

**OCCUPATIONAL STRESS: A REVIEW OF THE LITERATURE  
RELATING TO MENTAL HEALTH**



**Alessia D'Amato  
Fred R.H. Zijlstra  
University of Surrey  
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## OCCUPATIONAL STRESS: A REVIEW OF THE LITERATURE RELATING TO MENTAL HEALTH

A great deal of research has been conducted in the last decade to assess occupational stress and its relationship to mental health and psychological disorders. This paper attempts to provide a framework for examining this work, with the dual objectives of summarizing the existing psychological literature and to highlight prominent structural frameworks defined over the years and empirically tested and their usefulness for further empirical research. The most important results and new directions for research are discussed.

### **1 Introduction**

The concepts of occupational stress and psychological health have been widely studied. Many researchers and professionals have looked at the relationship between both concepts of which the large amount of literature in this domain give evidence. Even in the last ten years, the psychological and medical research produced hundreds of articles and papers on this subject.

The aim of this paper is to present a systematic review of the literature in the area of stress and mental health of the last ten years in order to find out whether there are relations between specific job features or characteristics and mental health disorders and reduced psychological well-being. First the main theoretical frameworks used in this domain will be discussed, and subsequently the empirical studies that were published in the last ten years. Special attention will be given to prospective studies (i.e. studies with a longitudinal design), since these studies can possibly show causal relationships between specific job or work related factors and psychological well-being or mental health disorders.

In order to achieve this aim an extensive summary of the various studies undertaken over the last ten years will be provided.

Various techniques and approaches have been used, both quantitative and qualitative techniques, to present an overview of the relevant literature. After discussing some relevant definitions and the methods for the literature search an Exploratory Analysis of the articles that were found will be presented. This is a technique based on analysing the content of the abstracts accompanying each article or chapter, and try to observe if there are certain trends noticeable in topics that are discussed in the literature. Hereto a special technique called Correspondence Analyses is used that will help to try to quantify the observed tendencies. This technique allows to check whether in specific periods of time particular concepts, or keywords, etc. have been used significantly more often (or less) than in other periods. In this way specific trends in the literature can be identified.

Next the various empirical contributions to the stress/strain literature are presented and discussed. These are presented under the headings of the major theoretical frameworks that have guided the empirical studies in this area: Lazarus & Folkman's cognitive/transactional model, Karasek's Job Demand-Control/Support model, and Siegrist's Effort-Reward Imbalance model.

Subsequently conceptual and methodological issues that are critical to the study of job stress and mental health will be discussed. Particular attention will be given to the debate on using longitudinal studies versus cross-sectional designs. Also the role of demographic variables and other moderating/mediating variables will be discussed.

However, we will first explain the procedures we used to search the literature, as well as the subsequent technique that was used for the Exploratory Analyses. An Appendix with the summary of important studies and cues is provided.

Finally, this paper will conclude with a discussion of the findings, and general conclusions and suggestions for future research in the area of stress at work and mental ill-health.

## 2 Stress and mental health: definitions and rationale

Stress is a somewhat ambiguous concept. After the concept was introduced by Selye (1950) in the fifties it has been used in many ways, often without exactly specifying what is meant. Therefore it is often seen as an ‘umbrella concept’, i.e. an unspecific and general concept, indicating a field of research where many different topics have been studied – e.g., physiological changes, work dissatisfaction, mental disorders, sexual problems, absenteeism, violence, and even accidents (Buunk, de Jonge, Ybema, de Wolff, 1998).

From a psychological perspective stress has often been defined as an unfavourable person-environment relationship (Lazarus, Folkman, 1984), which is related to negative psychological and/or physical health (Murphy, Schoenborn, 1987; Brown, O’Brien, 1998). This definition includes that stress should be conceived as a multidimensional construct which can include the *perception* of, or *responses* to events and environmental factors. Stress is often considered to be primarily an emotional process, but can affect physical health as well.

Historically, four main approaches in the area of stress research can be distinguished:

1. Stress as a *stimulus*, i.e. an external load or demand originating from an event or situation that affects the individual and is potentially harmful;
2. Stress as a psychological or physiological *response* of the organism to external stimuli;
3. The interactional approach, which describes stress as a *process* where the organism responds to particular situations or events (i.e. stressors) by developing strain reactions;
4. The cognitive appraisal approach, which defines stress as the response when people appraise a situation and *perceive* an imbalance between the demands imposed upon them and the resources they have available to meet those demands (Moore, Cooper, 1998; Buunk et al., 1998).

The models that are currently most prominent have been built under the last theoretical framework, and therefore a widely accepted definition of psychological stress is:

*“A relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being” (Lazarus, Folkman, 1984; p.21).*

Based on this definition, both in the academic and in the professional field, various interpretations of the stress concept have been developed: “Stress is the adverse reaction people have to excessive pressure or other types of demands placed upon them”. And it is believed that there is a straightforward relation between poor work organization and subsequent ill health (<http://www.hse.gov.uk/stress>). Others have characterized stress as the imbalance between the resources/capacities that individuals have available and the demands imposed upon that individual (Re, 1998) and when this imbalance is normally seen as leading to the deterioration of psychological well-being.

Studying the relation between job characteristics, stress and mental health is extra complicated by the fact that the concepts have been used interchangeable: stress has been conceived as the result of detrimental working conditions, but also as causing poor conditions. Terms such as job stress, occupational stress have been used both as *input variables*, and, together with work stress, job strain and mental health or psychological disorders, have also been conceptualised as *outcomes* of a process that is referred to as stress. This makes it usually rather difficult to make a clear distinction between input and output. In particular if we take into account that burnout (often seen as a specific form of a stress reaction) is also often used as a synonym of poor men-

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tal health. Different constructs are used to indicate mental health in the stress/strain process, sometimes they are called *negative emotions* as anxiety, depression, anger. Moreover stress can also be accompanied by non-specific tensions and physical sensations which can be labelled in different ways as well as their effect on cognitive and social processes (Buunk et al., 1998).

Warr (1994) has presented five main components of mental health in Western societies: a) affective well-being, b) degree of competence, c) level of aspiration, d) level of autonomy and e) basic functioning. But he pointed out that in occupational research the first three aspects usually receive most of the attention, and in his own research three facets are mentioned: depression, anxiety, and job satisfaction (Warr, 1990).

The following review aims to shed some light on the content of the constructs that are used, as well as the relationship between job stress and mental health. Although stress can have physical consequences as well as psychological consequences, the present review will focus primarily on the psychological consequences.

### **3 Methods of data collection**

The literature on work stress and mental health outcomes over a period including the years 1993 to 2002 was reviewed. Relevant publications were found through searching two major databases:

- *PsycINFO* (via *PsycINFO: psychological*)
- *Medline* (via *PubMed: biomedical*).

The first search concentrated on work- or job- related stress, and the second part of the electronic research focused on publications on mental health. In a third step the results of both searches was merged in a database which than contained only those articles that simultaneously focused on the above topics.

Two sets of keywords have been used to search the databases, see below (Table 1). The results are shown in Table 2.

In total 561 articles have been selected as potentially relevant. These articles have been screened as being relevant by reading the abstracts, and in cases of doubts, the whole article. A few papers were deleted because they obviously didn't match the purpose of the study. Moreover, some articles showed up in both searches, and therefore appeared twice in the final database.

***Table 1: Keywords used in the literature research<sup>1</sup>***

<i>Group</i>	<i>Key words</i>
1) <i>Key words related to work or job stress</i>	<i>Job stress</i> <i>Job related stress</i> <i>Work- and Worker-Stress</i> <i>Work related stress</i> <i>Occupational stress</i> <i>Job strain</i> <i>Work- and Worker- strain</i>

<sup>1</sup> Within each group of key words we used the Boolean term OR. Subsequently search 1 and 2 were combined, using AND.

	<i>Job stressors</i>
2) <i>Key words related to mental health</i>	<i>Mental health</i>
	<i>Psychological disorder*</i>
	<i>Psychological illness</i>
	<i>Mental illness</i>
	<i>Mental disorders..</i>
	<i>Mental disease*</i>

**Table 2. Number of hits by database.**

<i>Database/ search-engine</i>	<i>Nr of hits for work stress keyword</i>	<i>Nr of hits for mental health keyword</i>	<i>After combination</i>	<i>Journal Articles</i>
<i>PsycINFO</i>	4252	58054	556	400
<i>Medline (Pub- Med)</i>	1169	54072	165	161

In sum, the formal criteria used for including/excluding the documents was: (1) the presence in at least one of the two databases; (2) the content itself with regard to the goal of this review; (3) only papers were included when they were written in one of the official languages of the European Union. A total number of 477 articles were considered to be relevant for the Exploratory Analysis. These papers were obtained in hard copy.

As a second strategy citations of relevant articles in the publications found were used to identify other relevant publications that were missed in the electronic-search (i.e. the ‘snowball-method’). Also the personal archives of researchers were used. This, however, resulted in only a small number of additional papers to be included. Furthermore, a few articles that were found to be relevant, but were published before 1993, have also been included in the review when they were seen as particular relevant or of theoretical importance.

As part of the exploratory analyses a ‘Content Analyses’ has been carried out. Content Analysis is a technique that allows an “objective, systematic and quantitative description of the manifest content of communication” (Berelson, 1952; Krippendorf, 1980). This technique can be used to identify which topics have received more attention in the literature under review and thus to find trends in the existing literature. For this the abstracts of the articles are used, since they are believed to most adequately represent the content of the paper, since authors try to indicate what they think is most important in the abstract. The analyses then focuses on finding the main concepts used in the studies. This method can subsequently be of help in revealing topics that most papers have in common, as well as to what extent articles are looking at different topics. For this a technique called ‘Correspondence Analysis’ is used.

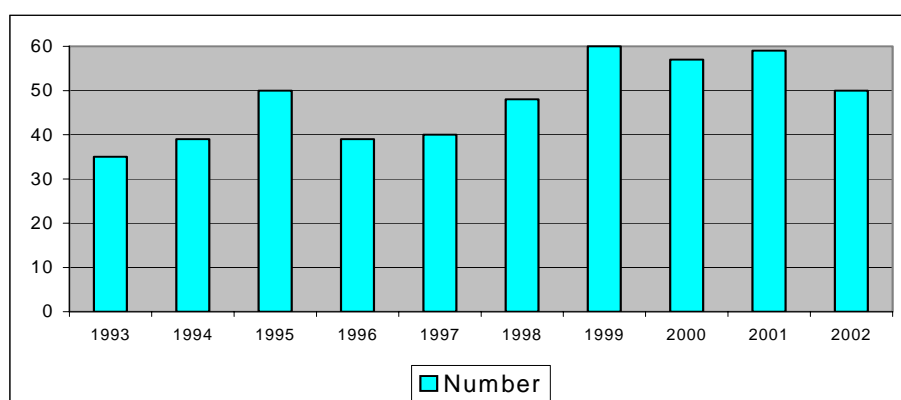
Correspondence Analysis (CA) has been used as a tool for Content Analysis to identify patterns in concepts and constructs that apparently are linked together. The software programme that is used with this technique (SPAD-T; 1989; 1993) is a programme for textual analyses. It identifies similarities in words, that are potentially referring to the same constructs. In order to allow the programme to analyse these texts a *dictionary* of constructs, terms, and concepts has to be created first. (For a detailed description of the method see Doise et al, 1995; Cemin & Colini, 1999; Krippendorf, 1980). Texts are screened by the software with regard to similarities and distances of the concepts and constructs. This means that the programme indicates which keywords (concepts, constructs, etc.) are represented most frequently in the various articles, and which keywords appear most frequently together in articles. The procedure has some similarity with exploratory factor analyses, it extracts communalities from the data, but can be used both for numerical and non-numerical data, and the second approach has been used in this paper.

Evidently, after the abstracts have been screened by the Correspondence Analyses, it is also necessary to look at the articles as well, since the articles contain the empirical information of the study that is presented. The Content Analysis is thus not only based on the abstracts, but takes the whole article into account. This information evidently is necessary to assess the relevance and importance of the articles.

#### 4 The Exploratory Analysis: Electronic research and Content Analysis

In Figure 1 a distribution of the number of papers retrieved from the literature search is presented. As mentioned, 477 papers were included, distributed over a ten year period, resulting in a range of 35 to 60 per year.

Figure 1: Distribution of articles over the ten years.



When reading the papers it became clear that some papers were more representative than others to describe what was going on in the field, and it also became apparent that some trends were present over the period under study.

In the Correspondence Analyses the degree of association between the articles that were published in each year was measured. The basic assumption is that there is no systematic association between the articles and the years, or in other words, that there is no correspondence between columns (years) and rows (articles/keywords). If an association is found this suggests that in a particular year a substantial number of articles in a particular year are more closely associated with each other than with articles published in other years.

The results suggest that 9 different dimensions (or factors) can be distinguished (see Table 3), explaining all the variance in the articles. However, as with exploratory factor analysis, not all dimensions are as meaningful and interpretable, therefore a decision rule is needed to decide how many factors we need to display the most important part of the variance in terms of the content of articles. The 'valeur propre' (the programme is French, this term can best be translated with eigenvalue) indicates the 'eigenvalue' of the dimensions, and the right part of Table 3 can be seen as a 'scree plot'. This indicates that the biggest kink in the curve (from top to bottom) is after three factors. These three factors are considered to be the most representative, and together explain 42.1 % of the total variance (inertia), since the other factors do (individually) not explain much variance anymore.

The next step is trying to interpret the three factors in order:

- to find out the what the core topics are in the international literature with respect to studies on stress and mental health;
- to highlight common patterns or variations within the research in this field.

**Table 3: Histogram of the 9 factors**

NUMERO	VALEUR PROPRE	POURCENT.	POURCENT. CUMULE	
1	.0557	16.03	16.03	*****
2	.0485	13.95	29.99	*****
3	.0422	12.15	42.14	*****
4	.0403	11.59	53.73	*****
5	.0383	11.01	64.74	*****
6	.0345	9.93	74.66	*****
7	.0320	9.22	83.89	*****
8	.0295	8.48	92.36	*****
9	.0265	7.64	100.00	*****

The CTR (contribution absolute) (Table 4) indicates the weight/contribution of the each year on the various factors (F1 to F5).

**Table 4.** EDITION DES COORDONNEES ET CONTRIBUTIONS DES COLONNES<sup>2</sup>

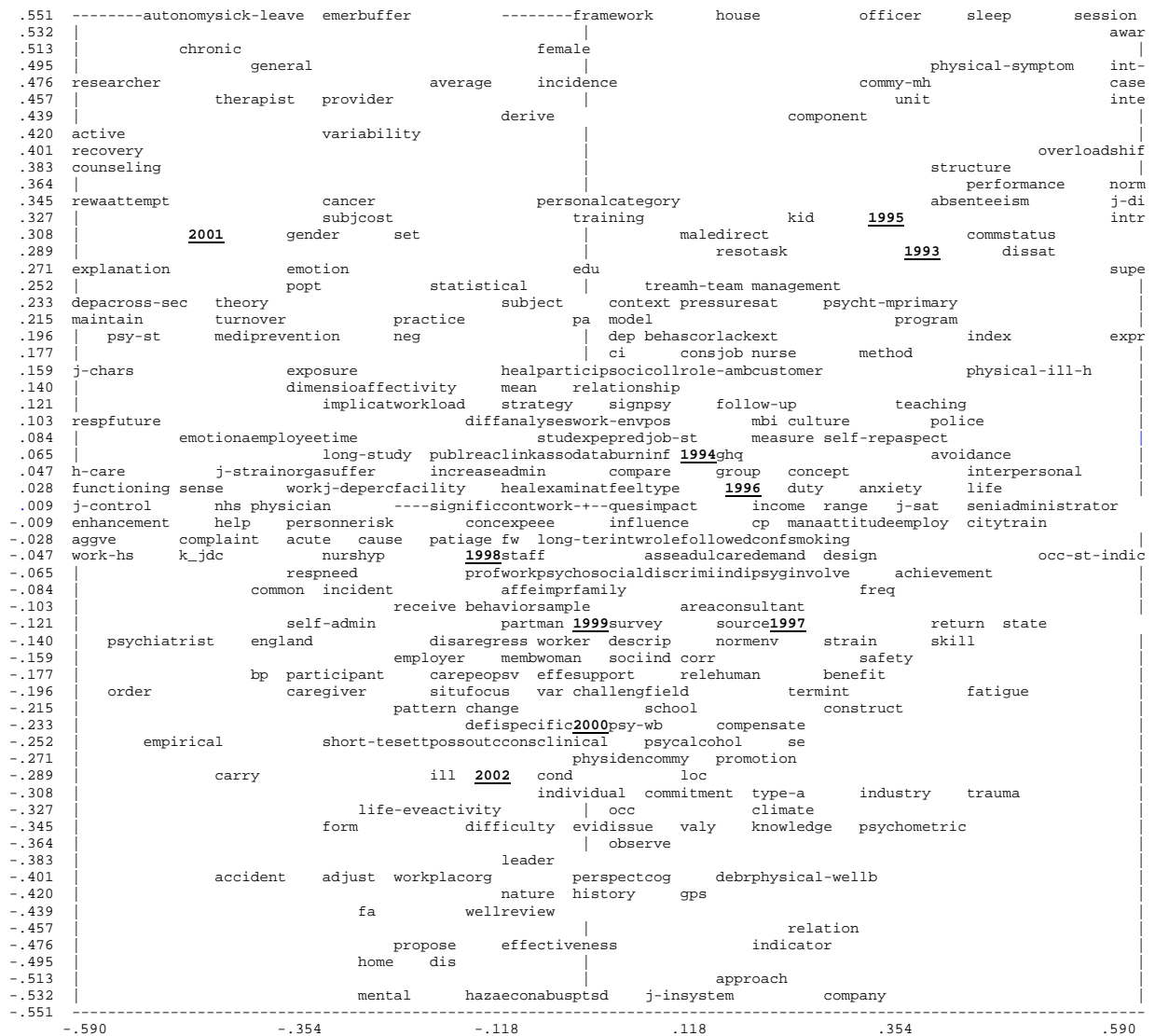
IDEN	LIBELLES	MASSES	DISTO2 *	CONTRIBUTIONS ABSOLUES *					
				F1	F2	F3	F4	F5	
200	2	.111		* 2.43	20.33	18.45	.00	.00	*
200	1	.148		*52.52	26.66	.00	1.29	.00	*
200	0	.121		* .00	14.61	4.40	2.51	.00	*
199	9	.136		* .00	5.12	36.30	6.78	.00	*
199	8	.094		* 1.85	.50	.03	14.54	.00	*
199	7	.084		* 3.66	2.95	8.40	19.87	.00	*
199	6	.075		* 4.11	.07	.22	24.90	.00	*
199	5	.089		*17.77	18.87	4.00	10.57	.00	*
199	4	.075		* 1.53	.56	.56	.75	.00	*
199	3	.066		*16.12	10.33	27.64	18.79	.00	*

As can be seen in Table 4, the first factor (F1) is primarily mainly determined (highest weights) by the year 2001, and 1995 and 1993. The second factor (F2) is primarily determined by the year 2001 as well, and secondly by 2002. Factor 3 (F3) is primarily characterised by 1999, 1993, and 2002. The graphical result of the CA is presented in Figure 2.

When looking at Figure 2 one should understand that topics (keywords) that are depicted close to the origins of the axis do not add much variance (have a low inertia), which means that they have been studied over the years in more or less the same quantity/degree. As on can see, the topics concerning mental health and job stress cluster in the centre (Fig. 2), and since the study concentrated on these two concepts this is in line with the goal of the study. The small inertia/variance (respectively .09 and .03 and .07 for health) indicates that no additional variance is explained by these topics. Similar results were found for the concept of burnout (inertia=.04), which demonstrates the central role of this concept in the stress/mental health research.

<sup>2</sup> The corresponding table for the rows has been produced.

Figure 2. Correspondence Analysis<sup>3</sup>



## 5 Interpreting the results of the Correspondence Analysis

The CA revealed that reorganization, recovery, social-network, reward and job characteristics are the keywords featuring on the far left side of the horizontal dimension (with negative loading) and in contrast on the far right side (with positive loading) of the same dimension the keywords supervisor, intention to leave, and job dissatisfaction can be found. The first group also describes research with a focus on explaining the relation between stress and strain, while the last studies appear to focus more on the actual situation and with no obvious interest in process.

<sup>3</sup> 86 point-doubles have been found in the analyses, therefore not all the items that are theoretically important have been highlight in the graphic.



A closer look at the results of the CA (looking at the full articles associated with the keywords) revealed that a trend is observable in the literature, which divides the earlier and more recent studies. The bulk of the studies at the beginning of the decade concentrated on identifying and describing occupational stressors and to highlight factors correlated with poor psychological health or mental well-being. The general assumption that there is a relation between stressful working conditions and mental ill health is generally accepted in this stage. Several studies show clear evidence that employees who work under stressful conditions are suffering of decreased mental health (see, e.g., Mishra, Somany, 1993) and that traumatic work-related events have psychological consequences (Wollman, 1993).

Sutherland and Cooper (1993) found that psychological ill health (anxiety, depression) was primarily predicted by high levels of job demands, demanding customers, lack of social support, coping strategies and administrative tasks. Warr (1994) also found that lack of decision latitude and high level of job demands were two important stressors that predicted anxiety and depression. Kirkcaldy, Furnham (1995) looked at social support as a moderating variable in the pathway from stress to mental health, but their hypothesis was not supported. Lack of social support appeared to be part of an overall job stress measure and did predict reduced mental/physical health and job satisfaction (Kirkcaldy, Cooper, Brown, 1995).

Other studies looked into the differentiation between various occupational groups (Marini, Todd, Slate, 1995) with regard to the relation between stressors and mental-health, and the influence of demographic variables or interventions, using cross-sectional studies (Carney et al., 1993; Turley et al., 1993; Travers, Cooper, 1993; Tsai, 1993; Kirkcaldy, Cooper, Furnham, 1993), with the exception of DiMatteo, et al (1993) who used a longitudinal design.

While in some studies stress and ill-health are considered to be an outcome of work as is job dissatisfaction, in other studies job stress is seen as causing dissatisfaction as well as mental health problems (Norvell et al., 1993; Schulz et al., 1995; Hromco et al., 1995). Several studies have demonstrated a great interest in job satisfaction in relation to the stress/strain process, this can be explained by the fact that both concepts are part of a complex cognitive appraisal process (Williams et al., 2002). Job satisfaction is therefore related to job stress, general job satisfaction as well as some specific facets of job satisfaction. General job satisfaction appears to be negatively related to burnout and psychiatric morbidity (Ramirez, Graham, Richard, Cull, Gregory, 1996).

Another topic that has received wide attention is the comparison of specific groups with general population norms (Sutherland, et al., 1993; Hromco et al., 1995; Carney et al., 1993).

Thus, the first period is characterized by research looking into the major stressors and their relation to mental health and job satisfaction (or dissatisfaction) as a facet of psychological well-being (Travers et al., 1993; Turley et al., 1993; Sutherland, Cooper, 1993; DiMatteo et al., 1993; Dollard et al., 1994; Singh et al., 1994; Hromco et al., 1995). In the last part of the decade under consideration the stress/strain models appear not to be a topic of study themselves but are mostly used as conceptual frameworks controlling and directing the studies in this domain. Also the interest in the comparison of groups of workers with the general population is still alive (Frank et al, 2001; Staven et al., 2001). Cropley et al. (1999) compared teachers with individuals with similar educational qualifications from a national survey and found that teachers experiencing high job strain are 5 times more likely to be screened positive for psychiatric morbidity. Also stress and mental health have received substantial attention in this period in relation to occupational or organizational changes (Siu et al., 1997; Pollard, 2001; Calnan et al., 2001;

O'Connor et al., 2000b). Also has the stress/strain process been linked to very serious psychological problems like suicide or suicide thoughts (Tyssen et al., 2001; Hawton et al., 2001).

Uncertainty about occupational future and role ambiguity during an organizational change appeared to be associated with reduction in mental health (Pollard, 2001). The three-waves studies by Vahtera et al. (2000) addressed the effects of downsizing on employees health and found that the interaction between job demands and social support, as well as the interaction between job control and social support predicted sickness absence, a facet of psychological illness. Sluiter (2001) demonstrated in a longitudinal study that workers were, on average, more distressed before a reorganization and shortly after the reorganization than at any other time. Also the topic of recovery from daily strains receives attention in studies. Recovery does lead towards decreases in levels of job stress and burnout and an increase in life satisfaction (Sluiter et al., 2001; Sonnentag, 2003).

In the second part of the ten year period we looked at, the organizational perspective in the relation between stress and mental health is clearly observable (Calnan et al., 2001; Van der Hulst, 2001; Tyssen et al., 2001; Rospenda, 2002) as well as the perspective of the occupation level (Finnoy, 2000) while in the beginning of the decade most studies seemed to focus on the role of personality variables (DiMatteo et al., 1993; Travers et al., 1993; Cooper, Kelly, 1993; Kirkcaldy et al., 1993; Eastburg et al., 1994; Warr, 1994).

A decade appeared to be an adequate time period to understand the development in research topics, which supports the choice to limit the analysis at the last ten years. This period illustrates, to some extent, the development of a framework as suggested by the first factor of the CA. When a new theoretical framework is presented the first period is devoted to demonstrating the stability and usefulness of the framework to understand the relationship between the phenomena and concepts under study (Schön, 1983 in Reichers & Schneider, 1990). What originally could be seen as a 'context-free' set of factors are thus firstly assessed and then described as part of coherent models or theories.

The first factor that emerged can be labelled *development* and shows the change of focus from an individual to an organizational perspective in the stress/strain research.

The second factor sheds light on the relation between various negative aspects of the work situation (i.e. abuse, hazards, and job insecurity) and coping strategies, also work- and non work issues are dealt with (such as recovery, reorganization, sick leave, social network in combination with domestic obligations). This suggests that the second factor can be labelled *third variables (issues/coping)*. The effects of violence/harassment experienced at work is moderated by demographic characteristics such as age and tenure and by physical and psychological working conditions. Aggression is usually associated with poor physical working environment, poor psychological climate (Soares, Lawoko, 2000) and has an impact on both: stressful working conditions and the outcomes in terms of psychological health. Relations between accidents and work-related stressors, as working long hours, and reduced well-being appear to be hard to demonstrate, while factors related to work content appeared to have some influence, such as having to deal with abused patients (Kirkcaldy, Trimpop, Levine, 2002; Tomasulo, 2002). Traumatic episodes related to work may be a turning point in people's life, and the response can either be adaptive or maladaptive, and subsequently lead to psychopathology (Wollman, 1993).

Interpersonal relationships have been demonstrated to be a significant antecedent of the stress/strain process when they are characterized by behaviour that is harassing or abusive (Rospenda, 2002). Thus harassment is seen as a possible job stressor, like as psychological demands and decision latitude, and affecting mental health. But also when workers are experiencing lack

of social support and lack of control over decisions, this can lead to psychological traumas (Denton et al., 2002). Scores on the General Health Questionnaire (indicating mental health problems) were higher when the demands exceeded the availability of skills, or when conflicting demands at work are experienced but also when work related violence and abuse are experienced (Balloch et al., 1998).

The opposite side of the second factor is described by coping and buffering strategies. Several models have been studied to understand the moderating or buffering effect of individual level variables between work attitudes and emotional well-being. Coping mechanisms have been widely studied in relation to stress and mental health (Travers et al., 1993; Turley et al., 1993; Kirkcaldy et al., 1993). Nurses who used active coping strategies - e.g. discussing problems with others - had less stress and burnout than those nurses who used passive strategies, such as consumption of alcohol (Kandolin, 1993). The combination of coping strategies with other buffering variables such as hardiness and social support was used to describe the process leading to burnout and mental ill-health as the result of workplace stressors (Duquette et al., 1994).

Coping responses appeared to have no effect on intention to leave or job satisfaction (Burke, 1994) but demonstrated to significantly affect the emotional well-being in terms of psychosomatic symptoms or, in general, mental health (Burke, 1994; Kirkcaldy, Furnham, 1995) and satisfaction (Sin et al., 1997). Cognitively oriented coping strategies appeared to be related to both Emotional Exhaustion and De-personalization (Brown, O'Brien, 1998).

It appeared to be difficult to find relations between sick leave and job stress and burnout (Onyett, et al., 1997) but it could be demonstrated to be a psychological consequence of job stress and intention to leave (Travers et al., 1993). The latter was the most highly related to mental ill health as a consequence of stress.

The third factor is more difficult to interpret. This factor encompasses keywords as leader/supervision and industry, managerial power, but also turnover and absenteeism and compensation, the power of the employees. At the opposite side of this factor keywords as job insecurity, accident and promotion, physical symptoms and accidents, the negative side of the power together with the external locus of control can be found. These are all concepts indicating that somebody else has the power.

Leadership style is also a predictor of both stress and poor psychological health in a male-dominated industry (Gardiner et al., 1999). Supervisor support is appears to be a buffering factor, it can be protective or even reduce role-stress and it is correlated with each dimension of burnout (Eastburg et al., 1994). Other studies also indicated that the managerial role is a significant source of stress and can affect people's mental health, particularly for managers at the middle level but not for the top management (Sin et al., 1997). Management practices also affect both perceived work stress and depression of those being supervised (Mackie, Holalan, Gottlieb, 2001).

Turnover is predicted by the organizational climate or the characteristics of the environment as well as by the feelings of burnout (Smoot et al., 1995). And the propensity to leave the job, together with 'emotional health' and satisfaction, is determined by stressors and coping strategies used (Hatotn, Emerson, 1995; Rahim, Psenicka, 1996). Job stress has direct and indirect effects on absenteeism, turnover rate and turnover intention (Siu, Cooper et al., 1997). Turnover intention was predicted by overall mental ill-health, but also job satisfaction and the use of hobbies as way of coping (Travers, Cooper, 1993).

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Onyett et al. (1997) hypothesized that positive outcomes would have been associated with role clarity, team's role, a sense of identification with the team and identification with profession or discipline.

Another topic that has received extensive attention is compensation claimed by workers for work-related psychiatric injury (Adler, 1999; U'Ren, U'Ren, 1999).

At the opposite side of the third factor Job insecurity has been discussed has an important stressor, both in terms of the objective situation and the individual's subjective perception. Three moderators -- individual differences, perceptions of fairness, social support -- have been identified in the relationship between consequences of job insecurity: such as work-related attitudes, job performance, physical health (insomnia, nausea, headaches), mental well-being, job-induced stress symptoms (Sverke, Hellgren, 2002). Job uncertainty is also found to be associated with behaviours like overcompensating and sexual harassment (Goldenhar et al., 1998).

Perceived levels of stress are greater for those with an external locus of control (Kirkcaldy, Shepard, Furnham, 2002). External locus of control predicted both mental health and physical health (Kirkcaldy, Cooper, Furnham, Brown, 1993) and lack of possibilities for promotion is a job stressor leading to mental ill-health.

In conclusion, the three factors described above account statistically, but also logically, for a large amount of variance in the literature. They describe the process, the problems related to the process, and the role of people in the process of communication and dissemination of the research results.

This process of Correspondence analyses appeared to be valuable in detecting trends in the literature. Evidently it is clear that for a full understanding of the literature one also has to look at the empirical results presented in the papers. This also is necessary to get an idea of how the constructs have been developed, what kind of rationale the authors have used for designing their studies and concepts (Krippendorf, 1980). We therefore feel that this first exploratory analysis of the literature is a useful step in order to understand the current state of the art of the literature in this domain, and will help to better understand the next step: a thorough examination of the major theoretical frameworks in this domain.

## **6. Stress and mental ill health: Theoretical Frameworks**

Historically, some theoretical models presented in the 70<sup>th</sup> and 80<sup>th</sup> have been influential in the stress literature. They have given more direction to both empirical research and development of theoretical frameworks other than other models have done. The most important ones will be briefly outlined below.

The Social Environment Model, firstly presented by French and Kahn at the University of Michigan (also known as the Michigan model) (French, Kahn, 1962), has been the starting point for a lot of stress studies in the 1970's. The model makes a distinction between objective and subjective (individuals' perceptions) aspects of work people's environment, and describes how these factors are interrelated and may lead to stress. This model has also been the basis for the Person-Environment-Fit model (French, Caplan, Harrison, 1982) which has been very influential. In this approach, stress is the interplay between objective and subjective components, both of the person and the work environment. Two sorts of incongruence have been underlined in this model as specially relevant for health:

- the experienced incongruence between the person's ability and the demands of the job;

- the experienced incongruence between the person's goals and aspirations and the supplies offered by the work environment.

Central in the P-E Fit model is the individual's appraisal and the coping behavior (defense mechanisms) in relation to stress reactions. Stress at work depends on high job demands in relation to the worker's abilities or resources, frustrated aspirations and dissatisfaction with valued goals (Pousette, Hanse, 2002). Defense mechanisms are supposed to reduce the subjective (perceived) misfit, while coping refers to strategies that may reduce objective misfit (Buunk, 1998).

The person-environment fit approach has been very useful as a starting point for various studies to study the relation between job characteristics (job stressors) and mental health outcomes (Burke, 1994; Rahim et al., 1996; Schulz et al., 1995). However, the majority of these studies have been conducted in the 70's and 80's and actually fall beyond the scope of this review. However, since the P-E fit approach has been influential it is worthwhile to be mentioned here.

In the remainder of this section we will focus our discussion on three prominent models that have been used as a basis for empirical research in the last decade – Lazarus, Folkman Transactional model, Karasek's Job Demand and Control/Support model, and Siegrist's Effort-Reward Imbalance model.

### **6.1 Stress-Appraisal-Coping Transactional Theory:**

The Transactional model (Lazarus & Folkman, 1984) describes the person and the environment in a dynamic, mutually reciprocal, bi-directional relationship and identifies a level of abstraction in which the person and the environment are taken together to form a new relational meaning. Both entities, person and environment, should be considered in their interdependencies.

Central assumption is the individual's cognitive appraisal of the environment. The individual evaluates and appraises each situation and determines whether that situation constitutes certain elements that are potentially threatening. This process then determines the individual's response to that situation. The response can include social, morale, and somatic health responses, new appraisal and coping. Two critical processes mediate the process: *cognitive appraisal*, the evaluative process that determines why and to what extent a particular transaction or series of transactions between the person and the environment is stressful; *coping*, is the process through which the individual manages the demands of the person-environment relationship that are appraised as threatening (i.e. stressful) and the emotions they generate (Lazarus, Folkman, 1984).

A variety of studies have been conducted under this framework: interventions, cross-sectional and longitudinal research. Tsai, Crockett's (1993), Holdsworth, Belshaw, Murray (2001) evaluated training workshops based on Lazarus et al. (1984) cognitive-behavioural model and specifically focused on training workers in coping with the work environment to reduce the stress related to work, But the results were inconclusive. In the study by Tsai et al. (1993) nurses participating in relaxation training experienced lower work stress and better mental health than a control group participating in a discussion of theory analysis. The strategy of appraisal (the relaxation training) revealed a significant main effect on the stress and mental health levels, but there was no interaction effect between treatment and time. Although the responses to stress showed to go through the same path of primary and secondary appraisal, time required for modifying health-related responses to stress differed from time required to reduce work-related stress and the results raised the question of whether psychological responses to work stress de-

velop more rapidly than conscious identification of the work-related stress responses (mental health).

Strain has been demonstrated to be the outcome relating to the person's previous experience, the success/failure in dealing with similar situations and the familiarity with the situation (Coffey, 1999). In particular when people have to deal with patients/clients that express threats they reported significantly more ill-health symptoms.

Similarly Singh, Goolsby, Rhoads (1994) argue that burnout occurs when stressors (job demands) exceed the individual's coping resources. Thus, even if job stressors and burnout are considered strictly related, the relationship with job outcomes can be described in a different way: by an inverted U curve for the former, and as linear and negative in slope for the latter. The study demonstrated that role stressors have a significant effect on burnout, but burnout as a mediator helps to uncover the positive, 'eustress'-type effects of role stressors. As the authors note, the effect of job stress on behavioural outcomes for one part of the range (positive slope) is inconsistent with the second part (negative slope) (Singh et al., 1994). In conclusion, burnout is a stronger predictor of job related mental health because it takes the cumulative effects and the individual coping resources into consideration. In line with the transactional approach burnout is defined as a psychological condition attained as an outcome of the stress appraisal process.

Under the Transactional process model, the role of commitment as part of the appraisal strategy in the pathway stress/strain is tested (Leong, Furnham, Cooper, 1996). The result of this study indicates that occupational stress was the only statistically significant predictor of mental and physical ill-health and Commitment appeared to be only a predictor for job satisfaction and intention to leave. Therefore commitment is not a moderator or an appraisal variable in the framework of the transactional model.

A different interpretation of the model is assumed by Tsai (1997), who aimed to develop a checklist of indicators of occupational stress. The author adopts the *transactional view* that suggests that the sources of stress are interactive with one's personal reactions, and one's response to stress in its turn affects social functioning, morale and somatic health. Four comprehensive factors endorsed the interaction between work stressors and nurses, leading the author to the conclusion that the results support the theoretical premise that nurse's work stress is the product of the interplay between the work setting, the patient's condition and the nurses' interpretation of these factors.

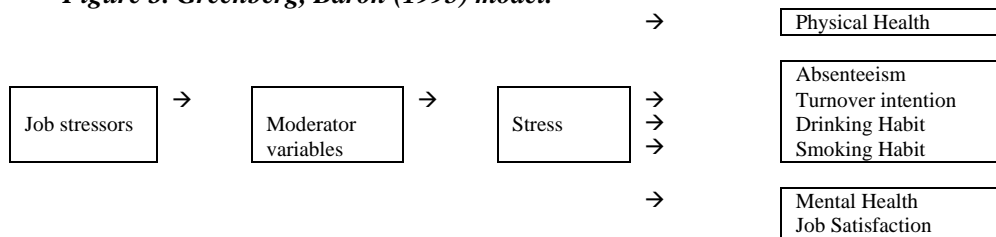
In a prospective study on suicidal thoughts (Tyssen et al., 2001) conducted in a nationwide representative sample of medical students, with data collection at two points in time with one year of interval, it was hypothesized that stressful working conditions were related to the occurrence of suicidal thoughts. In this study the researchers controlled for mental distress (depression and anxiety), personality and other possible predictors. Cross-sectional analysis showed that work related stress failed to predict suicidal thoughts when mental distress was entered in the model. Also at T2 the effects of job stress, vulnerability and not being married/cohabitant seem to disappear when mental distress was entered. Suicidal planning at T2 was predicted by mental distress and job stress. Mental distress and job stress failed to account for the change in the two periods of time. Job stress is related to mental health problems and need for treatment. The individual's perception (and appraisal) of work-related stress, in line with Lazarus' theory, is a stronger predictor of mental distress than objective measurements (Tyssen et al., 2000).

Lazarus et al. (1984) model was also confirmed by Williams et al. (2002) using structural equation modeling analysis, and where workplace conditions have been demonstrated to be the

major determinants of mental and physical health when job satisfaction and stress are used as moderators between dependent and independent variables. According to the theory, stressors (workplace conditions) are subjected to cognitive processes which results in an appraisal of stress (satisfaction, stress) resulting in perceived stress (mental and physical conditions).

Greenberg and Baron (1995) also proposed and tested a general stressor-strain model that can be interpreted in Lazarus' framework. In this model the moderators are the cognitive appraisal leading to stress and the last column contains the strain symptoms. The model was empirically supported by a study of Sin et al. (1995).

**Figure 3. Greenberg, Baron (1995) model.**



### 6.2 Karasek's Job Demand-Control/Support Model (JDC/S)

The Job Demand Control model postulates that a psychological work environment is characterized by the combination of the level of job demands and the level of job control. And the model predicts that the most adverse reactions, or psychological strain, occurs when the psychological demands are high and the worker' decision latitude (constraints in decision making or lack of control over the task) is low (Karasek, 1979). At the opposite workers exposed to high levels of demand are more able to cope with the sources of stress if they perceive they have a high degree of decision-making latitude and autonomy in the job.

Low social support at work further increases the risk for negative health consequences (Johnson, 1986; Johnson, Hall, 1988). The expansion of the model by including social support came from the realization that job control is not the only resource available for coping with job demands, but social support in the workplace may also function as a moderator of job demands (Buunk, et al., 1998).

The model was later expanded to a more dynamic version integrating the job strain and active behaviour hypothesis to predict strain development and learning over time (Karasek, Theorell, 1990; Karasek, Brisson, Kawakami, Houtman, Bongers, 1998). The most important interaction claimed in the model is that two separate sets of outcomes (strain and activity level) are jointly predicted by two different combinations of demands and control (p.143, Karasek, 1989). The strain hypothesis of the JDC model is supported when there are two main effects of job demands and job control and/or when there is a multiplicative interaction effect between these two work characteristics -- employees working in environments characterized by high demands and low control experience the highest level of strain, and the above-mentioned additive or multiplicative interaction effects of demands and control are complemented with a main or interaction effect of social support -- employees working in environments characterized by high demands, low control and low social support experience the highest level of stress (de Lange et al., 2003).

Thus, the assumption of Karasek's JDC model is that psychological strain (indicated by psychosomatic health complaints and mental fatigue) occur particularly in jobs with low decision latitude and low social support. While high work motivation as well as learning and develop-

ment opportunities will occur in jobs characterized by high demands, high decision latitude and high social support.

Karasek's model has probably been the most popular model to look at stress/strain process in the last decade, considering the number of studies demonstrating that for individuals involved in jobs with high demands, the amount of discretion is an important determinant of mental health and that the three dimensions of the JDC/S are significant independent predictors of stress (O'Connor et al., 2000b; Mausner-Dorsch et al., 2000; Calnan et al., 2001). Job demands in combination with other stressors (practice administration, interruptions, working environment, routine medical work, emotional involvement and work/home interface and social life) have been found to predict levels of mental ill-health (Rout, Cooper, Rout, 1996). Also, having immediate and direct feedback is a protective factor against burnout and psychiatric morbidity (Ramirez, Graham, Richard, Cull, Gregory, 1996). Good mental health is linked with having sufficient resources and good management practices, and having a high level of autonomy (Graham, et al., 1996).

In many studies it was demonstrated that increased levels of job strain are associated with mental ill-health: subjects in the high strain groups appear to be significantly more depressed than all the other groups and the same outcome was observed for anxiety levels and somatic complaints. At the opposite, high demand in combination with high control stimulate individuals to develop new behavioral patterns on and off the job.

The three dimensions of the Job Demand Control/support model were significantly related to mental health complaints: a negative relation for job control and social support, and a positive relation for job demands (Calnan et al., 2001). The logistic regression carried out with GHQ case ness as a dichotomous dependent variable to identify the relative influence of job content and other work characteristics, controlling for a range of independent variables, showed that (a) high job demands are twice as likely to be a GHQ case compared to those with low job demands; (b) low job control are just over twice as likely to be a GHQ case compared with those who have high job control; (c) low social support are 2.37 times more likely to be a GHQ case compared with those with high social support.

Tummers et al. (2001) demonstrated that high workload (high demand/low control) and limited social support lead to increased levels of Emotional Exhaustion.

Another partial confirmation of Karasek model as predictor of mental health can be found in Sluiter et al's. (2001) study. In the regression analysis the three factors predicted 29% of the variance of health complaint, consisting of poor Sleep Quality, Psychosomatic complaints, and Emotional Exhaustion. Job control had a weak influence on the prediction. When age and physiological factors were added (repeated measures of adrenaline and cortisol) the predictive power rose substantially ( $R^2=.53$ ) and job control contributed not significantly.

In the study of Mausner-Dorsch (2000) high psychological strain was associated with a significant increase in prevalence of three forms of depression (major depressive episodes, depressive syndrome, dysphoria). The association was stronger when the interaction term (JD X JC) was tested, confirming Karasek's main thesis that most psychological job strain is induced by the combination of high demands and low control.

A 'voice outside of the chore' is the research of Smulders et al. (1998) who were unable to demonstrate in a longitudinal study that the interaction between job control and job demand to predicts ill-health effects. Absence behavior, postulated as the outcome variable was only marginally or not at all affected by job demand and job control, and a high level of job demands was associated with lower level of absence. High levels of job demands may indeed not only



harm the mental well-being of employees, but also work as a pressure to attend work. The linear regression analysis carried out with quadratic terms of job control and job demands as predictors, and absence measures as dependent variables, could not establish any deviation from linearity, so that the model which hypothesized that an optimum level of control and demands is the best for one's well-being at work was not supported.

It should be noted however that the study was under the form of an 'Incomplete-Four waves panel design' with long intervals between the measurements. This may mean that unknown confounding variables may have had an effect.

An opposite result was obtained in a longitudinal study by Vahtera et al. (2000). They found effects of changes in psychosocial work environment, as predicted by Karasek's model. The health outcomes had been measured in terms of general health generating sickness absence.

In the Job Demand-Control-support Model, and in contrast with other occupational stress models, differences in individual characteristics are not considered to be important mediators in the stress-strain relationship. Decision latitude and control are understood as job-level characteristics and not individual-level characteristics (Guglielmi, Tatrow, 1998). The JDC/S assumes that behavior is, to a significant extent, generated by the social environment. Emotional responses are treated as a dependent variable derived from work-related behavioral requirements (Karasek et al., 1998). Although Makikangas & Kinnunen (2003) show that differences in personality characteristics have an impact upon stress and well-being for both males and females, using Karasek's model.

Payne presented the Job Demand/Support/Constraints model, which is only slightly different from Karasek's model (Payne, 1979;1980). However, there is not enough empirical evidence that justifies to include this model in the overview (Rose et al., 1998).

In sum, the JDC/S model has not only received confirmation. Literature reviews found modest support of the hypothesis that the combination of high demands and low control results in high job strain (van der Doef, Maes, 1999; de Lange et al., 2003). The large number of studies supporting this framework present clear evidence for causal relationships between work characteristics and health across time (de Lange et al., 2003).

### **6.3 Siegrist's Effort-Reward Imbalance Model (ERI)**

A model presented in the last decade and that has demonstrated to have considerable value in predicting psychological well-being, is Siegrist's (1996) Effort/Reward imbalance (ERI) model. The ERI model claims that mental health problems arise from an imbalance between high levels of effort spent at work, while actually the rewards are meager or non-existent, and therefore do not match the level of effort. The imbalance violates expectations about reciprocity and adequate exchange, and these situations are supposed to be potentially very stressful.

The model has been developed in relation to the previously discussed models: the person-environment fit model (French et al., 1982), the JDC/S model (Karasek & Theorell, 1990) and the transactional perspective (Lazarus & Folkman, 1984). However, different from Karasek's model, it shifts the focus of analysis from control to reward, whereby the potentially beneficial effects of the work role on emotional and motivational self-regulation are contingent on a basic prerequisite of exchange in social life: reciprocity. In contrast to the transactional model, the ERI model states that negative affect associated with the experience of an imbalance may not necessarily be subject to conscious appraisal, especially as it is a chronically recurrent everyday experience (Siegrist, 1996).

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In sum, the model claims that lack of reciprocity between costs and gains define a state of emotional distress, with special propensity to autonomic arousal and associated strain reactions. High cost/low gain conditions are likely to elicit recurrent feelings of threat, anger and depression or demoralization.

Low reward (e.g., lack of promotion prospects, job insecurity, money, esteem, status control) in association with high extrinsic (e.g., work pressure, workload) or intrinsic efforts (personal coping pattern, e.g., high need for control divided in engagement and vigor, feelings of sustained anger or hopelessness or sleep disturbance) is an independent predictor of cardiovascular disease in a prospective study. Having a demanding but unstable job, achieving at a high level without being offered any promotion prospects, are examples of a particularly taxing and stressful working context. Direct evidence for the ERI model has been mainly found for physical health (cf. Peter, Siegrist, Cremer, Stork, Seide, 1995, in Siegrist, 1996) but also some direct and indirect evidence for mental health problems is reported. A series of findings indicated that a high ratio of effort-reward imbalance is associated with level of burnout symptoms reported with bus drivers and in hospital nurses (Siegrist, 1996). Indirect evidence is reported by Donaldson (2002) and Tomasulo (2002).

Carney, Donovan, Yurdin, Pernell-Arnold, Bronberg, Malloch (1993) found that burnout was the outcome of the imbalance between efforts and rewards while dealing with clients.

It has been claimed that the outcomes of the ERI model also vary depending on the specific reward indicators. In the study of van Vegchel, de Jonge, Bakker, Schaufeli (2002) esteem, salary, and job security were considered as rewards. The strongest effects of a high-effort/low-reward imbalance on psychosomatic complaints and exhaustion were found for self-esteem and job security. As for salary, the high effort/low reward condition did not show significant health risks.

Stansfeld et al. (1999) operationalized the ERI model in terms of Competitiveness, work-related over-commitment and hostility (high efforts) and poor promotion prospects or blocked career (low reward). The pathway from efforts/reward to psychiatric disorders was empirically demonstrated and the conclusion was that individual characteristics determine to what extent the work environment has an impact on future mental health (Stansfeld et al., 1999).

Therefore it was suggested that personal characteristics have to be taken into account, and that rewards can be different in various settings. Support from colleagues and working in multi-disciplinary teams were major sources of reward among CMHT staff as well as developing good relations with services users (Onyett et al., 1997).

The Effort-Recovery model (Meijman & Mulder, 1998) claims that effort expenditure (or work) has benefits in terms of productivity, but is also associated with short-term physiological and psychological costs (Zijlstra, 1993). Van der Hulst et al. (2001) tested the importance of rewards and external pressure to work overtime as moderator variables between working overtime and psychological health and burnout. In low reward conditions both groups of subjects, those working and not-working overtime, showed risk of burnout, poor recovery and work-family interference, and also home/work interference. The same results were found when controlling for external pressure to work overtime with psychosomatic health complaints. Moderately long working weeks are not necessarily associated with adverse psychological health, even if pressure to work overtime is high, as long as job rewards are high. In other words, as long as there is a healthy balance between the effort invested at work and the rewards that are received in return (in terms appreciation, job security and career development, but also an adequate salary).

According to Graen, & Uhl-Bien, (1995) the Leader-Member exchange model should be studied in relation to Siegrist's model, to add information on the balance/imbalance process.

The idea of balance as well as the effect of personality characteristics is also central in Warr's Vitamin Model (1994). The model is an extension of the P-E Fit model and the main idea is that mental health is affected by job characteristics in a way that is analogous to the effect of vitamins on physical health: intake initially improves health and physical functioning, but beyond a particular level no further improvement is observed. Similarly, an abundance of desirable environmental features can have a negative impact on mental health. The Vitamin model considers nine factors as precursors for mental health: opportunity for control, opportunity for skill use, externally generated goals, variety, environmental clarity, availability of money, physical security, opportunity for interpersonal contact, valued social position. The model explicitly makes assumptions on non-linearity in the relationships and also aims to specify the ways in which matching personal characteristics can moderate the general impact of particular environmental features (Warr, 1994). The curve-linearity of the relationship between job demands, autonomy and social support with job satisfaction and burnout has been tested by hierarchical multiple regression analysis (de Jonge, Schaufeli, Furda, 1995).

In fact Karasek's JDC/S model and Siegrist's ERI model appear to have quite some similarity in terms of the concepts they use: demands, control, support, efforts, rewards are all subjectively perceived. The three factors of Karasek's model affect the perceived effort/reward ratio; the reward can also be understood as the appraisal of the situation.

In conclusion, Beehr's (1995) warning that 'there is currently no accepted model of stress being used in the field' (p.50) is over. Researchers can take advantage by using established models. A true value can be found in Lazarus's transactional model that should be considered as a worthwhile theoretical framework, but can be difficult in its operationalization. On the other hand, Karasek's and Siegrist's models are relatively straightforward in their operationalization, but are in some way limited to understand the process of developing strain as result of stressful situations at work. For example, recent studies have questioned the dimensionality of Karasek's decision latitude factors and assessed the influence on work pressures, proposing work pressure as a mediating variable between job control and strain outcomes. The conclusion was that it is important to distinguish between different facets of control and different patterns of relationship between job control, work pressure and measures of strain (Carayon & Zijlstra, 1999).

Thus, the three perspectives discussed above are not mutually exclusive but should be seen as complementary. For example, Lazarus' model focuses on the process, Karasek's model on the job and Siegrist's model on the individual perception. While Karasek's model is role-based, Siegrist's effort-reward imbalance model is individual-based as different persons may react differently to a given work environment and develop more readily health problems than others. The ERI model, considering rewards as well as demands, and taking into account individual characteristics (as efforts applied to work) increases the predictability of future morbidity. Thus individual characteristics affect the influence of work environment on mental health (Stansfeld, et al., 1999).

## **7 Methods of data collection and research design**

Theoretical frameworks are the *bodywork* of research but empirical study is the *engine*: the nature, the design and the instrumentation.

Other than factors of aggregation, as demonstrated by the Content Analysis, also factors of differentiation can be clearly seen along the studies. First of all, among the documents, some were literature reviews (Wollman, 1993; Duquette et al., 1994; Sverke et al., 2002; Edwards et al., 2002; Mackie, 2003; Guglielmi et al., 1998; Zapf et al., 1996), a few other were theoretical (Pottage et al., 1996; Warr, 1994; Karasek et al., 1998; Burke, 1994) and a number were empirical and research based. Some were also speculative in nature (Adler, Schocket, 1999; U'Ren, U'Ren, 1999; Howard, 1995; Reynolds, 2000; Kleinberg, 2000). Stansfeld (2002) discussed the previous studies under the framework of Karasek and Siegrist models and the usefulness of research data for management of the organization. Also speculation, but with a different aim, in Adler et al. (1999) and U'Ren et al. (1999) articles interested in the discussion of the legal outcomes of the stress/strain process.

As we have already noted, in the bulk of articles it is hard to say that a new theory has been displaced, but it is more correct to argue that a few theoretical models have been tested by research-based evidence.

Furthermore, Williams et al., (2002) have been lamenting for two problems that they think should be addressed, and that also constitute an important matter of differentiation among the wide literature: the design of the research and the method of data collection.

For the method of data gathering, the major approach has been the collection of information by self-report measures. Also in the CA the inertia of the survey item, was .03 and testify the massive use of this research tool in the field. Notwithstanding the criticism about the biased information when the unique source are the subjects, it is otherwise accounted that the best source of information are the persons experiencing first-hand certain situations but only if well established measures and meaningful data analysis are employed. For example, the mediation perspective for the stress research claim that the psychological processes mediating the effects of stressors on wellbeing are detected only on self-reports for both the stressful events and the reactions to these events. The occurrence of an event, its perception, and the emotional reaction are often not fully distinguishable, which makes it difficult to draw conclusions about the causal order in the association (Buunk et al., 1998).

Different sources of information can lead to absolutely incommensurable data as in Lawson, O'Brien (1994) where the burnout inventory has been administered and compared to data derived from observations. While self-reported questionnaires indicated a very low level of burnout for the three dimensions, observational data were telling a different story and one of the major common behavioral activity was the avoidance of contact with patients and negative customer interactions. The conclusion of the authors was that direct observation of behavior may tell more about burnout that can be gained from other sources. It should be mentioned that the observers involved in the research, for their nature of persons not foreigner in the workplace, may have reported prejudiced. Notwithstanding, it testify about the incommensurability of the information gathered from different sources. At the opposite the findings of Sluiter et al. (2001) is that the levels of change in strain during reorganization, is similar to the change in blood pressure.

Bekker et al. (2000) examined both self-reported health and stress and cortisol levels, a physiological indicator of stress and reported intergroup differences for the self-reported measures but no systematic group differences with regard to physiological stress. Diary on measures of systolic blood pressure (SBP), diastolic blood pressure (DBP) and heart rate (HR) in workday as well as non-work day in day time and evening time (O'Connor, O'Connor, Daryl, Bundred, 2000a) have been compared to measures of job stress and worker strain. Reported stress was related to higher measures of Anxiety and Depression but not somatization and higher

blood pressure. When self-report of stress has been compared to objective measures of daytime autonomic measurement, no correlation has been found (Kageyama et al., 1998). The latter measures resulted correlated to sleep quality.

In our proposal, both autonomic measures of daytime activity and sleep quality should be considered short-term effect and stress and depression long term effects.

But more important in our discussion is to understand that by combining self-reported measures and objective measures, the effects of methodological or conceptual overlap between the measured variables can be mitigated and the risk of falling in the *triviality trap* can be reduced (de Lange et al., 2003). The principle of triangulation, or in other words the measurement of stress and its outcomes in three separate ways -- self-report, independent assessment and average data -- would allow to disentangle the contribute of cognitive appraisal in the assessment of constructs (Kristensen, 1996).

However, while self-reported measures have peculiar methodological shortcomings, they are likely to remain a major research method for obtaining individual perceptions of stress and its effects (Carson, Hardy, 1998).

Also, another differentiation that can be done is between qualitative and quantitative studies that we didn't consider because of the small amount of papers falling in the first category. It should be noted nonetheless, that they are more common in the first period, following the framework displacement (Tsai, 1993; Sloan et al., 1994). By the narratives of emergency service personnel (police, firemen, paramedics, psychologists, medical and psychiatric physicians, nurses and social workers) that experienced a critical incident, five sources of stress were found: traumatic stimuli, adverse work environment, time pressure, quantitatively workload, qualitatively workload. The five categories of stress resulted all significantly related to the avoidance and intrusion scores on the Impact of Event Scale (Sloan et al., 1994).

A second *common lament* (Williams et al., 2002) in the stress/strain literature concern the limitation of the use of cross-sectional data and the need of longitudinal/perspective studies. This is particularly true and important as job stress is part of a complex cognition appraisal process that yields different reactions (psychological, behavioral and physiological) at different points in time (Williams et al., 2002).

The stress literature of the last decade abounds with studies conducted with cross-sectional research methodologies that have had a big important to exhibit the correlated factors inside of the stress/strain pathway. Although the cross-sectional design cannot establish causation, interesting hypothesis of causality can be suggested and have provided the basis for longitudinal research. High correlation between job stress and life stress and the impact on mental health (Shieffield, Dobb, Carroll, 1994) arise the question of the causality.

Following the evidence of the importance of social support, a longitudinal intervention study has demonstrated as the improvement in perceived social support is related to the improvement in emotional exhaustion (Corrigan et al., 1997). Stress have been found as predictor of the resulting mental health in a one year follow up longitudinal study (Makikangas et al., 2003). High levels of work-related stress at baseline resulted in more psychological distress at six months (Revicky et al., 1996).

Carayon, Yang, Lim (1995) demonstrated that the bi-variate relationship in the stress/strain process change over time. Different correlations in different points in time were detected between job design variables (job demands, job content, job control, social support and job future ambiguity) and worker strain (boredom, workload dissatisfaction, depression, tension-anxiety, anger, fatigue, daily life stress, health complaints) using a cross-sectional design. Canonical correlational analysis for three rounds of a longitudinal study suggested that a substantial relation-

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ship exists between job design and worker strain. The correlations between the original variables and the two canonical functions or variates, showed a two-dimensional underlying structure of the relationships between job design and worker strain for all three rounds: job demands/stress and job content & support/satisfaction. The result introduces a dynamic relationship between job design and worker strain that it is impossible to caught by a cross-sectional design.

Stansfeld, Fuhrer, Shipley, Marmot (1999) also confirmed Karasek and Siegrist models in a longitudinal study on civil servants using a three phases assessment and logistic regression analysis. The direction of causality confirmed the longitudinal relation between work characteristics and emergence of psychiatric disorders. High efforts in combination with low rewards and high job demands and Lack of support were associated with the increase of psychiatric disorder, as measured by the GHQ.

In the longitudinal study aiming to examine the relationship between psychosocial factors at work (JCD/S model) and changes in depressive symptoms, taking into account self-esteem, hostility and type A behavior, Paterniti et al. (2002) found an independent contribution by the two pattern of factors. Job stressors did effect the change in Depressive symptoms but the hierarchical linear regression analysis demonstrated an effect defined by personality. The impact of work stressors remained stable also when personality factors were added in the equation, confirming also the job-related stress basis of the model.

Mino et al. (1999) in a longitudinal two-year cohort study found significant relationships between job stress (single item measure) and mental health and controlling for demographic characteristics. By the results of the multiple logistic regression analysis, some stressors were strictly related to the organization and this led to two different conclusions: the organizational workplace as source of stress, and the need of further studies to control the results in different organizations. Thus, this study confirm that job stress cause mental health problems.

Two factors should be particularly controlled before to end up at the conclusion of value of longitudinal studies: the importance of the incomplete design and the lag time. One year, for example, can be a very long interval where people can suffer but also recovery themselves.

It has also been claimed that none of the longitudinal study assess the potentiality of, e.g., depressive disorders in increase work stress or an improvement in mental health ameliorating the working conditions, as Kivimaki et al. (2002) study about organizational justice and mental health. The baseline mental health must always be measured to assess the potentiality of stress to lead to ill mental health. Also after a period of absence from work for mental ill-health and adequate recovery, the person can experience better working conditions, but if this period of absence continue with maybe only bureaucratic reasons or lack of support, the situation could completely change.

As for the method of data analysis, it is obvious that regression-based methods are more powerful than correlational but the use should always be defended by a logic and evidence-based platform. In correlational research it is difficult to demonstrate the reversed or reciprocal causal relationships (Zapf et al., 1996; de Lange et al., 2003). Also dichotomous method loses information when compared with using a continuous scale. The use of regression methods (retaining continuous scores) and the evaluation of the regression lines at fixed points above and below the mean from the regression equation (Landsbergis, Theorell, 2000).

## 8. Instruments

### *Stress*

Several instruments have been used, along the years, to assess the linkage between work stress and mental health, some of them purposively validate to encompass the two main constructs other than related variables.

Highly used has been the Occupational Stress Inventory (OSI; Cooper, Sloan, Williams, 1988; Cooper et al., 1989) and its derivatives, the Pressure Management Indicator (see Horan, 2002). The OSI measures seven different aspects of occupational stress:

- (i) Perceived Sources of job stress (factors intrinsic to the job, managerial role, relationships with other people, career and achievement, organisational structure/climate and home/work interface);
- (j) Type A behaviour pattern (attitude to living, style of behaviour, ambition);
- (k) Locus of control (organisational forces, management processes, individual influences);
- (l) Coping strategies/skills: seeking social support, task strategies, logic, home/work relationships, time management, involvement);
- (m) Job satisfaction (achievement, value and growth, the job itself, organisational design and structure, organisational processes, personal relationships);
- (n) Mental health;
- (o) Physical health.

Several studies are based on this questionnaire (Kirkcaldy, Cooper, Furnham, Brown, 1993; Kirkcaldy, Furnham, 1995; Kirkcaldy, Cooper and Brown, 1995; Leong, Furnham and Cooper, 1996; Travers, Cooper, 1993; Sutherland, Cooper, 1993; Kirkcaldy, Shepard, Furnham, 2002; Grainger, 1995).

As for the results, regression analysis revealed that the overall mental ill health was predicted by a combination of work pressures, coping mechanisms (Travers, Cooper, 1993) or social support, time and involvement (Kirkcaldy, Furnham, 1995). The interactions between stress due to factors intrinsic to the job and organizational commitment were significant predictor of mental ill health (Leong, Furnham, Cooper, 1996). Grainger et al. (1995) found significant higher levels of stress and mental ill-health in British-trained pre-registration house officers than in the general population.

In Turley et al.'s (1993) the work stressors used as independent variables, failed to demonstrate a significant effect on mental health.

A second Occupational Stress Inventory (OSI, Osipow, Spokane, 1987) has been used to measure stress and mental health problems. This instrument consists of three questionnaires (Marini, Todd, Slate, 1995; Rahim, Psenicka, 1996):

- (i) the Occupational Role Questionnaire: role overload, role insufficiency, role conflict, role ambiguity, role boundary, role responsibility and physical environment;
- (ii) the Personal Strain Questionnaire: vocational strain, psychological strain, interpersonal strain, physical strain;
- (iii) the Personal Resources Questionnaire: recreation, self-care, social support and ration/cognitive coping.

Higher lack of personal resources-higher stress and higher stress-higher psychological strain was the result of Marini et al. (1995). The stressors showed to be independent each other, and highlight a different effect on psychiatric symptoms. Only the link connecting role insufficiency and overload to psychiatric symptoms was significant (Rahim et al., 1996).

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In its revised form, the OSI-R (Osipow, 1998) supported the hypothesis that employees attending a training group exhibited improved rational/cognitive coping skills in the face of work-related stress as measured by the Rational/Cognitive Coping subscale.

The Job Content Questionnaire (Karasek, 1985; Karasek et al., 1998), in full or parts, has been widely and successfully used along the years to assess sources of job stress and their relation with mental health (Calnan, Wainwright, Forsythe, Wall, Almond, 2001; O'Connor, O'Connor, Daryl, Bundred, 2000a; O'Connor, O'Connor, Daryl, Bundred, 2000b; Soares, Lawoko, 2000; Tummers, Janssen, Landeweerd, Houkes, 2001; Rospenda, 2002; Cropley, Steptoe, Joeke, 1999).

The JCQ is a self-administered instrument designed to measure social and psychological characteristics of the job. The first scales – decision latitude, psychological demands and social support – are used to measure high demands/low control/low support on job strain development. Other aspects of work demand assessed are physical demands and job insecurity. The JCQ is available and validated in several EU languages and has been used for large studies in Europe and USA (Karasek et al., 1998).

The PSS (Perceived Stress Scale, Cohen et al., 1983), a 14-item self-report scale demonstrated that perceived stress was predicted by physical symptoms, anger suppression and satisfaction (Norvell, Walden, Gettelman, Murrin, 1993) and was correlated to depression (Mackie, Holdhan, Gottlieb, 2001)

The NIOSH Job Stress Questionnaire (Hurrell, McLaney, 1988) was the primary sources of items to measure job control, job demands, job certainty, job satisfaction, responsibility, skill under-utilisation and social support demonstrating that skill under-utilisation was associated with increased level of strain (Goldenhar, Swanson, Hurrell, Ruder, Deddens, 1998).

Other than general instruments to assess stress, a few occupation-specific questionnaire have been used: such as the Community Psychiatric Nurse Stress Questionnaire (Coffey, 1999); the 15-item Dental Stress Scale (DiMatteo, Shugars, Hays, 1993); the Nurse Stress Checklist (Tsai, 1993), the Nurse Stress Scale (Eastburg, Williamson, Gorsuch, Ridley, 1994), the Organizational Job Stress Scale of the Medical Personnel Stress Survey (Hromco, Lyons, Nikkel, 1995); the Stress Audit (Heuer, Bengiamin, Downey, Imler, 1996). These instruments focus on stress consequences in terms of mental health problems and reduced levels of satisfaction (DiMatteo, et al., 1993).

Original questionnaires have also been developed. A 10-factors sources of Job-specific Pressure for teachers (Travers, Cooper, 1993) demonstrated high correlation between mental health and work pressure and coping strategies. The work stress scale (Lewis, Nace, Barnhart, Carson, Howard, 1994) found positive correlations between stress factors and psychological health.

The lack of shared position of the social support construct emerge in the literature also with reference to the instruments of measure employed: it is claimed usually as a potential sources of stress but also as a moderator of the stress/strain process. Other than depicted by the instruments already discussed, other measures have been used.

Crnic and Greenberg's (1983) questionnaire measuring perceived social support and satisfaction with support, showed that psychological wellbeing is predicted by life stress and social support (Sheffield, Dobbie, Carroll, 1994). Two subscales from the Work Environment Scale (Moos, 1986) measuring peer cohesion and supervisor support correlated with burnout (Eastburg, Williamson, Gorsuch, Ridley, 1994) as the Perceived social support scale (Brown, O'Brien, 1998) and the Modified Social Support Questionnaire, to measure individual's perceptions about size of and satisfaction with the support networks (Corrigan, Williams, McCracken, Kommana, Edwards, Brunner, 1998).



The Support Exchange Questionnaire (SEQ) present four perceived support factors -- emotional support, task support, material support and informational support, -- collapsing in one general dimension demonstrated the effect of social support on self-esteem, mastery and depression (Vilhjalmsson, 1998). Adequate social support and a high level of sense of coherence showed a protective effect on the association between violence experienced at adult age and a high level of common symptoms. Sense of coherence was measured using Antonovski's operationalization (Kranz et al., 2000).

### *Mental Health*

Among the occupational stress researchers, one of the most widely measures of psychological distress employed, has been the General Health Questionnaire (GHQ), a well established screening questionnaire for psychiatric disorders suitable for use in general population (Goldberg, 1978; Goldberg, Williams, 1988; Goldberg, Williams, 1991).

The GHQ and the GHQ-12 measure social dysfunction, physical health problems, strain, depression, inability to cope, anxiety-based insomnia, loss of confidence, self-esteem and other symptoms of mental distress. It has been applied in full or one or more subscales (Ramirez, Graham, Richard, Cull, Gregory, 1996; Hardy et al., 1997; Balloch, Pahl, McLean, 1998; Gardiner et al., 1999; De Goede, Spruijt, Iedema, Meeus, 1999; Coffey, 1999; Grassi, Magnani, 2000; Calnan, Wainwright, Forsythe, Wall, Almond, 2001; Donaldson, 2002; Sheffield, Dobbie, Carroll, 1994). Relations have been found between generally GHQ caseness and stress, but not in Gardiner et al. (1999). Suggestions about the evaluation of the responses are provided in several studies (Dollard et al., 1994; Webster et al., 1983). The GHQ has been adapted for several languages.

The GHQ-12 used as a questionnaire generating a general score and two subscale scores corresponding to positive and negative items showed that the positive component of mental health was significantly correlated to positively oriented job stressors; the negative to negatively oriented (Iwata, Kawakami, Haratani, Murata, Araki, 1999).

Although it has been argued that psychiatric disorders as assessed by the GHQ are merely measures of distress, Stansfeld et al. (1999) argue that it does measure psychiatric disorder; cases are associated with reduced functioning and the enhancement of the risk of work absence.

The GHQ showed significant relations between stress and mental health in a longitudinal study where healthy workers at the baseline assessment showed risk of develop psychiatric disorders as a consequence of job stress (Mino et al., 1999). In Makikangas et al. (2003) significant correlations has been found both at the time 1 and 2 between workload and lack of control and mental distress measures by the GHQ.

The Crown-Crisp Experiential Index (formerly the Middlesex Hospital Questionnaire) has been used at the beginning of the decade, a questionnaire measuring six subscales of mental health: free floating anxiety, phobic anxiety, obsession, somatic anxiety, depression and hysteria as well as a general index of mental health (Sutherland, Cooper, 1993; Travers, Cooper, 1993; Rout, Cooper, Rout, 1996). Differential factors of stress have been resulted predictive of mental ill health.

The RAND Mental Stress Index (MHI-5), a 5-item self-report measure of aspects of mental health functioning including anxiety, depression, and general positive affect (DiMatteo, Shugars, Hays, 1993), as already noticed, demonstrated that personal time and lack of respect were the precursors.

Frequently researchers have been used validated scale as checklists to detect, and mostly confirm, the relation between stress and depression, anxiety, irritability, somatization (Hardy et

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al., 1997; Vinokur, Pierce, Buck, 1999; Cropley, Steptoe, Joeke, 1999; O'Connor, O'Connor, Daryl, Bundred, 2000b; Donaldson, 2000; Revicki, Gershon, 1996), a list of somatic complaints (Finnoy, 2000) or psychological symptoms, such as Anger, Tension, Sadness (Goldenhhar, Swanson, Hurrell, Ruder, Deddens, 1998).

A measure of Anxiety, Depression and Somatization (SCL-90, Derogatis et al., 1973) (O'Connor, O'Connor, Daryl, Bundred, 2000a) and the depression subscale of the SCL-90-R symptom inventory pertaining to symptoms such as sadness, loneliness, guilt, self-depreciation, lack of interest, loss of energy and suicidal intention (Vilhjalmsson, 1998).

Paterniti et al. (2002) found substantial longitudinal correlation between job stressors and change in depression measured by the mean of the Center for Epidemiological Studies' Depression Scale (CES-D), a 20-item self-report questionnaire (Mackie, Holdhan, Gottlieb, 2001) and Mackie et al. (2001) a cross-sectional correlation.

*Burnout*

It has been claimed that burnout as outcome measure of stress-full working conditions is not validated as a construct (Tennant, 2001); nonetheless it does demonstrate well established and significant relationships to psychological health status and depression in particular. Burnout has been somewhere measured as a construct describing mental health, other times as an antecedent of psychological health or a consequent. It has also been defined as an inappropriate response to the challenge of work, and associated with poor performance and ill-health (Turley et al., 1993). A different hypothesis testing the role of burnout as mediator between stress and job satisfaction has been tested (Singh, Goolsby, Rhoads, 1994).

On average, burnout has been measured as interchangeable or as an aspect of mental ill-health and the commonly measurement instrument has been the Maslach Burnout Inventory (Maslach, Jackson, 1981) (as examples, see Carney, Donovan, Yurdin, Pernell-Arnold, Bromberg, Mallach's, 1993; Eastburg, Williamson, Gorsuch, Ridley, 1994; Smoot, Gonzales, 1995; Ramirez, Graham, Richard, Cull, Gregory, 1996; Brown, O'Brien, 1998; Corrigan, Williams, McCracken, Kommana, Edwards, Brunner, 1998; Coffey, 1999; Grassi, Magnani, 2000; Tummers, Janssen, Landeweerd, Houkes, 2001; Singh, Goolsby, Rhoads, 1994; Hannson, Hallberg and Axelsson, 1995; Kandolin, 1993).

The MBI assesses three factors: (a) EE: "*emotional exhaustion, emotional resources are depleted, workers feel they are no longer able to give of themselves at a psychological level;* (b) *de-personalization, the development of a negative, cynical attitudes about one's clients;* (c) PA: *reduced personal accomplishment, tendency to evaluate oneself negatively ... and to feel dissatisfied with accomplishments on the job*" (Maslach, Jackson, 1981). Kandolin (1993) assessed the burnout questionnaire and found the three expected factors.

The resulting correlations between stress and burnout have been mostly in the expected direction and have been widely named along the paper.

The Japanese version of the Pines' Burnout Scale (Pines, 1981) has also been used to measure burnout (Ito, Kurita, Shiiya, 1999) demonstrating that burnout is higher in a particular occupation with specific sources of stress. The Oldenburg Burnout Inventory (Demerouti et al., 2002), a measure of burnout in human services and industrial production, assess two distinctive factors: Exhaustion and Disengagement. While burnout has been empirically demonstrated as a long-term, habitual experience and as a construct different than short-term strain work consequences, it has been also considered as a consequence of specific short-term strain effects deriving from the organizational job design. Short-term strain act therefore as intermediate outcomes or mediators in the burnout-job design linkage model (Demerouti et al., 2002).

### *Moderators and third variables*

The purpose to use moderators, dividing the population in subgroups, is to increase the correlation. Different moderators have been used or the influence of third variables has been entered in the stress/mental health linkage because of evidence of the importance. Several moderators have been assessed along the years and the main are emerged during the previous discussion. Therefore there is only little information left to add and mainly about demographics.

Among personality factors, locus of control and type A behavior have been particularly studied. The role of locus of control and the external pole has been previously discussed. As for type A behavior pattern, it has long been believed to be a strong predictor of cardiovascular diseases and other stress-related illnesses. Measures of type A behavior have been detected using the Type A Behavior questionnaire (Travers, Cooper, 1993; Rout, Cooper, Rout, 1996), the Type A personality (Tang, Gilbert, 1995) and the OSI General behavior scale (Leong, Furnham and Cooper, 1996). Type A behavior and job stressors were significantly predictive of high levels of mental ill-health in Rout et al. (1996) but not in Leong et al. (1996). Type A is not a powerful predictor of occupational stress and health outcomes (Kirkcaldy, Cooper, Furnham, 1993).

By the use of the PROSCAN questionnaire measuring dominance, extraversion, pace, conformity and logic it was demonstrated the existence of a number of significant relationships between burnout and five personality variables. The interaction term comprised of support and extraversion variables was correlated with Emotional Exhaustion (Eastburg, Williamson, Gorsuch, Ridley, 1994). As for the expression of anger as a personality trait it was demonstrated that individuals who holds their anger in appear to have higher levels of perceived stress and report more symptoms (Norvell, Walden, Gettelman, Murrin, 1993). But although from the previous studies it is undeniable that certain aspects of personality could render a person more vulnerable to the psychological work environment (Stansfeld, 2002), personality factors might confound the association between work reported characteristics and psychiatric disorders. To control for this analyses of work characteristics and psychiatric disorders have been adjusted by hostility. The result shows a little effect on decision authority, but decreased the effect of job demands in men and increased the effect of job demands in women (Stansfeld et al., 1999).

In the future, the suggestion of Seibert, Kreimer (2001) should be taken and adopt a more holistic personality framework when studying the effect of personality to occupational well-being.

Involvement in the three domains – job, parental, marital – appeared as reducing both distress and level of depression (Vinokur, Pierce, Buck, 1999). Job involvement selected with burnout as an outcome variable depending both on stress, showed a different pattern from the latter: while burnout is in the study considered as stress-related variables mainly predicted by workload and social support, job involvement is here considered as person-level variable and partially independent from work characteristics (Tummers, Janssen, Landeweerd, Houkes, 2001).

It should be also mentioned that job involvement is usually considered as organizational climate's factors, therefore in contrast with the previous result. When the Ward Atmosphere Scale (WAS, Moos, Houts, 1968; Moos, 1989) addressing the individual's opinions, feelings and perceptions of central characteristics of the ward milieu has been used, the feeling of burnout improved after some training as a cause of improved work environment (Smoot, Gonzales, 1995; Finnoy, 2000).

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The analysis of the literature, while confirming the hypothesis illuminating the linkage stress/strain, also show the importance of demographic variables in understanding the relation.

The demographic variables mainly studied throughout has been gender with inconsistent empirical research, partially due to the job design and the variables entered in the model. Differences in the stressors concurring to strain has been found for male and female (Re, 1997) and also in male and female dominated industries (Gardiner et al., 1999). High job strain women showed higher association with depressive episodes and high job strain men with dysphoria. Also being men and young was associated with a significant increase in prevalence of depressive syndrome (Mausner-Dorsh et al., 2000). In a follow-up longitudinal study different models have been found for men and women about the moderating effect of personality between stress and well-being (Makikangas et al., 2003), but the same model has been found by de Goede et al. (1997) and by Paterniti et al. (2002). In both male and female workers the association between the JDC/S and an increase in depression scores was found. The association was independent of personality traits and other confounding factors (Paterniti et al., 2002).

Gender did not have any remarkable direct or moderating influence on the effects of shift-work (Beermann, Nachreiner, 1995) in a sample of police officers and also in physicians (Connor et al., 2000). No gender differences in burnout and stress symptoms have been found with regard to shift-workers, even if the incidence of violence and aggressiveness in their patient contacts was more strongly connected with burnout in women than in men (Kandolin, 1993). Contrary to the hypothesis that women would report greater distress and behavioral responses to threat than men, no significant relationship was found between sex and trauma symptoms or acute stress reactions (Koopman et al., 1998). In the longitudinal study of Carayon et al. (1995) gender and the other demographic variables were not related to worker strain defined by job stress.

Differences in gender were found with female physicians associated with higher work stress and anxiety (Lewis, Nace, Barnhart, Carson, How, 1994). High levels of social support at work have been found to be predictive of better mental health in employees and the effects are stronger in women than men, higher with regard to supervisor than colleagues (Stansfeld et al., 1999). Mino et al. (1999) show gender-related differences with regard to supervisor relationship: a poor relationship affect only women mental health.

As for age, Sluiter et al. (2001) using a hierarchical regression model found that stress was explaining the 29% of the total variance in mental health but a significant increase (.53) was determined by adding in the model age as well as physiological measures of stress. Older employees had more job control than younger but age was only weakly related to job demands (Smulders et al., 1999); the predictive validity of work characteristics on psychiatric disorders didn't change when adjusted for age and employment level (Stansfeld et al., 1999).

As for tenure, several authors have detected the role of years of tenure/experience. The longer the tenure, the higher the sense of success (Carney et al., 1993) but tenure in the organization has important direct effects on burnout (Schulz et al., 1995) and the longer the tenure, the more likely is to report stress and psychological strain.

The occupational role has been studied as a major intervening variable between stress and strain (Travers, Cooper, 1993; Kirkcaldy, Cooper, Furnham, Brown, 1993; Corrigan, 1994; Rout, Cooper, Rout, 1996; Vinokur, Pierce, Buck, 1999), other than practice characteristics (Lewis, Nace, Barnhart, Carson, Howard, 1994; Hromco, Lyons, Nikkel, 1995), training (Hansson, Hallberg and Axelsson, 1995; Ito, Kurita, Shiiya, 1999; Leong, Furnham and Cooper, 1996).

The stress related to the occupation does not exhibit a statistically significant effect on GHQ caseness (Calnan et al, 2001) but it does in somebody else results (Cooper, Kelly, 1993). The

relation between duration of exposure to unfavourable work characteristics and health may be non-linear: long term exposure can have stronger detrimental effects than short-term exposure (Karasek, Theorell, 1990). The more qualified workers have an over-commitment toward the job and therefore appeared to be more stressed and vulnerable; the less qualified workers present less risk of burnout. Also industry workers are better able to invest in extra-work activities, while health professionals are more obsessed with work also in non-work time (Re, 1997). In the study of Koopman et al. (1998) occupational role emerged as a mediator between stressful events and strain. People working in administrative staff positions have less flexibility in the job, and experience the greater distress in roles that increase the likelihood of coming into unavoidable contact with potentially violent patients. Psychiatric female reported to be equal to corresponding physicians in work amount and stress, more satisfied but with poorer mental health (Frank et al., 2001). Different roles inside of the hospital didn't effect the stress/mental health pathway (Calnan et al., 2001). Travers et al. (1993) also suggested to consider the relationship between the level and nature of stress and the profession.

Education has multiple direct and indirect relationships with burnout: the better educated participate more in decision making and have more autonomy and this increases work satisfaction, and reduces burnout. At the same time, the higher educated can also be more at risk for burnout, due to the fact that they are professionals with great responsibilities and sometimes higher expectations (Schulz et al., 1995). Police officers with higher education reported less psychosomatic symptoms and negative feeling states (Burke, 1994).

Finally marital status involvement as well as parental have been consistently showed to play a protective role between stress and mental health (Kirkcaldy, Cooper, Furnham, Brown, 1993; Eastburg, Williamson, Gorsuch, Ridley, 1994; Kirkcaldy, Furnham, 1995; Kirkcaldy, Cooper and Brown, 1995; Rout, Cooper, Rout, 1996; Heuer, Bengiamin, Downey, Imler, 1996; Vinokur, Pierce, Buck, 1999; Grassi, Magnani, 2000; Ito, Kurita, Shiya, 1999) but not in Bekker et al. (2000).

## **9 Discussion**

The overview of studies clearly demonstrate that there is an association between measures of work-stress and mental well-being, even if the strength of the association varies among studies and it is fragmented, as this overview clearly indicated. In order to understand this relation it is first of all important to understand what is meant with the construct of job stress and mental health. Second, a variety of factors may moderate the stress-strain pathway or relationship: intervening variables or socio-demographics factors.

The aim of this study was to describe how research in the last decade has faced the theoretical and practical problem to model and assess levels of job stress and mental health and their relationship. In some of the studies we reviewed stress and mental health are used as predictors of health outcomes, in other studies they are entered as outcome variables together with physical symptoms, and in yet other studies they are treated as both predictor and criterion measures at the same time.

Thus, while it is clear that stress is a multi-facet concept (see also Lewig, Dollard, 2001) there is no agreement about the sources and the factors concerned. Also, while generally it is accepted that psychological ill health arises because of stressful working conditions, argument exist over whether stress is an individual or a workplace problem.

The relation between occupational stress and mental health has hardly been studied in laboratory studies or experiments (Lazarus & Folkman, 1984). In social science research on work

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and health, a few sources of information are generally available: contextual information derived from independent sources (e.g., administrative data, objective measurement), descriptive information obtained from workers and evaluative information reflecting subjective appraisal, gathered through interviews and surveys (Siegrist, 1996). In many cases, self-report data on job conditions as well as self-report on psychological wellbeing are the only feasible information-gathering strategy. Self-report data are often seen as a risk because they may be biased because the individual can influence the results. However, there are various ways to control for this, and moreover various studies have shown that self-reported data actually are quite adequate and reliable (Frese & Zapf, 1988).

Several operational definitions of stress have been proposed and used throughout the years. Stress has been viewed as characterized by the relation between the available resources and the demands (Re, 1998). But it is peculiar that many studies on stress and psychological health define stress in term of stressors, sources or causes of stress, or in term of the perception of the situation.

The literature is abundantly full of suggestions about the potential factors of stress. Kandolin (1993), e.g., reports stress symptoms experienced by workers often reported as connected with objective working conditions but also role clarity and perceptions of organizational aspects have demonstrated to be potential stressors affecting burnout (Blumenthal et al., 1998). Stress has been operationalized in role overload, under-utilization of skills, lack of responsibility for people, lack of participation (Tang, Gilbert, 1995). Other indicators of occupational stress are the lack of: flexibility, discretion, supportive relationships, opportunities to learn and grow, access to the information, support and resources necessary to get the job done (Spence Laschinger et al., 1997). Stressors at work are quantitative workload, variance in workload, cognitive demand, job control and skill under-utilization (Iwata, Kawakami, Haratani, Murata, Araki, 1999). Job stress has been studied as work overload and effect on the home life, result of poor management and resources, managerial responsibilities assumed, dealing with patients' suffering (Ramirez, Graham, Richard, Cull, Gregory, 1996), practice administration and job demands, interruptions, working environment, routine medical work, emotional involvement and work/home interface and social life (Rout, Cooper, Rout, 1996). Stress is also *Lack of power and influence* and *Discrimination* (Gardiner et al., 1999). In most research the three prominent factors of stress were role conflict and role ambiguity and role overload (Beehr, Walsh, Taber, 1976), (Singh, Goolsby, Rhoads, 1994). Kanter's conception of empowerment involves structuring work environments in ways that provide workers with flexibility, discretion, supportive relationships, opportunities to learn and grow, access to the information, support and resources necessary to get the work done (Spence Laschinger, 1997). Occupational mental health is strongly related to perceived work empowerment (Spence Laschinger, 1997).

Stress has also been identified as the opposite of satisfaction facet and the correlation with workload and burnout has been assessed: the higher the percentage of clients, the less the satisfaction and the higher the burnout (Dupree et al., 1995).

In the context of research on stress and its relationship with mental health problems most attention has been devoted to professions who provide care. The characteristics of those work settings appear to be stressful, resulting in nervous tension and developing of all kind of defense mechanisms (Re, 1998). Another profession that received a lot of attention in the first years of the decade, are the teachers (see also Gugliemi, Tatrow, 1998), also a 'service providing profession'. Teacher stress and burnout have negative repercussions on the educational system. It is remarkable that many studies have focused on the public sector, and one of the reasons can be

the accessibility of the data from large organization. Other explanations should be considered as well (Lewig, Dollard, 2001). It might very well be that the public sector is more easily accessible to collect data, and therefore in the general opinion (and media) the idea has risen that civil servants experience higher levels of stress and health related problems. However, the time lost and the average cost per stress claim is much higher for private sector workers than for workers in the public sector, at least in South Australia (Lewig, Dollard, 2001).

The causal relation between psychological stress and psychosomatic complaints has been directly addressed in several study. As noticed, cross-sectional studies are more common and practiced than prospective/longitudinal studies despite that fact that longitudinal research designs are more powerful. Longitudinal research allows to exclude reversed causal relationships even when the hypothesis is logical (healthier people get the better jobs --drift-hypothesis -- and depressed people tend to assess their workplace more negatively -- true stress/stressors hypothesis) (Zapf et al., 1996). Strong evidence on the causal order of variables requires a longitudinal design (de Lange et al., 2003) but both cross-sectional and longitudinal studies can still fail to demonstrate the real variance between stressor and strain factors because of two reasons:

- the healthy workers effect: it is likely that workers who are seriously ill will stop working and they won't be included in the studies research sample in the first step or also will drop out at a later stage (Zapf, Dormann, Frese, 1996);
- the numbers of factors intervening in the relationship.

As for longitudinal studies, it is important to choose an appropriate time-lag using considerations that are theoretically driven. The suggestions by Zapf et al. (1996) give direction for such studies: all variables measured at all time points should be measured by the same measurement method, third variables as potential confounders in the stress/strain relationships should be taken into consideration, decisions concerning time lag and assumptions about the time course should be made on theoretical grounds. Linear structural equation approach, inclusion of measurement models and the test of multiple competing models are suggested as appropriate data analyses techniques. While several studies are using stepwise regression analysis as method of data analysis, it has been argued that this is too exploratory. Regression analysis also assumes that the relationship between variables is linear, which is questionable. Linear methods of data analysis imply a similarity between change in stressors and strains, and might underestimate the true strength of the stressor/strain relation (Zapf, et al., 1996). Log-linear regression analysis is proposed to deal with the problem of linearity (Kikcaldy, Trimpop, Levine, 2002).

Another problem with longitudinal studies is the rate of attrition (Pollard, 2001; Moyle, Parkes, 1999), therefore a parallel study should be addressed in order to assess the rate and cause or mortality other than strong procedures to attract the sample. Well designed cross-sectional studies that thoroughly consider the effects of potential moderating variables can still be very useful in this type of research (Mino et al., 1999).

In a review of research on work stress and employee health, Ganster and Schaubroek (1991) concluded that there was a lack of convincing evidence demonstrating that job stressors cause health effects. Nevertheless, they did agree that work experience plays a significant role in mental and physical health. This review shows that the majority of studies do demonstrate that there is a relation between particular job characteristics (stressors) and mental health problems. Stress factors have extensively been recognized as major causes for depression, anxiety and other psychological disorders. Therefore, it is hard to assume, given that all these studies point in the same direction, that there is no evidence for a relation between work and mental health prob-

lems. Strictly spoken there is maybe not sufficient evidence to demonstrate causality, but there certainly is a lot of *circumstantial evidence*.

Several questions remain unanswered. First of all, a number of studies suggests that organizational strategies can help to reduce levels of strain, but actually very few studies have made specific recommendations to avoid work-related psychological ill-health (Dollard et al., 1994). When the psychosocial work environment, or even some of its elements, would be improved this could decrease the risk of illness among the working population (Vahtera et al., 2000).

As for the role of socio-demographic factors in the pathway between stress and mental health, there is no agreement about the magnitude of the impact these variables have in the process. The different nature of the various studies and variety in operationalization/ classification of stress and mental health, and other moderating or intervening or demographic variables makes it very difficult to come to conclusions in this respect.

A major question concerns the stress-strain process itself, whether it is a uniform process within the various occupations or whether the process can be job specific. Stress and strain have often been measured in specific occupations, and than the results are compared against the general population. However, only few studies have addressed the question of the process and epidemiological studies are not very common. Also, when epidemiological studies have been implemented, they have been limited to an European country (North et al., 1996) or to a single professional roles or occupations (Amick et al., 1998; Williams et al., 2002).

Weinberg & Creed (2000) demonstrated that both stress at work and stress outside the work independently contribute to psychiatric disorders. Results are in line with North et al. (1996), who also indicated that poor mental health, as measured by absence because of psychiatric disorders, were associated with both stress at work (high demands and low rewards) and stress at home (difficulties in the closest relationships outside of work).

Work and family are the two common sources of satisfaction in life, but also of stressful experiences (Tennant, 2001). A model of work/family conflict to explain the linkage work stress/mental health is empirically tested in Vinokur, Pierce, Buck (1999). Measures of Family stress, distress and involvement have usually assessed marital stress, parental stress, marital distress and parental distress, marital involvement and parental involvement. It is suggested that also the frequency with which the respondent's family life interfered with the job (Vinokur, Pierce, Buck, 1999) should be taken into consideration. The stressors of the private life domain appear to account partly for the variance in mental health, in combination with job stress (De Goede, Spruijt, Iedema, Meeus, 1999). However, these associations are not always found, for example, family demands did not correlate with burnout in a sample of nurses (Kandolin, 1993). A model should be developed comprising the major variables, including those from outside of the work environment. Such a model would be a useful framework to describe this complex process and could also provide a meaningful analytical strategy. Not only work demands may have a potentially negative effect on family, the relation might also be in the other way around, as has been demonstrated by Burke (1994). Therefore studies on stress should preferably also include specific measures for family/work conflict.

Another important stress-related issue is coping. Coping has a central role in understanding the relation between organizational stress and mental ill-health or psychological well-being, and it is impossible to present a model of occupational stress that doesn't include coping strategies (Burke, 1994). "*Coping is a process, yet most measures ... are static. Significant advances must*



*be made in our understanding of coping if we are to increase significantly our understanding of work stress* “ (Burke, 1994).

Some complaints follow the review of Cooper and Marshall (1976) on the study of the effect of stress on mental ill health and coronary heart disease:

- most studies use correlational analysis with limited inferences about causality and failing to point out the role of intervening variables;

- there is a lot of confusion of dependent and independent variables by using the term stress too widely – to describe pressure on the individual (e.g. work overload), its' effects (e.g. poor work performance), and also his reactions (e.g. escapist drinking);

- more attention should be given to definition and measurement of variables: should stress be measured objectively (e.g., diastolic blood pressure) or subjectively (e.g., self-report)? How adequate are the currently used measures? Use of broad categories (e.g. occupational levels) obscure meaningful differences between groups and make the comparison of findings between studies more difficult;

- as for the samples: some researchers attempt to generalize from an intensive study of a small and highly specific sample; others, from large-scale samples using simplistic survey techniques.

After 27 years of research most of these complaints are not applicable anymore: there now is better knowledge on method analysis, and that has partially improved the strenght of the results. There still is a substantial number of theoretical perspectives, but the theoretical orientation is more clear now, and there is less disagreement on definitions and concepts. The use of representative samples and the use of sub-categories have led to more understanding of the process.

The numbers and results of the studies presented here testify of the maturity of a field. Nevertheless, the European context, so rich in cultural and contextual differences has never been studied in a *benchmarking* perspective, which takes into account both job design and general policies to understand the relation between working characteristics and psychological health. Different sources of stress affecting mental health have been found in Western and Eastern countries (Tsai, 1999). Comparing the models in different countries can added to our understanding of the process. Another question that only a cross-cultural study can address, is whether the labour market in the various countries does affect the levels of stress, and therewith also the relation with health problems.

Another gap in the literature concerns real cross-cultural studies in the European context. Also studies claiming to be cross-cultural (e.g., Karasek et al., 1998) aren't always what they pretend, because the data collection took place at different points in time, and data are not always gathered for the purpose of the comparison.

Only a few studies have focused on the general population. It is undeniable that each job, each occupation, has job-specific stressors that can lead to mental health problems in different ways, but the first question that should be addressed concerns the exploration of common factors that have an impact on the mental health of the population. And also it should be discussed and empirically demonstrated whether there are occupations that constitute larger risks than other occupations, in particular when general policies have to be developed.

Also more information is needed on the effects of chronic stressful experiences and the cumulative effects of work-related stress and the effects of other life domains (Siegrist, 1996) when the goal is to develop human resource policies.

A clear recommendation is to develop a multilevel design where occupation-specific and culture-specific models are assessed and compared against each other.

Another suggestion was made by Edwards (1992). He suggests to analyse the effect of work stress on mental ill-health or psychological well-being in extreme situations and use a cybernetic model that is theoretically and logically sustainable, in order to assess and understand the direction of the causality. At this moment the role of the structure of the organization and the organizational climate is not yet sufficiently clear. Several authors have tried to define the influence of the workplace on the work environment, but only a very limited set of variables are taken into account. The concepts are so closely related that it is not always clear what falls into the domain of work stress and what in the climate one. Work pressure, clearly a stress variable (Vagg, Spielberger, 1998) is somewhere else named as climate factor (Hemingway, Smith, 1999).

As earlier reviews noted, stress is essentially a multi-factorial concept, which means that we should focus on more than one stressor at a time if we are to draw meaningful conclusions from our data (Cooper, Marshall, 1976), “*research in theory of stress, coping and adaptation is, perforce, interdisciplinary and multileveled, including, in addition to psychological interpretation, the social and physiological*” (Lazarus, Folkman, 1984). A good way to continue the study is an active collaboration between academics and professionals.

But while we have to avoid thinking about these problems from a single causal perspective, it is also necessary to assess the relative and absolute magnitude of the different sources of stress to avoid over-estimation or under-estimation. Despite some of the methodological weakness and the gaps in our knowledge, it has been widely demonstrated that stress is not a variable but a dynamic process involving different constructs and outcomes.

Therefore, as far as the research on stress is concerned, it no longer makes sense to define stress as the ‘dark side of work’ (Holt, 1982; p. 421).

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