-efficacy instrument.

4.2. The study

Aim

The aim of the study was to develop and test the psychometric properties of the Occupational Coping Self-Efficacy for Nurses (OCSE-N) Scale.

Instrument development

Item generation

For the item generation phase, a semi-structured interview was conducted with 62 nurses who were participating in a larger study on quality of working life in nurses. The participants were recruited from two general hospitals. To obtain a comprehensive item pool, sampling occurred across different wards (e.g. emergency, medical, surgical and community). Most (82%) participants were female, which approximates the distribution of nurses in the Italian healthcare context. The mean age was 40,11 years (SD = 9,2). To generate items, open-ended interviews were conducted to elicit information on the occupational stressors of nurses. Participants were asked 'Excluding the problems that do not depend on your action and on your colleagues – e.g. salary –what is the main working problem that a nurse has to cope with today?' and 'What is your main problem at work?' The participants' responses were written down by the interviewer and a list of occupational stressors was developed. The list was reduced to nine occupational stressors by removing redundant answers and by grouping together similar responses. These nine occupational stressors were transformed into items by taking participants' remarks and rewording them to encapsulate the self-appraisal of one's ability to cope with each stressor. Eleven experienced health professionals (one psychologist, eight nurses and two head nurses) reviewed the questions before the scale was finalized (see Appendix).

Validity and reliability testing

The dimensionality of the scale was estimated through both exploratory and confirmatory approaches. Internal consistency of each resulting scale was estimated by computing Cronbach. Concurrent validity was assessed by estimating correlations between the OCSE-N dimensions and two external criteria: burnout dimensions and coping styles.

Participants

In consultation with the Umbria and Lazio Regional Departments of Health Care, nine hospitals were selected on the basis of their representative characteristics. All managers agreed to participate in the study. We randomly selected 2186 nurses, who were representative of nurses of the Central Italy (Umbria and Lazio regions) and 1405 nurses agreed to take part in the study, which was conducted in 2006. The sample represented a 64% response rate, fairly typical for surveys of this length (Gelsema et al. 2006). Participants were contacted at their place of work and received a questionnaire and an accompanying letter in which they were invited to participate in the study. The accompanying letter explained that the goal of the study was to examine 'nurses' quality of working life'. They were asked to leave their completed anonymous questionnaires in a sealed box placed in their room. Twenty-two incomplete protocols were excluded. Thus, the final sample consisted of 1383 nurses. We compared respondents with non-respondents on demographic parameters of gender and age. The 1383 participants were representative of the 2186 nurses who were asked to participate as regards these variables.

Instruments

Demographic data

Data on gender, age, marital status, working age and the area of nursing (critical area, medical/surgical area and community area) were collected using a specially designed form.

Occupational Coping Self-Efficacy Scale for Nurses

The items of the OCSE-N were developed on the basis of the previous item generation phase. The final version consisted of nine questions (see Appendix for the item content) with answers presented on a 5-point Likert type scale where 1 means 'not at all easy to cope with' and 5 means 'totally easy to cope with'. Instructions were given as follows: 'the following statements describe occupational stressful situations which nurses may cope more or less easily with. For each situation, please rate how confident you feel you can easily cope with it'.

Coping strategies

Ways of coping were measured using the Coping Inventory for Stressful Situations – Short Version (CISS-SV), a 21-item shortened version of the CISS (Endler & Parker 1999). For each coping item, the nurses indicated on a 5-point scale (1 = not at all and 5 = very much) the extent to which they had used that strategy in a stressful situation at work. Scores were calculated for the three scales: task-oriented coping (7 items, e.g. 'Determine a course of action and follow it'), emotion-oriented coping (7

items, e.g. 'Become very upset') and avoidance-oriented coping (7 items, e.g. 'Go out for a snack or meal'). The Cronbach alpha reliability estimates were 0.75 for task-oriented coping, 0.82 for emotion-oriented coping and 0.78 for avoidance-oriented coping.

Burnout measure

To assess the nurses' level of burnout, the Italian version of the Maslach Burnout Inventory (MBI) (Sirigatti & Stefanile, 1991) was employed. Participants were asked to rate, from 0 (never) to 6 (daily), how often they experienced feelings like those described in each of the 22 items. The questionnaire consisted of three dimensions: emotional exhaustion (9 items), such as 'I feel frustrated by my job'; depersonalization (5 items), such as 'I don't really care what happens to some patients'; and personal accomplishment (8 items), such as 'I feel very energetic'. The Cronbach alpha reliability estimates were the following: 0.88 for emotional exhaustion; 0.72 for depersonalization and 0.82 for personal accomplishment.

Ethical considerations

The study was approved by national and regional ethics committees. Informed consent was obtained from all participants. Data were anonymously gathered and the voluntary nature of the study was emphasized. Data were stored in accordance with the Italian Data Protection Act (2006) (http://www.garanteprivacy.it/garante/document?ID=1311248).

Data analysis

We tested the following hypotheses:

• the OCSE-N's dimensions should be positively associated with coping strategies aimed at changing the situation (e.g. direct action or planning) and negatively associated with both emotion-focused (e.g. self-preoccupation) and avoidant strategies (e.g. behavioural withdrawal);

• the OCSE-N scores should also correlate with the burnout dimensions. Namely, as the burnout syndrome (Maslach 1993) represents a combination of an affective response (emotional exhaustion) that is similar to depression, a cynical and skeptical attitude towards work, colleagues and clients (depersonalization), as well as an evaluation of one's efficacy in the job (personal accomplishment), the OCSE-N scores should be negatively correlated with both emotional exhaustion and depersonalization, and positively associated with personal accomplishment. Moreover, consistent with results of a meta-analysis (Pfenning & Husch 1994) and of a study by Glass and McKnight (1996), the sizes of the correlation estimates were expected to range from low to medium, according to Cohen's classification of

effect sizes (Cohen 1988). After a screening of their quality, the data were randomly split into two independent groups and then tested using exploratory factor analysis (EFA) for group 1 (n = 691) and a confirmatory factor analysis (CFA) approach for group 2 (n = 692). According with the guidelines of Tabachnick & Fidell (2001), in both groups the adequacy of sample size is considered very good (n > 500). As regards EFA, the maximum likelihood (ML) extraction was used with preliminary estimates of communalities obtained from the square of the multiple correlation coefficient of each variable with all the other variables. Oblique promax rotation was chosen as the rotation method. The factor model structure derived in the EFA was then tested for model fit using CFA. The CFA method enables making comparisons of differing factor structures for a given set of data and can be used for both developing and refining measurement instruments (Floyd & Widaman 1995). CFA was conducted with the AMOS (Analysis of Moment of Structure) statistical software (version 5, SmallWaters Corporation, SPSS Inc, Chicago, IL, USA; Byrne 2001) using ML estimates. Each of the specified models were compared with the most restrictive model (the so-called null-model M0) (Byrne 2001). In the present case, M0 corresponds with the hypothesis that there are just as many uncorrelated factors as there are items, i.e. a model without a factor structure. The model fit was assessed using the following reported fit indices: chi-square, the rootmean-square error of approximation (RMSEA), the Comparative Fit Index (CFI) and Akaike's information criterion (AIC). Chi-square tests the null hypothesis of perfect model fit where the residual covariance equals zero. Unfortunately, the application of chi-square to large samples is problematic because it is highly sensitive to even small amounts of unexplained covariance (Thompson 2004) so that, with a sufficient sample size, almost any model tested will have a statistically significant chi-square value. The overall chisquare was included here for comparison purposes because it is widely reported. The RMSEA examines the probability of close model fit and is considered a more appropriate test, as it has been shown to be less affected by sample size (Floyd & Widaman 1995). RMSEA values represent a covariance that is not explained by the model so that smaller values indicate better model fit. Most investigators interpret the RMSEA as indicating a poor model fit when it is above some upper bound, typically set between 0.05 and 0.08 (Thompson, 2004). The CFI, a revised version of the Bentler–Bonett (Bentler & Bonnett 1980) normed Fit Index that adjusts for degrees of freedom (d.f.), ranges in value from 0 to 1.00. It is derived from the comparison of a restricted model (i.e. one in which structure is imposed on the data) with an independence (or null) model (one in which all correlations among variables are zero) in the determination of goodness-of-fit. A CFI value of 0.90 has served as the rule-of-thumb lower limit cutpoint of acceptable fit. To facilitate the comparison of different models, AIC is reported. A difference of two or more in the AIC is required for each d.f. used to determine the best model, and the model with the lowest AIC, given parsimony considerations, is the preferred model (Loehlin, 2004). All

subsequent testing of the data were based on the full sample (n = 1383). We explored possible demographic differences on the scale(s) through the examination of t-test (gender) and Pearson's estimates (age). Internal reliability was estimated by calculating the Cronbach alpha coefficient for the scale(s) derived from the analysis and by checking whether every item increased Cronbach alpha. Criterion validity was estimated using the stress model that was applied to the development of the scale. Relations between the OCSE-N scores and the CISS-SV variables and the MBI dimensions were examined using the Pearson product– moment correlations.

4.3. Results

The mean age of the respondents was 39.1 years (SD = 8.4); 22.6% (n = 312) were men and 77.2% (n = 1067) were women. Participant demographics are shown in Table 4.1.

Construct validity

Exploratory factor analysis.

Data screening showed that the assumptions of normality were not severely violated (-0.34 < skew < 0.43; -.0.34 < Kurtosis > -1.08; West et al. 1995). Both the Kaiser–Myer–Olkin Measure of Sampling Adequacy (0.83) and Bartlett's Test of Sphericity ($\chi 2(36)$ 1989.63; $P < 0.0000$) indicated the factoriability of the correlation matrix (Tabachnick & Fidell, 2001). Two factors met the commonly used Kaiser criterion (eigenvalue values >1) for determining the number of factors to extract in factor analysis ($\chi 2(19)$ = 90.71). Following the suggestions of Graham et al. (2003), Table 4.2. presents the factor loadings included both in the pattern and in the structure matrix.

The two rotated factors accounted for 46.9% of the total variance. The first factor accounted for 34.4% (Eigenvalue = 3.09) of the total variance and consisted of six items that tapped the perception of 'CSE to manage the occupational burden'. The second factor accounted for 12.5% (Eigenvalue = 1.12) of the total variance and contained three items that reflected the 'CSE to manage relational difficulties in the workplace' (conflicts with colleagues, supervisors and healthcare workers).

Table 4.1.: Demographics and characteristics of participants (N=1383)

Variables	Nurses
Gender (%)	
Male	312 (22.6)
Female	1067 (77.2)
Age (years)	
20-29	169 (12.0)
30-39	578 (42.4)
40-49	419 (30.7)
50-59	183 (13.4)
60-69	17 (1.2)
> 70	3 (0.2)
Type of employment contract	
Permanent	95.2
Temporary	4.8
Years of experience as nurses (%)	
< 5	199 (15.0)
5-9	212 (15.9)
10-14	292 (22.0)
15-19	173 (13.0)
> 20	454 (34.1)
Type of clinical placement	
General hospital	555 (41.7)
University hospital	608 (45.6)
Oncologycal hospital	169 (12.7)
Ward Type	
Surgical wards	26.7
Medical wards	21.9
Emergency wards	13.0
Mixed wards	11.7
Psychiatric wards	3.2
Obstetric-Paediatric wards	12.2
Other Wards	11.3

Confirmatory factor analysis

Although the EFA findings suggested that a two-dimensional construct underlies the OCSE-N, a careful examination of the factor loadings included in the structure matrix suggested that the possibility of considering one dimension could not be ruled out. Two-factor analytical models for the OCSE-N were specified: the one-factor model, which assumes that all OCSEN items load on a general composite CSE factor (M1); the two-factor oblique model, in which the CSE with general nursing burden and CSE concerning relational difficulties in the workplace, constitute two separate correlated dimensions (M2). The fit of the specified models are shown in Table 4.3.

Table 4.2: Factor loadings for specified two factor solution: exploratory factor analysis of the OCSE-N Items with promax rotation (N = 691).

	Pattern Matrix		Structure Matrix	
Item	F1	F2	F1	F2
1	.74		.67	
7	.68		.64	
4	.59		.61	.34
3	.56	.	.65	.46
6	.53		.60	.39
5	.46		.48	
8		.92	.33	.85
2		.77	.42	.79
9		.66	.48	.73

Note: only factor loadings > 0.30 are shown.

Table 4.3: Comparison of OCSE-N confirmatory factor analityc models: Goodness of Fit Statistics (N = 692).

Model	χ^2	df	CFI	AIC	RMSEA	90% RMSEA CI
M_0	1805,85	36	---	1823,85	.27	.26; .28
M_1	464,40	18	.75	500,37	.15	.14; .16
M_2	163,100	26	.92	201,10	.08	.07; .09

Note. CFI = comparative fit index; AIC = Akaike information criterions; RMSEA = root-mean-square error of approximation; M_0 = independence model (i.e., in which all correlations among variables are zero); M_1 = One factor model; M_2 = Two factor model.

The best relative fit was found for M2. The comparison of the fit indices suggested that the two-factor model was better than the alternative ones. Specifically, the χ^2 statistic was 163.10 based on 36 d.f., which was statistically significant. The CFI was 0.92, which is slightly higher than 0.90, the value typically considered as evidence of good fit (Hu & Bentler 1999). Similarly, RMSEA was 0.08, which falls within the cut-off points recommended by Hu and Bentler (1999), indicating acceptable model fit. Finally, the M2 model, given parsimony considerations, reported the lowest AIC. Examination of the modification

indexes (MIs) for clues to further model improvement demonstrated the error correlation between items 4 and 6 to be consistently large (MI = 24.61). However, as the M2 solution achieved an acceptable fit, and to avoid the acceptance of an overfitted model (Byrne 2001), we stopped including additional parameters. Among demographic differences, only age showed statistically significant differences with both scales: CSE to manage general nursing burden r = 0.14 (P < 0.001), CSE to manage the relational difficulties in the workplace r = 0.12 (P < 0.001).

Reliability

Cronbach alpha value estimates were satisfactory for the two subscales. For 'CSE to manage general nursing burden' alpha = 0.77; and for 'CSE to manage the relational difficulties in the workplace', alpha = 0.79.

Criterion-related validity

Table 4.4. shows the relationship of the OCSE-N factors with the CISS-SF dimension scores and the levels of burnout measured by the MBI. In accordance with our hypotheses, Pearson's correlation coefficients between the OCSE-N dimensions and both the MBI variables and CISS-SF dimensions were all statistically significant. The OCSE-N dimensions were positively associated with task coping strategies and negatively associated with both emotion-focused and avoidant strategies. The OCSE-N Scales also correlated with the burnout dimensions. They were negatively correlated with both emotional exhaustion and depersonalization, and positively associated with personal accomplishment. These patterns of correlations support the construct validity of the OCSE-N.

Table 4.4 Pearson correlations between OCSE-N scales and MBI dimensions (N = 1383).

	Burnout Dimensions			Coping Dimensions		
	Emotional Exhaustion	Depersonalisation	Personal Accomplishment	Task	Emotion	Avoidance
1. CSE general nursing burden	-.31**	-.25**	.21**	.08**	-.21**	-.08**
2. CSE about the relational difficulties on workplace	-.21**	-.19**	.22**	.07*	-.20**	-.09**

Note. * p < 0.05; ** p < 0.01;

4.4. Discussion

Study limitations

This study has limitations that should be acknowledged. First, reliance on self-report data may have biased the results. Gathering self-reports on coping strategies, self-efficacy beliefs and burnout in the same questionnaire could lead to artefacts such as priming and consistency effects associated with the bias of common method variance which is expected to inflate the correlations between measures in our questionnaire. However, James et al. (1979) suggested that claims of method variance have more legitimacy and support when there appears to be something operating that results in a general and a widespread spurious inflation of the obtained relationships. This would imply that if method variance is evident and problematic, the correlation matrix should reflect this tendency by showing consistently high correlations across variables. Inspection of the Table 4.4. suggests that such a general artificial inflating mechanism is not evident. Nevertheless, our findings need to be replicated with additional studies in this area using more objective reports of occupational strain (e.g. diastolic blood pressure, levels of serum lipids, serum uric acid levels, etc.) and job performance (measures of turnover, absenteeism). Second, the generalizability of our results may be limited because the study was based on a selection of healthcare organizations in Italy; hence, the results are not representative for Italy as such. However, consistent with previous research, we found that CSE beliefs and coping strategies were negatively related to burnout

dimensions. These outcomes offer some confidence that our sample and data were not greatly unrepresentative of other samples and data.

Factor structure and internal consistency.

We identified and tested the factor structure of the OCSE-N for two independent samples of randomly split data using EFA and CFA. Two different and correlated factors (r = 0.52) emerged that described the nurses' self-appraisals of their ability to cope with occupational demands: 'CSE to cope with the occupational burden' and 'CSE to cope with the relational difficulties in the workplace'. We found that the two-factor model fits significantly better than a single factor model, indicating the existence of an underlined bidimensional conceptual structure. Although a close inspection of MIs revealed one parameter representing correlated errors to account for misfit (between errors of items 4 and 6) we did not re-specify the model to avoid producing an overfitted solution. Indeed, following the suggestion of MacCallum et al. (1992, p. 501), 'when an initial model fits well, it is probably unwise to modify it to achieve even better fit because modifications may simply be fitting small idiosyncratic characteristics of the sample'. The subscales were shown to be empirically distinct; an attribute which is regarded as desirable in self-efficacy instruments (Bandura, 2001) because interpretation is greatly simplified. The subscales showed adequate internal consistency estimates (0.77 and 0.79).

Criterion-related validity of the OCSE-N.

As predicted, the OCSE-N dimensions are related to the CISS-SV dimensions. All OCSE-N scores gave statistically significant results: (i) negative correlations with both the emotion-oriented coping and the avoidance-oriented coping scores; (ii) positive correlations with the task-oriented coping score. In sum, the coping strategies viewed as less adaptive (i.e. emotion-oriented and avoidant coping strategies) were associated with fewer CSE beliefs and the opposite pattern was found between OCSE-N dimensions and the more adaptive coping strategies (i.e. task-oriented coping). These results are consistent with expectations based on previous research on adaptive personality traits and coping (e.g. Hewitt & Flett, 1997), and provide support for the construct validity of the OCSE-N.

The pattern of associations between the OCSE-N and MBI Scales provides additional support for the construct validity of the OCSE-N dimensions. Based on these results, it appears that, in line with the theoretical construct, nurses with weaker perceptions of CSE report more burnout symptoms (high emotional exhaustion and depersonalization, and lower personal accomplishment) than their colleagues feeling more confident with their ability to cope with occupational stressors. One may state that,

considering the sample size, the amount of variance shared by the variables is fairly weak. They are, however, comparable with those reported by other authors in studies measuring similar constructs. Perhaps the low-variance shared by CSE dimensions and burnout dimensions may depend on an indirect relationship. As we saw above, self-efficacy beliefs may influence behaviours that decrease the likelihood of increased environmental stress, thus indirectly affecting distress symptoms (Bandura, 1997).

Finally, it seems that occupational CSE occurs more frequently among older employees, who have more working beliefs and burnout in the same questionnaire could lead to artefacts such as priming and consistency effects associate with the bias of common method variance which is expected to inflate the correlations between measures in our questionnaire. However, James et al. (1979) suggested that claims of method variance have more legitimacy and support when there appears to be something operating that results in a general and a widespread spurious inflation of the obtained relationships. This would imply that if method variance is experience. This is in line with the observation that among healthcare workers positive states and job satisfaction are positively related to age and work experience (Swanson et al., 1996). However, a cautionary note should be added because survival bias cannot be ruled out: those with lower self efficacy beliefs and/or higher burnout early in their careers are likely to quit their jobs, leaving behind the survivors, who exhibit higher levels of self-efficacy.

Importance of occupational CSE beliefs

It should be noted that many other self-regulation models also incorporate the dimensions identified by the OCSE-N. Ford (1992) makes a distinction between capability and context beliefs. Capability beliefs refer to whether one has the personal skills needed to function effectively ('Will I be able to do sport daily?'). Context beliefs refer to whether one has the responsive environment needed to support goal attainment ('Will my colleagues support me to attain this goal?').

Kagitcibasi (1994) argued that autonomy and relatedness to others are dual human needs, and self-regulation theory must recognize the interaction and the need to synthesize the two characteristics to explain goal-oriented action and to promote optimal human functioning. Furthermore, the evaluation of the construct of perceived CSE should find benefits from recognizing a subject who engages in individual efforts to address (occupational) group-based needs and goals. Indeed, people do not function in a social vacuum '…the behaviour of one person influences the behavioural options of another in ways that are not random…Self-regulation simply proceeds with regard to the group as a system concept rather than to the self-image' (Carver & Scheier 1982, p. 131). Finally, the constructs detected by the OCSE-N are in accordance with the nursing perspective of Orem's Self-Care Deficit Theory (Orem 1995), which posits the concept of nursing agency as a central construct. It refers to the knowledge and skills possessed by

nurses and used to help others understand their self-care demands or to use their self-care agency. Nursing agency includes specific actions, teaching, or provision of a supportive environment. A self-care deficit exists when selfcare agency is less than that required to meet self-care requisites, and nursing agency is required to meet self-care demands.

Conclusion

Our findings suggest that nurses can have two basic and distinct CSE beliefs: beliefs about general occupational burden and beliefs about the relational difficulties in the workplace. They occur simultaneously to shape adjustment to occupational stress. In this regard, the OCSE-N may be useful in refining the stress-coping model; moreover, the theoretical and practical value of the occupational CSE construct could be evaluated also within stress management interventions among healthcare workers. Indeed, a particularly important area for future investigation will be the study of how efficacy evaluations shift as a result of specific stress management interventions.

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Appendix

Instructions and items content of the Occupational Coping Self Efficacy Questionnaire for Nurses (OCSE-N).

"The following statements describe occupational stressful situations which nurses may cope more or less easily. For each situation, please rate how confident you feel you can easily cope with it".....

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1) Difficulties with the patients;

2) Relational difficulties with your supervisor;

3) Insufficiently defined procedures

4) Relational difficulties with patient relatives

5) Difficulties in deciding how to do the work

6) Physical tiredness

7) To do a lot of tasks in the same time

8) Relational difficulties with colleagues

9) Relational difficulties with the others health care workers (physicians, etc).

Chapter 5. Occupational coping self efficacy increases the prediction of distress and well being in nurses beyond psychosocial job characteristics.

Abstract

The purpose of the present study was twofold: a) to test the core hypotheses of the Job Demand Control Support (JDCS) model, i.e. high job demands in combination with low job resources – control and social support - are associated with higher distress and lower mental well being (job satisfaction, burnout, psychological distress, and somatic complaints), and control and social support moderate the impact of high job demands on these outcomes; and b) to extend the model analyzing the direct and interactive role of occupational coping self efficacy beliefs. Questionnaire data from 1479 nurses (65% response) were analyzed.

Controlling for demographic variables, hierarchical regression analyses indicated that high demands, low job control and low social support additively predicted the distress/well being outcomes. Furthermore, some support for the buffering role of support on the impact of high job demands on well-being was found.

Occupational coping self efficacy (OCSE) accounted for substantial additional variance (2% to 6%) in all outcomes, after controlling for the JDCS variables. In addition, the results indicate that occupational coping self efficacy buffers the impact of low job control on distress. Low control was detrimental only for nurses with low occupational coping self-efficacy. Furthermore, we found a three way interaction among control, social support and OCSE in the prediction of emotional exhaustion: nurses with low levels of OCSE benefit from high control, and this effect is enhanced when social support is high as well. Nurses with high levels of OCSE are less emotionally exhausted regardless of their level of job resources. Limitations of the study and theoretical and practical implications are discussed.

Key Words: Job demand control support model; occupational coping self efficacy; burnout; psychological distress; job satisfaction; nurses

5.1. Introduction

Research suggests that nursing has become increasingly stressful, with levels of psychological distress exceeding those of general population norms (Gelsema, Maes, & Akerboom, 2007; Hasselhorn, Muller, & Tackenberg; 2005). The main purpose of the present study was to gain more insight in the relationships between occupational stressors, job resources, occupational coping self efficacy, and job-related and general psychological distress and well being in nurses.

The Job Demand-Control-Social Support Model

To study the impact of occupational stressors on occupational and general psychological distress/well being, the Job Demand Control-Social Support (JDCS) model is regarded as a useful conceptual framework (Karasek & Theorell, 1990).

The original version of the model assumes two basic hypotheses of how certain work variables, job demands (e.g., time pressure) and control (e.g., decision authority and skill discretion), may combine and lead to various well-being outcomes: (1) the strain hypothesis which assumes additive effects of both: high job demands precipitate job strain, as does low job control (main effects); (2) the buffer effect: job control has a moderating effect on the relationship between job demands and job strain (buffer hypothesis). Later, social support from co-workers and supervisors was added to the model (Johnson & Hall, 1988) as a second job resource. Similar to job control, social support may influence distress and well being via two pathways (Cohen and Wills, 1985). One suggests that social support has a direct effect on distress/well being outcomes regardless of whether employees experience high levels of job demands or not; the second suggests that support has a beneficial effect specifically for individuals who perceive high levels of stressors. The 'buffer hypothesis' of the JDCS model states that social support decreases the negative impact of high demands and low control on well-being.

A number of reviews (de Lange, Taris, Kompier, Houtman, & Bongers, 2003; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; van der Doef & Maes, 1999) examined whether job demands, job control and social support combine additively ((iso)strain hypothesis) or interactively to explain well-being. They indicated that the (iso) strain hypothesis has been tested more often than the buffer hypothesis and that it has received considerable support, whereas, the studies testing the buffer hypotheses show more inconsistent results. This conclusion was supported in a review on JDC(S) variables and distress/well being focussing specifically on nurses (Gelsema, Maes, & Akerboom, 2007). These authors, in line with

other researchers (de Lange et al., 2003; de Jonge, van Vegchel, Shimazu, Schaufeli, & Dormann, 2010; van Vegchel, de Jonge, & Landsbergis, 2005) indicate that the lack of support for the buffer hypotheses of the model could be attributed to the use of general scales to assess the JDCS dimensions. Occupation-specific measures might be required to adequately examine the moderating effect postulated by the JDCS model. Therefore, in the present study a measure developed with the specific purpose to assess nurses' job characteristics was used.

An alternative explanation for the inconsistent support for interactive effects is the presence of conjunctive moderator variables, such as individual differences related to the work stress process (Semmer, 2003; van der Doef & Maes, 1999). Indeed, a number of studies have found support for the notion that the impact of the psychosocial job characteristics is dependent on personal variables (see e.g., Parkes, 1994; Semmer, 2003). As such, job situations are not inherently stressful for all employees, and psychological, physical and/or behavioral responses to stressors are the result of the interaction between the individual and the situation (Sutherland & Cooper, 1988). Mounting evidence supports the utility of cognitive appraisal theories in the examination of the process of adjustment to occupational stress (e.g., Jex, Bliese, Buzzell, & Primeau, 2001; Nauta, Liu, & Li, 2010).

In the light of the above considerations, the central aims of the present study are (1) to test the basic assumptions of JDCS model using an occupation-specific operationalization of its dimensions, and (2) to investigate the direct and moderating effects of a personal factor likely to impact the adjustment process, namely occupational coping self efficacy beliefs.

Occupational Coping Self Efficacy

One factor that has been shown to influence the response to negative events such as occupational stressors is self-efficacy (Bandura, 1997). Self-efficacy refers to the belief an individual has in his or her ability to execute a task and thus to obtain the desired outcome (Bandura, 1997). Self efficacy beliefs can determine whether people will invest effort and how long they will persist in their effort in the face of obstacles and aversive experiences. Research has shown that individuals who believe themselves to be efficacious in confronting particular threatening situations had reduced autonomic arousal and stress reactions in those circumstances, while their distress increased in situations where they had low self-efficacy beliefs (Bandura, 1997; Schwarzer, 2003).

To our knowledge, a limited number of studies have attempted to extend the JDCS assumptions by including self efficacy beliefs. Schaubroeck and colleagues found that only among workers with high job related self-efficacy job control moderated the negative effect of high demands on blood pressure

(Schaubroeck & Merritt, 1997) and on chronic symptoms of upper respiratory infections (Schaubroeck, Jones & Xie, 2001). For those low in self efficacy, high job control combined with high job demands was associated with negative health consequences, a finding that is in contrast with predictions derived from the JDC model. A more recent study (Meier, Semmer, Elfering & Jacobshagen, 2008) tested the three-way interaction hypothesis (Demand x Control x Self efficacy) in a sample of 96 service employees, with affective strain and musculoskeletal pain as dependent variables. The interaction was significant only with regard to affective strain. Similar to Schaubroeck and Merrit's findings, the predicted buffering effect of high job control on the impact of job demands was found for those high on self efficacy, whereas high job control tended to increase the affective strain attributable to job demands for those low in self efficacy. Likewise, in a longitudinal study conducted in a sample of 100 customer service representatives, Jimmieson (2000) only found evidence for the buffer role of job control on the impact of role conflict on depersonalization among individuals with high job self efficacy. For the other three dependent variables of the study (psychological well-being, job satisfaction, and somatic health), however, no moderating effect of self efficacy was found. Finally, Salanova, Peiro, and Schaufeli (2002) attempted to extend the JDC model, examining two alternative dimensions of self efficacy, generalized self-efficacy and task-specific (computer) self-efficacy, in a group of 405 workers using information technology in their jobs. They found a three-way interaction with both self-efficacy measures in predicting the burnout dimensions exhaustion and cynicism. However, only for task specific self-efficacy the results were in line with the prediction: job control buffered the effects of job demands on burnout among workers with high task specific self efficacy, and it had stress-enhancing effects among those with low task specific self efficacy. The authors pointed out the importance of considering domain specific areas of self efficacy in occupational stress research, and suggested that the assessment of self efficacy beliefs should be tailored to the particular domain of functioning that is the object of interest.

Taken together, the results of these studies suggest that job control buffers the negative impact of job demands mainly for employees with high job related self efficacy. For efficacious employees, facing demanding situations with a lack of job control could be particularly harmful. On the other hand, employees with low self efficacy may find job control stressful because having high control forces them to assume control that they feel unprepared to use (Litt, 1988).

So far, research on self-efficacy in the occupational context has not included social support, which is surprising from a JDCS perspective. Social support may be regarded as a workplace resource provided by others, as coping assistance or as an exchange of resources. In line with the findings concerning job control, one could postulate that the extent to which the job resource social support acts as a buffer is dependent on the employees' self-efficacy beliefs. Employees with high self-efficacy may make more

proper use of the social support offered in dealing with the demands of the job, whereas for employees' with low self-efficacy high social support might not be regarded as a resource which can help them in dealing with existing occupational stressors. For this latter group of employees, high social support might even be harmful in the sense that it underscores their idea that they are not capable to handle the situation by themselves.

Finally, it must be noted that in only one study (Salanova, Peiro & Schaufeli, 2002) significant main effects of both generalized and task-related self efficacy were found. In this study, both self-efficacy measures were negatively related to exhaustion, whereas only computer self-efficacy was significantly associated with cynicism.

The focus of this study is on a specific type of self efficacy: occupational coping self efficacy (OCSE). It is an occupational version of coping self efficacy beliefs that refer to an individual's beliefs about one's ability to cope with external stressors (Bandura, Taylor, Williams, Mefford, & Barchas, 1985). Several studies have pointed at the central role of coping self efficacy (CSE) in helping individuals to recover from traumatic, stressful, and threatening events (for example, phobias, natural disasters, military combat, criminal and sexual assault (Bandura, 1997; Benight & Bandura, 2004). High CSE has been related with a better psychological adjustment to highly stressful life changes and events such as aging (Kraaij, Garnefski, & Maes, 2002), chronic disease (HIV-seropositive, Chesney, Neilands, Chambers, Taylor, & Folkman, 2006), natural disaster (Benight et al., 1999), peer aggression among adolescents (Singh and Bussey, 2009), and physical assault (Ozer & Bandura 1990).

Overall, these results suggest that positive self evaluative beliefs as CSE have direct effects on distress/well being outcomes, beyond the impact of external stressors. A high level of coping self-efficacy tends to create an adaptive approach leading individuals to view tasks or situations that require high efforts as challenging and as positive experiences. Whereas, when CSE perceptions are low, it is more likely that individuals perceive the same tasks or situations as stressful and greater energy is directed to manage the increasing emotional distress (Bandura, 1997).

At present, to our knowledge, no published studies have looked at the relationship between occupational coping self-efficacy and distress/well being dimensions. Only Schwarzer (2003), in a theoretical paper argued that the stronger one's perceived efficacy to cope with occupational stressors, the more proactive and persistent one's efforts will be in dealing with the demands (*proactive coping*). Therefore, on the basis of these considerations, in the present research we explore the direct and moderating effect of occupational coping self efficacy on distress/well being.

The Present Study

In order to examine employee well-being comprehensively, outcome variables from several distress/well being dimensions were included in the study, namely burnout (cognitive motivational and affective dimensions), psychological distress, somatic complaints (physical and affective components), and job satisfaction (cognitive and motivational dimension).

The following four hypotheses are examined:

H1): High job demands, low control and low social support are related to high burnout, high psychological distress and somatic complaints, and low job satisfaction (additive or iso-strain hypothesis);

H2): Job control and social support moderate the negative impact of job demands on occupational and general psychological distress/well being (buffer hypothesis);

H3) Occupational coping self efficacy accounts for substantial additional variance in employee on occupational and general psychological distress/well being, after controlling for demographic variables and job dimensions. Higher levels of occupational coping self-efficacy are associated with lower distress and higher well being;

H4) The buffering effect of control on the impact of high demands on distress/well-being is only observed in individuals with higher levels of occupational coping self efficacy (H4a), conversely it is hypothesized that job control acts as a stress exacerbator in individuals with lower levels of occupational coping self efficacy (H4b).

Finally, the interaction effects of social support and occupational coping self efficacy will be explored, given the lack of research providing directions for hypotheses.

5.2. Method

Sample and procedure

From 9 Italian public health care organizations, 2292 nurses were randomly selected. Of this initial sample, 1509 nurses agreed to take part in the study. They were contacted at their workplace and received a questionnaire and an accompanying letter in which they were invited to participate in the study. Data were anonymously gathered and the voluntary nature of the study was emphasized. The research was approved by national and regional ethics committees. Informed consent was obtained from all

participants. They were asked to leave their completed questionnaires in a sealed box. Incomplete questionnaires were excluded, resulting in a final sample of 1479 nurses (65% response rate).

The mean age of the respondents was 39.2 years ($SD = 8.4$); 22.8% ($n = 337$) were men and 77.2% ($n = 1142$) were women. The mean tenure in the nursing profession was 15.5 years ($SD = 9.2$), 49% worked in medical and surgical wards, 20% worked in emergency wards, and 31.7% were community nurses.

Measures

The study variables are divided into four sections: socio-demographic variables, JDCS variables, occupational coping self efficacy, and distress/well-being outcomes.

- *Background variables*. Age was measured in years and gender was categorized as 1 = male and 2 = female.

- *JDCS variables*. These variables were measured with three scales of the validated Italian version of the Leiden Quality of Work Life Questionnaire for Nurses (LQWLQ-N: Maes, Akerboom, van der Doef, & Verhoeven, 1999; Pisanti *et al.*, 2009). These three LQWQ-N scales provide an occupation-specific measurement corresponding closely to the original operationalisation of job demands, control, and social support in the Job Content Instrument (JCI; Karasek, 1985). Job demands were measured with one scale (work and time pressure: 4 items; e.g. "I must care for too many patients at once"). Control was measured with two scales: skill discretion (4 items; e.g. "My work is varied.") and decision authority (4 items; e.g. "I can decide for myself when to carry out patient-related tasks and when to carry out non-patient-related tasks."). Social support was assessed with two scales: social support from supervisor (6 items; e.g. "I can count on the support of my direct supervisor when I face a problem at work.") and social support from co-workers (6 items; e.g. "The nurses in my department work well together."). Responses are measured on a 4-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*).

- *Occupational Coping Self-Efficacy of Nurses*. The specific occupational coping self efficacy beliefs for nurses were measured using OCSE-N (Occupational Coping Self-Efficacy scale for Nurses; Pisanti, Lombardo, Lucidi, Lazzari, & Bertini, 2008). It consists of nine items with a 5-point Likert type scale (1 'not at all easy to cope with' to 5 'extremely easy to cope with'). Instructions were given as follows: 'the following statements describe occupational stressful situations which nurses may cope more or less easily with. For each situation, please rate how confident you feel you can easily cope with it' (e.g., "Doing a lot of tasks at the same time"; "Relational difficulties with colleagues"). For this study, the two scales 'Coping Self-Efficacy to cope with the occupational burden' and 'Coping Self-Efficacy to cope with the relational

burden' ($r = .61$) were combined to form a single measure of occupational coping self efficacy for nurses, with a Cronbach's alpha of .83.

- *Distress/Well-being outcomes.* Two categories of outcomes were assessed: general and occupational distress/well-being. General distress outcomes were assessed with three scales from the Italian version (Violani & Catani, 1995) of the Symptom Checklist (SCL-90; Derogatis, 1983): anxiety (10 items, e.g. "feeling afraid"), depression (16 items, e.g. "feeling lethargic") and somatization (12 items, e.g. "headache"). Respondents indicated to what extent they had experienced each symptom over the past week. Answers were provided on a 5-point scale (1 = *not at all*; 5 = *very much*). Because the scales of anxiety and depression showed a high correlation ($r > .70$), the items comprising the two scales were combined to form a single measure of psychological distress. Job satisfaction and burnout were assessed as indicators of occupational distress/well being. Job satisfaction was operationalised with the seven-item of LQWLQ-N scale (e.g., "I am satisfied with my job"). Burnout was assessed by the Italian version (Sirigatti & Stefanile, 1991) of the 22-item Maslach Burnout Inventory (MBI; Maslach, Jackson & Leiter, 1996) which contains the three subscales: emotional exhaustion (9 items; e.g. "I feel frustrated by my job"); depersonalisation (5 items; e.g. "I don't really care what happens to some patients") and personal accomplishment (8 items; e.g. "I feel very energetic"). Participants were asked to rate from 0 (never) to 6 (daily) how often they experienced feelings described in each of the 22 items.

Data analysis

Descriptive statistics and Pearson's correlations were assessed. The hypotheses of the study were tested in a series of hierarchical regression analyses. Firstly, we controlled for the variables gender and age, because these demographic variables were correlated with both predictors and outcomes under study. In the second block we entered the main effects of the JDCS dimensions: job demands, control and social support; subsequently, the two way (third block) and three way interactions (fourth block) of the JDCS variables were included. Next, the main effect of OCSE was entered (fifth block); followed by the two way (sixth block), three way (seventh block) and four way (eighth block) interactive terms of OCSE with the JDCS variables. In the final analyses, a more parsimonious model was examined, including all main effects, the significant interactions, and those non-significant interactions that need to be included in the model in order to adequately test the higher order interactions (Cohen, Cohen, Aiken & West, 2003).

In all regression analyses the JDCS dimensions and OCSE were standardized to avoid multicolinearity that might otherwise result from the use of multiplicative terms (Cohen et al., 2003). Graphical presentation of the significant interactions is based on the regression coefficients of the

regression lines for employees high (1 *SD* above the mean) and low (1 *SD* below the mean) on the moderator variable, and taking into account the lower order interaction between predictors.

5.3. Results

Preliminary analyses

The zero-order correlations of the variables, and their means, standard deviations and reliabilities (Cronbach's α) are presented in Table 5.1. All scales measuring the study variables display acceptable to good reliability (alpha coefficients ranged from .70 to .94).

The correlations between the JDCS variables and the dependent variables are all significant and in the expected direction.

Table 5.1. Means (*M*), Standard Deviations (*SD*), Internal Consistencies (Cronbach's *α*), and Zero-Order Correlations of the Study Variables (*N* = 1479).

Variable	M	SD	α	1	2	3	4	5	6	7	8	9	10	11
Background variables														
1) Gender[a]	----	----	----	----										
2) Age	39.2	8.4	----	.01	----									
Job conditions														
3) Demands	2.9	0.7	.74	.01	-.03	----								
4) Control	2.8	0.6	.74	.02	-.01	-.05	----							
5) Social Support	2.8	0.6	.87	-.00	-.00	-.05	.44***	-----						
Personal Variable														
6) Occupational Coping Self-Efficacy	3.0	0.7	.83	-.00	.17***	-.12***	.28***	.34***	----					
Distress / Well Being Outcomes														
7) Emotional exhaustion	19.9	12.1	.89	.05	.05*	.19***	-.22***	-.26***	-.30***	---				
8) Depersonalization	4.4	5.1	.70	-.11***	-.04	.11***	-.18***	-.19***	-.25***	.39***	----			
9) Personal accomplishment	36.2	8.8	.85	.02	.13***	-.13***	.25***	.19***	.22***	-.19***	-.33***	----		
10) Psychological distress	70.9	23.1	.94	.17***	.10**	.12***	-.18***	-.19***	-.23***	.52***	.31***	-.22***	----	
11) Somatic complaints	25.0	8.6	.84	.15***	.09**	.17***	-.15***	-.22***	-.22***	.51***	.19***	-.14***	.65***	----
12) Job satisfaction	17.1	3.8	.72	-.01	.03	-.20***	.42***	.44***	.35***	-.44***	-.23***	.28***	-.26***	-.26***

[a] Male = 1; Female = 2

*p < .05; **p < .01; ***p <.001

Occupational coping self efficacy is associated both with the JDCS variables and all dimensions of distress/well being. More specifically, higher occupational coping self efficacy is associated with higher job control, social support, personal accomplishment and job satisfaction, and with lower job demands, emotional exhaustion, depersonalization, psychological distress and somatic complaints.

Hierarchical regression models

a) Testing the additive and interactive effects of the JDCS Model

Table 5.2. presents the results of the hierarchical regression analyses in which burnout components, job satisfaction, psychological distress and somatic complaints were regressed on the psychosocial job characteristics and occupational coping self efficacy.

In line with the iso-strain hypothesis (Hypothesis 1), the analyses show consistent additive effects of the psychosocial work dimensions on all outcomes. Higher job demands, lower control and lower support are associated with higher levels of emotional exhaustion (F *change* (3, 1144) = 52.7, p <.001, ΔR^2 = 12%), depersonalization (F *change* (3, 1143) = 24.4; p <.001, ΔR^2 = 6%), somatic complaints (F *change* (3, 1106) = 33.3, p <.001, ΔR^2 = 8%), and psychological distress (F *change* (3, 1134) = 32.7, p <.001, ΔR^2 = 8%). Furthermore, analyses on the positive outcomes show that lower levels of job demands, higher levels of control and higher levels of social support are related to higher levels of job satisfaction (F *change* (3, 1144) = 148.1, p <.001, ΔR^2 = 28%), and personal accomplishment (F *change* (3, 1101) = 35.5, p <.001, ΔR^2 = 9%).

With regard to the second hypothesis focussing on the moderating effects of control and social support, analyses show three significant interaction effects: job demands x control in the prediction of job satisfaction and emotional exhaustion, and job demands x social support in the case of depersonalization. However, job control did not show the hypothesized buffer effect, as job control was more beneficial for well-being in a *low* job demands situation (see Figures 1 and 2).

Social support did show the hypothesized effect, buffering the negative effect of job demands on depersonalization (B = -.05; p < .05) (see Figure 3).

However, no evidence for the hypothesized three-way interaction of demands, control, and support was found. Thus we can conclude that Hypothesis 2 receives limited support: only social support emerged as a moderator of the impact of high demands on depersonalization.
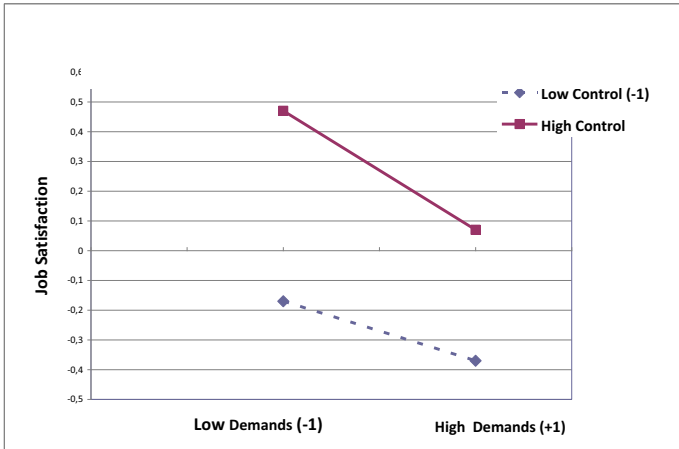
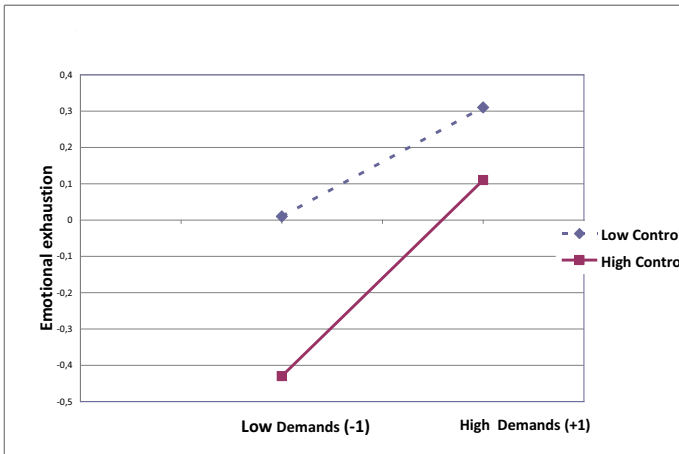*Figure 1.* Job demands X Job control, predicting Job Satisfaction (p < .05)

Figure 2. Job demands X Job control, predicting Emotional Exhaustion (p < .05)

Table 5.2. Health and well-being outcomes regressed on socio-demographic variables (age, gender), the JDCS variables, Occupational Coping Self-Efficacy, and their interactions. The unstandardized regression coefficients (B's) are reported (N = 1479).

Predictors	*JS*	*EE*	*DP*	*PA*	*SC*	*PD*
Gender (1 = M; 2 = F)	.01	.06*	-.13***	-.01	.15***	.15***
Age	.03	.06	-.05	.18***	.08**	.11***
Block 1 ΔR^2	.001	.007*	.018***	.031***	.030***	.033***
Gender (1 = M; 2 = F)	.02	.06*	-.13***	-.02	.16***	.15***
Age	.04	.05	-.05	.18***	.08**	.10***
Demands	-.16***	.21***	.09***	-.07**	.20***	.12***
Control	.29***	-.14***	-.10***	.21***	-.07*	-.14***
Social support	.31***	-.19***	-.13***	.10***	-.16***	-.13***
Block 2 ΔR^2	.279***	.121***	.059***	.086***	.081***	.075***
Gender (1 = M; 2 = F)	.02	.06*	-.13***	-	-	-
Age	.04	.05	-.05	-	-	-
Demands	-.17***	.21***	.09***	-	-	-
Control	.30***	-.16***	-.10***	-	-	-
Social support	.31***	-.18***	-.13***	-	-	-
Demands x Control	-.06*	.06*	-	-	-	-
Demands x Social support	-	-	-.05*	-	-	-
Control x Social support	-	-.01	-	-	-	-
Block 3 ΔR^2	.003*	.004	.004*	-	-	-
Gender (1 = M; 2 = F)	.02	.06*	-.13***	-.02	.15***	.15***
Age	.00	.10***	-.01	.16***	.11***	.14**
Demands	-.15***	.19***	.07**	-.06**	.18***	.11***
Control	.27***	-.12***	-.08**	.18***	-.04	-.11***
Social support	.25***	-.11***	-.07*	.06+	-.10***	-.07*
Demands x Control	-.06*	.06*	-	-	-	-
Demands x Social support	-	-	-.06*	-	-	-
Control x Social support	-	-.01	-	-	-	-
OCSE	.20***	-.26***	-.18***	.15***	-.21***	-.21***
Block 4 ΔR^2	.034***	.059***	.036***	.023***	.039***	.043***
Gender (1 = M; 2 = F)		.06*	-.13***		.15***	.15***
Age		.10***	-.01		.12***	.14**
Demands		.19***	.07**		.18***	.10***
Control		-.11***	-.07**		-.03	-.11***
Social support		-.10***	-.07*		-.10**	-.06*
Demands x Control		.06*	-		-	-
Demands x Social support		-	-.06*		-	-
Control x Social support		-.06*			-	-
OCSE		-.29***	-.20***		-.22***	-.22***
Control x OCSE		.15***	.08**		.07**	.07**
Social support x OCSE		.02			-	-
Block 5 ΔR^2		.021***	.008** (.12)		.006**	.006*

Table 5.2. (Continued).

Predictors	JS	EE	DP	PA	SC	PD
Gender (1 = M; 2 = F)		.06*				
Age		.10***				
Demands		.19***				
Control		-.13***				
Social support		-.12***				
Demands x Control		.06*				
Control x Social support		-.05*				
OCSE		-.31***				
Control x OCSE		.15***				
Social Support x OCSE		.01				
Control x Social Support x OCSE		.05*				
Block 6 ΔR^2		.003*				
R^2 final model (Adj R^2)	.318*** (.314)	.215*** (.208)	.12 (.10)	.139*** (.134)	.156*** (.151)	.158*** (.153)

* p < .05; **p < .01; *** p < .001; OCSE = Occupational Coping Self-Efficacy; Block *n* ΔR^2: *R* Square Change.
Note: The three way interaction Demands x Control x Social Support, the two way interaction Demands x OCSE, the three way interaction Demands x Control x OCSE and Demands x Social Support x OCSE, and the four way interaction Demands x Control x Social Support x OCSE were consistently non-significant and therefore omitted in the final analyses.
JS: Job satisfaction; EE: Emotional exhaustion; DP: Depersonalization; PA: Personal accomplishment; SC: Somatic complaints: PD: Psychological distress.

b) The role of occupational coping self efficacy

In line with Hypothesis 3, occupational coping self efficacy (OCSE) explained a significant proportion of the variance in all outcomes beyond the socio-demographic and JDCS variables. More specifically, OCSE explained the highest additional variance, 6%, for emotional exhaustion (*F change* (1, 1130) = 81.8, *p* < .001), followed by 4% for depersonalization (*F change* (1, 1142) = 45.2, *p* < .001), psychological distress (*F change* (1, 1151) = 58.3, *p* < .001), and somatic complaints (*F change* (1, 1120) = 51.1, *p* < .001), 3% for job satisfaction (*F change* (1, 1143) = 57.1, *p* < .001), and 2% for personal accomplishment (*F change* (1, 1100) = 29.0, *p* < .001). As expected, lower OCSE was consistently associated with higher distress and lower well-being.
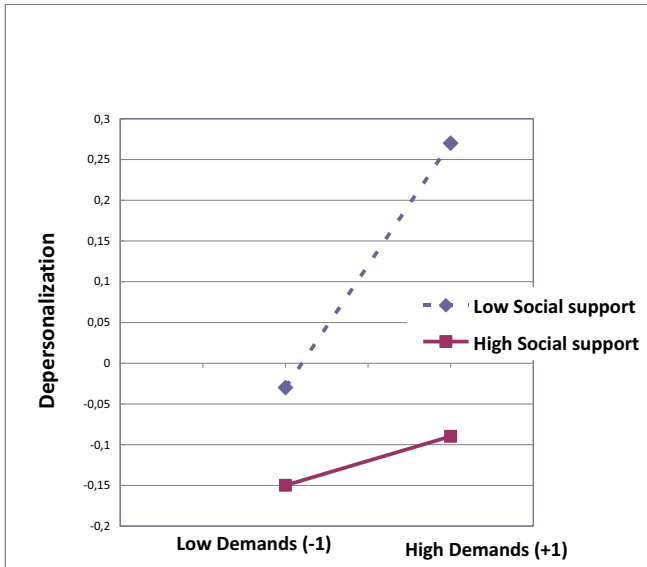
Figure 3. **Job demands X Social Support, predicting Depersonalization (p < .05)**

As described in Table 5.3. the regression analyses yielded significant two way interactions between OCSE and job control in predicting emotional exhaustion (B = .15, p < .001), depersonalization (B = .08, p <.01), psychological distress (B = .07, p <.01), and somatic complaints (B = .07, p <.01). The interactions accounted for 2% of the added variance in the case of emotional exhaustion; and 1% in the other instances. As depicted in the Figures 4 - 6, the nature of the interaction is similar: high OCSE moderates the harmful effects of low control on the outcomes, whereas for nurses with low OCSE, lower levels of control are associated with higher distress.
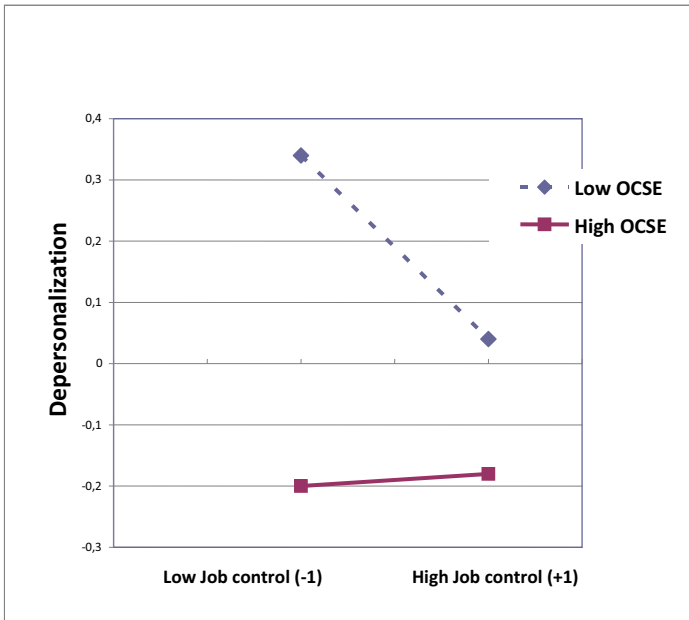
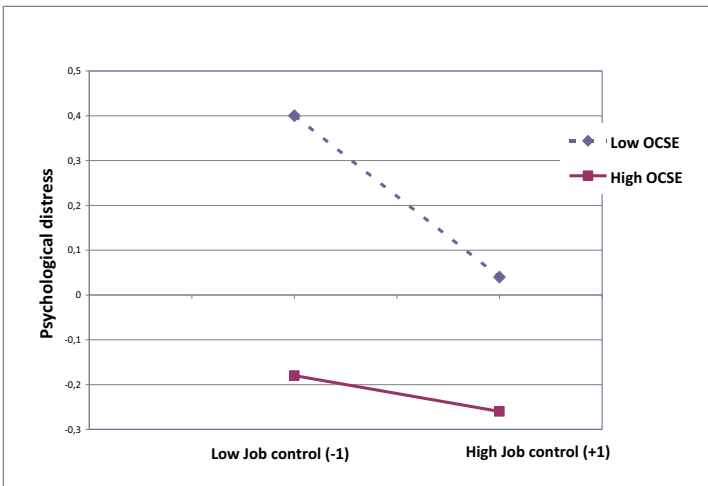*Figure 4.* Job control X OCSE, predicting depersonalization (p < .01)

Figure 5. Job control X OCSE, predicting psychological distress (p < .01)
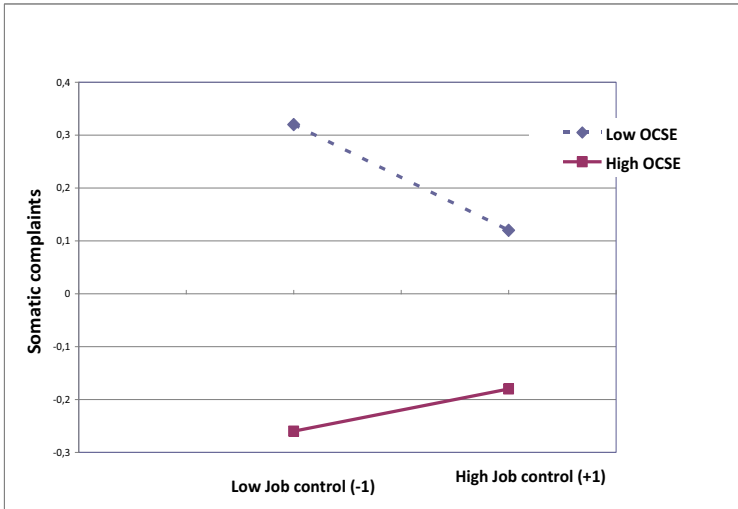
Figure 6. Job control X OCSE, predicting somatic complaints (p < .01)

Furthermore, a significant three way interaction of job control, social support and OCSE on emotional exhaustion ($B = .05$, $p < .05$) was found. This interaction is illustrated in Figure 7a and 7b, depicting the effects of demands and control on emotional exhaustion separately for low OCSE (-1 *SD*) employees and high OCSE (+ 1 *SD*) employees. It becomes evident that nurses with high OCSE score low on emotional exhaustion regardless of their levels of job control and social support. For nurses with low OCSE, high control is associated with lower emotional exhaustion; this effect is amplified when these nurses also experience high levels of social support.

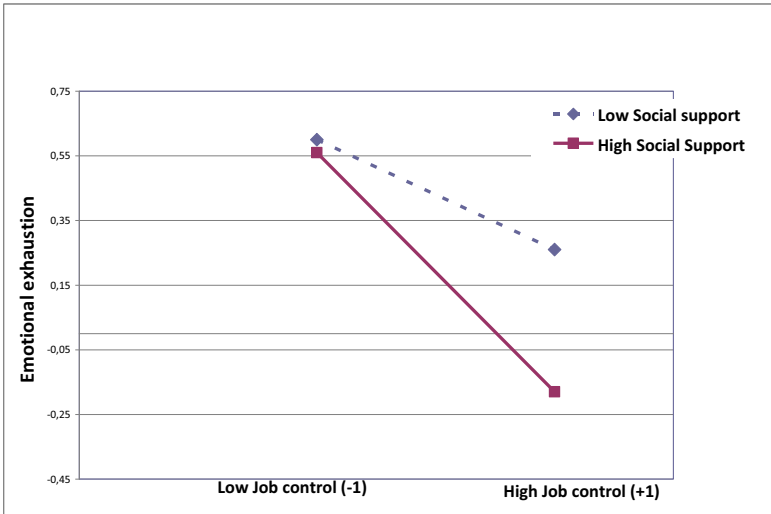*Figure 7a.* Job control X Social support X OCSE, predicting emotional exhaustion in low OCSE (p < .05)
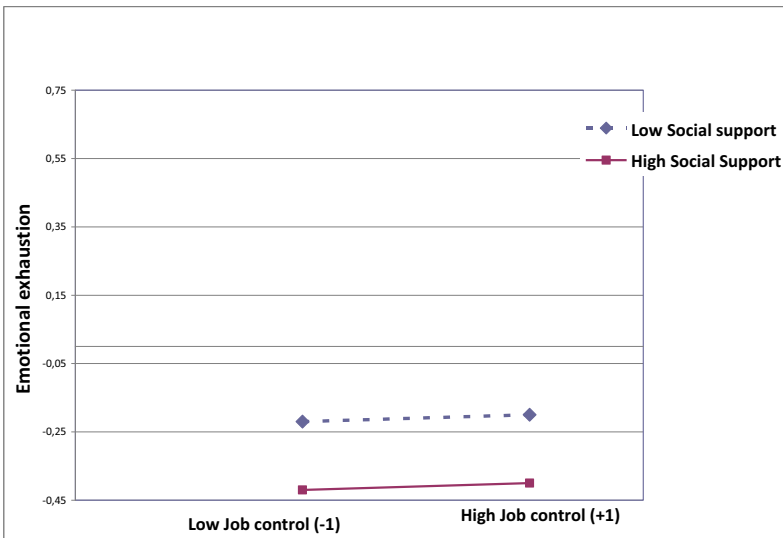

Figure 7b. Job control X Social support X OCSE, predicting emotional exhaustion in high OCSE (p < .05)

5.4. Discussion

In the present study we aimed to investigate the relationships between occupation-specifically assessed psychosocial job dimensions and job-related and general distress/well-being

in nurses, focusing on both the additive and interactive hypotheses of the Job Demand-Control-Support (JDCS) model; and on the direct and moderating role of a personal variable, occupational coping self efficacy, in this context.

Firstly, it was hypothesized (Hypothesis 1) that job demands, job control and social support would be additively associated with distress/wellbeing. Further, it was examined whether the job resources - control and social support - moderated the impact of high demands on the outcomes under study (Hypothesis 2). With regard to Hypothesis 1, we found full support for the additive hypothesis across outcomes. These findings are in line with previous research on nurses (e.g., Sundin, Hochwalder, Bildt, & Lisspers, 2007). Also in line with previous research (e.g., Bakker, Le Blanc, & Schaufeli, 2005; Rodwell, Noblet, Demir, & Steane, 2009) job satisfaction and personal accomplishment are more strongly related to the job resources control and support, whereas job demands and support are more strongly associated with emotional exhaustion, and somatic complaints. For depersonalization and psychological distress, demands, control, and support seem to play a more equal role.

Examining the buffer hypothesis, we found significant two-way interactions between demands and control, in the prediction of job satisfaction and emotional exhaustion. In both cases, in contrast to expectations, high job control was more beneficial in the case of *low* demands. These results are in line with the findings from previous studies among nurses (Proost et al., (2004) and human service employees (van Vegchel et al., 2004), showing that employees working in the active jobs suffer from almost equally high levels of emotional exhaustion and low levels of job satisfaction as their counterparts in the high strain condition. As suggested by van Vegchel and colleagues (2004), it seems that in the condition of low demands, job control may be more useful to deal with the occupational stressors than in the case of high demands. In this latter condition, having high control is not of much use because one cannot exert the control in order to deal with the demands.

We also found a significant two-way interaction effect between job demands and social support on depersonalization. This moderating effect was in line with Cohen and Wills (1985)' hypothesis: high social support buffers the negative impact of high job demands on depersonalization. Also this result was found in the study by Proost et al. (2004). Depersonalization represents a sort of attitudinal response to chronic demands and refers to an unfeeling and impersonal response towards the patients in one's care or service. The findings suggest that within a highly demanding situation in terms of patient care, positive social

interactions with their stable social work environment (i.e. colleagues and supervisor) can shield nurses from developing this defense mechanism of emotional detachment from their patients.

We did not find any support for the combined moderating effect of job control and support (three-way interaction effect). In a commentary paper, Taris (2006) concluded that the buffer hypothesis was fully supported in only 10% of the tests conducted to test this interaction, little more than chance level. The current study, despite its occupation-specific assessment of demands, control, and support, yields similar limited support for the buffer hypothesis.

Our third hypothesis stated that high levels of occupational coping self efficacy would exert a direct positive effect on nurses' well-being. The findings provided consistent support for this notion. After taking into account the socio-demographic and JDCS variables, occupational coping self efficacy explained substantial additional variance (2% to 6%) in all six indicators of wellbeing/distress under study. All relationships were in the predicted direction: occupational coping self efficacy was negatively related to all distress variables (emotional exhaustion, depersonalization, psychological distress and somatic complaints) and positively related to both positive outcomes (job satisfaction and personal accomplishment). As mentioned in the introduction, only Salanova, Peiro & Schaufeli (2002) found consistent associations between a specific measure of self efficacy (Computer Self Efficacy) and burnout dimensions regardless of the levels of JDCS variables. These and our findings lend support to the notion that it is important to measure self efficacy related to the specific tasks employees have to deal with in their work context in order to gain insight into employee well-being and distress. Individuals with higher levels of OCSE are more likely to interpret occupational situations as challenging tasks. As a result, they may be more likely to invest more effort to effectively deal with a less favourable work situation, thereby reducing the potential for development of negative affective outcomes (Bandura, 1997).

Furthermore, we examined the moderating role of occupational coping self efficacy in the relationship between psychosocial job characteristics and nurses' distress/well being. Hypothesis 4 stated that job control would act as moderator of high levels of job demands only for employees with high levels of OCSE, whereas high levels of job control would act as a stress exacerbator for nurses with low levels of OCSE. There was no support for these propositions. Job control did not emerge as a moderator of the impact of job demands, not for the whole sample as mentioned previously, and neither for specific subgroups in terms of OCSE. We found however evidence suggesting that occupational coping self efficacy buffers the negative impact of *lack of job control* on distress. In other words, especially for nurses with low OCSE lower job

control was associated with higher levels of distress. This finding is quite in contrast to the expectation that for employees with low OCSE high job control would be stress-enhancing (see e.g., Litt, 1988). So, our study indicates that believing that a situation is uncontrollable does not always lead to an increase in distress. The appraisal of both external coping resources (job control) *and* internal coping resources (OCSE) as low seems to put employees at risk for distress, regardless of their level of demands. Furthermore, the results suggest that OCSE as an internal resource can compensate the lack of external job resources, in this case job control.

Finally, we found a significant three way interaction between OCSE, job control, and social support in predicting emotional exhaustion. High levels of OCSE are consistently associated with lower levels of emotional exhaustion regardless of the levels of support and control. Nurses with low levels of occupational coping self efficacy, however, seem to require high job control to attenuate emotional exhaustion – an effect that is strengthened when they perceive their working environment as supportive. In other words, whereas the internal resource of high OCSE seems sufficient to protect nurses from becoming emotionally exhausted, nurses who lack this internal resource seem to require substantial compensating external resources (job control and social support) to stay emotionally fit. Again, a finding in contrast with the notion that for employees with low OCSE, high job control would be stress-enhancing.

The interactive effects in the current study add, albeit significant, a limited proportion to the explained variance in the outcomes under study. This is generally the case in regression analyses, due to the amount of variance already explained by the main effects of the predictors. However, as indicated by for instance Wall, Jackson, Mullarkey, & Parker (1996), this does not indicate that the moderating effect has limited theoretical and practical implications. The variance explained in a subgroup can be quite large even when the overall effect is small. In our study, for instance, for the high OCSE employees the level of control had virtually no impact on emotional exhaustion, depersonalization, psychological distress, and somatic complaints. However, for employees with low OCSE low control was an important predictor for these outcomes. To illustrate, for the subgroup of nurses with low OCSE (< -1.0 *SD*) low job control was a strong predictor ($R^2 = .10$, $B = -.34$, $p < .001$) for emotional exhaustion, whereas for the subgroup of nurses with high OCSE ($> + 1.0$ *SD*), job control failed to predict emotional exhaustion ($R^2 = .01$, $B = .09$, $p > .05$)

The findings of the present study have a number of theoretical and practical implications. The most important theoretical implication stems from the fact that in the explanation of general and occupational indicators of nurses' distress and well-being, we found support for both additive

and interactive effects of job stressors, job resources and occupational coping self efficacy beliefs. It suggests that the impact of psychosocial job characteristics on distress and well-being is also affected by the individuals' coping self-efficacy beliefs.

A practical implication of the present study is that, besides focusing organisational interventions on the reduction of demands, and enhancement of control and support, enhancing nurses' coping self-efficacy beliefs may have beneficial effects on their distress and well-being levels. Coping self-efficacy beliefs are directly amenable to intervention (Bandura, 1997). There are four processes through which occupational coping self-efficacy could be boosted, including mastery experiences (e.g. workshops that provide experiences of successfully facing occupational stressors), vicarious experience (e.g. examining how colleagues' handle occupational stressors), verbal persuasion (e.g. encouragement from more experienced and respected supervisor or fellow nurses), and physiological states (e.g., positive and negative feedback received from physiological and emotional states when facing occupational stressors). According to social cognitive scientists (e.g., Bandura, 1997; Zimmerman, 2000), the most influential way to improve self efficacy beliefs is by promoting "mastery experiences". Mastery experiences provide individuals with an active experience of the positive effects of their actions, and their interpretations of these effects stimulate their efficacy beliefs. Success in coping with occupational stressors raises self-efficacy, whereas failure lowers it. Therefore, one could also focus on tools such as an after-event review (Ellis, Ganzach, Castle, & Sekely, 2010) to analyze the causes for success or failure in facing occupational stressors.

The current study has some limitations that should be acknowledged. First, this study was focused on the nursing profession – a necessity to enable the use of occupation-specific measures of job characteristics and occupational coping self-efficacy. However, this restriction to a single occupational group might hamper the generalisation of the findings to other occupational groups. Second, given its cross-sectional design, this study does not provide possibilities for causal inferences regarding psychosocial characteristics, occupational coping self-efficacy, and distress/wellbeing. As such, the possibility of reversed or reciprocal causality cannot be ruled out. A carefully designed longitudinal study, with appropriate time intervals (cf. Zapf, Dormann, & Frese, 1996) could provide further insight into the causal processes involved. Furthermore, our study relies on self-reported measures. Although the correlations among variables could be inflated by affective dispositions, such as Negative Affectivity (Watson, Pennebaker, & Folger, 1997), this is unlikely to account for the significant interactions.

Despite these limitations, the results of this study show that the personal factor occupational coping self-efficacy has both direct effects on employee distress/well-being and plays a moderating role in the influence of psychosocial job characteristics on distress/well-being. Further examination of the role of occupational coping self-efficacy seems essential to enhance our understanding of the impact of job characteristics on employee distress. Furthermore, the current findings suggest that interventions aiming at enhancing occupational coping self-efficacy may bolster employee well-being.

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Chapter 6. Psychosocial job characteristics and psychological distress - well being: the mediating role of personal goal facilitation.

Abstract

This study examined the mediating role of personal goal facilitation through work (PGFW), defined as perceptions of the extent to which one's job facilitates the attainment of one's personal goals, in the association between psychosocial job characteristics and psychological distress and job-related well being.

Questionnaire data from 217 nurses (84% female, with a mean age of 42.7 years, SD = 7.2) were analyzed. Results indicated that unfavourable psychosocial job characteristics (high demands, low control and low social support) are associated with lower PGFW. Furthermore, personal goal facilitation through work explained significant additional variance (from 2% to 14%) in psychological distress (somatic complaints and emotional exhaustion) and job related well being (personal accomplishment, job satisfaction, and work engagement), controlling for demographic indicators and psychosocial job characteristics. Finally, the results provided support for the mediating effects of PGFW between all psychosocial job characteristics and all outcomes, except in the case of depersonalization.

This study suggests that hindered personal goal facilitation may be a mechanism through which psychosocial job characteristics have a negative impact on employees' well-being. Limitations of the study and theoretical and practical implications are discussed.

Key words: Psychosocial job characteristics; Personal goal facilitation through work; Mediation analysis; Burnout; Work engagement; Job satisfaction; Psychological distress; Nurses.

6.1. Introduction

Several studies have demonstrated that nurses, in the course of their careers, frequently experience a great deal of stress that may have implications for their physical and mental health status (Lambert & Lambert, 2001; McVicar, 2003). Although these studies have produced important findings and have demonstrated that adverse work experiences are associated with nurses' strain, the precise *mechanisms*, through which occupational stressors may be linked to lower well-being have not yet been completely clarified.

The aim of this study is to gain more insight in the relationships between occupational stress, job resources, self regulation at work, and psychological distress and well being.

Psychosocial job characteristics and personal goal facilitation through work.

It is widely recognized that certain psychosocial job characteristics may contribute to the incidence of psychological distress and well being. The three most studied psychosocial job dimensions in relation to mental health are job demands, job control, and social support from colleagues and supervisor (Karasek & Theorell, 1990). These variables form the core components of the Job Demand-Control-Social Support model (JDCS; Karasek, 1979; Karasek & Theorell, 1990) and, as suggested by Kompier & Taris (2005), are identified as critical job features in a variety of theoretical approaches including the job characteristics theory (Hackman & Oldham, 1980), the Michigan organization stress model (Caplan, Cobb, French, van Harrison, & Pinneau, 1975), the effort–reward imbalance model (Siegrist, 1996) and the vitamin model (Warr, 1994). Psychosocial job demands relate to the work load, and refer to the dimensions of the job environment that might overburden employees' personal capacities, as for example, time pressure, role conflict and quantitative workload. Job control, or decision latitude, refers to the person's ability to control his or her work activities. It includes two distinct but related dimensions: skill discretion and decision authority. Skill discretion refers to the level and variety of the skill required for the work tasks and the possibilities to acquire new skills in the job role. Decision authority reflects the extent to which people have freedom over how they do their work and have a say over what happens. The third dimension, added later to the model, social support, refers to instrumental and emotional support from colleagues and superiors (Johnson & Hall, 1988; Karasek & Theorell, 1990).

Pomaki and Maes (2002) relate the three JDCS variables to basic human needs. According to self determination theory (Deci & Ryan, 1985) subjects strive to fulfill three basic needs: competence, autonomy, and relatedness. These needs link to the JDCS variables: demands with competence, control with autonomy, and social support with relatedness (Pomaki and Maes, 2002). However, it is still scarcely investigated how the psychosocial job variables are related with need constructs and how the perception of unfavourable psychosocial job conditions can interfere with the fulfillment of these basic needs (Pomaki and Maes, 2002).

Furthermore, some authors (Semmer & Meier, 2009; van der Doef & Maes, 1999) argued that several occupational stress models assume that occupational demands (stressors) and job resources, such as job control and social support, underlie strain and well being. Several studies suggest that self regulation theory could add a complementary point of view to these occupational stress models (Hyvonen, Feldt, Tolvanen, & Kinnunen, 2010; Pomaki & Maes, 2002; ter Doest, Maes, Gebhardt, & Koelewijn, 2006). Self regulation theory argues that most human behaviour is goal-directed, and that singular behaviours are thus organized or directed by personal goals. Goals are 'internal representations of desired states, where states are broadly construed as outcomes, events, or processes' (Austin & Vancouver, 1996, p. 338). In the self regulation literature authors agree on the fact that individuals pursue multiple goals simultaneously. From a health psychology perspective, a sizeable amount of research has focused on the process of goal pursuit (e.g., Latham & Locke, 2007). The perception that one is progressing towards or attaining valued goals is considered by several authors as an important determinant of satisfaction and well being (e.g., Little, 2007). Goals serve as an important reference for the cognitive and affective system so that people experience positive feelings when they make progress toward goals and negative feelings when they fail to reach their goals (Diener, Suh, Lucas, & Smith, 1999). Progressing towards strivings, perceiving that they have been achieved, anticipating success, and perceiving clarity and little difficulty, may facilitate well-being. In a review (Koestner, Lekes, Powers, & Chicoine, 2002), researchers found that goal progress was associated with improved affect.

Personal goal facilitation through work (PGFW) refers to perceptions of the extent to which one's job facilitates the attainment of one's personal goals (ter Doest et al., 2006). In a cross sectional study conducted among 1036 health care workers, personal goal facilitation through work accounted for significant variance in well being and distress variables, even after controlling for JDCS dimensions (ter Doest et al., 2006). More specifically, all regression coefficients observed for the four goal facilitation scales (personal growth goals, physical well-being goals, social relationship goals, and self-confidence goals) were positively related to

favourable job attitudes (job satisfaction and personal accomplishment). Furthermore, two of the goal facilitation scales—representing respectively work's facilitation of self-confidence goals and physical well-being goals— were negatively associated with psychological distress measures (emotional exhaustion and somatic complaints). These findings indicated that personal goal facilitation through work explained unique variance in well being/distress outcomes beyond the impact of psychosocial job variables. However, it has also been suggested (Pomaki & Maes, 2002) that personal goal facilitation is likely to *mediate* the influence of psychosocial job variables on distress outcomes. More specifically, the notion is that deleterious psychosocial job conditions (high job demands, low job control and social support) can predict psychological well being, via direct effects, and indirectly by hindering the opportunities for employees to pursue their valued goals. In addition, favourable job conditions can have a direct beneficial impact on well being as well as an indirect one by facilitating the attainment of personal goals. To our knowledge, there are no studies that have explored the mediating role of employees' perceptions of progressing towards or of attaining valued personal goals in the relationship between psychosocial job variables and distress/well being outcomes.

Thus, in order to examine the ideas discussed above, the main aim of the present study is to analyze whether PGFW mediates the effect of JDCS variables on employee psychological distress and well being.

Psychological distress and well being

In the present study we examined a variety of psychological distress and well being outcomes, namely job satisfaction, burnout, work engagement and somatic complaints.

Job satisfaction could be defined as "a positive (or negative) evaluative judgment one makes about one's job or job situation" (Weiss, 2002, p. 175). Burnout is described as a combination of emotional exhaustion, depersonalisation, and diminished personal accomplishment that may occur among individuals "who work with other people in some capacity" (Maslach, 1993). Several authors (Maslach, Schaufeli, & Leiter, 2001; Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002) introduced work engagement as the hypothetical antipode of burnout. Schaufeli and colleagues defined work engagement as "… the positive, fulfilling, and work-related state of mind that is characterized by vigor, dedication and absorption" (Schaufeli et al., 2002, p. 74). Somatic complaints refer to complaints, such as headache, stomach ache, and back pain.

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Research hypotheses.

We hypothesized that PGFW would mediate the effect of JDCS variables on general distress and job related well being. Three hypotheses are addressed in this study. The first hypothesis deals with the associations between psychosocial job variables and PGFW. We hypothesized that, after controlling for the effects of background variables such as age and gender, low scores on job demands, and high scores on job control and social support will be associated with high scores on PGFW (hypothesis 1).

Further, we expected that high levels of PGFW will be associated with lower scores on the three dimensions of psychological distress (somatic complaints, emotional exhaustion, and depersonalization) and higher scores on the three job related psychological well being variables (personal accomplishment, job satisfaction, and work engagement) above and beyond the JDCS variables (hypothesis 2).

Finally, the third hypothesis dealt with the mediation role of PGFW. We expect that the psychosocial job variables and the psychological distress/well-being outcomes will be indirectly associated via PGFW (hypothesis 3).

6.2. Methods

Sample and procedure.

The study population consisted of 287 nurses from an Italian hospital. The investigators approached subjects during workshops of the in-service training curriculum, and provided information about the purpose and design of the study. Data were collected by means of paper and pencil questionnaires. Two hundred and seventeen questionnaires (response rate: 81%) were returned. Of the respondents, the majority was female (84%). The mean age was 42.7 years (SD = 7.2; range: 28-56). On average, respondents had been working in a health care setting for 17.0 years (SD = 9.1; range = 1-37 years). Participants who completed the questionnaire and those that did not, showed no differences on age and gender. Data were anonymously gathered and the voluntary nature of the study was emphasized. The research was approved by national and regional ethics committees. Informed consent was obtained from all participants.

Measures.

The study variables are: demographic variables, JDCS variables, personal goal facilitation through work, and distress-well being outcomes.

- Demographic variables. Age was measured in years and gender was categorized as 1 = male and 2 = female.

- JDCS Variables. These variables were measured with three scales of the Italian language version of the Leiden Quality of Work Life Questionnaire for Nurses (LQWLQ-N; Maes, Akerboom, van der Doef, & Verhoeven, 1999). These three LQWQ-N scales provide an occupation-specific measurement corresponding closely to the original operationalisation of job demands, control, and social support in the Job Content Instrument (JCI; Karasek, 1985). Responses are measured on a 4-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*).Job demands were measured with one scale (work and time pressure: 4 items; e.g. "I must care for too many patients at once"). Control was measured combining skill discretion (4 items; e.g. "My work is varied.") and decision authority (4 items; e.g. "I can decide for myself when to carry out patient-related tasks and when to carry out non-patient-related tasks.") scales. Social support was assessed with two scales: social support from supervisor (6 items; e.g. "I can count on the support of my direct supervisor when I face a problem at work.") and social support from co-workers (6 items; e.g. "The nurses in my department work well together."). For the purpose of this study both scales were integrated into one social support scale.

- Personal goal facilitation (PGFW). Personal Goal facilitation through work was measured with an adapted version of the workplace questionnaire of the goal facilitation inventory (GFI-W; Maes, ter Doest, & Gebhardt, 2005). Respondents answered the same question for each of 40 higher-order personal goals: "To what extent can you achieve the following goals through your work?" Answers could be provided on a 10 point scale (1 = *not at all*; 10 = *completely*). Some examples of higher order goals were: "Performing well..", "Supporting others..", "Being financially independent..", "Learning new things..". Items were averaged to create the scale score.

- Distress/well being outcomes. Six distress/well-being outcomes were assessed: five job-related measures (job satisfaction, the three burnout components, and work engagement), and a general strain measure: somatic complaints. Job satisfaction was operationalized with the seven-item LQWQ-N scale (e.g., "I am satisfied with my job."). Burnout was assessed by the Italian

version (Sirigatti & Stefanile, 1991) of the 22-item Maslach Burnout Inventory Human Service Survey (MBI-HSS; Maslach, Jackson, & Leiter, 1996) which contains the three subscales: emotional exhaustion (9 items; e.g. "I feel frustrated by my job"); depersonalisation (5 items; e.g. "I don't really care what happens to some patients") and personal accomplishment (8 items; e.g. "I feel very energetic"). Participants were asked to rate from 0 (never) to 6 (daily) how often they experienced feelings described in each of the 22 items. Work engagement was measured with the shortened version of the Italian version (Balducci, Fraccaroli, & Schaufeli, 2010; Pisanti, Paplomatas, & Bertini, 2008) of the Utrecht Work Engagement Scale (UWES-9; Schaufeli et al., 2002). Each of the three dimensions (vigor, dedication, and absorption) was assessed with three items. Example items are: "During my work I feel full of energy" (vigor), "I am enthusiastic about my job" (dedication), and "When I am working very intensively, I feel happy" (absorption). Items of work engagement were rated on a seven-point scale ranging from 0 ("never") to 6 ("always"). Given that the interest of our research is on work engagement as global score, as recommended by the authors (Schaufeli & Bakker, 2003) the scores on the three dimensions of work engagement were summed to form one overall score of work engagement. Somatic complaints were assessed with the somatisation subscale from the Italian version (Violani & Catani, 1995) of Symptoms Checklist (SCL90-R; Derogatis, 1983). The 12 items measure the degree to which subjects experienced during the last week physical states such as "Headaches" and "Hot or cold spells". The answer categories ranged from 1 (not at all) to 5 (extremely).

Data analysis

The main aim of this paper was to examine whether PGFW mediated the associations between psychosocial job variables and outcome variables.

Mediation analysis is most commonly conducted using causal steps (Baron & Kenny, 1986). In this approach, the first step in testing mediation is to estimate the total effect (direct and indirect relationships) between the independent variable (X) and the dependent (Y). If a total effect is not found, Shrout and Bolger (2002) strongly suggest proceeding with mediation steps as indirect effects are likely to be significant. The second step of Baron and Kenny (1986) method is to test the relationship between independent variables and the mediator. Third, the mediator must relate to the outcome after controlling for the independent variable. Fourth, if there was a significant relationship in step 1, researchers are encouraged to examine the decrease in magnitude of this estimate such that if the previous estimate was significant, but no longer is, then mediation of this relationship can be claimed. If the estimate is reduced in magnitude yet is

still significant (direct effect), then only partial mediation can be claimed. In addition, it is suggested to test the magnitude and significance of indirect effects, particularly if the relationships among independent and dependent variables are non-significant.

Although it is the most common method for testing mediation, researchers have pointed out shortcomings of the Baron and Kenny (1986) approach and recommend reporting estimates of the size of the indirect effect and statistical significance tests (MacKinnon & Fairchild, 2009; Preacher & Hayes, 2008). An assumption of statistical significance tests is that the data are normally distributed. However, indirect effects are likely skewed so the assumption of normality is often untenable (Preacher & Hayes, 2008). In accordance with Preacher and Hayes (2008) we derived estimates of the indirect effects, using a bootstrapping method. Bootstrapping is a nonparametric re-sampling procedure used to test mediation effects. Researchers have noted that bootstrapping procedures, compared to other mediation approaches have higher power and are more sensitive to Type I error rates (MacKinnon & Fairchild, 2009). Bootstrap sampling distributions rely on resampling the original dataset K (usually >1000) number of times to achieve the direct and indirect effects. Thus, the final sample does not follow normality assumptions and is a nonparametric approximation of the original sample. Several bootstrap confidence intervals can be used including percentile, bias corrected, and bias corrected accelerated (Efron & Tibshirani, 1993). The latter two bootstrap confidence intervals are an improvement over the percentile method, because they can be used with smaller samples and have higher power for detecting mediation effects (Fritz & MacKinnon, 2007). Mediation exists if the value zero is not included in the confidence interval. In accordance with Preacher and Hayes (2008) we estimated 5000 bootstrap samples in which the independent variables were job demands, control, and social support, the mediator was personal goal facilitation through work, and the dependent variables were somatic complaints, emotional exhaustion, depersonalization, personal accomplishment, job satisfaction, and work engagement. We also included gender and age as covariates in the model, because these demographic variables may confound the results (cf. Spector, Zapf, Chen, & Frese, 2000).

Recapitulating, to test hypothesis 1 (concerning the associations between the three psychosocial job dimensions and PGFW) a hierarchical regression analysis was conducted. The first block included the background variables, namely participant age and gender; in the second step the three psychosocial job variables were entered. Relevant to hypothesis 2 (concerning the associations between PGFW and the outcomes of the study, above and beyond psychosocial job variables) and hypothesis 3 (stating that the association between psychosocial job variables and

the outcomes would be mediated by PGFW) a second series of regression analyses were carried out. In the first block we included participant age and gender; in the second step the three JDCS variables were entered; finally, in the third step PGFW was entered. To test the mediation effect itself, we followed the logic outlined in Preacher and Hayes (2008). That is, rather than to focus on the strength of the association between psychosocial job variables and the outcomes of the study as proposed by Baron and Kenny (1986), we estimated the indirect effects using a bootstrapping method.

6.3 Results

Descriptive data and zero-order Pearson correlations of the study variables are displayed in Table 6.1. All scales measuring the study variables have acceptable levels of internal consistency (alpha coefficients ranged from .69 to .89). Furthermore, the correlations show that the associations between PGFW on the one hand, and psychosocial job variables and outcome variables on the other, generally meet our expectations. More specifically, PGFW was associated both with psychosocial job variables and all outcomes except depersonalization. High levels of personal goal facilitation through work were related to high levels of job control, social support, personal accomplishment, job satisfaction, work engagement; and with low values of job demands, emotional exhaustion, and somatic complaints.

Table 6.1. Means (M), Standard Deviations (SD), Internal Consistencies (Cronbach's α), and Zero-Order Correlations of the Study Variables (N = 217) .

Variable	M	SD	α	1	2	3	4	5	6	7	8	9	10	11
Background variables														
1) Gender[a]	---		---	---										
2) Age	42.7	7.2	---	-.12	---									
JDCS dimensions														
3) Job demands	2.7	0.6	.74	.16*	-.02	---								
4) Job control	2.7	0.4	.77	-.05	-.01	-.13	---							
5) Social support	2.7	0.5	.83	-.03	-.02	-.16*	.45***	---						
Mediator variable														
6) Personal Goal Facilitation through Work	7.2	1.3	.89	-.11	-.12	-.21**	.37***	.34***	---					
Outcomes														
7) Somatic complaints	2.2	0.8	.87	.30***	.14*	.27***	-.23***	-.19**	-.35***	---				
8) Emotional exhaustion	25.6	8.0	.83	.19**	.30***	.23***	-.34***	-.31***	-.44***	.64***	---			
9) Depersonalization	5.6	4.2	.69	-.22***	-.13	.26***	-.07	.03	-.09	.02	.16*	---		
10) Personal accomplishment	32.7	5.7	.76	.17*	.07	-.13	.29***	.19**	.41***	.07	-.11	-.36***	---	
11) Job satisfaction	2.5	0.6	.88	-.00	-.17*	.13	.53***	.45***	.45***	-.17*	-.45***	-.16*	.25***	---
12) Work engagement	4.0	0.9	.84	.26***	-.13	.08	.45***	.23***	.44***	-.07	-.37***	-.15*	.61***	.58***

[a] Male = 1; Female = 2

Note: *p < .05; **p < .01; ***p <.001

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The regression results for testing mediation are reported in Table 6.2. All psychosocial job variables were related to PGFW. Lower levels of job demands (Beta = -.16; $p < .05$) and higher levels of both job control (Beta = .27; $p < .001$) and social support (Beta = .18; $p < .01$) were associated with higher scores on PGFW (hypothesis 1 was supported).

Table 6.2 Testing the mediation effect of Personal Goal Facilitation through Work (PGFW) in the relationship between psychosocial job characteristics and distress/well-being: R-squares and Standardized estimates (betas) of the regression analyses (N = 217).

Predictors	Mediator	Outcomes					
	PGFW	SC	EE	DP	PA	JS	ENG
Gender [a]	-.10	.32***	.26**	-.21**	.17*	-.04	.24***
Age	-.13	.17*	.26***	-.14*	.09	-.18**	-.10
Δ R²	.02	.12***	.12**	.04*	.03*	.03*	.07***
Gender [a]	-.04	.26***	.20**	-.21**	.22**	.01	.26***
Age	-.12	.16*	.25***	-.14*	.09	-.16**	-.10
Demands	-.16*	.21**	.16*	.23**	-.14*	-.04	.10
Control	.27***	-.16*	-.24***	-.11	.27***	.39***	.45***
Social Support	.18**	-.07	-.11	.10	.03	.28***	.06
Δ R²	.20***	.09***	.15***	.05**	.11***	.34***	.23***
Gender [a]	--	.25***	.19**	-.21**	.24***	.02	.27***
Age	--	.14*	.22***	-.15*	.14*	-.14*	-.05
Demands	--	.19**	.14*	.21**	-.08	-.00	.11
Control	--	-.11	-.17*	-.04	.17*	.33***	.36***
Social Support	--	-.04	-.08	.10	-.03	.24***	-.01
PGFW	--	-.18**	-.25***	-.13	.37***	.22***	.36***
Δ R²	----	.02*	.05***	.01	.11***	.04***	.10***
R²	.22	.24***	.31***	.10**	.25***	.41***	.40***
Adj R²	.19	.21	.29	.08	.23	.39	.38

Note: [a] Male = 1; Female = 2; * p < .05; **p < .01; *** p < .001; PGFW: Personal Goal Facilitation through Work; SC: somatic complaints; EE: emotional exhaustion; DP: depersonalization; PA: personal accomplishment; JS: job satisfaction; ENG: engagement.

Concerning the effects of psychosocial job variables on *somatic complaints*, a close inspection of the table 6.2. indicated that, after controlling for gender and age, higher levels of job demands (Beta = .21, p < .01) and lower levels of job control (Beta = -.16, p < .05) were associated with higher levels of somatic complaints, after controlling for the demographic variables. Furthermore, we found that higher levels of

PGFW were associated with lower levels of somatic complaints (2% of additional variance accounted; Beta = -.18; p < .01) above and beyond demands, control and social support variables. Nurses with low scores of PGFW were more likely to experience high levels of somatic complaints (hypothesis 2 supported). As shown in the results of the bootstrap confidence intervals presented in table 6.3., the relationship between job demands and somatic complaints was partially mediated by personal goal facilitation through work, and the relationship between job control and somatic complaints was fully mediated by personal goal facilitation through work. Furthermore, the assessment of the indirect effect through bootstrapping showed that the mediating effect of PGFW for all three job characteristics was significant (hypothesis 3 is supported).

Table 6.3. Bootstrap Confidence Intervals for the mediation effect of Personal Goal Facilitation through Work in the relationship between job characteristics and distress/well-being outcomes (N = 217).

	Corrected 95% C.I.		Accelerated 95% C.I.		
	Lower	Upper	Lower	Upper	P value
Somatic Complaints					
Demands	0.002	0.061	0.002	0.0893	< .05
Control	-0.103	-0.012	-0.2054	-0.0064	< .01
Social support	-0.086	-0.009	-0.1699	-0.0059	< .01
Emotional Exhaustion					
Demands	0.004	0.074	0.004	0.122	< .05
Control	-0.126	-0.026	-0.293	-0.035	< .001
Social support	-0.105	-0.017	-0.203	-0.019	< .005
Depersonalization					
Demands	-0.004	0.044	-0.008	0.073	ns
Control	-0.072	0.009	-0.150	0.029	ns
Social support	-0.060	0.007	-0.127	0.019	ns
Personal Accomplishment					
Demands	-0.103	-0.004	-0.156	-0.004	< .05
Control	0.045	0.167	0.067	0.297	< .001
Social support	0.025	0.143	0.040	0.193	< .005
Job Satisfaction					
Demands	-0.066	-0.003	-0.082	-0.002	< .05
Control	0.023	0.109	0.026	0.169	< .001
Social support	0.013	0.092	0.019	0.117	< .005
Work Engagement					
Demands	-0.095	-0.003	-0.150	-0.002	< .05
Control	0.042	0.153	0.062	0.313	< .001
Social support	0.023	0.131	0.038	0.214	< .005

Note: Gender and age were controlled for in the analyses. Confidence intervals were set to 95%. An indirect effect exists if the value zero is not included in the confidence interval.

Regarding *emotional exhaustion*, results in table 6.2. showed that after controlling for gender and age, nurses who reported higher levels of job demands (Beta = .16, p < .05), and lower levels of job control (Beta = -.24, p < .001), have higher levels of emotional exhaustion. Results showed that PGFW, after controlling for demographic variables and psychosocial job dimensions, was negatively related to emotional exhaustion (5% of additional variance accounted; Beta = -.25, p < .001), supporting hypothesis 2. Results of the assessment of indirect effects through bootstrapping described in table 6.3. showed that the mediating effect of PGFW for all psychosocial job variables were significant. Hypothesis 3 is also supported in this case.

With respect to *depersonalization,* results in the table 6.2.indicated that it was only positively related to job demands (Beta = .23; p <.01). PGFW was not associated with depersonalization (hypothesis 2 was not supported). As also shown in table 6.3., the mediation hypothesis of PGFW was not supported (hypothesis 3), PGFW did not mediate the associations between the psychosocial job variables and depersonalization.

With regard to *personal accomplishment*, as shown in the table 6.2., after controlling for gender and age, those who reported lower levels of job demands (Beta = -.14, p < .05) and higher levels of job control (Beta = .27, p < .001) had higher levels of personal accomplishment. Results showed that PGFW was positively related to personal accomplishment (11% of additional variance accounted; Beta = .37, p < .001), supporting hypothesis 2. Besides, results show that, after PGFW was taken into account, the effect of job demands (Beta = -.08, p = ns.) became non significant, suggesting full mediation by PGFW; and the effect of job control (Beta = .17, p < .05) became weaker, albeit still significant, suggesting partial mediation. Furthermore, the assessment of the indirect effect through bootstrapping described in table 6.3. showed that the mediating effect of PGFW for demands, control and social support was significant (hypothesis 3 is supported).

As shown in table 6.2., after controlling for gender and age, high levels of both job control (Beta = .39, p < .001) and social support (Beta = .28, p < .001) were associated with high levels of *job satisfaction*. Results demonstrated that nurses with high levels of PGFW (4% of additional variance accounted; Beta = .22; p < .001) were more satisfied (hypothesis 2 is supported). Further, results show that, after PGFW was taken into account, both the effects of job control (Beta = .33, p < .001) and social support (Beta = .24, p < .001) became weaker, albeit still significant, which suggests partial mediation. Again, as shown in the table 6.3. all indirect effects were significantly different from zero. Thus, the relationships between the psychosocial job dimensions on the one hand, and personal accomplishment on the other, were partially mediated by PGFW (hypothesis 3 is also supported in this case).

Finally, with regards to *work engagement*, the results depicted in table 6.2. show that job control (Beta = .45, p < .001) was positively associated with work engagement and that this association became weaker, although still significant, after the inclusion of the significant effect of PGFW (10% of additional variance accounted; Beta = .36, p < .001) (hypothesis 2 supported). As shown in table 6.3., all indirect effects were significantly different from zero. Thus, the relationships between all JDCS variables and work engagement were mediated by PGFW (hypothesis 3 supported).

6.4. Discussion

The present study was designed to investigate the mediation role of personal goal facilitation through work in the relationship between psychosocial job variables and distress/well being outcomes. More specifically we examined: (1) whether low levels of job demands and high levels of control and social support are related to high levels of personal goal facilitation through work; (2) whether personal goal facilitation through work is negatively related to psychological distress (i.e., somatic complaints, emotional exhaustion and depersonalization) and positively associated with job related well being (i.e., personal accomplishment, job satisfaction and work engagement); and (3) whether personal goal facilitation through work mediates the relationships between the JDCS variables and outcome variables. Most of these hypotheses were supported by the results of a series of multiple hierarchical regression analyses and bootstrapping procedures.

First, hypothesis 1 was supported. Favourable psychosocial job conditions (low demands, high control and high social support) are associated with high scores on the perception of employees to pursue and attain their personal goals through work. Clearly these findings reaffirm the importance of psychosocial job conditions for employee wellness also in terms of the opportunities available to attain their personal goals (Pomaki & Maes, 2002; Pomaki, Maes, & ter Doest, 2004).

The second hypothesis deals with the direct relationship between personal goal facilitation through work and outcomes. Our results largely supported this hypothesis. In regression analyses, personal goal facilitation through work explained significant additional variance (from 2% to 11%) in psychological distress (somatic complaints and emotional exhaustion) and job related well being (personal accomplishment, job satisfaction and work engagement), after controlling for demographic indicators and psychosocial job variables. These results are in line with previous findings by ter Doest et al. (2006), who found that personal goal facilitation through work accounted for substantial variance in psychological

distress/well being outcomes (somatic complaints, emotional exhaustion, personal accomplishment and job satisfaction), even after taking into account the role of psychosocial job dimensions from the JDCS model. In line with the general literature on self regulation, progressing towards or attaining valued personal goals is an autonomous determinant of psychological distress and well-being (Elliot & Sheldon, 1998; Little, 1989). Goal attainment elicits positive states, whereas people who fail to live up to self- or other-imposed goal standards experience a range of negative emotions (e.g., Higgins, 1987).

Contrary to our expectations depersonalization was not associated with personal goal facilitation through work. Probably, this is because depersonalization refers specifically to relationships with patients as opposed to the other outcomes of the study. Depersonalisation represents indifference or a "distant attitude" toward patients and work in general "…. in that it reduces the energy available for performing work and for developing creative solutions to the problems work presents" (Leiter & Schaufeli, 1996, p. 231). Thus depersonalization represents a sort of cognitive, emotional and behavioural "disinvestment" in worklife. Therefore it could be difficult to find relationships with self regulatory constructs at work, such as personal goal facilitation through work.

A close examination of the direct effects of psychosocial job variables on outcomes reveals that job demands, above and beyond the effects of demographic variables and the mediator, were directly related to all distress outcomes (somatic complaints, emotional exhaustion and depersonalization). However, job demands did not show any significant direct association with job related well being outcomes (personal accomplishment, job satisfaction and work engagement). These results are in line with previous studies (e.g., Bakker & Demerouti, 2007; van Veldhoven et al., 2002), and suggest that job demands (especially time pressure) are primarily related with psychological distress variables providing support for the health impairment process. This is basically an energetic process of wearing out in which high job demands exhaust the employee's energy backup. The long term consequences of this process will be high psycho-physiological strain, which in turn will exert a negative impact on health (Karasek & Theorell, 1990). Job control was directly and negatively related with emotional exhaustion and showed direct positive associations with all job related well being dimensions (personal accomplishment, job satisfaction and work engagement). Social support showed a direct positive association with job satisfaction. These results are consistent with an autonomous motivational process of job resources (e.g., Schaufeli & Bakker, 2004). This motivational process is triggered by the perception of availability of job resources (in our case specifically job control) that are instrumental to pursue work goals, and foster employees' growth, learning and development (Schaufeli & Bakker, 2004). Therefore, job resources are not only necessary to deal with job demands but they are also important in their own right.

With regard to the indirect association between psychosocial job variables and outcomes via PGFW, our results showed that all bootstrapping tests of indirect effects were significant, except for depersonalization. In addition, the associations between job demands and control on the one hand, and personal accomplishment on the other hand were fully mediated by personal goal facilitation through work. Thus hypothesis 3 was largely supported, psychosocial job characteristics can influence employees psychological well being directly and indirectly through personal goal facilitation. Favourable psychosocial job conditions (low demands, high control, and high social support) may influence the extent to which one's job facilitates the attainment of one's personal goals, which in turn may influence psychological well being. Conversely, unfavourable psychosocial job conditions (high workload, lack of control, and low social support) may hinder the attainment and pursuit of personal goals, which, in turn, is likely to negatively influence the psychological well being of employees.

Limitations and future research

Two limitations of the present study should be mentioned. First and foremost, the study was conducted in a cross-sectional design. Even if the hypothesized model is supported by previous research, the cross-sectional design limits our ability to determine causal relationships between psychosocial job dimensions, personal goal facilitation through work, and psychological distress/well being. These relationships could be reciprocal (e.g. low personal goal facilitation through work can lead to higher levels of psychological distress, and vice-versa). Prospective studies should be conducted in the future to better evaluate the exact nature of these relationships.

The second limitation of the present research is that only nurses, all working for the same organization, were involved, and the large majority of them were female. This may limit generalizability of the findings. Thus, the specific nature of the present sample underlines the need to replicate the current study in other samples.

Practical implications.

The practical implications of the study relate to the relations between JDCS variables and personal goal facilitation through work of nurses. Favourable psychosocial job characteristics appear to be instrumental in the goal pursuit process, and consequently, in occupational and general well being. Therefore, it is advisable to focus interventions on reduction of excessive job demands and on the improvement of job resources. Specific interventions could incorporate: taking measures to avoid

structural and incidental understaffing; implementation of autonomous teams to enhance job control, and training in leadership qualities for supervisors (providing feedback and support, coaching) (e.g., Michie & Williams, 2003). Our findings also suggest that organizations interested in employees' well-being should take employees' perception of personal goal facilitation through work into account. This could be done by screening work populations for the impairment of the attainment of personal goals at work.

In conclusion, our findings suggest that the extent to which employees experience their work as facilitating their personal goal pursuit plays a mediating role in the psychosocial job characteristics - employee well being association.

6.5. References

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Chapter 7. Psychosocial job characteristics and job burnout in nurses: a longitudinal analysis of the changes of job characteristics.

Abstract

The aim of the present longitudinal research was to test the Job Demand-Control-Support (JDCS) model and to analyze whether changes in psychosocial job characteristics are related to (changes in) burnout. This two wave study was carried out over a period of 14 months in a sample of 217 Italian nurses.

Hierarchical regression analyses were used, controlling for demographic variables (gender and age) and the burnout dimension at Time 1. Contrary to expectations, high job demands at Time 1 were associated with high personal accomplishment at Time 2, and high social support at Time 1 was associated with high emotional exhaustion at Time 2. As expected, high job control at Time 1 was related to low emotional exhaustion and high personal accomplishment at Time 2. Moreover, results did not provide evidence for the hypothesized moderating effect of control and social support on the relationship between job demands and job strain (buffer hypothesis).

Further, changes in job conditions between Time 1 and Time 2 explained additional significant variance (between 4% and 18%) in the burnout dimensions measured at Time 2. Increases in job demands were associated with increases in emotional exhaustion and depersonalization, and with decreases in personal accomplishment across time. Decreases in job control and social support were associated with increases in emotional exhaustion across time. The study provided support for the associations between changes in psychosocial job variables and the changes in burnout dimensions across time.). These findings suggest that the work environment is dynamic and susceptible to change.

The paper discusses the limitations and implications of the study and identifies directions for future research.

Key words: Job demand-control-support model main effects, moderating effects, longitudinal study, burnout, nurses.

7.1 Introduction

A number of studies have shown that nurses, in the course of their careers, experience a great deal of stress that may have implications for their physical and mental health status (McVicar, 2003; Hasselhorn, Muller, & Tackenberg, 2005).

The most-researched long-term consequence of stress in nurses is occupational burnout, which is defined as a multidimensional construct whose three facets are: emotional exhaustion, depersonalization, and lack of personal accomplishment (Maslach, Schaufeli, & Leiter, 2001). Emotional exhaustion refers to feelings of being emotionally overextended and exhausted by one's work and contact with other people. Depersonalization refers to an unfeeling and impersonal response towards the recipients of one's care or service. Lack of personal accomplishment refers to a decline in one's feelings of competence and successful achievement in one's work. Burnout prevalence among nurses varies between 2% and 11% (Bourbonnais, Comeau, & Vezina, 1999; Kilfedder, Power, & Wells, 2001; Schaufeli, 2007).

Psychosocial job dimensions may contribute to the incidence of burnout among health care employees (Schaufeli, 2007). The three most studied psychosocial job dimensions in relation to mental health are job demands, job control (skill discretion and decision authority), and social support from colleagues and supervisor (Karasek & Theorell, 1990). These variables form the core components of Job Demand Control-Social Support model (JDCS) (Karasek, 1979; Karasek & Theorell, 1990). The basic assumption of this model states that high job demands, low control and low support *additively* predict high stress reactions (iso-strain hypothesis). On the other hand, researchers have focused on the buffer hypothesis, stating that high job control and/or social support is expected to moderate the negative impact of high demands on stress reactions (Karasek and Theorell, 1990). This theoretical issue has an important implication for job redesign. A *buffer* effect of control and social support would lead to recommendations to increase job control and social support in order to decrease the detrimental effects of demands. On the other hand, if the `iso-strain' hypothesis is valid and this would be the result of additive effects of demands, control and social support, it would be insufficient to focus solely on the increment of job resources, with the high demands maintaining their unfavourable effect on employees health.

Some authors (de Lange, Taris, Kompier, Houtman, & Bongers, 2003; Häusser, Mojzisch, Niesel, & Schulz-Hardt, 2010; van der Doef & Maes, 1999) reviewed the main assumptions of the JDC(-S)

model(s). Overall, a general conclusion from these reviews is that the additive hypothesis received more support than the buffer hypotheses.

Several studies have examined the main effects of the JDCS variables on burnout dimensions. These studies suggest that job demands (such as time pressure and workload) are a stronger predictor than control for emotional exhaustion and depersonalization but a weaker predictor than control for personal accomplishment (Lee & Ashforth, 1996; Schaufeli, 2007). Social support appears to be associated with each burnout dimension, although the relationship is less strong than in the case of job demands (Schaufeli, 2007). These findings were also confirmed in nursing populations (e.g., Bakker, Le Blanc and Schaufeli, 2005; Hochwalder, 2006; 2007; Proost, De Witte, De Witte, & Evers, 2004).

Regarding the role of control and social support as buffer factors that reduce the detrimental effects of high demands on burnout outcomes, both van der Doef and Maes (1999) and Häusser et al. (2010) pointed out that few studies supported the buffer hypotheses. Van der Doef and Maes (1999) found that all four studies that tested the moderator role of control on burnout did not support this hypothesis. Furthermore, no buffering effect of support on the impact of high strain was found in the two studies examining this hypothesis. Analogously, Hausser et al. (2010), in a recent article that updated the findings of the previous review and that focused on emotional exhaustion, found that only 4 out 27 studies revealed full support for the buffering effect of control. Results were less consistent in the case of social support, only 1 study out of the 13 studies that tested the three-way interaction confirmed the buffer hypothesis of the JDCS model.

An issue of interest for our research regards the design of the studies. The four burnout studies of Van der Doef and Maes's review (1999) were cross sectional, whereas in the Häusser et al. (2010) review, seven studies of the 35 studies that applied the model to emotional exhaustion used a longitudinal design. The latter studies provided less support for additive effects (3 supportive out of 7 studies) than cross-sectional studies (17 supportive out of 28 studies). Furthermore, Häusser et al. (2010) found only two longitudinal studies that examined the buffer hypothesis, of which one found support for the moderating effect of control on the impact of job demands.

Reviewing the studies on nursing populations we found that that emotional exhaustion was the most frequently investigated dimension also in this occupational group (e.g., Bourbonnais, Comeau, Vezina, and Dion, 1998; Bourbonnais et al., 1999; Bakker et al., 2005; de Jonge, van Breukelen, Landeweerd & Nijhuis, 1999; Landsbergis, 1998; Proost, et al., 2004; Schmidt & Diestel, 2010; Tummers, Landeweerd, & van Merode, 2002). The strain hypothesis was more investigated than buffer hypotheses: namely 22 studies examined the additive effects of job demands and control *vs* 7 studies that examined the interaction between the two psychosocial dimensions. Furthermore, the iso strain hypothesis was tested in

12 studies, whereas only one study analyzed the three way interaction. Additive effects of demands and control were found in 7 of the 22 studies that tested this hypothesis, whereas only the study of de Rijk, Le Blanc, Schaufeli, and de Jonge (1998), found a buffer effect under condition of a third individual variable, i.e. active coping. In this study, control moderated the negative effects of job demands on emotional exhaustion only in the subsample of nurses that showed higher values on active coping. In addition, the iso strain hypothesis has been supported by the findings of 3 studies (Bourbonnais et al., 1999; Hochwalder, 2006; 2007), whereas only one study (Proost et al., 2004) tested the three- way interaction and found partial support only in the case of personal accomplishment.

Finally, two longitudinal studies (Bourbonnais et al., 1999; Gelsema, et al., 2006) on nurses failed to support both hypotheses.

Although the longitudinal research designs are more suitable to draw conclusions concerning the causal relations among the study concepts than cross-sectional designs, we should acknowledge that the vast majority of existing longitudinal studies on job stress and occupational strain focused on the influence of occupational stressors on a stress reaction at a later point in time (Taris & Kompier, 2003). For instance, a study among human service employees in Sweden, with a 1-year time interval (Vegchel, de Jonge, Soderfeldt, Dormann, & Schaufeli, 2004) revealed, after controlling for demographic variables and the related dependent variable at Time 1, significant positive associations between both quantitative demands on the one hand, and emotional exhaustion and personal accomplishment on the other, one year later. Job control was negatively associated with both emotional exhaustion and depersonalization one year later, whereas it was positively related with personal accomplishment. Social support had a lagged negative association with emotional exhaustion. The authors did not find any significant buffer effect. With regards to nurses, Ganster, Fox, & Dwyer (2001) found that, after controlling for the dependent variable at Time 1, neither the main effects of job demands and control, nor their interactive term, accounted for significant portions of explained variance in mental health after 5 years. However, as suggested by several authors (e.g. de Lange, Taris, Kompier, Houtman, & Bongers, 2002; Melamed, Armon, Shirom, & Shapira, 2011; Roe, 2008) the work environment is not a static phenomenon, it is dynamic and susceptible to change. A limited number of studies examine the influence of changes of psychosocial job dimensions on burnout outcomes. For example, in a recent longitudinal research with a 1-year time interval conducted among 201 Dutch telecom managers, Schaufeli, Bakker, & van Rhenen (2009) found that increases in job demands (i.e., overload, emotional demands, and work-home interference) and decreases in job resources (i.e., social support, autonomy, opportunities to learn, and feedback) were associated with increases of emotional exhaustion and cynicism over time. Likewise, Bourbonnais et al (1999), in a sample of Canadian nurses, examined changes in the dimensions of the

demand-control model and found significant main effects of adverse changes in job strain condition (high demands and low control) across time, on emotional exhaustion over time. Finally, Gelsema and colleagues (2006), in a sample of nurses, found that an increase in job demands (i.e. workload and physical demands) was associated with increases in emotional exhaustion across time. In this latter study, the authors measured psychosocial job variables through an occupation specific measure. Some authors (Kasl, 1996; Narayanan, Menon, & Spector, 1999; van der Doef, and Maes, 1999) have argued that generic measures to assess occupational stressors and resources might not adequately reflect the specific workplace conditions, and have pointed out the need for more occupation-specific assessment. They suggest that occupation-specific measurement of demands, control, and support could improve the explanatory and predictive power of the JDCS model (Kasl, 1996; van der Doef & Maes, 2002). Therefore, in the present study a measure to assess specifically nurses' job characteristics was used.

To recapitulate, the previous studies on the effects of JDCS variables on burnout have indicated four issues that we will deal with in the present research: a) most of studies have examined the hypotheses of the JDCS model on emotional exhaustion, whereas the other two dimensions, depersonalization and personal accomplishment, have been studied less frequently, b) the iso strain hypothesis and the buffer hypotheses have hardly been examined concurrently in a longitudinal design, c) the effects of changes of psychosocial job variables on burnout dimensions are hardly examined, and d) it would be advisable to adopt specific occupation-measures to examine the effects postulated by the JDCS model.

Research hypotheses.

On the basis of the theory and empirical studies described earlier, two hypotheses are addressed in this longitudinal study.

The first hypothesis deals with the across-time effects of Time 1 JDCS dimensions on Time 2 burnout. After controlling for the effects of each Time 1 burnout dimension and background variables such as age and gender, it is expected that the combination of high job demands, low job control and low social support at Time 1 will be additively associated with high levels of burnout at Time 2 (high scores of emotional exhaustion and depersonalization, low scores of personal accomplishment: Hypothesis 1a). Further, it is expected that job control and social support will moderate (buffer) the impact of high levels of job demands on burnout (Hypothesis 1b).

The second hypothesis is concerned with the across-time effects of *changes* in JDCS variables on burnout. More specifically, we will test whether increases in job demands and decreases in job control and social support are associated with increases in emotional exhaustion and depersonalization; furthermore,

we will test whether decreases in job demands and increases in job control and social support are associated with higher levels of personal accomplishment (Hypothesis 2).

7.2. Methods

Sample and procedure.

A two-wave longitudinal study with a 14 months time interval took place among nurses of an Italian Hospital. Questionnaires were distributed in February 2007 (Time 1) and April 2008 (Time 2).

The investigators approached subjects during workshops of the in-service training curriculum, and provided information about the purpose and design of the study. Data were collected by means of paper and pencil questionnaires. In a last question, at both measurement times, we asked the respondents to provide an anonymous code. By means of this anonymous code we were able to link the questionnaires at both points in time.

The study population consisted of 287 nurses from an Italian hospital. All nurses worked on a permanent basis. At Time 1, 264 (92%) usable questionnaires were returned. At Time 2, 217 (drop out 41 = 19%) questionnaires were returned. Our final study sample (the 'panel group') consisted of these 217 nurses who filled out both questionnaires (response rate of 76% of the initial group). Of these respondents, the majority was female (84%). The mean age was 42.7 years (SD: 7.2; range: 28-56). On the average the respondents had been working in a health care setting for 17.0 years (SD: 9.1; range = 1-37 years). Participants who completed both questionnaires and those that only participated in the baseline survey did not differ on any demographic variable (age, gender, education, number of cohabitating children), or psychosocial job characteristic (JDCS), or burnout dimension.

Measures.

The study variables were divided into three sections: demographic variables, JDCS variables and burnout. The questions were asked in identical format at both data collection waves.

- *Demographic variables.* Age was measured in years and gender was categorized as 1 = male and 2 = female.

- *JDCS Variables.* These variables were measured with three scales of the Italian language version of the Leiden Quality of Work Life Questionnaire for Nurses (LQWLQ-N; Maes, Akerboom, van der Doef, & Verhoeven; 1999). These three LQWQ-N scales provide an occupation-specific measurement

corresponding closely to the original operationalisation of job demands, control, and social support in the Job Content Instrument (JCI; Karasek, 1985). Responses are measured on a 4-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). Job demands were measured with one scale (work and time pressure: 4 items; e.g. "I must care for too many patients at once"). Control was measured combining skill discretion (4 items; e.g. "My work is varied.") and decision authority (4 items; e.g. "I can decide for myself when to carry out patient-related tasks and when to carry out non-patient-related tasks.") scales. Social support was assessed with two scales: social support from supervisor (6 items; e.g. "I can count on the support of my direct supervisor when I face a problem at work.") and social support from co-workers (6 items; e.g. "The nurses in my department work well together.") For the purpose of this study both scales were integrated into one social support scale.

- Burnout was assessed by the Italian version (Sirigatti & Stefanile, 1991) of the 22-item Maslach Burnout Inventory Human Service Survey (MBI-HSS; Maslach, Jackson & Leiter, 1996) which contains the three subscales: emotional exhaustion (9 items; e.g. "I feel frustrated by my job"); depersonalisation (5 items; e.g. "I don't really care what happens to some patients") and personal accomplishment (8 items; e.g. "I feel very energetic"). Participants were asked to rate from 0 (never) to 6 (daily) how often they experienced feelings described in each of the 22 items.

Data analysis.

The first hypothesis was tested in hierarchical regression analyses. Four blocks of variables were created. In the first block we controlled for the variables gender and age, because these demographic variables may confound the results (e.g., Theorell & Karasek, 1996). Moreover, we included in the first block the outcome measured at Time 1. The second block concerned the main effects of Time 1 Job demands, job control, and social support. Subsequently, the two way (third block) and three way interactions (fourth block) between the JDCS variables measured at Time 1 were considered in the model. To avoid multi-collinearity and to facilitate the interpretation of the interaction terms, the scores on the job conditions were standardized before analysis (Cohen, Cohen, West, & Aiken, 2003). If the interaction effects of the JDCS dimensions proved non-significant, they were omitted from the final regression models.

The second hypothesis focused on across-time changes in burnout as a function of the changes of JDCS dimensions across time. First, in line with Taris (2000) and Smith & Beaton (2008), a change score (Cohen's Delta: difference between T2 and T1 divided by standard deviation at T1) was computed for each job condition. Next, in the final step of the hierarchical regression analyses, the change scores of each JDCS variable were entered. The F change was evaluated to determine whether the change scores of

JDCS variables led to a significant increase in explained variance in the outcome, after considering the demographic variables, the outcome and the JDCS variables measured at Time 1.

7.3. Results

Descriptive data and zero-order Pearson correlations of the study variables are displayed in Table 7.1. All scales measuring the study variables displayed acceptable levels of reliability (alpha coefficients ranged from .67 to .96). Furthermore, Table 7.1. shows that the effect sizes of test–retest correlations between the JCDS variables at Time 1 and Time 2 are medium (Cohen, 1992). This finding supports the above mentioned argument that the psychosocial job variables are not very stable over time. The burnout variables have medium test–retest reliability as well.

Table 7.1. Means (M), Standard Deviations (SD), Internal Consistencies (Cronbach's α), and Zero-Order Correlations of the Study Variables (N = 217).

Variable	M	SD	α	1	2	3	4	5	6	7	8	9	10	11	12	13
Background variables:																
1) Gender[a]	---		---	---												
2) Age	42.7	7.2	---	-.10	---											
Time 1																
3) JD	2.8	0.6	.71	.09	-.08	---										
4) JC	2.7	0.5	.80	-.05	.16*	-.13	---									
5) SS	2.7	0.6	.86	-.15*	.10	-.16*	.39***	---								
6) EE	2.5	1.3	.89	.20**	.11	.19**	-.34***	-.25***	---							
7) DP	1.1	1.1	.72	-.18**	.03	.17*	-.22**	-.05	.42***	---						
8) PA	4.4	1.1	.87	.03	.05	-.02	.24***	.01	-.16*	-.41***	---					
Time 2																
9) JD	2.7	0.6	.79	.16*	-.04	.37***	-.22***	-.09	.17*	.04	-.05	---				
10) JC	2.7	0.4	.76	-.05	-.03	.06	.35***	.37***	-.19**	-.08	.10	-.13	---			
11) SS	2.7	0.5	.88	-.03	-.03	-.06	.23***	.48***	-.15*	.01	.08	-.16*	.45***	---		
12) EE	2.8	0.9	.83	.24***	.20**	.08	-.18*	.02	.53***	.18*	-.20**	.25***	-.33***	-.30***	---	
13) DP	1.1	0.8	.67	-.22***	-.11	-.01	.08	.12	.11	.36***	-.28***	.25***	-.07	.03	.17*	---
14) PA	4.1	0.7	.76	.17*	.04	-.17*	.32***	.16*	-.14*	-.25***	.32***	-.13	.29***	.19**	-.12	-.36***

[a] Male = 1; Female = 2

Note: *p < .05; **p < .01; ***p <.001.

Legenda. JD: Job demands; JC: Job control; SS: Social support; EE: Emotional exhaustion; DP: Depersonalization; PA: Personal accomplishment

The variables included in the first block accounted for 28% of the variance in Time 2 emotional exhaustion (*Fchange*(3, 181) = 23.8, p <.001). Inspection of the separate estimates reveals that this is due to the effects of Time 1 emotional exhaustion (Beta = .45; p <.001), of gender (Beta = .15; p <.001), and age (Beta = .14 p < .05). In the next block, the inclusion of the main effects of Time 1 JDCS variables improved the prediction of Time 2 emotional exhaustion by 3% (*Fchange*(3, 178) = 2.5, p = .06). The main effects showed that both control and social support measured at Time 1 were associated with Time 2 emotional exhaustion (Hypothesis 1a was not supported). That is, higher levels of job control measured at Time 1 were associated with lower levels of emotional exhaustion measured at Time 2 (Beta = -.15; p < .05), and, contrary to expectations, higher scores of social support at Time 1 were associated with higher levels of emotional exhaustion at Time 2 (Beta = .17; p < .05). Inclusion of the Time 1 JDCS two way (Model 3) and three way interactions (Model 4) did not significantly improve the prediction of Time 2 emotional exhaustion (Hypothesis 1b was not supported). Thus all the interactive terms were omitted from the final model analyses.

As concerns depersonalization, both the first ((*Fchange*(3, 184) = 15.1, p < .001, ΔR^2 = 20%) and the second block ((*Fchange*(3, 181) = 3.0, p < .05, ΔR^2 = 4%) accounted for significant variance in Time 2 depersonalization. Time 1 depersonalization was the most important predictor by far (Beta = .36 p < .001). In the second block we did not find any significant association. So, for depersonalization neither Hypothesis 1a and Hypothesis 1b were supported by the data. Also in this case, inclusion of the Time 1 JDCS two way (Model 3) and three way interactions (Model 4) did not significantly improve the prediction of Time 2 emotional exhaustion (Hypothesis 1b was not supported). Thus, also for depersonalization, all the interactive terms were omitted from the final model analyses.

Finally, personal accomplishment was mainly predicted by variables included in the Model 1 and 2. Again, the first block of variables accounted for a significant proportion of the variance in the outcome variable ((*Fchange*(3, 184) = 14.2, p < .001, ΔR^2 = 19%). Inspection of the separate estimates reveals that this is fully due to the effect of Time 1 personal accomplishment (Beta =.40 p < .001). Inclusion of the main effects of Time 1 JDCS variables improved the prediction of Time 2 personal accomplishment significantly by 8% ((*Fchange*(3, 181) = 6.9 p < .001). Both Time 1 job demands (Beta = .21; p <.01) and Time 1 job control (Beta = .21; p <.01) were associated with Time 2 personal accomplishment (Hypothesis 1a was not supported). High job demands and high job control at Time 1 were associated with high personal accomplishment at Time 2. Inclusion of the Time 1 two way and three way interactions (Model 3 and 4) did not significantly improve the prediction of Time 2 personal

accomplishment (Hypothesis 1b was not supported). Thus, also for personal accomplishment, all the interactive terms were omitted from the final model analyses.

Testing associations between changes in JDCS dimensions and changes in burnout.

Analysis of the change scores revealed that nurses experience considerable changes in all job conditions over time. Depending on the job condition, 26% (job demands), 26% (job control), 33% (social support) of the nurses showed an improvement of more than 0.5 SD difference between T1 and T2, and 23% (job demands), 23% (job control) and 28% (social support) of the nurses showed a worsening of more than 0.5 SD difference.

Regarding our second hypothesis, the analyses in table 7.2. indicate to what extent changes in psychosocial job variables are associated with changes in the burnout outcomes. Controlling for the initial burnout dimension, the blocks that included the changes in job conditions explained significant additional variance in all outcomes measured at Time 2. The change scores explained an additional 18% of the variance in emotional exhaustion at Time 2 ((F_{change} (3, 175) = 21.0, p < .001). Those employees who showed an increase in job demands (Beta = .14; p < .05) and a decrease in job control (Beta = -.38; p <.001) and social support (Beta = -.21; p <.005) over time, reported more emotional exhaustion at time 2 (Hypothesis 2 was supported). With regard to depersonalization, the block with change scores accounted for an additional 12% of variance (F_{change} (3, 178) = 10.6, p < .001). The results showed that an increase in job demands (Beta = .38; p < .001) was associated with an increase of depersonalization over time (Hypothesis 2 was only supported for demands: across-time changes in job demands were associated with changes in depersonalization over time). Regarding personal accomplishment, again the changes in job conditions between T1 and T2 contributed significantly to the (change in) personal accomplishment at T2. The block including the change scores accounted for an additional 4% of the variance ((F_{change} (3, 178) = 3.10, p < .05): a decrease in job demands (Beta = -.18; p < .05) was related to an increase in personal accomplishment over time (Also in this case Hypothesis 2 was only supported for demands: across-time changes in job demands were associated with changes in depersonalization over time).

Table 7.2. Results of hierarchical regression analyses examining the effect of demographic variables, the burnout dimension measured at time 1, psychosocial job dimensions measured at time 1, and changes in psychosocial job dimensions between Time 1 and Time 2 on the three burnout dimensions assessed at Time 2 (N = 217).

Variables	Emotional exhaustion at time 2			Depersonalization at time 2			Personal Accomplishment at time 2		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Gender (1 = M; 2 = F)	.38	.16	**.15***	-.40	.16	**-.17***	.25	.13	**.14***
Age	.02	.01	**.14***	-.01	.01	-.13	-.00	.01	-.05
Burnout dimension T1	.32	.04	**.45***	.29	.05	**.36***	.26	.04	**.40***
Block 1 ΔR²	**.28***			**.20***			**.19***		
Gender (1 = M; 2 = F)	.45	.16	**.18****	-.30	.16	-.13+	.23	.13	**.14***
Age	.02	.01	**.15***	-.02	.01	**-.14***	-.00	.01	-.04
Burnout dimension T1	.30	.05	**.43***	.33	.06	**.42***	.20	.04	**.31***
Demands T1	-.01	.10	-.01	-.11	.10	-.08	.26	.08	**.21****
Control T1	-.29	.15	**-.15***	.15	.14	.08	.34	.12	**.21****
Social support T1	.26	.11	**.17***	.19	.10	.13	.11	.09	.09
Block 2 ΔR² (R²)	**.03 (.31***)**			**.04* (.24***)**			**.08*** (.27***)**		
Gender (1 = M; 2 = F)	.45	.14	**.18****	-.39	.15	**-.16***	.22	.13	**.16***
Age	.01	.01	.10	-.02	.01	**-.16***	-.00	.01	-.02
Burnout dimension T1	.28	.04	**.40***	.32	.05	**.41***	.20	.04	**.30***
Demands T1	.17	.10	.11	.19	.11	.13	.14	.09	.11
Control T1	-.74	.17	**-.38***	.11	.18	.06	.41	.16	**.26***
Social support T1	.20	.12	.13	.24	.13	.17	.10	.11	.08
Δ Demands	.11	.05	**.14***	.28	.05	**.38***	-.11	.05	**-.18***
Δ Control	-.32	.07	**-.38***	-.10	.07	-.13	.07	.06	.11
Δ Social Support	-.20	.07	**-.21****	.03	.07	.03	.02	.06	.03
Block 3 ΔR²(R²)	**.18*** (.49***)**			**.12*** (.35***)**			**.04* (.31***)**		
R²	**.49***			**.35***			**.31**		
Adj R²	**.47**			**.32**			**.27**		
Full Model	**F (9, 175) = 19.01**			**F (9, 187) = 10.75**			**F (9, 187) = 8.79**		

Note: Given that the interaction terms of JDCS variables were non significant, they were omitted from the final analyses; * p < .05; **p < .01; *** p < .001; Block *n* ΔR² : R Square Change;
Δ Demands, Δ Control, Δ Social Support: (Cohen's Delta) difference between T2 and T1 of each JDCS variable divided by standard deviation at T1.

7.4. Discussion

Firstly, we hypothesized that high demands, low control, and low social support (all measured at Time 1) would longitudinally contribute to high burnout (high emotional exhaustion, depersonalization, and low personal accomplishment, all measured at Time 2). The three burnout dimensions appeared differentially related to the hypothesized cross lagged main effects of demands, control, and social support. With regard to emotional exhaustion, we found that, after controlling for the burnout dimension measured at Time 1, low levels of job control and high levels of social support (at Time 1) were significantly cross lagged related with high levels of emotional exhaustion measured at Time 2. Among the JDCS variables only job demands did not show a significant cross lagged association with emotional exhaustion. This result is in line with the findings of Teuchmann, Totterdell, and Parker (1999). They found that job demands (operationalized in terms of time pressure as in the present study) fluctuated in parallel with emotional exhaustion over time. Likewise, in the present study we found significant *cross sectional* associations between these two variables at Time 1 and at Time2, suggesting that the two dimensions are directly fluctuating.

Furthermore, as regards the significant positive cross lagged association between social support and emotional exhaustion, apparently this finding is contrary to our predictions and to several results found in cross sectional studies conducted on burnout among nurses (e.g. Hochwalder, 2006; Sundin, Hochwalder, Bildt, & Lisspers, 2007; Proost et al., 2004). However, some researchers found a positive correlation between social support at work and psychological distress (Beehr, Bowling, & Bennett, 2010; Ganster & Victor, 1988; Karasek, Triantis, & Chaudhry, 1982). In line with the argumentations of de Jonge and Schaufeli (1998), in small working groups, "..less strained employees absorb part of the problems of their more strained colleagues, equilibrating individual strain differences." (de Jonge & Schaufeli, 1998; Page 403). Over time, this association could be detrimental for employees because it might nurture their feelings of hopelessness and helplessness. As regards depersonalization, after controlling for the effect of demographic variables and depersonalization measured at Time 1, we did not find any significant main effect of JDCS variables measured at Time 1 on depersonalization measured at Time 2. Thus in the case of depersonalization Hypothesis 1a was not supported. Compared to the two other dimensions of burnout (emotional exhaustion and personal accomplishment) depersonalization has the weakest links with psychosocial job variables (Schaufeli, 2007) and might be more dependent on the person's own skills and individual variables. For instance, in a sample of teachers, Cano-Garcia, Padilla-Munoz, & Carrasco-Ortiz (2005) found that the prediction of high scores in depersonalization was based

on low scores in employees 'personal agreeableness. Authors did not find associations with psychosocial variables.

Finally, with respect to personal accomplishment, we found that, after controlling for personal accomplishment measured at Time 1, high levels of job demands and control (measured at time 1) were significantly cross lagged related with high levels of personal accomplishment measured at Time 2. These findings do not support our Hypothesis 1a: only the relationship between job control and personal accomplishment was in line with our predictions. However, the positive association between high levels of demands and personal accomplishment was in line with a cross sectional study conducted among nurses (Lee and Akhatar, 2007) and a longitudinal study of van Vegchel et al., (2004), and from a theoretical point of view should not be considered as totally unexpected. When high job control occurs in conjunction with high job demands ('active job"), it is hypothesized that employees are able to deal with these demands, protecting them from excessive strain, fostering in them feelings of learning and of mastery, and leading them to positive states, such as motivation and personal accomplishment.

Beyond the main effects previously discussed, we did not find any significant interactive effect. Although we adopted a specific measurement of JDCS variables for nurses, hypothesis 2b was not supported in our study. This finding is in line with Taris (2006), who concluded that full support for the buffer hypothesis was found in a small percentage of studies, little more than chance level. The available evidence suggests that the interactive effect is an exception rather than the rule.

Inclusion of changes in job conditions improved the prediction of burnout dimensions (4% to 18% of additional explained variance). Differential patterns of relationships between (changes in) job conditions and (changes in) burnout dimensions were found. In accordance with other longitudinal studies conducted among nurses in other countries (Bourbonnais, et al., 1999; Burisch, 2002; Gelsema et al., 2006), changes in emotional exhaustion were most strongly influenced by increases in job demands and decreases in both job control and social support. This final model explained 49% of the variance in emotional exhaustion. With respect to depersonalization, the full model explained 35% of variance. After controlling for demographics variables and depersonalization measured at Time 1, the only significant predictor was changes in job demands: more specifically, increases in job demands were associated with increases in depersonalization at Time 2. Finally, as regards personal accomplishment, the full model explained 31% of the variance. After controlling for demographic variables and Time 1 personal accomplishment, decreases in job demands across time were associated with higher levels of Time 2 personal accomplishment.

Overall, this pattern of results suggests that an increase over time of job demands tends to result in elevated levels of all dimensions of burnout over time (high emotional exhaustion, depersonalization, and

low personal accomplishment); however, only for emotional exhaustion the changes in job control and in social support seem to have a detrimental effect. This finding is in line with the general literature on burnout (Schaufeli, 2007): among all burnout dimensions, the psychosocial job conditions are mostly associated with emotional exhaustion.

Strengths and Limitations

A first strength of the present study is that we tested our hypotheses in a two-wave panel research. Secondly, we focused on the effects of changes in the JDCS variables on (changes) in burnout. Longitudinal studies in this specific area appear to be rather scarce (e.g., Taris & Kompier, 2003), and have seldom investigated the influence of changes in in psychosocial job characteristics on (changes in) burnout levels.

Limitations of the study should be noted. Firstly, the current data set was drawn from a specific group of employees (nurses, all working for the same organization). However, de Lange et al. (2003) have concluded in their review that studies based on heterogeneous populations do not provide more support for the JDCS hypotheses than studies based on homogeneous samples. "..This suggests that homogeneous populations provide enough true individual and within-occupation variation in job characteristics (i.e., provide enough exposure contrast) to be as useful as heterogeneous samples in testing the DCS model." (de Lange et al., 2003: page 300). Nevertheless, the unique nature of the present sample underlines the need to replicate the current findings on different occupational groups. Finally, although two-wave longitudinal designs offer better opportunities for testing cross lagged associations than cross sectional studies, a more comprehensive examination of the cross-lagged relations between psychosocial job variables and burnout would require a multi-wave study (Taris & Kompier, 2003).

In agreement with these reservations, it seems important that future longitudinal multi waves research analyzes the hypotheses presented in this study in different occupational groups.

Implications

The present study found evidence for longitudinal relationships between JDCS variables and occupational burnout. The results are encouraging because they suggest that job redesign interventions, focusing on improvement of psychosocial job characteristics may be an effective tool to prevent and reduce burnout.

According to Schalk, Halfens, Hollands, & Cummings (2010), these improvements could be achieved by interventions as changing routines/responsibilities, organizing team meetings, training in

leadership qualities for supervisors (providing feed-back and support, coaching). These interventions should be integrated into current management activities. We should bear in mind that these intervention strategies are more effective if they are permanent rather than temporary and occasional: managing work-related stress is not a one-off activity but part of a continuing cycle of good management at work and of the effective management of occupational stress and well being.

In conclusion, our study underlines the importance of investigating the associations between the changes in psychosocial job variables and the (changes in) burnout dimensions, across time. Even after controlling for demographic variables, burnout, and psychosocial job characteristics at Time 1, the effects of changes in psychosocial job variables on changes in burnout dimensions remained of interest. Thus, it appears that more attention for this phenomenon is warranted in terms of changes in the levels of psychosocial job variables rather than focusing on their "static" effects. From a practical point of view, these findings suggest of developing interventions to promote favourable psychosocial changes.

A possible next step in future research would be to conduct an experimental study examining whether through changes in JDCS dimensions, burnout can be prevented or reduced.

7.5. References

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Chapter 8. General discussion

Introduction

The aim of this dissertation was to examine the relationships between psychosocial job characteristics (demands, control and social support) and various psychological distress-well being indicators in nurses. In this final chapter, the general conclusions that can be drawn from the research findings are discussed. First, Section 8.1 provides an overview of the main findings. In Section 8.2, theoretical and methodological considerations of the studies are discussed. In Section 8.3 the practical implications of our results will be addressed. We conclude with a discussion of recommendations for future research (Section 8.4)

8.1 Summary of main findings

The present thesis investigated the contribution of the Job Demand Control Support (JDC(-S) model (Karasek & Theorell, 1990) to explain psychological distress and well being in nurses. The main hypotheses of the JDC(-S) model are: a) the (iso-) strain hypotheses, according to which high job demands, low job control (and low levels of social support) have independent and detrimental effects on well-being outcomes; b) the buffer hypothesis that suggests that high levels of job control (and social support) can moderate the noxious effects of high job demands on nurses well being.

The review study showed that the more frequently studied the (iso-) strain hypotheses received more support than the buffer hypotheses; support for both hypotheses is mainly found in cross sectional studies; buffering effects of job control in the relationship between demands and outcomes were only found in less than $1/10^{th}$ of the all tests. The most important difference between supportive and non supportive studies was the operationalization of demands and control: more specifically studies that assessed a specific demand in combination with a specific corresponding aspect of control were more supportive ("matching" hypothesis). The limited number of studies that investigated the three way interaction hypothesis of JDC(-S) model did not permit us to draw firm conclusions about this hypothesis.

Furthermore the review suggests the existence of some differential effects of the JDC(-S) dimensions on various outcomes. Firstly, our results indicated that "job demands" is the most important predictor with respect to psychological distress and somatic complaints, emotional exhaustion and depersonalization. The studies that are reported in chapters 3, 5, 6 and 7, confirm the existence of

differential effects of the JDC(-S) variables. Overall these results are also in line with previous studies (e.g., Bakker & Demerouti, 2007; van Veldhoven et al., 2002), and suggest that job demands (especially time pressure) are primarily related with psychological distress variables providing support for the health impairment process. This is basically an energetic process of wearing out in which high job demands exhaust the employees' mental and physical resources. The long term consequences of this process will be high psycho-physiological strain, which in turn will exert a negative impact on health (Karasek & Theorell, 1990). Secondly, the results of our review showed that job control and social support were stronger associated with personal accomplishment and job satisfaction than job demands. These findings are consistent across chapters 3, 5, 6 and 7, except for social support and personal accomplishment. These results are also consistent with an autonomous motivational process of job resources (e.g., Schaufeli & Bakker, 2004). This motivational process is triggered by the perception of availability of job resources that are instrumental to pursue work goals, and foster employees' growth, learning and development (Schaufeli & Bakker, 2004). Therefore, job resources are not only necessary to deal with job demands but they are also important in their own right.

Regarding the role of control and social support as buffer factors that reduce the detrimental effects of high demands on nurses well being, our review provided very limited support for both two-way and three way hypotheses. These results are consistent with previous reviews (Van der Doef and Maes, 1999: Häusser, et al., 2010) and are consistent across chapters 3, 5, 6 and 7. Only in the chapter 5, we found significant two-way interactions between demands and control in the prediction of job satisfaction and emotional exhaustion. In contrast to expectations, in both cases, high job control was more beneficial in the case of *low* demands. As suggested by van Vegchel and colleagues (2004), it seems that in the condition of low demands, job control is more effective to deal with the occupational stressors than in the case of high demands. In this latter condition, having high control is not of much use because one cannot exert the control in order to deal with the demands. We also found a significant two-way interaction effect between job demands and social support on depersonalization. This moderating effect was in line with Cohen and Wills (1985)' hypothesis: high social support buffers the negative impact of high job demands on depersonalization. Also this result was found in the study by Proost et al. (2004). Depersonalization represents a sort of attitudinal response to chronic demands and refers to an emotional distancing and an impersonal response towards the patients in one's care or service. The findings suggest that within a highly demanding situation in terms of patient care, positive social interactions with their stable social work environment (i.e. colleagues and supervisor) can shield nurses from developing this defense mechanism of emotional detachment from their patients.

We did not find any support for the combined moderating effect of job control and support on job demands (three-way interaction effect). In a commentary paper, Taris (2006) concluded that the buffer hypothesis was fully supported in only 10% of the tests conducted to test this interaction, little more than chance level. The studies included in the present dissertation also yielded very limited support for the buffer hypothesis.

In Chapter 1, we introduce five issues regarding the relationship between psychosocial job characteristics and psychological distress- well being.

A first issue refers to the fact that JDC(S) model neglects the impact of organizational variables on health-related outcomes (Van der Doef & Maes, 1999). The present thesis addresses this topic in chapter 3, where we examined in two groups of nurses (Italian and Dutch) how and to what extent various organizational variables from the Tripod accident causation model (Wagenaar et al., 1990; 1994) would make an independent contribution in explaining occupational and general well-being, beyond that attributed to the JDCS constructs. The Tripod model states that the causes of accidents at workplace are traced back to "systemic errors" in the way the organization functions. More specifically, it posits that unsafe acts are not random events, but are elicited by psychological precursors (e.g., attitudes, expectations, motives, emotional worry). These psychological precursors, in turn, are caused by the latent failures, namely dysfunctional aspects of the organizational environment: e.g., poor planning, understaffing, having to work with poor equipments. In our study we considered as organizational variables: financial reward; personnel resources; work agreements and material resources. We found that organizational variables significantly add to the prediction of most distress/wellbeing outcomes, beyond the effects of the JDCS variables. For personal accomplishment and psychosomatic complaints, however, the organizational conditions fail to improve the explained variance. The additional variance explained by the organizational conditions varies from 1 to 2% for emotional exhaustion and depersonalization to 6% for job satisfaction. Whereas personnel resources are significantly associated with all outcomes, financial reward is only significantly associated with job satisfaction. Adequate work agreements are associated with higher job satisfaction and lower depersonalization. Adequate material resources are only related to higher depersonalization.

Secondly, some authors (De Lange et al., 2003; Gelsema, Maes, & Akerboom, 2007) indicate that the lack of support for the buffer hypotheses of the model could be attributable to the use of general scales to assess the JDC(S) dimensions. More occupation-specific measures might be required to adequately assess the moderating effect postulated by the JDC(S) model. Therefore, in our studies (chapters 3, 5, 6 and 7) a specific measure developed with the purpose of assessing nurses' psychosocial

job variables was adopted. However, as we have seen, although we used an occupation-specific measure of JDC(S) variables we found limited support for buffer hypotheses.

A third issue regards the comparability of the JDC(S) model in different countries. In the chapter 3 we tested the effects of JDC(S) model on several strain reactions in two samples of academic nurses working in two different European health care contexts, i.e. Italian (N = 609) and Dutch (N = 873) nurses. We found that Italian nurses experienced higher job demands (work and time pressure, physical demands), and lower social support from colleagues, than their Dutch counterparts. Italian nurses also report lower levels of job satisfaction, and higher levels of emotional exhaustion, depersonalization, and somatic complaints than the Dutch nurses. These findings suggest that the health care context has indeed its impact on nurses' emotional exhaustion and somatic complaints partly through less favourable psychosocial job characteristics (high work and time pressure, high physical demands, low support from colleagues). However, existing cultural differences in the experience and expression of distress and complaints may also contribute to the cross-national differences found.

Fourthly, traditionally, research on the JDC(S) model has neglected individual variables (van der Doef & Maes, 1999; Semmer & Meier, 2009). The present thesis addresses this issue in chapters 4, 5 and 6. In the chapter 4 we described the development and psychometric qualities of the Occupational Coping Self-Efficacy scale for Nurses (OCSE-N). This questionnaire measures the individual's beliefs about one's ability to cope with the specific occupational stressors of nursing profession (OCSE-N). On the basis of data from a sample of Italian nurses (N = 1383) the factor structure of the OCSE-N was determined. The results revealed two factors: coping self-efficacy to cope with the occupational burden and coping self-efficacy to cope with the relational burden. In the chapter 5 we aimed to extend the JDC(S) model analyzing the direct and interactive role of occupational coping self efficacy beliefs. Questionnaire data from 1479 nurses were analyzed. Two categories of outcomes were taken into account: general and occupational distress/well-being. General distress outcomes were assessed with two scales of psychological distress (anxiety and depression) and somatic complaints. Job satisfaction and burnout were assessed as indicators of occupational distress/well being. We found that Occupational coping self efficacy (OCSE) accounted for additional variance (2% to 6%) in all outcomes, after controlling for the JDCS variables. In addition, the results indicate that occupational coping self efficacy buffers the impact of low job control on distress. Low control was detrimental only for nurses with low occupational coping self efficacy. In chapter 6 we analyzed the mediating role of personal goal facilitation through work (PGFW), defined as perceptions of the extent to which one's job facilitates the attainment of one's personal goals (ter Doest, Maes, Gebhardt & Koelewijn; 2006), in the association between JDCS variables and psychological distress and job-related well being. Questionnaire data from 217 nurses were analyzed. Six distress/well-being

outcomes were assessed: job satisfaction, three burnout components, work engagement, and somatic complaints. The results indicated that personal goal facilitation through work explained significant additional variance (from 2% to 14%) in psychological distress (somatic complaints and emotional exhaustion) and job related well being (personal accomplishment, job satisfaction, and work engagement), controlling for demographic indicators and psychosocial job variables. Furthermore, the results provided support for the mediating effects of PGFW between all psychosocial job dimensions and all outcomes, except in the case of depersonalization. Favourable psychosocial job conditions (low demands, high control, and high social support) may influence the perception of the extent to which one's job facilitates the attainment of one's personal goals, that may in turn influence psychological well being. Conversely, unfavourable psychosocial job conditions (high workload, lack of control, and low social support) may hinder the attainment and pursuit of personal goals, which, in turn, is likely to negatively influence the psychological well being of employees.

The fifth issue concerns the design of the studies that tested the assumptions of JDC(-S) model. The vast majority of studies that investigated the relationships between the JDC(-S) model and psychological distress used a cross-sectional design, and therefore did not permit inference of causality. The underlying assumption in many longitudinal studies is that psychosocial job dimensions remain fairly stable over time, allowing researchers to make causal inferences regarding the observed differences in psychological strain over time. However, as suggested by several authors (e.g., Roe, 2008) the work environment is not a static phenomena, it is dynamic and susceptible to change. In the chapter 7 we examined the across-time effects of *changes* in JDC(-S) variables on burnout indicators. Aim of this study was to test the JDC(-S) model longitudinally and to analyze if changes in psychosocial job variables are related to (changes in) burnout dimensions. This two wave study was carried out over a period of 14 months in a sample of 217 Italian nurses. Results revealed that job demands had a lagged positive (rather than a negative) effect on personal accomplishment; as expected job control had a detrimental effect on emotional exhaustion and a beneficial effect on personal accomplishment. Social support had beneficial lagged effects on emotional exhaustion. Further, the blocks that included the changes in job conditions explained additional significant variance (between 4% and 18%) in the burnout dimensions measured at Time 2. Increases in job demands were associated with increases in emotional exhaustion and depersonalization, and with decreases in personal accomplishment across time. Decreases in both control and social support were associated with increases in emotional exhaustion across time. The study provided support for associations between changes in psychosocial job variables and changes in burnout dimensions across time.

8.2 Theoretical and methodological considerations

The present thesis addressed two points of criticism on the JDC(S) model, namely that it neglects the role of the organizational dimensions and individual variables in explaining psychological distress and well being.

First, the cross national study described in the Chapter 3 has demonstrated that besides the key dimensions of the JDCS model, organizational conditions play a role in nurses' well-being. Furthermore, the findings suggest that the health care context exerts its effects on nurses' distress partially through less favourable job characteristics. The findings regarding the differential impact of JDCS variables and organizational conditions suggest that in a less favourable work situation in terms of demands and resources (i.e., Italian health care system), understaffing has a stronger impact on nurses' well-being.

Second, in the current thesis, we have attempted to extend the JDCS assumptions by including two self regulatory constructs: self efficacy beliefs (Chapter 5) and personal goal facilitation through work (Chapter 6). In the Chapter 5, we hypothesized a direct and interactive role of occupational coping self efficacy beliefs on distress/well being. The findings provided consistent support for the direct positive effects of OCSE on nurses' well-being. Furthermore, we found evidence suggesting that OCSE buffered the negative impact of *lack of job control* on distress. In other words, especially for nurses with low OCSE lower job control was associated with higher levels of distress. To explain these findings both social cognitive theory and the cognitive-emotional stress appraisal model (i.e. Lazarus & Folkman, 1984) suggest that individuals may differently appraise their coping resources, and this in turn may influence their abilities to cope with stressful situations. The appraisal of external coping resources (job control) *and* internal coping resources (OCSE) as low seem to put employees at risk for distress, regardless of their level of demands. Furthermore, the results suggest that OCSE as an internal resource can compensate the lack of job control. The most important theoretical implication of the present study stems from the fact that in the explanation of general and occupational indicators of nurses' distress and well-being, we found support for both additive and interactive effects of job stressors, job resources and occupational coping self efficacy beliefs. This indicates that both environmental variables and personal variables, both directly and in interaction, contribute to the explanation of employee distress and well-being. In Chapter 6, we examined the mediating role of personal goal facilitation through work (PGFW) between JDC(-S) variables and psychological distress and well being variables such as somatic complaints, burnout dimensions, work engagement and job satisfaction. Findings revealed that psychosocial job variables can influence employees psychological well being directly and indirectly through personal goal facilitation

through work. Favourable psychosocial job conditions (low demands, high control and high social support) increase the perception of employee's ability to pursue and attain their personal goals, that in turn stimulate personal growth, learning, and psychological well being. Conversely, unfavorable psychosocial job conditions (high workload, lack of control and social support) may hinder the attainment and pursuit of personal goals. This, in turn, may influence negatively the psychological well being of employees.

Overall, results of the two studies suggest that self regulation theory could offer a complementary point of view to occupational stress models such as the JDCS model that focus on job conditions (Pomaki & Maes, 2002; ter Doest, Maes, Gebhardt & Koelewijn; 2006).

Furthermore, in the study described in Chapter 7, we have attempted to overcome some of the methodological drawbacks of previous empirical studies. This study used a longitudinal design, as such, this design is more suitable to draw conclusions concerning the causal relations among the study concepts than cross-sectional designs. The longitudinal design consisted of a time interval of fourteen months between the waves of measurement. This gave the opportunity to control for baseline burnout and to assess changes over time with respect to both JDCS variables and burnout dimensions. However, although two-waves longitudinal designs offer better opportunities for testing causal processes than cross sectional studies, multi-waves longitudinal designs permit even stronger conclusions about possible causal relations between psychosocial job variables and mental health (Taris & Kompier, 2003), because they can provide more information about the stability and change of the variables and cross-lagged (i.e., over time) relations than two-wave or cross-sectional designs.

Finally, the studies included in the present dissertation share some common methodological limitations with other studies in occupational health psychology research. For instance, the fact that our samples were drawn from a specific group of employees (i.e., nurses) is both a strength and a weakness. An advantage is that this mostly eliminates socio-economic status factors that are confounded with both health status and occupational differences (cf. Ganster, Fox, & Dwyer, 2001). A limitation of sampling from a single occupational domain, however, is that the variation in job characteristics might be restricted in comparison with larger epidemiological studies (e.g., Kristensen, 1995). Moreover, from a theoretical point of view, it seems plausible that, individuals self select themselves in a specific profession (i.e. while searching for employment, employees choose a job that fits their own preferences and needs, Schneider, 1998). Thus the association between particular job characteristics and active learning behavior (or strain) may at least partly be due to third factors. However, we should bear in mind that the nursing profession is

characterized by demands and skills that can vary importantly from e.g. a psychiatric or oncology ward to an emergency department.

In order to generalize the results to other occupations (especially male populations), more research in multi-occupational groups is needed. Further investigation of gender effects may be particularly warranted, as some studies indicate that results may depend on employee gender (e.g., van der Doef and Maes, 1999).

As with all samples from the active working population, a "healthy worker effect" may have influenced the results (cf. Zapf et al., 1996). That is, employees with adverse health reactions may be absent from work more frequently, rendering our sample less representative. However, in Chapter 7 there was no difference in measured levels of psychosocial variables and burnout of nurses who participated in the second measurement and those who did not.

8.3 Practical Implications

The findings of the investigations included in the present dissertation have implications for the nursing profession.

First, the limited support for the moderating effects of job control and social support justify focusing on all three psychosocial job variables of JDCS model. Thus interventions that target to help the individual to take control over their circumstances and exercise greater personal influence, and encourage individuals to seek social support and at the same time, through interaction with other participants and increase their support networks, are likely to be much less effective than interventions that focus exclusively on the reduction of workplace stressors.

Moreover, on the basis of the results of the cross national study described in the chapter 3, organizational dimensions deserve considerable attention in creating healthy work environment. Thus, specific interventions should be also directed at: training in leadership qualities for supervisors (providing feedback and support, coaching); enhancing bottom-up communication within the organization; implementation of autonomous teams; taking measures to avoid structural and incidental understaffing; providing training possibilities (e.g., specialization) (see e.g., Michie and Williams, 2003; Schalk et al., 2010).

The results of Chapters 4 and 5 suggest that besides focusing on the reduction of demands, and enhancement of control and support, enhancing nurses' coping self-efficacy beliefs may have beneficial effects on their distress and well-being levels. In line with Social Cognitive theory, Coping self-efficacy beliefs are directly amenable to intervention (Bandura, 1997). There are four processes through which occupational coping self-efficacy could be boosted, including mastery experiences (e.g. workshops that provide experiences of successfully facing occupational stressors), vicarious experience (e.g. examining how colleagues' handle occupational stressors), verbal persuasion (e.g. encouragement from more experienced and respected supervisor or fellow nurses), and physiological states (e.g., positive and negative feedback received from physiological and emotional states when facing occupational stressors). According to social cognitive scientists (e.g., Bandura, 1997; Zimmerman, 2000), the most influential way to improve self efficacy beliefs is by promoting "mastery experiences". Mastery experiences provide individuals with an active experience of the positive effects of their actions, and their interpretations of these effects stimulate their efficacy beliefs. Success in coping with occupational stressors raises self-efficacy, whereas failure lowers it.

8.4 Suggestions for future research

The findings of this thesis reveal several avenues for future research. Some suggestions for future research have already been mentioned in the discussion of methodological and theoretical considerations. These suggestions include the importance of organizational and individual variables, the need of further research in other occupational groups to determine whether the results are generalizable to other (especially male) occupations, the more multi-waves studies to examine the specific causal lags over which specific psychosocial job variable influence specific outcome variable.

Based on the results, some additional recommendations can be made for future research. In this section, we will focus our attention more elaborately on two topics.

A first issue that deserves more attention in future research concerns the focus on self regulatory constructs. This thesis has shown that certain self regulatory constructs (occupational coping self efficacy and personal goal facilitation through work) are negatively related to psychological distress and positively associated with positive states (e.g. job satisfaction and personal accomplishment). In addition, other self regulatory aspects have been explored in a study by Pomaki, Maes, & ter Doest (2004) among health care workers. Authors found that midlevel work goal processes (i.e., cognitions and emotions involved in the

pursuit of self-set work goals) explained significant portions of variance in job satisfaction, burnout, depression, and somatic complaints, over and above that of the JDCS model. Thus, it would be advisable in future longitudinal researches to study the relationships between psychosocial job characteristics, different work goal process (individual variables, mid level and higher order goals), and psychological distress well being. Another related issue that has not been considered in the present dissertation but that could be of interest in the occupational stress literature refers to the research on goals from different life domains and the way they relate to one another. Given that the nursing job is characterized by various duties and nurses have to face interests of numerous parties: those of managers, supervisors, patients, colleagues and themselves it is reasonable to argue that ability to avoid goal conflict and to balance goals from different life roles, is an important area for sustained research. Further research integrating self regulation constructs in occupational stress theories such as the JDCS model could make a significant contribution.

Secondly, the results of the study presented in Chapter 7 showed that changes in psychosocial job conditions are associated with (changes in) burnout dimensions. These findings led to project and to implement longitudinal research for evaluating the effects of interventions specifically aimed at improving JDCS dimensions. Therefore, it is recommended to develop interventions aimed to improve employees well being by improvement of their work situations and to evaluate these kind of intervention in (quasi-) experimental longitudinal design.

Future research should take into account these recommendations.

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Summary in English

Summary

Nurses have been identified as having a risk of experiencing stress and burnout. The nature and organization of the job make nursing inherently difficult. Research highlights that occupational stress is largely dependent on psychosocial job characteristics, such as job demands and job resources. The studies included in this thesis focus on the relationships between occupational stressors and job resources, operationalized on the basis of the JDC(-S) model, and different outcomes (such as burnout, psychological and somatic complaints, and diminished job satisfaction) among nurses. The JDC(S) model focuses on three dimensions of psychosocial working conditions: job demands and the two job resources: job control and social support. Psychosocial job demands relate to the work load, and include, for example, time pressure, role conflict and quantitative workload. Job control, or decision latitude, refers to the employee's ability to control his or her work activities and skill usage. Social support refers to instrumental and emotional support from colleagues and superiors. The model predicts that health and wellness are most threatened in a situation of high work demands, low control and low social support. Furthermore it is assumed that high control and high social support moderate (buffering effect) the detrimental impact of high work demands on health and wellbeing.

In Chapter 1 of this dissertation, we distinguished five main questions that can extend earlier research on JDC(-S) model. More specifically: (1) beyond the JDC (-S) dimensions, which is the contribute of organizational variables on psychological well being and distress outcomes ? (2) Could the lack of support for the buffer hypotheses of the model(s) be attributable to the use of general scales to assess the JDC (-S) dimensions ? (3) The third question concerns the validity of the JDC(S) model in various countries. Is the JDC (-S) model cross-national generalizable across different countries ? (4) What is the role of individual variables in the relationships between psychosocial job characteristics on the one hand, and psychological well being and distress, on the other hand ? (5) The fifth question regards the longitudinal effects of psychosocial job characteristics on a specific construct of psychological strain. What are the across-time effects of changes in JDC(S) dimensions on burnout indicators ?

These topics were dealt with in Chapters 2-7, and the main results presented are summarized below.

Results

Topic 1. The contribute of organizational variables on outcomes, beyond the JDC (-S) variables. In chapter 3, we examined in two groups of nurses (Italian and Dutch) how and to what extent various organizational variables from the Tripod accident causation model would make an independent

contribution in explaining occupational and general well-being, beyond that attributed to the JDCS constructs. The Tripod model posits that the causes of accidents at workplace are not random events, but are elicited by psychological precursors (e.g., attitudes, expectations, motives, emotional worry). These psychological precursors, in turn, are caused by the latent failures, namely dysfunctional aspects of the organizational environment: e.g., understaffing, and having to work with poor equipments. In our study we considered as organizational variables: financial reward; personnel resources; work agreements and material resources. We found that organizational variables significantly add to the prediction of most distress/wellbeing outcomes, beyond the effects of the JDCS variables.

Topic 2. Could the lack of support for the buffer hypotheses of the model(s) be attributable to the use of general scales to assess the JDC (-S) dimensions ? In literature several authors suggested that more occupation-specific measures might be required to adequately assess the moderating effect posited by the JDC (-S) model. In chapters 3, 5, 6 and 7 a specific measure developed with the purpose of assessing nurses' psychosocial job characteristics was adopted. However, we found limited support for buffer hypotheses. This finding is line with the results of the systematic review presented in the chapter 3. We reviewed 43 studies on the JDC (-S) model in relation to psychological distress and well-being, involving nurses and published in English language journals from 1979 to 2010 (inclusive). The review shows that the (iso)strain hypothesis is more intensively studied than the buffer hypotheses, and results are more supportive for the (iso)strain hypothesis than for the buffer hypotheses. Buffering effects of job control in the relationship between demands and outcomes were found in 9% of the tests. The limited number of studies that investigated the three way interaction hypothesis of the JDCS model did not permit any conclusions about the validity of this hypothesis.

Topic 3. Is the JDC (-S) model cross-national generalizable across different countries ? Chapter 3 presents the results of a cross national where we tested the effects of JDC(-S) dimensions on several strain reactions in two samples of academic nurses working in different European health care contexts, i.e. Italian and Dutch nurses. We found that Italian nurses experienced higher job demands, and lower social support from colleagues, than their Dutch counterparts. Italian nurses also report lower levels of job satisfaction, and higher levels of emotional exhaustion, depersonalization, and somatic complaints than the Dutch nurses. In a less favourable work situation in terms of demands and resources (i.e., Italian health care system), understaffing has a stronger impact on nurses' well-being. These findings suggest that the health care context has indeed its impact on nurses' emotional exhaustion and somatic complaints partly through less favourable psychosocial job characteristics (high work and time pressure, high physical demands, low support from colleagues).

Topic 4. What is the role of individual variables in the relationships between psychosocial job characteristics, on the one hand, and psychological well being and distress on the other hand ? This issue is addressed in chapters 4, 5 and 6. In the chapter 4 we described the development and psychometric qualities of the Occupational Coping Self-Efficacy scale for Nurses (OCSE-N). This questionnaire measures the individual's beliefs about one's ability to cope with the specific occupational stressors of nursing profession. In the chapter 5 we aimed to extend the JDC(S) model analyzing the direct and interactive role of occupational coping self efficacy (OCSE). We found that OCSE accounted for additional variance (2% to 6%) in all outcomes, after controlling for the JDC (-S) variables. In addition, the results indicate that occupational coping self efficacy buffers the impact of low job control on distress. Low control was detrimental only for nurses with low occupational coping self efficacy. In chapter 6 we analyzed the mediating role of personal goal facilitation through work (PGFW), defined as perceptions of the extent to which one's job facilitates the attainment of one's personal goals, in the association between JDCS variables and psychological distress and job-related well being. The results provided support for the mediating effects of PGFW between all psychosocial job dimensions and all outcomes, except in the case of depersonalization.

Topic 5. What are the across-time effects of changes in JDC(S) dimensions on burnout indicators ? In chapter 7 we tested the JDC(-S) model longitudinally and analyzed if changes in psychosocial job variables are related to (changes in) burnout dimensions. Results revealed that the blocks that included the changes in job conditions explained additional significant variance (between 4% and 18%) in the burnout dimensions measured at Time 2. The study provided support for associations between changes in psychosocial job variables and changes in burnout dimensions across time.

Chapter 8 describes the methodological limitations, assets, theoretical as well as practical implications, and recommendations of the aforementioned results. We can conclude from this thesis that it is advisable to extend the JDC (-S) model, considering organizational and individual variables. Furthermore, it is recommended to develop interventions aimed to improve employees well being by improvement of their work situations and to evaluate these kind of intervention in (quasi-) experimental longitudinal design.

Summary in Dutch

Samenvatting

Dat verpleegkundig personeel risico loopt op het ervaren van stress en burnout wordt breed onderkend. De aard en de organisatie van het werk maken het verpleegkundig beroep inherent moeilijk. Onderzoek benadrukt dat werkstress grotendeels afhankelijk is van de psychosociale werkkenmerken, zoals werkeisen (job demands) en hulpbronnen in het werk (job resources). De studies die opgenomen zijn in dit proefschrift richten zich op de relaties van werk stressoren en hulpbronnen, geoperationaliseerd op basis van het Job Demand Control Support model, met verschillende uitkomstmaten (zoals burnout, psychologische en somatische klachten, en verminderde arbeidssatisfactie) onder verpleegkundigen. Het Job Demand Control Support model veronderstelt dat drie werkkenmerken centraal staan als het gaat om de invloed van de arbeidssituatie op de gezondheid en het welbevinden van werknemers: de werkeisen (job demands), de regelmogelijkheden (job control) en de sociale steun van collega's en leidinggevende (support). Het model voorspelt dat gezondheid en welbevinden het sterkst bedreigd worden in een situatie van hoge werkeisen, lage controle, en lage sociale steun. Daarnaast wordt verondersteld dat hoge regelmogelijkheden en hoge sociale steun een bufferende werking hebben op de negatieve invloed van hoge werkeisen op gezondheid en welbevinden.

In hoofdstuk 1 onderscheiden we vijf hoofdvragen die richting geven aan het in dit proefschrift beschreven onderzoek naar het JDCS model: (1) naast de invloed van de JDCS constructen, wat is de bijdrage van organisatorische factoren op psychologisch welbevinden en distress? (2) Is het ontbreken van ondersteuning voor de buffer hypothesen van de model(len) toe te schrijven aan het gebruik van algemene (in plaats van beroepsspecifieke) schalen voor de meting van de JDCS constructen? (3) De derde vraag heeft betrekking op de validiteit van het JDCS model in verschillende landen. Is het JDCS model cross-nationaal generaliseerbaar? (4) Wat is de rol van individuele variabelen in de relaties tussen de psychosociale werkkenmerken aan de ene kant, en welbevinden en distress aan de andere kant? (5) De vijfde vraag betreft de longitudinale effecten van psychosociale werkkenmerken op een specifieke werkgerelateerde uitkomstmaat. Wat is het effect van *verandering* in de JDCS kenmerken op burnout?

Deze thema's zijn behandeld in de hoofdstukken 2 tot en met 7, en de voornaamste resultaten worden hieronder samengevat.

Resultaten

Thema 1. De aanvullende bijdrage van organisatorische factoren op uitkomsten, naast de JDCS variabelen. In hoofdstuk 3, hebben we in twee groepen van verpleegkundigen (Italiaans en Nederlands) onderzocht hoe en in welke mate organisatorische variabelen van het Tripod model een onafhankelijke bijdrage leveren in de verklaring van werkgerelateerd en algemeen welbevinden, naast de JDCS factoren. Het Tripod model veronderstelt dat de oorzaken van ongevallen op de werkplek niet willekeurige gebeurtenissen zijn, maar zijn ontstaan door psychologische precursoren (bijvoorbeeld attitudes, verwachtingen, motieven, emotionele zorgen). Deze psychologische precursoren, op hun beurt, worden veroorzaakt door latente fouten, te weten disfunctionele aspecten van de organisatie: bijvoorbeeld onderbezetting en inadequate apparatuur. In ons onderzoek hebben we de volgende organisatorische variabelen meegenomen: financiële beloning; personele middelen; procedures en regels, en materiële middelen. We vonden dat deze organisatorische variabelen bijdroegen aan de voorspelling van de meeste welbevinden/distress maten, in aanvulling op de effecten van de JDCS variabelen.

Thema 2. Is het ontbreken van ondersteuning voor de buffer hypothesen van het model toe te schrijven aan het gebruik van algemene, m.a.w. niet beroeps-specifieke, schalen voor de beoordeling van de JDCS dimensies? In de literatuur wordt door verschillende auteurs voorgesteld dat meer beroeps-specifieke maten nodig zouden kunnen zijn om het bufferende effect zoals het verondersteld wordt in het JDCS model adequaat te onderzoeken. In de hoofdstukken 3, 5, 6 en 7 is een specifiek instrument gebruikt, ontwikkeld om psychosociale werkkenmerken bij verpleegkundig personeel te meten. We vonden echter slechts geringe ondersteuning voor de buffer hypothesen. Deze bevinding is in lijn met de resultaten van de systematische review gepresenteerd in hoofdstuk 3. In deze review zijn 43 studies uit de periode 1979-2010 naar het JDC(-S) model en psychologisch welbevinden en distress bij verpleegkundigen meegenomen. Hieruit blijkt dat de (iso)strain hypothese vaker onderzocht is dan de buffer hypothese, en dat de onderzoeken meer ondersteuning bieden voor de (iso)strain hypothese dan voor de buffer hypothese. De bufferende effecten van regelmogelijkheden in de relatie tussen werkeisen en uitkomstmaten werden gevonden in 9% van de toetsen. Het beperkt aantal studies dat het gezamenlijke bufferende effect van regelmogelijkheden en sociale steun onderzocht, maakte het niet mogelijk hierover een eenduidige conclusie te trekken.

Thema 3. Is het JDCS model cross-nationaal generaliseerbaar? Hoofdstuk 3 presenteert de resultaten van een cross-nationale studie waarin de relaties tussen de JDCS werkkenmerken en

stress reacties in twee onderzoeksgroepen van verpleegkundigen werkzaam in een verschillende Europese gezondheidszorgcontext, namelijk Italiaanse en Nederlandse verpleegkundigen. We vonden dat Italiaanse verpleegkundigen hogere werkeisen en lagere sociale steun van collega's ervaren in vergelijking met hun Nederlandse beroepsgenoten. De Italiaanse verpleegkundigen scoorden ook lager op arbeidssatisfactie en hoger op emotionele uitputting, depersonalisatie en somatische klachten dan de Nederlandse verpleegkundigen. Verder lijkt in een minder gunstige werksituatie in termen van werkeisen en middelen (d.w.z. in het Italiaanse gezondheidszorgsysteem) personele onderbezetting een sterkere negatieve relatie met het welbevinden van verpleegkundigen te hebben. Deze bevindingen suggereren dat de gezondheidszorgcontext inderdaad deels via minder gunstige psychosociale werkkenmerken (hoge werk- en tijdsdruk, hoge fysieke belasting, lage sociale steun van collega's) effect heeft op de mate van emotionele uitputting en somatische klachten van verpleegkundigen.

Thema 4. Wat is de rol van individuele factoren in de relaties tussen psychosociale werkkenmerken aan de ene kant, en psychologisch welbevinden en distress aan de andere kant? Dit thema is onderzocht in de hoofdstukken 4, 5 en 6. In hoofdstuk 4 zijn de ontwikkeling en de psychometrische kwaliteiten van de Occupational Coping Self-Efficacy (OCSE) schaal voor verpleegkundigen (OCSE-N) beschreven. Deze vragenlijst meet het vertrouwen in het eigen vermogen om met specifieke beroepsmatige stressoren binnen het verpleegkundig beroep om te gaan. In hoofdstuk 5 breiden we het JDCS model uit door de directe en interactieve rol van OCSE te onderzoeken. We vonden dat OCSE naast de JDCS werkkenmerken extra variantie (2%-6%) verklaart in alle uitkomstmaten. Bovendien laten de resultaten zien dat vertrouwen in het eigen copingvermogen een bufferende werking heeft op de relatie tussen lage regelmogelijkheden en distress. Lage controle was alleen nadelig voor verpleegkundigen met een laag vertrouwen in eigen copingvermogen. Tenslotte, in hoofdstuk 6 hebben we de mediërende rol van persoonlijke doelfacilitatie door het werk in de relatie tussen werkkenmerken en welbevinden/distress onderzocht. Persoonlijke doelfacilitatie door het werk betreft de mate waarin iemands werk bijdraagt aan de verwezenlijking van persoonlijke doelen. De resultaten bieden ondersteuning voor een dergelijke mediërende rol van persoonlijke doelfacilitatie in de relatie tussen alle psychosociale werkkenmerken en alle uitkomstmaten, met de uitzondering van depersonalisatie.

Thema 5. Wat zijn de effecten van veranderingen over tijd in de JDCS kenmerken op burnout? In hoofdstuk 7 is het JDCS model longitudinaal onderzocht en is nagegaan of (veranderingen in) de psychosociale werkkenmerken gerelateerd zijn aan verandering in burnout dimensies na 14 maanden. Met name veranderingen in werkkenmerken bleken een aanzienlijke proportie

additionele variantie (+ 4% tot +18%) te verklaren in de burnout dimensies op een later tijdstip. De resultaten van deze studie geven aan dat veranderingen over tijd in psychosociale werkkenmerken gepaard gaan met veranderingen in burnout.

Tenslotte, hoofdstuk 8 beschrijft de methodologische beperkingen en sterke punten van de uitgevoerde studies, en de theoretische en praktische implicaties en aanbevelingen op basis van de bovengenoemde resultaten. We kunnen concluderen dat het raadzaam is om het JDCS model aan te vullen met organisatorische werkkenmerken en daarnaast oog te houden voor individuele variabelen. Tenslotte is het aan te bevelen om interventies te ontwikkelen gericht op het verbeteren van psychosociale en organisatorische werkkenmerken om langs die weg het welbevinden van verpleegkundigen te bevorderen, en dergelijke interventies te evalueren in (quasi)experimenteel longitudinaal onderzoek.

Summary in Italian

Riassunto

Gli infermieri sono soggetti a rischio di stress e burnout. La natura e l'organizzazione del lavoro rendono la professione infermieristica intrinsecamente difficile. La ricerca evidenzia che le dimensioni psicosociali, quali le richieste e le risorse lavorative, influenzano il benessere e lo stress sul lavoro. Gli studi descritti nella presente tesi si focalizzano sulle relazioni tra stressor lavorativi e le risorse sul posto di lavoro operazionalizzate secondo il modello Domanda-Controllo e Sostegno Sociale, da un lato, e le ripercussioni sul distress degli infermieri (burnout, disturbi psico-somatici, e diminuita soddisfazione lavorativa) dall'altro.

Il modello Domanda /Controllo/Sostegno sociale (DCS, Karasek e Theorell, 19901) si basa su tre fattori chiave: *le richieste lavorative o la domanda* (job demands), ossia la percezione dell'insieme delle caratteristiche stressogene lavorative (es. la pressione temporale, l'ambiguità di ruolo, etc); la *percezione di controllo,* (job control) vale a dire la percezione di discrezionalità nell'organizzare il proprio lavoro (*decision authority*), anche attraverso differenti modalità (*skill variety*), e il *sostegno sociale*, che si riferisce alla sensazione di far parte di una rete costituita da legami affettivamente appaganti all'interno dell'organizzazione e di poter contare su relazioni di reciproco aiuto da parte di colleghi e supervisori. Secondo il modello, la percezione di alte richieste, basso controllo e basso sostegno sociale sono particolarmente nocive per il benessere psicologico di chi lavora (ipotesi additiva; *main effects*). Inoltre, secondo il modello, sia il controllo che il sostegno sociale agiscono da moderatori (*buffer effects*) degli effetti deleteri delle richieste lavorative sul benessere psicologico. Nel capitolo 1 della presente tesi sono descritti cinque quesiti in grado di ampliare la comprensione del modello Domanda/Controllo/Sostegno sociale. Più in particolare: (1) oltre le dimensioni del modello, qual è il contributo delle variabili organizzative sul benessere e sul distress psicologico? (2) La mancanza di supporto empirico per le ipotesi moderatrici (buffer) del modello potrebbe essere attribuibile all'uso di scale generali per misurare le dimensioni del modello DCS? (3) La terza questione riguarda la validità del modello DCS in diversi paesi. Le assunzioni del modello sono generalizzabili nei diversi contesti nazionali? (4) Qual è il ruolo delle variabili inerenti l'individuo nelle relazioni tra le dimensioni psico-sociali, da un lato, e il benessere psicologico e il distress, dall'altro? (5) Il quinto quesito riguarda gli effetti longitudinali delle dimensioni psicosociali del modello DCS su un costrutto specifico di stress psicologico. Quali sono gli effetti delle fluttuazioni temporali delle dimensioni del modello DCS sulle variazioni di ciascun indicatore del burnout?

Tali questioni sono state affrontate dettagliatamente nei Capitoli 2-7 e i principali risultati sono sintetizzati di seguito.

Risultati

I Questione. Il contributo delle variabili organizzative sul benessere e sul distress psicologico. Nel capitolo 3 abbiamo esaminato in due gruppi di infermieri (italiano e olandese) come e in quale misura le variabili organizzative del modello "Tripod" sulla sicurezza lavorativa siano in grado di incidere indipendentemente rispetto alle dimensioni del modello DCS sul benessere/distress psicologico. Secondo il modello "Tripod" le cause degli infortuni sul luogo di lavoro non sono eventi casuali, ma sono provocati da precursori psicologici (ad esempio: atteggiamenti, aspettative, motivazioni, stati affettivi). Questi, a loro volta, sono causati da dimensioni disfunzionali del contesto organizzativo, ad esempio la carenza di personale, il dover lavorare con attrezzature scadenti, etc. Nel nostro studio abbiamo considerato come variabili organizzative disfunzionali: la qualità della remunerazione economica, la percezione che nell'organizzazione vi sia un adeguato numero di dipendenti, il rispetto delle norme procedurali e la qualità delle risorse materiali dell'organizzazione. Dopo aver valutato il ruolo delle variabili del modello DCS, abbiamo trovato che le variabili organizzative predicono porzioni significative di varianza nella spiegazione del benessere e del distress.

II Questione. La mancanza di sostegno per le ipotesi "buffer" potrebbe essere dovuta all'utilizzo di misure generali delle dimensioni del modello DCS ? In letteratura diversi autori hanno suggerito che misure maggiormente *occupation-specific* dovrebbero essere sviluppate per valutare adeguatamente gli effetti "*buffer*" assunti dal modello DCS. Per esaminare le assunzioni del modello DCS, nei capitoli 3, 5, 6 e 7 è stata utilizzata una misura sviluppata con lo scopo di valutare le specifiche dimensioni psico-sociali del lavoro degli infermieri. Abbiamo trovato, tuttavia, un supporto limitato per ipotesi "*buffer*". Questo risultato è in linea con i risultati della rassegna presentata nel capitolo 3. Abbiamo esaminato 43 studi che hanno preso in esame le ipotesi del modello DCS in relazione al benessere e al disagio psicologico in popolazioni di infermieri, e pubblicati in riviste internazionali tra il 1979 e il 2010 (inclusi). L'analisi effettuata dimostra che l'ipotesi additiva è stata più intensamente investigata rispetto alle ipotesi *buffer*; inoltre i risultati hanno evidenziato una maggiore conferma per le ipotesi additive che per le ipotesi *buffer*. L'effetto moderatore del controllo nella relazione tra richieste lavorative (job demands) e distress è stato riscontrato nel 9% degli studi. Il numero limitato di studi che hanno indagato l'interazione a tre vie (domanda X controllo X sostegno sociale) del modello DCS non ha consentito alcuna conclusione circa la validità di questa ipotesi.

III Questione. Il modello DCS è generalizzabile nei diversi contesti nazionali? Nel capitolo 3 sono presentati i risultati di uno studio cross national, in cui abbiamo esaminato le assunzioni del modello DCS in due gruppi di infermieri attivi in policlinici universitari di due nazioni caratterizzate da diversi contesti sanitari: l'Italia e l'Olanda. Gli infermieri italiani hanno evidenziato maggiori livelli di richieste lavorative e minore sostegno sociale da parte dei colleghi, rispetto agli infermieri olandesi. Inoltre gli infermieri italiani hanno

riportato minori livelli di soddisfazione lavorativa e maggiori livelli di esaurimento emotivo, depersonalizzazione e disturbi somatici rispetto ai colleghi olandesi. Da un punto di vista organizzativo la situazione italiana è quella che si è caratterizzata come meno favorevole in termini di richieste lavorative e di risorse; tra le dimensioni organizzative la carenza di personale ha un impatto maggiore sul benessere degli infermieri. Il differente contesto sanitario influenza l'esaurimento emotivo e i disturbi psicosomatici in parte attraverso le condizioni psicosociali meno favorevoli (la percezione di maggiore pressione temporale, elevate pressioni fisiche, lo scarso sostegno da parte dei colleghi)

IV Questione. Qual è il ruolo delle dimensioni inerenti l'individuo nelle relazioni tra le dimensioni del modello DCS, da un lato, e le variabili di distress e benessere psicologico dall'altro? Tale questione viene affrontata nei capitoli 4, 5 e 6. Nel capitolo 4 abbiamo descritto lo sviluppo e le qualità psicometriche dell' Occupational Coping Self-efficacy per infermieri (OCSE-N). Il questionario misura le credenze individuali sulla capacità di far fronte agli specifici fattori stressogeni della professione infermieristica. Nel capitolo 5 ci siamo proposti di ampliare il modello DCS analizzando il ruolo diretto e interattivo dell' OCSE. I risultati delle analisi di regressione multipla hanno mostrato che l'OCSE aggiunge significative porzioni di varianza in tutte le variabili criterio (2% al 6%), dopo aver controllato l'azione delle dimensioni del modello DCS. I risultati, inoltre, indicano che le credenze di autoefficacia moderano (effetto buffer) l'impatto di scarso controllo sul lavoro in tutte le variabili di distress. La percezione di basso controllo era dannosa solo per gli infermieri con una bassa efficacia di fronteggiamento delle situazioni stressanti. Nel capitolo 6 abbiamo analizzato il ruolo di mediazione del Personal Goal Facilitation through work (PGFW), definita come la percezione della misura in cui il lavoro facilita il raggiungimento dei propri obiettivi personali, nell' associazione tra le variabili del modello DCS e alcune dimensioni di distress e benessere psicologico. I risultati hanno fornito supporto per gli effetti mediativi del PGFW tra ciascuna dimensione del modello DCS e tutte le variabili dipendenti, eccezion fatta per la depersonalizzazione.

V Questione. Quali sono gli effetti delle fluttuazioni temporali delle dimensioni del modello DCS sulle variazioni temporali degli indicatori di burnout? Nel capitolo 7 abbiamo analizzato longitudinalmente il modello DCS e se i cambiamenti nelle variabili psicosociali di lavoro sono legati a (variazioni) nelle dimensioni del burnout. I risultati hanno rivelato che i blocchi che includevano i cambiamenti nelle condizioni di lavoro spiegavano porzioni di varianza aggiuntiva significativa (tra il 4% e 18%) sulle variazioni temporali degli indicatori di burnout. Lo studio ha fornito supporto per l'ipotesi inerente le associazioni tra i cambiamenti nelle variabili psicosociali di lavoro e le variazioni delle dimensioni del burnout attraverso il tempo.

Il capitolo 8 descrive i limiti metodologici, le implicazioni teoriche e pratiche, e le raccomandazioni derivanti dai risultati. Possiamo concludere che è opportuno estendere il modello DCS, considerando le variabili organizzative e individuali. Si raccomanda, infine, di sviluppare interventi mirati a migliorare il

benessere personale attraverso il miglioramento delle condizioni psicosociali sul posto di lavoro e valutare questo tipo di intervento in disegni (quasi-)sperimentali con disegno longitudinale.

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Curriculum Vitae

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Renato Pisanti was born in Caserta, Italy on 21 December 1970. After high school (secondary school for math and science - liceo scientifico - "Nino Cortese" at Maddaloni (CE) Italy) he started his University studies at the "Sapienza" University of Rome, where he received his Master's degree in Organizational Psychology in 1995. His master thesis "Fear communications in anti-drugs spots: the effects among adolescents " was awarded with a fellowship by the Italian Institute of Social Medicine as "Best study in Preventive Medicine" in 1996. In the following year he attended a one year specialization course (Corso di Perfezionamento) in Health Psychology at the Department of Psychology of "Sapienza" University of Rome. During this course he attended the Advanced Erasmus Course in Health Psychology at Thessaloniki (Greece) coordinated by Professor Stan Maes, and he joined the "Euroteach" research network. After completing the civil service, he moved for one year to the Clinical and Health psychology section of Leiden University. During this time he completed the Italian part of the Euroteach study on occupational stress in secondary school teachers. He returned to Italy in 1999. During the subsequent eight years he worked first as research assistant, later as consultant in various departments of the Italian Health Ministry. Moreover he attended a 4-year Clinical program at "Sapienza" University of Rome. He specialized in Health Psychology and graduated in 2003. He embarked on his PhD research in Clinical and Health Psychology section of Leiden University in 2007 and completed the present thesis in December 2011.