The NOHSC Symposium on the OHS Implications of Stress

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EXECUTIVE SUMMARY

The National Occupational Health and Safety Commission of Australia commissioned this paper on adverse health effects, key theories, interventions, and implications for policy and practice in relation to work stress. The nature of the workplace is changing rapidly and in the context of the new information economy, globalisation, and the introduction of new technologies, emerging risks for Australian workers include increased pace of work, longer hours, more emotion work, greater cognitive demands, exposure to violence, increased monitoring, and job insecurity. At the same time greater participation and dialogue between key stakeholders in the way new work practices evolve, holds great promise for not only preventing work stress and promoting health and well-being, but at the same time contributing to job satisfaction, productivity, work meaning, social cohesiveness and competitiveness.

The aim of the paper was to undertake a comprehensive review of the occupational stress literature in the following areas:

- current evidence for the health impacts of stress;
- the history and evolution of major models of how work stress operates, considering the definitions of stress employed by the different paradigms, and their limitations and problems, as well as their contributions to our understanding;
- policy and practical implications, with an overview of strategies used to identify, assess, and manage stress in the workplace.
Evidence for health effects

Exposure to stressors does not necessarily cause health problems in all people. While the experience may be accompanied by feelings of emotional discomfort, and may significantly affect well-being at the time, it does not necessarily lead to the development of a psychological or physiological disorder. In cases where the stressor is prolonged stress may affect health; or it may sensitise a person to other sources of stress by reducing their ability to cope. Evidence is accumulating that the common assumption of a relationship between stressors, the experience of stress and poor health appears to be justified.

First of all, it is important to understand the normal physiological response to stress. It is generally agreed that there are two arousal pathways relevant to the response to stress:

- the hypothalamic-pituitary-adrenal-cortical arousal system (HPA axis) that involves the activation of the adrenal cortex by the pituitary gland to release cortisol, into the blood.

- SNS-adrenal-medullary arousal involves stimulation of the adrenal medulla, by the hypothalamus acting through sympathetic nervous system (SNS) to release adrenalin and SNS synapses to release noradrenalin.

When faced with a challenge (a ‘stressor’), complex interactions and feedback occur between the systems. If the challenge is short term, the initial reaction is adaptive: it enables the individual to mobilise energy resources in the body to deal with the stressor. Common responses are increased heart rate, increased blood pressure, and more rapid breathing.

When the stressor is continuous (chronic), severe (e.g. violent act) or with repeated exposure, the normal physiological reaction may turn pathological. The individual enters the stage of resistance where different physiological changes occur as the individual attempts to withstand the stressor. The resting baseline levels of both adrenalin and cortisol are elevated and among other changes there is a slower return to baseline levels. This indicates a diminished ability to cope physiologically.

Finally, if exposure to the stressor continues, a person may reach a stage of exhaustion where organic damage can occur.

It is assumed that chronic stress results in an inability to recharge the adrenomedullary response required for adaptation. This leads to adrenalin degeneration and to cardiovascular degeneration. Further, the elevation of adrenalin and cortisol may affect cardiovascular health partly via the effects of hormones on blood pressure and serum cholesterol levels.
This paper discusses the possible adverse health effects of work stress under two headings:

- physiological and physical effects, and
- psychological and psychiatric effects.

**Physiological and physical effects of stress**
The clearest evidence for physical health effects of work stressors comes from a number of longitudinal studies which found an elevated risk of cardiovascular disease due to job strain.

In addition, the Whitehall II study showed a link between low levels of job control and an increased risk for coronary heart disease. Obesity is also found to be linked to job strain.

Other health effects such as asthma, peptic ulcers, and rheumatoid arthritis are thought to result from work stress.

**Psychological and psychiatric health effects**

**Chronic strain**

Most stress models assume that the condition of chronic stress leads to acute reactions or strain symptoms in the worker which in turn may be precursors to disease or lead to disease.

Numerous studies have linked work stress to psychological strain symptoms including:

- cognitive effects, such as job dissatisfaction and an inability to concentrate;
- affective disorders, including mental health states such as anxiety, anger and depression; and
- somatic symptoms such as headaches, perspiration, and dizziness.

Such conditions may not necessarily be classifiable under recognised psychiatric classification systems. Rather, the conditions may represent significant functional disturbances or risks for the development of clinical disorders.

Longer term psychological outcomes may include mental illness and suicide.

Behavioural strain may be indicated by the use of alcohol and drugs, including tobacco; reduced work performance; higher levels of absenteeism or sick leave; an increase in industrial accidents and higher staff turnover.
Besides these outcomes, strain from the work environment may spill over into the home environment, leading to marital problems and other social issues.

**Post-traumatic stress disorder**

Stressors in the work environment may present as intense, acute events, beyond normal expectations. For example, the experience of violent incidents, witnessing a robbery, working with abused clients, or dealing with road accidents may be very upsetting or even life threatening.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-IVTR 2000), and the International Classification of Diseases (ICD-10) provide the criteria for diagnosis of post-traumatic stress disorder (PTSD) including the exposure to a traumatic event and the experience of sequelae associated with that event.

Symptoms typically include intrusive recollections, dreams, sensitivity to stimuli associated with the initial event, and avoidance of activities or situations associated with the trauma. A range of other psychological conditions may co-exist with PTSD, such as anxiety, depression, thinking of suicide, panic disorder, anti-social personality disorder, agoraphobia, and substance abuse. Arguments have been made recently that chronic stressors could also be viewed as a precursor to PTSD, for example in the case of bullying.

In summary, the evidence indicates that chronic stress results in chronic neuroendocrine and cardiovascular over-arousal, peripheral adrenalin degeneration and cardiovascular degeneration. These physiological changes are presumed to underpin both psychological and physical health problems, and the well demonstrated link between the work environment and a range of health effects including cardiovascular disease, psychological and psychiatric symptoms.

**Work stress theories**

Job stress is defined generally as “the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health and even injury” (NIOSH, 1999).

There are many different theories about how work stress arises and how it causes or contributes to adverse health effects. Though they may differ in emphasis, in many ways the theories overlap and complement each other. These theories can be grouped in different categories, for example:

- stimulus/response combinations;
- interactional vs transactional models;
This paper discussed four dominant contemporary theoretical models of work stress, in terms of interactional theories and transactional theories.

**Interactional theories**

These focus on the structural features of a person’s interaction with their work environment, and include:

- the demand-control/support (DC/S) model; and burnout.

**The DC/S model**

This emphasises the work environment. It argues that strain (seen as a consequence of stress) results from the joint effects of high job demand and low job control. Social support has been added to the model; more recently strain effects are exacerbated in conditions of low support.

**Burnout**

The literature on burnout emphasises the social work environment of human service workers. It describes a syndrome of emotional exhaustion, lack of personal accomplishment and depersonalisation in response to chronic exposure to difficult clients.

Empirical tests of the model, however, reveal that strain results more from operational and organisational aspects of the job than from dealing with difficult clients.

Factors involved in the development of strain are seen in this model to include:

- work overload;
- lack of control;
- insufficient reward;
- breakdown of community;
- absence of fairness; and
- value conflict.
Recent formulations have focused on the importance of a mismatch between the person and the job, and highlighted the value of more positive engaging aspects of healthy work combinations.

**Transactional theories**

These focus on the cognitive processes and emotional reactions associated with the person’s interaction with their environment. Transactional models are in a sense a development of the interactional model and are largely consistent with them.

Transactional models include:

- the effort-reward (ERI) model; and
- the cognitive-phenomenological theory of stress.

**Effort-reward imbalance (ERI) model**

The ERI model builds on the idea that workers expend effort at work and expect as part of a socially negotiated process, an adequate reward (money, esteem, status control). According to the model, when an imbalance occurs, strain can result. The ERI model also specifies a personal variable as very important in the model. Referred to as over-commitment, it is argued that some people have the tendency to contribute large efforts to the task, and in a sense create an extra (intrinsic) demand that can exacerbate the imbalance.

**Cognitive-phenomenological model**

This model of stress emphasises personal appraisal and coping responses as important in the stress process. In other words, individuals perceive a situation as stressful, and appraise their own resources for coping with it. If they feel their ability to cope is not adequate to resolve or deal with the situation, this results in psychological strain.

These theories each explain important aspects of the work stress picture. The models differ, however, in that some put more emphasis on those aspects of the work environment which are able to be influenced by management, while others view the individual, and the individual’s coping strategies, as the key to dealing with the issue. This is clearly a critical difference, since if the problem is defined as a deficiency in an individual’s coping mechanisms, management is less likely to conclude that a re-organisation of work practices is called for.

The paper expands on these theories, and discusses their implications for workplace practice. In particular the DCS and ERI models have provided key elements for stress intervention in major international work stress policy frameworks, because they clearly identify work dimensions,
because they are clearly evidence based. Even when personal disposition is implicated, work characteristics exert a strong influence on health and productivity outcomes.

Difficulties emerging from testing the theories, together with identified organisational problems, have given rise to more active, participatory, research methodologies. These include management approaches that use multiple theories and intend to develop new local theory. Contemporary approaches to the measurement of work stress in organisations call for multidisciplinary strategies, and the inclusion of relevant value positions.

**Sources of work stress**
An impressive body of research has delineated certain features of the work environment that the vast majority of workers find stressful. The paper explores a range of sources of work stress, including physical and psychosocial stressors, stressful features of jobs, individual factors and lifestyle, gender differences, socio-economic status and job control, workplace violence, the role of the supervisor and emerging issues such as globalisation and other pressures on workers.

**Implications for policy and practice**
Strategies for identifying, assessing and managing stress in the workplace may be implemented at the individual level, the organisational level or the national level. The paper presents an overview of these strategies, as they emerge from a review of the literature. It concludes that there is considerable scope for tackling the problem through organisational interventions.

Recommendations arising from a consideration of the research encompass a number of policies to promote whole of organizational approaches, healthy organisations, sustainable organisations and ethical action. These include the following:

- **Focus on primary prevention;**
- **Ensuring proper training and career development for improved P-E fit;**
- **Ensuring optimum conditions for the introduction of new technologies;**
- **Worker involvement in planning and change;**
- **Equal opportunities and fairness; and**
- **Interventions to improve work design.**
The latter could include a focus on organisation and management to improve communications and staff involvement and control over work; develop a culture in which staff are valued; structure situations to promote formal and informal social support within the workplace; evaluate work demands and staffing levels; evaluate supervisor/manager performance; and reduce violent exposures.

Recommendations for policies at the national level relate to:

- priorities for research
- the need for more comprehensive data and national monitoring systems
- examination of the effects of legislation
- a clearing house for all relevant information and educational materials
- more education and training on work stress and interventions for all stakeholders.

Further, guidelines for best-practice in organizational stress intervention are provided. These recommendations seem relevant and applicable in the Australian work environment today.

Conclusion
We would do well to remember that the ‘job’ concept has only a 200 year history and that jobs themselves and their inherent structures are human constructions, not immutable, but capable of continuous improvement. As demands for quality and productivity increase and new demands emerge, such as emotional and cognitive demands, work management will require change. Workers will require more varied organisational responses to assist them to cope with old, new, and emerging risks as well as high performance. Policies and strategies for continuous monitoring and dialogue between the full range of stakeholders is imperative.
INTRODUCTION

This paper aims to provide a comprehensive review of the occupational stress literature in the following areas:

- current evidence for the health impacts of stress;
- the major models of work stress, their strengths, limitations, and contributions to our understanding; and
- policy and practice implications, with an overview of strategies used to identify, assess, and manage stress in the workplace.

CURRENT EVIDENCE FOR HEALTH IMPACTS OF WORK STRESS

Stress is considered to arise from exposure to stressors, but it is important to establish from the outset that this does not necessarily cause health problems in all people. In many cases, while taxing people’s coping mechanisms, no lasting damage is caused. While the experience may be accompanied by feelings of emotional discomfort, and may significantly affect well-being at the time, it does not necessarily lead to the development of a psychological or physiological disorder.

In cases for example where exposure is prolonged, health effects may result. Further, the health state itself may act as a stressor, as it may sensitise the person to other sources of stress by reducing their ability to cope. Within limits, the common assumption of a relationship between the stressor, the experience of stress and poor health appears justified.

The health effects of work stress are discussed under two headings:

- physiological and physical effects; and
- psychological and psychiatric.

Physiological and physical effects of stress

Physiological process

Work stressors or hazards or risks are defined as environmental situations or events potentially capable of producing the state of stress. When exposed to a stressor, the body’s reaction involves a number of physiological processes. It is generally agreed that there are two arousal pathways in the response to stress:

- the hypothalamic-pituitary-adrenal-cortical arousal system (HPA axis) that involves the activation of the adrenal cortex by the pituitary gland to release cortisol into the blood; and
• **SNS-adrenal-medullary** arousal involves stimulation of the adrenal medulla, by the hypothalamus acting through sympathetic nervous system (SNS) to release adrenalin and SNS synapses to release noradrenalin.

**Stages of the response to stress**

When faced with a challenge (i.e. a stressor), complex interactions occur, with feedback between the systems, but in due course there is a return to baseline levels. The initial reaction is adaptive and enables the individual to mobilise energy resources in the body to deal with the stressor. Common responses are increased heart rate, increased blood pressure, more rapid breathing.

When the exposure to the stressor is continuous (chronic) or severe (e.g. violent act), however, health problems can occur. This is presumed to be because of sustained physiological arousal associated with the stressor.

With repeated exposure to a stressor, the individual enters the stage of resistance where different physiological changes occur as the individual attempts to withstand the stressor.

Finally if the stressor continues a stage of exhaustion is reached where organic damage, or even death can occur.

By progressing through these stages, the normal physiological response may turn pathological.

**Chronic stress**

When an individual has been exposed to demands on a **chronic** basis with little opportunity for control, for example in high stress jobs, the resting baseline levels of both adrenalin and cortisol are raised. Among other changes there is also a slower return to baseline levels. This indicates a diminished ability to cope physiologically.

It is assumed that **chronic** stress results in an inability to recharge the adrenomedullary response required for adaptation. This leads to adrenalin degeneration. Further, the elevated levels of adrenalin and cortisol may affect cardiovascular health. This is thought to occur partly via the effects of hormones on blood pressure and serum cholesterol levels.

There is growing evidence for the neuroendocrine-immunological mediation of the impact of psychosocial stressors on health and quality of life, even the common cold. The concept of allostatic load is relevant here. Allostasis refers to the response of the body required to return to homeostasis. Allostatic load refers to the inefficient operation of allostatic systems, whereby activated hormones are not ‘turned off’. This concept is being used as an organizing framework for examining a range of emotional, behavioural, and social factors in relation to a variety of health outcomes.
Evidence of health outcomes

The clearest evidence for the health effects of work stressors comes from a number of studies, particularly those tests of the main dimensions of a key model of work stress: the job demand/control model. This model, which will be discussed in detail later, sees work stress as arising from jobs where the worker has a high level of job demands in combination with a low level of control (e.g. little latitude for decision-making).

Research findings include:

- elevated risk of cardiovascular disease related due to job strain (high demand, low control) has been demonstrated in a number of longitudinal studies;\(^\text{17}\)

- results from the Whitehall II study confirm that people at lower levels of the civil service have poorer health, further reinforcing the well-established fact of a socio-economic gradient in worker health;\(^\text{18}\) Reasons for this gradient are thought to include work stress;

- the Whitehall II study also shows a link between low levels of job control and an increased risk of coronary heart disease (eg. plasma fibrinogen);\(^\text{19}\) and

- an increase in obesity due to job strain;\(^\text{20}\)

CHD is also linked to working long hours;\(^\text{21}\)

Most conditions susceptible to work stress involve the cardiovascular and respiratory systems, (eg CHD, and asthma), the immune system (eg rheumatoid arthritis), and the gastrointestinal system (eg gastric ulcers);\(^\text{22}\)

Psychological and psychiatric outcomes

Chronic strain

Another concept common to many stress models is that the condition of stress leads to acute reactions, or symptoms of strain in the worker. These reactions may be transitory and necessary to cope with a new challenge. However, the accumulation of strains over time is considered to result in psychological and behavioural effects as well as physiological reactions;\(^\text{23}\)

Cognitive and psychological effects

Psychological strain includes cognitive and psychological effects, such as:

- an inability to concentrate;

- job dissatisfaction;
• affective disorders, including anxiety, depression and anger, and
• somatic symptoms such as headaches, perspiration, and dizziness.

Psychological conditions that are investigated as consequences of job stress may not necessarily be classifiable under recognised psychiatric classification systems. Rather, the condition may represent ‘significant functional disturbances or risks for the development of clinical disorders’. Longer term psychological outcomes may include mental illness and suicide. For example, the Whitehall II study found that social support at work, low decision latitude, high job demands, and effort-reward imbalance were associated with increased risk of psychiatric disorder over time.

**Behavioural strain**

This may be indicated by increased or excessive use of alcohol and drugs, including tobacco; or by reduced work performance, higher levels of absenteeism or sick leave, industrial accidents and staff turnover.

Besides these outcomes, strain from the work environment may spill over into the home environment, leading to marital problems and other social issues.

**Post-traumatic stress disorder (PTSD)**

A range of traumatic stressors may be experienced in the work environment as intense, acute events, beyond the normal range of expectations; for example, the experience of violent incidents, witnessing a robbery, working with abused clients, or dealing with road accidents. Such events may even be life threatening.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-IVTR 2000), and the International Classification of Diseases (ICD-10) provide the criteria for diagnosis of PTSD, including the exposure to a traumatic event, and the experience of sequelae associated with that event.

Symptoms typically include:

• intrusive recollections;
• dreams;
• sensitivity to stimuli associated with the initial event; and
• avoidance of activities or situations associated with the trauma.

A range of other psychological conditions may co-exist with PTSD, such as anxiety, depression, thoughts of suicide, panic disorder, anti-social personality disorder, agoraphobia, and substance abuse. Chronic stressors have also been viewed as a precursor to PTSD, for example in the case of bullying. In contrast to most other assessments of the effects of work events on workers, PTSD has a strong legal position. This is because a distinctive feature of
the disorder is that it can be diagnosed clinically, while at the same time addressing the issue of causality. The physiological changes thought to result from chronic stress, i.e. chronic neuroendocrine and cardiovascular over-arousal, peripheral adrenalin degeneration and cardiovascular degeneration, are presumed to underpin both psychological and physical health problems.

**MAJOR MODELS OF WORK STRESS**

**The context of stress**

The literature on work stress reveals the influence of socio-political contexts on the research agenda and on the way work stress is conceptualised. Of course, the discussion on stress, or indeed anything else, does not arise in a political or ideological vacuum.

Early research on work stress (e.g. beginning with that of Kahn and his colleagues and continuing in the USA during the 1960s and ‘70s) focused on personal attributes and subjective characteristics rather than the characteristics of the situation. It has been argued that this individualised conception of role stress effectively depoliticised the discussion on work stress, facilitating its easy passage into corporate human resource management.

At the same time in the Scandinavian countries, a social democratic political approach to the issue was emerging. The climate gave rise to a radically different research perspective focusing on work characteristics and occupational health. The context was one of work reform and industrial democracy, and it was supported by trade unions, government and employers’ organisations.

Since the early 1960s research in the area has burgeoned, leading to different understandings about what stress is or means. Since stress has many causes, investigators have been able to formulate, and at least partially validate, substantially different models of the causes of stress.

Moreover, ideas of stress are further complicated by the incorporation of various values, such as:

- a humanistic-idealistic desire for a good society and working life;
- a drive for health and well-being;
- a belief in worker participation, influence, and control at the individual level; and
- an economic interest in competitiveness and profits of business organisations and the economic system.

Placed within this framework, occupational stress becomes a social and political problem as much as a health problem.

There is general agreement in the literature about the definitions of a stressor (antecedent of stress) and a strain (consequence of stress). As we shall see, however, stress definitions vary...
according to a theoretical perspective. Some theories do not specifically define the intermediary term ‘stress’. Work stress, job stress and occupational stress are often used interchangeably. A generic definition given is “job stress can be defined as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. Job stress can lead to poor health and even injury”

**Work stress theories, paradigms, and frameworks**

Work stress theories attempt to describe, explain and predict stress/strain according to a coherent set of hypotheses. The many theories differ in emphasis, but their content is often overlapping and complementary. Taxonomies include the following:

- stimulus/response combinations;
- sociological vs psychological paradigms; and
- environmental vs individual emphasis.

Cox et al (2000) assert that most current stress theorising is psychological, and conceptualises work stress in terms of a negative psychological state, and the dynamic interaction between the person and their work environment. This includes:

- *interactional theories*, focusing on the structural features of a person’s interaction with their work environment; and
- *transactional theories*, focusing on the cognitive processes and emotional reactions associated with the person’s interaction with their environment.

In reality this framework is not clear-cut as some models clearly embrace important sociological influences (ie DCS & ERI). Four dominant contemporary theoretical models of work stress are discussed below.

**Interactional theories**

Interactional models explain work stress in terms of the individual’s interaction with the work environment.

**Demand-control/support model**

The job demand-control (JDC, or DC) model put forward by Karasek argues that work stress arises primarily from the structural or organisational aspects of the work environment rather than from personal attributes or demographics. According to this model, ‘strain results from the joint effects of the demands of the work situation (stresors) and environmental moderators of stress, particularly the range of decision making freedom (control) available to the worker facing those demands.”
Strain is understood to result for people with objective high job demand and objective low control over their work, irrespective of individual differences in appraisal or coping. This conceptualisation of stress views environmental causes as the starting point, although it does not strictly preclude the importance of personal factors.

Objective stressor → Strain

Empirical tests of the work environment model ideally investigate the link between objective stressors and illness. Stress in these models refers to the intermediate state of arousal between the objective stressor and strain. Karasek notes that this state (stress) is rarely measured in his research.

Drawing from research in industrial sociology, animal research on ‘learned helplessness’ and health psychology, the theory hypothesises that when workers are faced with high levels of demands and a lack of control over decision making and skill utilisation, adverse health effects will result:

- as levels of psychological work demands increase and workplace autonomy or control decreases levels of psychological strain increase (follow Diagonal A, Figure 1), and
- as demands and control increase congruently, increases in job satisfaction, motivation, learning, efficacy, mastery, challenge, and performance will be observed (follow Diagonal B).

Karasek argues that high demand jobs produce a state of normal arousal (i.e. increased heart rate, increased adrenalin, increased breathing rate), enabling the body to respond to the demand. However if there is an environmental constraint, such as low control, the arousal cannot be channeled into an effective coping response (e.g. participation in social activities and informal rituals). Unresolved strain may in turn accumulate and as it builds up can result in anxiety, depression, psychosomatic complaints and cardiovascular disease.

According to the model, workers in high strain jobs (e.g. machine paced, assemblers, and service-based cooks and waiters) experience the highest levels of stress. High status workers, such as executives and professionals, have frequent opportunities to control or regulate high levels of demands (i.e. active jobs).
The model has been expanded to include social support as an important aspect of the work environment. A recent review of 81 studies of social support, in particular emotional support, found that it was reliably related to beneficial effects on aspects of cardiovascular, endocrine and immune systems. Further, potential personal health related behaviours did not appear to be responsible for the associations. Jobs with high demands, low control, and low support from supervisors or co-workers (DCS model) carry the highest risk for psychological or physical disorders (high strain-isolated jobs).

Considerable empirical support for the model has been found:

- empirical tests of the DC model have shown that large-scale multi-occupational studies tend to provide support for interaction effects between demand and control predicting strain;
- smaller scale studies of the DC model in homogeneous samples have found primarily main effects of demands and control.

**Figure 1. The psychological demand-decision latitude model:** Dynamic associations linking environmental strain and learning to evolution of personality. Adapted with permission from Healthy Work: Stress, Productivity, and the Reconstruction of Working Life (p 99), by R. A. Karasek and T. Theorell, 1990, New York: Basic Books.
• epidemiological studies provide the most convincing support for the core assumptions of the DCS model\textsuperscript{59}. Longitudinal studies have shown job strain to predict myocardial infarction (heart attack) in a study of working men over ten years\textsuperscript{60};

• in a recent review of ten longitudinal studies of men, six showed an increase in cardiovascular disease (CVD) risk due to job strain (high demands, low control), and two showed mixed results. Of five cohort studies in women, four showed higher levels of elevated risk in CVD related to job strain\textsuperscript{61}, and

• further, a recent study of 33,698 working women (nurses) in the United States found high strain workers showed lower vitality and mental health, higher pain, and increased risk of both physical and emotional limitations than workers in ‘active jobs’. Iso-strain (high strain-isolated) work increased the risks further\textsuperscript{62}.

Most studies of the DCS framework have examined the job strain hypothesis, though ‘patterns of active coping behaviour could affect the progression of disease development’\textsuperscript{63}.

A South Australian study of 419 correctional officers\textsuperscript{64} showed that the level of active coping was significantly higher in active jobs than in passive jobs, consistent with the idea that workers experiencing passive jobs, with little opportunity for control, will show reduced motivation to tackle new problems. A more recent study found both increased worker motivation but also greater health impairment in 381 insurance company workers in active jobs\textsuperscript{65}. It was argued that the levels of demands were in fact too high, that they were not reduced by increasing control, and that neither too few or too many demands are good for employees\textsuperscript{66}.

**Evaluation**

In comparison to all other models, empirical testing of the DC(S) models has dominated the occupational stress research in the past 15 years. This is probably in part due to the ease with which the highly specified three dimensions of the model can be researched. On the other hand, the model has been criticised for its relative simplicity and predictably, its lack of attention to psychological processes.

Although the model is essentially a sociological model, a challenge is that tests of the model are usually by self-report and in this way results represent psychological appraisals rather than assessments of the objective situation\textsuperscript{67}. There is, however, good evidence of consistency between self-report and objective ratings of the work environment\textsuperscript{68}.

The model attracts strong empirical support and has good face value in the workplace\textsuperscript{69}. However modern work demands are squeezing out “passive” and “relaxed” jobs (eg scientists increasingly compete for funding, physicians participate in settings of corporate managed care), which may lead to two classes of occupations: those with high control or those with low control, but all with high demands\textsuperscript{70}.
The model helps to develop links between productivity and healthy work. It takes account of the work environment imperative of productivity and postulates that increased productivity will occur when workers have jobs that combine high demands and high control (i.e. active jobs).

**Burnout**

The notion of burnout is particularly relevant for people-oriented professions. It is thought to result from prolonged exposure to chronic interpersonal stressors on the job, especially from working with troubled people. Burnout is conceptualised as ‘an individual stress experience embedded in a context of complex social relationships, and it involves the person’s conception of both self and others’.

Although human service work is argued to impose special stressors on workers because of the client’s emotional demands, some studies have found that stressors such as client’s emotional demands, or problems associated with the professional helping role, such as failure to live up to one’s own ideals, are less potent in predicting stress than those more in common with other non-helping professions. For example a US study of 168 protective services personnel (social workers) found that organisational variables were more strongly associated with job satisfaction and burnout than were client factors.

Overall empirical research on burnout has generally shown that job factors are more strongly related to burnout than are biographical or personal factors. The burnout process is said to begin with some frustration or loss of autonomy with which the individual failed to cope adequately.

Maslach and Jackson note that although personality variables are certainly important in burnout, research has led us to the conclusion that the problem is best understood (and modified) in terms of job-related stress. The prevalence of the phenomenon and the range of seemingly disparate professionals who are affected by it suggest that the search for causes is best directed towards uncovering the operational and structural characteristics of stressful situations.

Recent theoretical developments regarding burnout have turned to more positive conceptualisations, focusing on contrasting or opposite states of burnout - specifically engagement. Engagement consists of high energy (rather than exhaustion), strong involvement (rather than cynicism), and a sense of efficacy.

One concept of interest to researchers is the job-person fit model, not in the narrow sense of how an individual personality fits with the job, but rather how their motivations, emotions, values and job expectations fit with the job, or the organisational context.

Job-person mismatch is hypothesised to lead to burnout: the greater the mismatch the greater the burnout. Maslach and Leiter outline six areas where mismatch can occur, resulting in increased exhaustion, cynicism, and inefficacy:

- work overload occurs when the job demands exceed limits;
• **lack of control** occurs when people have little control over the work they do, either because of rigid policies and tight monitoring, or because of chaotic job conditions;

• **insufficient reward** involves a lack of appropriate rewards for the work;

• **breakdown of community** occurs when people lose a sense of positive connection with others in the workplace, often due to conflict;

• **absence of fairness** occurs with the perceived lack of a just system and fair procedures which maintain mutual respect in the workplace; and

• **value conflict** occurs when there is a mismatch between the requirements of the job and peoples’ principles.

**Evaluation**

According to Maslach (1998), the six mismatch model may be useful when formulating interventions. It has been argued that burnout research may be flawed as it merely reframes or renames a phenomenon that other occupational groups share.

The framework focuses attention on the relationship between the person and the situation, rather than on one or the other in isolation. Research tends to find job factors more strongly linked to burnout than personal factors. The model identifies key work dimensions which overlap with the DCS and ERI models.

**Transactional theories**

**Effort-reward imbalance model (ERI)**

Like other transactional theories of stress, this model focuses on the cognitive processes and emotional reactions associated with the person’s interaction with their environment. That is, it emphasises the interaction between environmental constraints or threats, and individual coping resources. It also relates to the social framework of the job (e.g. social status of job (see Figure 2).

According to this model, workers expend effort at work and they expect rewards as part of a socially (negotiated) organised exchange process of work. It assumes that the work role in adult life provides a crucial link between self-regulatory functions such as self-esteem and self-efficacy and the social opportunity structure. ERI theory emphasises *rewards* (such as money, esteem, and social control) rather than job control. Strain results when an imbalance occurs between the efforts a worker puts in, and the rewards that are received. For example, workers who have high job demands and low pay, or who experience a threat to their job security or status, are likely to experience strain as a result of this imbalance. This can be expressed in terms of the ratio of efforts/reward.
Over-commitment

ERI further distinguishes between efforts made in response to the job’s demands, and efforts made as a result of a personal characteristic of coping, a pattern of excessive striving in combination with a strong desire to be approved and esteemed. These are referred to as extrinsic efforts and intrinsic efforts respectively.

This pattern of intrinsic effort is referred to as over-commitment. Conceptually it has links with the ‘Type A’ behaviour pattern and negative affectivity. A worker may have a high need for control, which results in over-commitment and immersion in the job. This is likely to be accompanied by a perception of low rewards. This is a major departure from the DCS model, which does not explicitly specify the role of personal disposition in work stress development.

Evaluation

One criticism of the ERI model is that we cannot rule out the possibility that the development of personal attributes is independent of exposure to the work environment. The impact of this is that when ERI research tests for the effect of over-commitment or negative affectivity on strain, true variance in strain measures due to variation in work environment measures could be removed. Effort-reward imbalance at work has been found in studies to predict new cases of coronary heart disease, and helps to explain cardiovascular risk factors in workers. It has also been shown to be important in explaining adverse health effects such as gastrointestinal disorders, psychiatric disorders and poor subjective health.

Figure 2. Model of effort-reward imbalance at work.

Cognitive approaches

Stress is often seen in cognitive approaches in terms of an individual’s perception and coping ability. Stress results when a person perceives events and the environment as taxing or exceeding their resources to deal with the demands on them, and this endangers their well-being.

In this cognitive model, the person’s appraisal of the situation, their feeling that it signifies harm to them and their doubts about being able to cope with it, are central to the view of stress. In their attempts to cope, they may focus on solving the problem, or try to regulate their emotional distress. The situation is then re-appraised and the process repeated. If the situation is unresolved then psychological and physiological strain persist, resulting in longer term negative effects on health and well-being.

Empirical tests of the model assess the relationship between cognitive appraisal and strain rather than the relation between the objective stressor and strain. Reduced to its simplest form:

\[
\text{Stressor} \leftrightarrow \text{Cognitive appraisal} \leftrightarrow \text{Coping} \rightarrow \text{Strain}
\]

Evaluation

The essence of this model is the meaning given by individuals to events. Research therefore requires investigations of individual transactions. While this approach provides rich insights into the cognitive processes of individuals, many limitations in its utility have been noted. Nevertheless the theory has generated significant amounts of research on stress and coping, and suggests coping approaches that may offer a useful array of intervention strategies.

Its limitations in a work context are that it cannot specify which aspects of the work environment might be worth modifying because according to the theory each individual would see the environment in a different way.

Overall evaluation of work stress theories

The theories each explain some aspects of the work stress picture, and each has its own limitations. Transactional models are in a sense a development of the interactional models and are largely consistent with them. Essentially the transactional models shed light on cognitive and coping processes.

It has been argued that it is worth studying the contribution of both the DCS and ERI models to explain health and well-being and various arguments have been put forward about the relationship between job considerations and personal factors. Finally, the DCS and ERI models have provided key elements for stress prevention in major health/work stress policy frameworks (ie Luxembourg Declaration, 1997 and The Tokyo Declaration, 1998).
Changing the job or changing the worker

The bulk of theory and evidence points to important psychosocial work environment antecedents in the development of occupational strain. A major criticism of the approach focussing on the work environment, however, is that it is simplistic, due to the implicit notion of the individual as passive. Proponents of the work environment approach respond that by locating the sources of stress within the workplace, connections to the broader concepts of alienation, power, qualifications, workers’ collectives, labour conflicts management can be made.

On the other hand, when stress is understood in terms of perception and individual differences, it is likely to be viewed as an individual problem. Instead of changing stressful work practices, strategies may be directed toward adapting the worker to the existing working conditions.

Most commentators hold, however, that the work environment should be the primary focus of research and intervention. These arguments are supported by studies of work stress interventions that suggest that although individual interventions are important and should be included as part of an overall organisational stress reduction program, organisational level interventions may provide more far-reaching change in health, well-being and productivity.

Comprehensive frameworks

There is no comprehensive theory available to fully explain work stress. Certain frameworks have therefore been proposed to capture key work variables and symptoms of stress shown to be linked.

It is useful to think of work stress as an on-going process with multiple and continuous feedback between a number of elements (refer to Figure 3, Kagan & Levi, 1975):

- the work environment context (psychosocial stimuli; as appraised by the individual interacting with the person, bringing certain vulnerabilities and strengths determines the emotional, behavioural and physiological reactions ie strain which under some circumstances may lead to precursors of disease or disease itself Interacting or moderating variables (eg social support) may exacerbate or ameliorate the relationships.

Complex models may specify moderator variables, personal (self-esteem, negative affectivity, coping) variables and/or social (support) variables. Moderator variables are important because in the presence of high or low levels of these factors, the link between stressors and strain is strengthened or weakened. Mediator variables on the other hand intensify or weaken the link between stressors and strain more directly. For example a mediator variable may account (in part) for the observed relationship between stressor and strain (e.g. negative affectivity). Moderator and mediator effects give some insight into areas for intervention where the work environment is immutable.
The limitations of the theories come to the fore in practical organisational research where it is clear that important local variables need to be included in the model. Further, difficulties emerging from testing the theories, together with identified organisational problems, have given rise to more active, participatory, research and intervention methodologies. These include management approaches that use multiple theories and intend to develop new local theory. Contemporary approaches to the measurement of work stress in organisations call for multidisciplinary strategies, and the inclusion of relevant value positions. This will be discussed in more detail in Section 3.

Fig. 3 A theoretical model for psychosocially mediated disease. (Kagan and Levi, 1975)
Sources of work stress

Although individual differences occur in stress perception there is a growing body of evidence that identifies what at least the vast majority of workers experience or react to as stressful. Stressors so identified may be physical or psychosocial in origin, and may interact with each other.

Physical stressors

These may include biological, biomechanical, chemical and radiological sources of stress. Physical hazards may be measured objectively, and therefore can be monitored and health standards set. It should be remembered that physical hazards can also lead to psychological injury.

Psychosocial stressors

These are aspects of work design and the organisation and management of work, which have the potential for causing stress.

Based on the most recent literature reviews, the table below sets out different categories of job characteristics, work environments and organisational aspects which have been shown to be stressful or harmful to health. Further important risk factors include issues to do with the management style, role of the supervisor, gender, personal factors, socio-economic status, and violence.
Table 1. Stressful characteristics of work

<table>
<thead>
<tr>
<th>Category</th>
<th>Risk factors/conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Job characteristics and nature of the work</strong></td>
<td></td>
</tr>
<tr>
<td>Job contents/ demands</td>
<td>High physical, mental and or emotional demands, lack of variety, short work cycles, fragmented or meaningless work, under-utilisation, high uncertainty, continuous exposure to people through work</td>
</tr>
<tr>
<td>Workload/workplace</td>
<td>Work overload or underload, machine pacing time pressure, deadlines</td>
</tr>
<tr>
<td>Work schedule</td>
<td>Shift working, inflexible work schedules, unpredictable hours, long or unsocial hours</td>
</tr>
<tr>
<td>Job control</td>
<td>Low participation in decision making, lack of control over workloads</td>
</tr>
<tr>
<td>Physical environment and equipment issues</td>
<td>Inadequate or faulty equipment, poor environmental conditions (space, light, thermal etc.)</td>
</tr>
<tr>
<td><strong>Social and organisational context of work</strong></td>
<td></td>
</tr>
<tr>
<td>Organisational culture and function</td>
<td>Poor communication, low levels of support for problem-solving and personal development, lack of definition on organisational objectives.</td>
</tr>
<tr>
<td>Interpersonal relationships at work</td>
<td>Social or physical isolation, poor relationships with superiors, interpersonal conflict, lack of social support.</td>
</tr>
<tr>
<td>Role in organisation</td>
<td>Role ambiguity, role conflict, responsibility</td>
</tr>
<tr>
<td>Career development</td>
<td>Career stagnation and uncertainty, underpromotion or overpromotion, poor pay, job insecurity, low social value to work.</td>
</tr>
<tr>
<td><strong>Individual risk factors</strong></td>
<td></td>
</tr>
<tr>
<td>Individual differences</td>
<td>Coping styles, personality, hardiness</td>
</tr>
<tr>
<td>Home-work interface</td>
<td>Conflicting demands of work and home, low support at home, dual career problems.</td>
</tr>
</tbody>
</table>
Individual factors and lifestyle

A range of personality variables may also be involved in work stress, including:

- ‘type A’ behaviour pattern
- hardiness
- locus of control
- negative affectivity, and
- self-esteem.

These factors may moderate the stressor-stress-strain relationship, influence the appraisal of the environment, create stressful environments, influence the nature and magnitude of responses to stress, influence coping, or directly affect levels of strain. They may also influence the self-selection of workers into stressful/non-stressful environments.

Individual factors may be the source of vulnerability (i.e. Type A, external locus of control), or offer positive resources for coping (e.g. internal locus of control, age, self esteem and mastery). The personal variable most frequently cited as important in work stress relations is negative affectivity. Studies that control specifically for the effects of negative affectivity still find that work environment stressors are significantly associated with strain.

Gender differences

Women are thought to be at greater risk for work stress due to the double demands of work and home:

- men are more likely than women to have high control over their work process, and women are several times more likely to hold high strain jobs, and
- several studies have reported that the high prevalence of job strain in women combined with large family responsibilities may lead to high cardiovascular risk.

Socio-economic status and job control

Socio-economic status has a well known link to health. It is easy to see how workers in jobs with low control also have low socio-economic status, and possibly a lifestyle that may lead to increased health risks. Studies have attempted to separate these effects and still find support for the independent contribution of low work control to increases in cardiovascular disease risk.
Violence in the workplace

Violence may be perpetrated by customers, or by workers themselves. Increasing work stress is argued to be a factor in precipitating violent events between workers, ranging from bullying to homicide. Baxter and Margavio theorised a possible link between the management of change and a spate of killings in the US postal service: when workers experience rapid organisational change, their sense of identity and control is reduced, which can trigger assaults or aggressive behaviour. Rapid technological and organizational change are disruptive to routine patterns of action and interaction. They argue that it is not that individual propensity cannot be completely ruled out, but that certain work conditions (rapid technological change, abusive authority, and high demands to increase productivity) erode personal control mechanisms and are likely to induce violent incidents.

Less severe but extremely damaging in its psychological impact are bullying and harassment. SA WorkCover Corporation’s 1998/1999 Statistical Report indicates that about half the cases of work stress are attributed to workplace violence: work-related pressures such as excessive workloads and unreasonable time-frames (30%); harassment and victimisation (26.3%); armed hold-ups and assaults (23.1%); and non violent conflict (16.3%).

The role of the supervisor

The National Health Service in the UK has issued an unequivocal statement that management styles clearly affect health. Current research underscores the importance of good management styles in reducing the level of stress in workers. Not only can conflict between managers, supervisors and workers lead to strain, but in many cases access to secondary/tertiary intervention is through the supervisor.

Emerging issues

In addition, workplace changes due to factors such as globalisation and the rapid development of communication technology have increased the range and intensity of stressors, such as pace, workload, longer shifts, longer hours, and stronger demands for high organisational performance.

Employment has become more precarious, as workers are employed increasingly on contract, and the permanent job itself has become more insecure and less well defined. It has been predicted that by 2020 a quarter of the workforce will be in non-traditional employment arrangements. Workers are being required to perform multiple tasks, learn new skills, and self-manage to meet competitive demands. This leads to jobs that are ill-defined, exacerbate role ambiguity and role conflict, and result in work stress. The flatter management structures arising from organisations downsizing to improve flexibility may also be a source of stress.
Public sector vs private sector stress

Research has highlighted differences in the experience and/or management of work stress in the public sector and private sector:

• in South Australia, public sector workers have more stress claims than private sector workers even though relative numbers are 40:60; and

• in the private sector, the average duration and cost per claim is higher than for the public sector.

These results may reflect a different philosophy of stress and culture of management in the public and private sectors. For example, it is possible that private sector workers because of pressures of cost containment and productivity imperatives may not make a stress claim until the situation reaches a crisis point, resulting in a more costly outcome. Going to work when sick can create organisational costs (e.g., underperformance) as well as health effects.

Summary

Each of the theoretical models of work stress proposes a particular ideology for conceptualising workplace stress, its antecedents and consequences. However, most of the evidence in the work stress literature unequivocally indicates aspects of the work environment which can contribute to occupational strain.

The research also acknowledges the importance of psychological processes such as perception, appraisal and coping, in improving our understanding of individual differences in reactions to the work environment.

The limitations of theory testing in applied settings calls for more active involvement of workers and relevant stakeholders to more fully understand the stress issue at a local level.

Sources of work stress arise from job characteristics and the nature of work, from the social and organisational context and from individual risk factors. Emerging risks include increased pace of work, longer hours, emotion work, cognitive demands, violence, increased monitoring, and job insecurity.

POLICY AND PRACTICE IMPLICATIONS

Overview of strategies to manage stress in the workplace

Strategies to identify, assess, and manage stress in the workplace may be implemented at the national level, organisational level, or individual level. A brief overview of different stress prevention and management approaches will be given before turning to the process of identification, assessment and management.

Interventions in stress management can be classed as primary, secondary or tertiary approaches, and both workplace and individual strategies can be identified on each of these levels.
Primary approaches

National policy level

Strategies at the national level include:

- legislation;
- national monitoring systems; and
- active transfer of knowledge.

Countries such as Sweden, the Netherlands and the UK, which have enabling legislation that provides a framework for stress prevention (as against prescriptive legislation), tend to have well-developed work stress prevention programs, in contrast to those which have not yet recognised work stress as an important policy issue (e.g. Germany, France).

National monitoring systems specific to stress, such as that in the Netherlands, are important for benchmarking and drawing attention to risky occupations.

Active transfer of knowledge may include the use of leaflets, research reports, books, conferences, training courses, video and TV broadcasting. Kompier et al found that it was the countries with framework legislation that organised the most preventive activities, conducted the most research, developed research networks and research groups, and embraced the active transfer of knowledge related to work stress. In Australia, a number of research groups and centres focus on work stress research.

Organisational level

At an organisational level, some approaches may be referred to as ‘healthy organisation approaches’ or organisational development approaches. The European Commission Guidance calls for mainstreaming of stress prevention into organisational development (healthy workers in healthy organisations objectives) to underpin the imperative for more flexible firms, with high skill, high trust and high quality to improve productivity and to create conditions for competitiveness and employment.

Recent developments call for inclusion of the economic interest components, and a whole of organisational approach to organisational performance analysis. Rather than focusing only on economic factors or health aspects, more versatile performance analysis requirements have led to a multidisciplinary result concept. It has been argued that performance analysis should also include a predictive element regarding present and future health of employees, to reflect the organisation’s collective health and capacity. In this way companies can be influenced to examine cost-benefit analyses of work environments that lead to unhealthy behaviour and low productivity, and health officers can be required to examine the cost-benefit analysis of work stress/ interventions.
Job redesign strategies may include interventions such as changing personnel policies including selection processes, training and development, career opportunities, or pre-employment medical examination to improve job-person fit; job enrichment, or changing work schedules.

**Secondary approaches**

These focus on reducing the impact of the stress response before it becomes too severe. It may include training groups or individuals to be resilient to work stressors, for example through stress inoculation training, fitness programs, and relaxation training.

**Tertiary approaches**

These focus on the amelioration of an identified stress condition. Tertiary stress approaches in the Australian workplace are essentially case management, injury management or disability management. Approaches may include psychotherapy, and post-traumatic assistance programs.

**Evaluation of interventions**

The efficacy or effectiveness of various interventions has also been considered.

**Organisational interventions**

Approaches such as the ‘healthy organisation’ approach aim to improve the workplace by making it more humane and democratic. Some studies that have successfully employed such strategies to alleviate burnout.

Ten case studies in the Netherlands found that sickness absenteeism was reduced and that financial benefits exceeded the costs of the intervention. Similar support was found in a Dutch study analysing another 11 European case studies. They suggested that a combination of organisational and individual interventions may work best especially where workers are in jobs with a low degree of latitude, and they found support for this in their analysis.

The lack of organisational intervention evaluations is highlighted in Van der Klink et al’s study, which incorporated only five organisational interventions of 48 studies examined. It has been suggested that ‘these (individual) solutions seem to offer an easy alternative to complex and difficult labor/management negotiations over workplace control. It appears to be dealing with symptoms instead of the causes, however’ to avoid the more difficult underlying issues.

It is therefore more likely to be politically expedient to focus at the individual level rather than the organisational level. The impetus for maintaining the status quo is not strictly management-driven. Psychologists, medical practitioners and other health professionals may unwittingly reproduce work stress situations by focusing on the individual (perhaps even economically-driven).
**Job redesign**

Several studies have attempted to redesign the central job dimensions of the DCS model. These have found that reduced levels of emotional strain, job dissatisfaction, absenteeism and intention to leave the job resulted from increased levels of both decision latitude and social support, and associated decreases in role conflict and role ambiguity. Devolution of control over pace of work, organisation of rest breaks, allocation of work assignments and overtime from supervisors to work teams, and increased control over work arrival and departures resulted in consistent benefits.

Changes in decision latitude and/or social support have led to an improved cardiovascular risk pattern; decrease in sleep disturbance and gastrointestinal complaints; and a decrease in the prevalence of pain in the upper part of the spine in a number of studies.

A few redesign studies have focused on improved productivity, such as quality of care, or worker competence in combination with decision latitude and have also improved health and decreased sick leave and increased productivity in employees. Not all studies provide consistent improvements in all areas. For example, Cordery, Mueller & Smith report more favourable work conditions, yet increases in absenteeism and turnover in a longitudinal study of autonomous work groups in comparison to traditional jobs in Australia.

**Individual approaches**

Consistent support has emerged for the usefulness of cognitive/behavioural approaches as well as stress inoculation training in the alleviation of stress symptoms.

**Relative efficacy of interventions**

A recent meta-analysis of 48 experimental studies (all utilising a no-treatment control group) evaluated the effectiveness of individual and organisational focused interventions on health complaints, psychological resources and responses, and quality of work life. It found a small but significant overall effect for the interventions as a whole, leading to the conclusion that stress management interventions can be effective. The analysis found a moderate effect for cognitive-behavioural interventions and multi-modal interventions, and a small effect for relaxation. A non-significant effect was found for organisational interventions.

The researchers expressed surprise at the lack of support for the effectiveness of the organisational interventions, pointing to recent (uncontrolled) evaluations which did find effects for organisational interventions.

The question of whether organisational interventions or individual interventions are better or more effective really depends on the aims and purpose of the intervention. For example where workers are experiencing acute levels of psychological distress, relaxation approaches may be helpful. Broad brush approaches to intervention may be less than effective.

In contrast to individual interventions, strictly controlled evaluations of job redesign interventions (i.e. increasing control or support) are said to be difficult or impossible to...
This makes it difficult to draw tight conclusions about the success of job redesign approaches to reducing work stress.

There are a number of challenges and difficulties in obtaining ‘gold standard’ evidence for the efficacy of interventions:

- a lack of longitudinal studies;
- a lack of control groups;
- rapid organisational change arising from numerous sources;
- multifactorial sources of work stress from inside and outside the organization;
- extra-organisational influences on variables such as local labour market conditions;
- a reliance on self-report data;
- short-term (individual) outcomes; and
- a lack of multidisciplinary approaches (e.g. economic aspects).

**Strategies to assess and identify problems**

Two key issues are important in assessing and planning interventions. They are how to implement the intervention, and as part of this, how to measure important aspects of the work stress process.

**Implementation**

Recommendations on how to identify and assess problems as part of the intervention strategy can be found in the literature. Such research must recognise the interpersonal and political contexts in which the research is undertaken.

Based on the outcomes of four best practice organisational intervention studies, the Dutch Government recommends a step-wise approach to organisational intervention.

A principal mechanism for successful intervention is participation of stakeholders, and this is most likely to be achieved in action intervention/research paradigms. The reciprocal nature of action research is that it aims to contribute to both the practical concerns of people in an immediate problematic situation and to the goals of social science by joint collaboration within a mutually acceptable ethical framework.

A growing number of researchers have endorsed an innovative version of action research, participatory action research (PAR), as a process for dealing equitably with power problems in applied research. Israel and Schurman used PAR in a six year longitudinal study of workers in an automobile manufacturing plant in Michigan to solve problems such as lack of...
system-wide information and communication, problems with supervisors, and lack of participation and influence over decision making. According to the researchers, evaluation showed improved health for employees (reduced cholesterol levels) and members of a consultative committee felt they were equals in the decision making of the team. According to the researchers, evaluation showed improved health for employees (reduced cholesterol levels) and members of a consultative committee felt they were equals in the decision making of the team. Recent literature has addressed the issue of how professionals can help groups (empower workers) to do their own intervention (participatory action research) and enable stakeholders to influence the process.

The participative/collaborative approach also reflects a devolution of control to workers over decision making. The chances of implementation of components of the program are further enhanced by collective efforts.

Participatory action research approaches with strong union involvement have significant advantages over expert dominated or management dominated intervention programs. A recent review of case studies of preventing stress and improving productivity concluded that the success of stress prevention depends on a subtle combination of two approaches, that is, ‘bottom-up’ (participation) and ‘top-down’ (top management support). The collective intelligence of employees at all levels has been claimed as the best source of solutions to challenges.

Measurement

Intervention necessarily requires assessment or measurement of a range of factors pertinent to work stress. Currently a range of instruments are available to assess organisational stressors, individual responses, organizational responses, individual distress and organisational distress. (See Figure 3).

Typically measurement requires workers to self-report stressors, aspects of well-being and so on. There are a number of limitations associated with self report (problems of memory, language ambiguity, social desirability, central tendency bias, response acquiescence, and consistency artifact which can lead to response distortions). Establishing links between self-report measures as part of the analysis may lead to another set of problems such as common method variance, and overlap in concepts.

To overcome these problems a range a strategy has been suggested including triangulation, more objective assessments of the work stressors, more objective measures of health states, longitudinal designs, assessment of possible moderators and mediators, and including group level measures.

Policies to reduce work stress

It is not the aim here to provide an exhaustive list of policies that could be implemented but rather some key policy implications along with a philosophical framework for advancing our understanding and developing processes to deal with new stressors as they emerge. The participation of a range of stakeholders in dialogue and research activities is critical to the development of policy that is responsive to new insights. A notable feature of the literature in the area is a lack of large Australian national studies or indeed systematic organisation of the
Australian evidence. This raises possibilities both at the national level and at the level of organisations.
National level

Policies that could be pursued at the national level include:

- providing further organisational support and funds to enable greater dialogue between all stakeholders, and to enable meaningful national engagement and participation in international discussion about work stress and its solutions;
- convening further national conferences and workshops on work stress in which government, social partners, workers and researchers can participate;
- undertaking research comparing Australian regulations, policies and practices with those in other countries;
- promoting whole of organizational approaches, healthy organizations, sustainable organizations and ethical action;
- development of a national network of work stress researchers;
- establishing a national monitoring system for identifying risk factors and risk groups in the working populations;
- making a systematic attempt to benchmark organisational performance on work stress management, so that intervention efforts can be more economically focused, eg. to sponsor research of national risk factors and risk groups;
- making work stress research a priority for National Health and Medical Research Council;
- supporting research that promotes positive or productive aspects of work such as morale and engagement, and explores emerging issues e.g. emotional and cognitive demands and workplace violence, its causes and consequences;
- the development of more comprehensive national databases, eg. NOHSC’s database of workers compensation statistics includes figures for work stress, but there is no breakdown of the data to reflect public vs private sector experience, and some jurisdictions’ data is omitted;
- more research on the effect of new legislation on rates of acceptance or rejection of stress claims;
- systematically identify gaps between research evidence and policy; and
- provide more education and training on work stress and interventions for all stakeholders to enable fuller participation in participatory processes for prevention.
To date, most Australian case studies have essentially focused on individual approaches to intervention\(^{[63]}\), in comparison to European efforts. In contrast to research about what causes stress and burnout, very little gold standard research, with case controls and randomised approaches, has been conducted on interventions that reduce work stress or burnout. It is therefore recommended that:

- Australian organisations are encouraged to use best practice principles in implementing interventions. At the same time there is an urgent need to conduct an evidence based meta-analysis of Australian work stress prevention and interventions;
- government, social partners, and researchers participate in television programs and videos on identification and prevention of stress at work; and
- development of a clearing house for all relevant information and other educational materials to be placed on WWW.

**Organisational level**

At the organisational level other measures are relevant, for example:

- focussing on primary prevention of work-related stress and ill-health rather than on treatment;
- promoting “internal control” approaches to healthier workplaces (see below best –practice);
- ensuring proper training and career development for better person-environment fit;
- ensuring optimum conditions for the introduction and uptake of new technologies, and integrating such introductions with stress prevention and health promotion;
- promoting workers’ motivations and adaptability through increased involvement in planning and implementation of change;
- promotion of equal opportunities and fair treatment of men and women, including selection and re-entry of women into the workforce and combining family and work responsibilities, to ensure the ‘high level protection of human health’ called for in the Treaty of Amsterdam;
- amending the education and training curriculum of various professionals to promote both the modernisation of organisational work and the prevention of work–related stress in an integrated manner (eg. in business schools, schools of technology, medicine, behavioural and social sciences)\(^{[66]}\).
• interventions to improve work design, organisation and management (e.g. 360 degree evaluation of supervisors’/managers’ styles) specifically to improve communications and staff involvement, and to enhance team working and control over work; develop a culture in which staff are valued; structure situations to promote formal and informal social support within the workplace; evaluate work demands and staffing; reduce violent exposures; define roles more clearly; avoid ambiguity in job security and career development; design work schedules to be more compatible for non-work responsibilities; and design forward, stable rotating shifts;

• use of local information to inform the exploration of stress. In a workplace context it is never sufficient to limit the exploration to general global variables. There is also a need for ‘local’ and more focused information specific to the organization; and

• provide secondary and tertiary support as necessary.

Guidelines for best practice in organisational implementation suggest that they:

• need to be stepwise and systematic;

• require an adequate diagnosis or risk analysis;

• combine both work-directed and person-directed measures;

• use a participatory approach (worker involvement);

• have top management support \(^1\), and

• are evaluated for costs and benefits of the intervention and in terms of health and productivity outcomes (EC guidance on work-related stress).

These recommendations are relevant and applicable in the Australian work environment today.

**CONCLUSION**

Changes in the work environment are taking place at an unprecedented pace. As demands for quality and productivity increase, and new demands emerge, such as emotional and cognitive demands, work management will require change. Workers will require more varied organisational responses to assist them to cope with old, new, and emerging risks as well as high performance. Policies and strategies for continuous monitoring and dialogue between the full range of stakeholders is imperative. Rather than rely on old models and methods, we now require active, coordinated and on-going meta-analysis of how we conceptualise stress, how we reduce negative effects and enhance positive outcomes for both the person and organisation.
3 Cox, 1988a, p.76
5 Dienstbier, 1989; Mason, 1974; Schaubroeck and Ganster, 1993
6 See Selye’s early work on the General Adaptation Syndrome-GAS.
7 See also Zergen, 1982
8 For a review of the literature see Dienstbier, 1989.
9 Karasek and Theorell, 1990
10 McCarty, Horwatt, and Konarska, 1988
11 Schaubroeck and Ganster, 1993
12 Pollard, 1997
13 Koopman, 2001
14 Cohen, Tyrrell and Smith, 1991
15 Mc Ewen, 1998
16 Hay, 2001
17 Belkic, Schnall, Landsbergis, and Baker, 2000
19 Bosma, Marmot, Hemingway, Nicholson, Brunner and Stansfeld, 1997
20 Hellerstedt & Jeffrey, 1997
21 Breslow & Buell, 1960
22 see Cox et al, 2000
23 Baker, 1985; Schuler, 1980
24 Amick, Kawachi, Coakley, Lerner, Levine, and Colditz, 1998
26 Caplan et al., 1975; Perrew and Anthony, 1990
27 Sauter et al., 1990, p. 1147
28 Greenhaus and Parasuraman, 1987
29 Stansfeld, et al, 1999
30 Greenhaus and Parasuraman, 1987; Kendall et al, 2000
31 Fox et al., 1993; Greenhaus and Parasuraman, 1987
32 See Kendall, et al, 2000
33 Tennant, 2000 Tennant 2001
34 Freckleton, 2001
35 Schaubroeck and Ganster, 1993
36 See Calnan, Wainwright and Almond, 2000
37 Mulhall 1996 p. 456
38 Beehr, 1989
39 Kahn, Wolfe, Quinne, and Snoek, 1964
40 Calnan et al, 2000, and Newton, Handy, and Fineman, 1995, p. 297
41 Calnan et al, 2000
42 Baker, 1985, p. 368
43 Levi, 1990
44 NIOSH, 1999
45 See Cox, 1978
46 Cox, et al, 2000
47 Karasek, 1979
49 Karasek, 1989
50 Karasek and Theorell, 1990
51 Frese and Zapf, 1988
52 Karasek, 1989
53 Abramson, Seligman, and Teasdale, 1978
54 See Karasek and Theorell, 1990
55 Johnson and Hall, 1988
56 Uchino, Cacioppo, & Kiecolt-Glaser, 1996
57 Schnall, Landsbergis, and Baker, 1994
58 For example, Hurrell and McLaney, 1989; Melamed, Kushnir, and Meir 1991; Perrewe and Anthony, 1990; Spector, 1987
59 see de Jonge and Kompier, 1997
60 Theorell, Tsutsumi, Hallquist, Reuterwall, Hogstedt, Frelund, Emlund, Johnson, and the SHEEP study group, 1998
61 Belkic, Schnall, Landsbergis, and Baker, 2000
62 Amick, Kawachi, Coakley, Lerner, Levine, and Colditz, 1998
63 Theorell and Karasek 1996, p. 10
64 Dollard and Winefield 1998
65 Demerouti, Bakker, de Jonge, Janssen, & Schaufeli, 2001
66 see Warr’s Vitamin Model, 1987
67 Muntaner and O’Campo, 1993
68 Spector, 1987
69 Theorell, 1998
70 Belkic et al, 2000
71 Maslach, 1998, p 87
72 Maslach, 1978; 1982
73 Collings and Murray, 1996; Shinn, Morch, Robinson, and Neuner, 1993
74 Jayaratne, Himle and Chess, 1991
75 Maslach and Schaufeli, 1993
76 Burisch, 1993
77 Maslach and Jackson, 1982
78 Leiter and Maslach, 1998
79 Maslach, 1998
80 Maslach and Leiter 1997 and Maslach 1998, p 75-76
81 Soderfeldt et al, 1995
82 Siegrist, 1996; 1998
83 Karasek et al, (1998) argued that “indeed, recent research (Dollard and Winefield, 1998) that explicitly test for the possibility of such over control with negative affectivity, using job experience cohorts to test whether negative affectivity is itself associated with duration of exposure to stressful job characteristics, finds that it is”.
84 see Siegrist & Peter, 2000
Theorell (1998) has conceptualised the relationship between the two models as the DCS embedded contextually within the ERI model. On the one hand ERI focuses on social structure, and while this is important for the DCS model that latter focuses on the situational aspect of the job). Theorell (1998) therefore argued that a good exploration of the work environment should include components of both DCS and ERI models (eg, health promoting aspects of both models - rewards, control, and support as well as others relevant to the local context (study environment)). A complicating and unresolved point however is where to locate the over-commitment personal variable.

Kristensen, 1996, p.254
Baker, 1985
Dollard and Winefield, 1996; Ganster and Schaubroeck, 1991; Schnall, Landsbergis, and Baker, 1994
Murphy, 1987
See Cooper and Marshall, 1976
For example, see Cox, 1978; Kagan and Levi, 1975
EC Guidance on work-related stress, 2000
Cox et al, 2000
Cox et al, 2000
See Dollard, Winefield, and Winefield, 2001
Cox and Griffiths, 1995
Cox et al 2000; also Macdonald 2001, personal communication
Friedman and Rosenman, 1974
Kobasa, 1979
Parkes, 1991
Brockner, 1988
Greenhaus and Parasuraman, 1987
see Dollard, Winefield, and Winefield, 2001; Stansfeld, Fuhrer, Shipley, and Marmot, 1999
Johnson & Hall, 1988
see Karasek and Theorell, 2000
Brisson, 2000
Marmot, 2000
Baxter and Margavio, 1996
Williams, Michie, and Pattani, 1998
Cotton, 2001; Dollard et al, 2001
Bousfield, 1999
Townley, 2000
Heiler, 1998
Cascio, 1995; Schabracq and Cooper, 2000 and Kendall et al, 2000
Judy and D’Amico, 1997
Kendall et al, 2000, and Dunnette, 1998
Kasl, 2000
Dollard and Walsh, 1999
see Cooper, 1998
Ganster and Schaumbroek, 1991
Kendall et al, 2000
Kompier et al, 1994
Kompier et al, 1994
Centres focusing on work stress and research include the Work and Stress Research Group, University of South Australia
See Kendall, et al, 2000
European Commission, 1998b
Liukkonen, Cartwright and Cooper (1999) propose four dimensions of company results:
1) financial result made up of quantitative measurements from the organisations profit and loss account and balance sheet;
2) time and personnel resources including hours worked, personnel statistics, levels of staffing and competency;
3) customer satisfaction demonstrated by qualitative measures such as how effective an employee is at providing value and satisfying the customer; and
4) health and safety including opinion surveys, and employee health appraisals.
They propose that the organisational performance analysis method (eg Oskar, a Swedish method) requires increased communication between different functional units in the organisation, to find a ‘company language’ and methods of combined reporting to bring results from different areas together. “Companies need meaningful information about the quantitative and qualitative values that affect profit development- information about customer satisfaction, employee health, work capacity, staff, competence and time utilisation” (p. 40).
Kendall et al 2000
Kompier and Cooper, 2000
The studies involved staff directly in identifying and solving organisational problems that contribute to stress and burnout.
Kompier et al ,1998
Kompier and Cooper, 1999
See also van der Klink, et al., 2001
Van der Klink et al, 2001; see also Geurts and Grundemann, 1999
Karasek and Theorell 1990.  p. 7
Briner and Reynolds (1999) argue that the choice of intervention will not be simple, and each will have costs, benefits, and limitations. As a general rule they argue that “the approach to interventions should be evidence based (see Briner, 1997) such that the causal relationships between job conditions and negative employee states and conditions are established before interventions are designed or implemented”. Theorell (1998) argues that published studies of job redesign interventions are typically unorthodox as job interventions sometimes include both individual and organisational components in job redesign, study groups may not be strictly comparable, both experimental and control conditions may have been subject to redesign but to different degrees, and because the follow-up period for evaluation is insufficiently long.

The methodological quality of Kompier and Cooper’s (1999) intervention case studies in general involved evidence obtained without a control group or randomisation but with follow-up evaluation (6 cases), a few with evidence obtained from a properly conducted study with a control group but no randomisation (2 cases), and 1 case which utilised a randomised case control group. Interestingly that latter study implemented an individual focused intervention, about which they comment “it is easier (although not easy!) to develop a randomized control condition (for a training program directed at the employee) than for a program which places the emphasis on changing stressful working condition” (p. 317).

Rossi and Freeman, 1989

Janssen, Nijhuis, Lourijsen, and Schaufeli, (1996). The steps are: 1) preparation and introduction of the project; 2) problem identification and risk-assessment; 3) choice of measures and planning of interventions; 4) implementation of interventions; and, 5) evaluation of interventions (similar to those of the control cycle Cox and Cox, 1993).

Karasek and Theorell, 1990

Rapaport, 1970, p 499

Landsbergis, Schurman, Israel, Schnall, Hugentobler, Cahill, and Baker, 1993

Israel and Schurman 1993

Leiter 1991; Wadsworth, 1998

See Dollard, Heffernan, Winefield, and Winefield, 1996

Karasek and Theorell, 1990. Landsbergis (1988) argues that collective (union) efforts to increase decision latitude can be the best guarantee against a ‘change of heart’ by top management, favouritism, or passivity resulting from paternalism, as well as assuring that the fruits of increased productivity will be equitably shared (eg, through increased job security) (p 236).
Triangulation of techniques in the assessment of the same phenomenon is also important. The idea is to validate the phenomenon under observation in at least 3 different ways. Assessors could use both quantitative methodologies (surveys, organisational data-bases) and qualitative methodologies (in-depth interviews; ethnographic field notes, case studies). Multiple-methods should provide more meaningful and comprehensive data. It enables an analysis of the occupational stress process, and sequences that occur in the interactions between workers and their workplaces in the development of occupational strain. Triangulation has been used successfully to study occupational stress (Israel, House, Schurman, Heaney, and Mero, 1989), and failures in occupational rehabilitation (Kenny, 1995).
## APPENDIX – Preventive strategies and surveillance indicators for organizational stress

### Primary Prevention

**Organizational strategies**
- Job and task redesign
- Participative management
- Career development
- Design of physical settings
- Role analysis
- Goal setting
- Social support

**Individual strategies**
- Managing perception of stress
- Managing the work environment
- Lifestyle management

### Secondary Prevention

**Organizational strategies**
- Team building
- Diversity programs

**Individual strategies**
- Relaxation training
- Spirituality and faith
- Emotional outlets
- Physical fitness/nutrition

### Tertiary Prevention

**Individual strategies**
- Psychological counselling
- Therapy behavioural psychological
- Trauma debriefing
- Medical care

### Surveillance Indicators

**Individual assessment of organizational stressors**
- Occupational Stress Inventory
- Job Stress Survey
- NIOSH General Job Stress Questionnaire
- Stress Diagnostic Survey
- Job Content Questionnaire

**Individual Responses**
- Absenteeism, tardiness
- Employee assistance program use
- Health unit visits
- Counselling referrals
- General Health Questionnaire
- Cornell Medical Indexes
- SCL-90-R (symptom checklist)

**Organizational responses**
- Absenteeism rate
- Employee turnover rate
- Internal transfer rate
- Grievances
- Work related incidences

**Organizational distress**
- Violent incidents
- Vandalism
- Health care costs
- Compensation awards
- Quantity of production
- Quality of production
- Sales volume and revenue

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**ORGANIZATIONAL STRESS PROCESS**

- **Organizational demands and stressors**
- **The stress response and its modifiers**
- **Individual and Organizational distress**
BIBLIOGRAPHY


SA WorkCover Corporation 1998/1999 Statistical Report


EXECUTIVE SUMMARY

In this paper I discuss some of the evidence relating to individual differences in reactions to stress and conclude that there is some good evidence to suggest that people vary in their experience of stressors, both in terms of whether a stimuli is perceived as stressful and the perceived intensity of the stressor. This can be seen clearly in the research on Negative Affectivity (NA) where people who are high on negative affectivity seem to over-report the intensity of stressors.

However, good evidence that people vary in their reactions to stressors, as opposed to their appraisal of stressors is harder to come by. Evidence is reviewed on the Type A concept, and I conclude that it does not provide a convincing basis for accepting that people are differently reactive. Furthermore the evidence that other variables such as NA influence reaction to stressors is equally weak. However this is an area that probably deserves greater attention, as relatively few studies have treated variables such as NA as anything other than a methodological nuisance factor.

So, evidence that people differ in their reactions to stress on the basis of their trait psychological individual difference factors is not particularly strong. However, situational and demographic individual difference factors such as age, wealth, education and social support do seem likely to influence people's reactions to stress.

In our recent book (Jones & Bright 2001), my co-author and I describe personality-based individual differences in reactions to stress as a myth. Although commonly we use such terms as mythology and folklore in a pejorative sense to describe something that is fictitious, myth can also be thought of as an account of something commonly held, but held in the absence of current scientific evidence.

My reading of the current literature would lead me to be cautious in pursuing individual differences approaches to stress interventions, especially if the focus is on trait psychological factors. My view is that this myth deserves more rigorous investigation.
INTRODUCTION

The idea that we vary in our vulnerability to stressors is an attractive proposition for organisations interested in selecting employees. It holds out the promise that they could recruit suitably robust employees, provided we could reliably measure this resistance concept. This potentially renders expensive stress-related compensation claims less likely. In the health field, this idea is attractive because it suggests we can identify vulnerable individuals and provide appropriate interventions to assist them.

A Conceptual Framework for Individual Differences

A plethora of individual difference factors have been investigated in relation to stress. They fit into three broad categories:

- genetic;
- acquired; and
- dispositional.

While genetic and dispositional factors are considered to be generally stable traits or characteristics of the individual, those acquired during the person’s lifetime can change. A list of some of the more commonly studied individual difference variables (or factors) are shown in Figure 1.

Figure 1. Individual Difference Variables

<table>
<thead>
<tr>
<th>Genetic</th>
<th>Acquired</th>
<th>Dispositional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Social class</td>
<td>Negative Affectivity/Neuroticism</td>
</tr>
<tr>
<td>Intelligence</td>
<td>Education</td>
<td>Type A</td>
</tr>
<tr>
<td>Physique</td>
<td>Social support</td>
<td>Locus of Control</td>
</tr>
<tr>
<td>Age</td>
<td>Job position</td>
<td>Coping style</td>
</tr>
<tr>
<td></td>
<td>Marital status</td>
<td>Self esteem/self efficacy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hardiness</td>
</tr>
</tbody>
</table>

Adapted from Cooper & Payne, 1988

Methodological Issues

Figure 2 shows three different ways that stress can impact upon symptoms:

- directly;
- indirectly, by affecting a variable that in turns impacts upon symptoms (mediation); or
- the relationship between stress and symptoms may be altered by an intervening variable (moderation).
These different mechanisms require different statistical analysis and failure to consider these alternative models has been a shortcoming in the individual differences literature.

**Figure 2: Alternative models**
(Adapted from Edwards, Baglioni & Cooper, 1990)

**GENETIC INDIVIDUAL DIFFERENCE FACTORS**

**GENDER**

There are well-established differences in health status and mortality between men and
Women. For example:

- Men are four times more likely to die of coronary heart disease (CHD), five times more likely to die of alcohol-related diseases and have an average life expectancy eight years shorter than females;\[188\]
- some studies tend to show that women report more strain symptoms and engage in more health related behaviours (e.g., visits to clinician, general practitioner);
- it is particularly notable that researchers have found that psychological symptoms such as depression are much more likely to be diagnosed in women than in men. Holmes (1994) reports that studies conducted in 30 countries over a period of 40 years reveal a female:male ratio of about 2:1. In terms of less serious levels of psychological ill-health, an analysis of two large international data sets by Lucas & Gohm (1999) also concluded that women were more likely to experience negative affective states than men. Similarly, the Whitehall Study (a large-scale longitudinal epidemiological study of London-based civil servants) reports significantly higher rates of psychological distress (using the general health questionnaire (GHQ)) in women than men;\[189\]
- not all studies reveal such clear-cut gender differences. Recent waves of the British Household Panel Survey (another large-scale longitudinal study that uses the GHQ: n = 10,000) found no significant differences;\[190\]

Several factors related to gender are likely to influence self-reports of psychological health status. Diener, Suh, Lucas and Smith, (1999) and Fujita, Diener and Sandvick (1991) both suggest that women tend to feel emotions more intensely and frequently than men. Alternatively, these differences may reflect different cultural expectations for men and women. It is, perhaps, more socially acceptable for women to express negative feelings or admit to lack of confidence and thus women are more likely to endorse items such ‘Do you find yourself needing to cry?’ or ‘Have you recently been losing confidence in yourself?’ However, it may also be the case that as gender roles equalise fewer studies will find significant differences.

While it may make sense from an experimenter’s point of view to control for genetic factors such as gender, this does not help us understand precisely how gender may influence the stressor-strain relationships. Individual differences based upon genetics have long been a cause of controversy within psychology and more broadly in society. The major difficulty for anyone wishing to assert that the stressor-strain relationship is affected by a genetic factor, must first establish the impact of co-varying environmental factors. So in the case of gender, it is not clear whether it is the biological sex of the person that influences strain responses or a complicated set of environmental stimuli. For instance, social learning, stereotyping, access to coping strategies, work patterns, social norms of behaviour and power imbalances between men and women may all plausibly contribute to these differences. Whether any reliable differences between the sexes exist, after these and many other factors have been taken into account, has yet to be determined adequately.
Age / Health

Similarly, in relation to age, a distinction is often drawn between an individual’s chronological and physiological age. Chronological age is the time elapsed since birth while physiological age depends on the amount of wear and tear or stress the individual has been exposed to. As such, it would seem that chronological age would be related to the type of stressors the individual is exposed to while physiological age would be related to the consequence or outcome of exposure to such stressors.

Chronological and physiological age are both related to an individual’s physique or overall health status. It is commonly observed that more physically robust individuals appear to cope better with stressors or stressful situations than physically weaker individuals. Once again, however, an individual’s physical status is likely to be affected by a host of non-biological factors such as previous medical history, personal habits and socio-economic status. Most stress research only considers chronological age.

Research findings on the relationship between age and psychological ill health do not show straightforward relationships. A study of 11,000 health-care workers by Wall et al (1997) revealed that younger respondents were in better general psychological health than their older counterparts. Data from the British Household Panel Survey (which spans a wider age range) reveals a more complex picture; well-being worsened in the middle-aged group (35-44) then improved with age only to deteriorate again at 75+. A study of 1686 workers from a wide range of occupations. The middle-aged workers reported lower levels of job-related enthusiasm and contentment than younger or older workers.

More work is needed on the role of age as an individual difference factor. Relationships are clearly likely to be complex. For example age may interact with stressors in impacting health (that is it acts as a moderator). This kind of relationship is seldom investigated.

ACQUIRED INDIVIDUAL DIFFERENCE FACTORS

While some individual difference factors may be genetic, many are acquired over time. Acquired factors include resources, such as financial assets or social supports, and various coping strategies that individuals may develop to deal with stressors. There is a large body of work examining the roles of coping strategies and social supports.

Education & occupation

Education and occupational status (being linked with income) are other acquired factors that one might expect would predict higher levels of psychological health. Studies on the psychological effects of unemployment found that highly educated respondents were more distressed than their counterparts with lower levels of education.

A national survey conducted in the USA found that men with higher levels of education were more likely to express reactions to environmental stressors in psychological terms (such as feelings of self-doubt, vulnerability, anxiety and ‘mental break-down’), whereas those of a lower educational status defined these judgements more in terms of physical symptoms.
Interestingly, in this study, educational status had no effect on women’s self-evaluations. The authors speculate that higher education might sensitize men to mental health issues, whereas women are likely to be already sensitised due to gender-role socialisation.

**Socio-economic status**

Socio-economic status is closely linked to educational status and it is also well-established that lower socio-economic status is associated with poorer physical health and higher mortality. Large-scale studies investigating occupational stressors and health outcomes usually take such variables into account as they may well be confounded with occupational stressors. For example, those in lower socio-economic groupings are likely to have jobs with less control, a job characteristic which is considered to be implicated in heart disease.

**DISPOSITIONAL INDIVIDUAL FACTORS**

While control for such demographic variables is important in stress research, more usually, when people refer to individual difference variables, they have in mind dispositional individual differences (i.e. personality traits). Several different traits have been linked to stress in the literature, but two stand out as having received particular interest. These are:

- Type A behavior; and
- Negative Affectivity (NA) (e.g. see George, 1992).

While the construct Negative Affectivity is considered one of the ‘Big 5’ personality dimensions, the Type A behaviour construct grew out of a body of research investigating risk factors for CHD. Both these variables have received considerable research attention and are consistently included in major review articles on dispositional variables.

The role of both in stress will be considered here. Firstly, however, the two main mechanisms through which dispositional factors can influence the stress process will be reviewed.

1. The first mechanism is where the dispositional factor influences the individual’s exposure to stressors. Referred to as the differential exposure hypothesis, it occurs when the stressor is the mediator between the dispositional variable and level of strain.

2. The second mechanism is where the dispositional factor influences the individual’s reactivity to stressors. Referred to as the differential reactivity hypothesis, it occurs when the dispositional factor moderates the stressor-strain relation. As discussed, the effect can be to buffer (i.e. reduce) or increase the detrimental effect of the stressor on the individual. It is this second hypothesised mechanism that generally has been examined in the research (O’Driscoll).
Type A and hostility

The concept of Type A Behaviour evolved out of a series of studies investigating risk factors for CHD which became known as the Western Collaborative Group Studies (WCGS). After eight years of extensive interviews and observation, a group of behaviours and traits was identified that appeared to distinguish ‘at risk’ individuals. This is referred to as Type A Behaviour Pattern. The Type A individual is described as impatient, irritable, hostile, competitive, job involved, achievement striving, competitive and deadline focused. The Type B individual is characterised by a relative lack of these characteristics. Even after controlling for traditional risk factors (e.g., blood pressure, cholesterol level, family history), the risk of developing CHD for Type As was reported to be twice that for Type Bs.

A number of studies have focused on the mechanisms whereby Type A may be implicated in strain outcomes. According to the differential exposure hypothesis, Type A individuals should place themselves in situations where they will encounter more stressors through, for example, self-selecting into more demanding jobs. The few studies examining this hypothesis have generally not been supportive. In one study, an analysis of type (Type A, Type B) by occupation showed both Type As and Type Bs to be in what are considered ‘stressful’ occupations (e.g., working on machine-paced assembly lines). Furthermore, on average, Type Bs scored higher on scales measuring somatic complaints.

According to the differential reactivity hypothesis, Type A individuals should be more reactive to stressors in the environment, showing a greater strain reaction under stressful conditions. Support for this hypothesis is mixed, with some studies finding for and some against this moderator hypothesis. More importantly, one of the few studies that has sought to test this hypothesis using an objective stressor measure (self-paced paced versus machine paced) also failed to support the hypothesis in relation to measures of anxiety and depression.

Generally, there appears to be more evidence suggesting Type A to be a risk factor for physiological indicators of strain than for either psychological or work-related distress. On the whole, however, research on Type A is ‘plagued by controversy’ with most of this controversy stemming from three factors:

1. The ill-defined nature of the construct. (It is debatable as to whether Type A represents a personality trait or a self-reported behavioural style).
2. Its unidimensionality. (The validity of the construct itself has been questioned with factor analytic studies showing it to be composed of a number of unrelated constructs). For example, Ganster et al., (1991) concluded that Type A as measured by the SI identified three, unidimensional factors: hostility; speech characteristics and answer content).
3. The validity of measures of the construct. (The validity of different means of measuring the construct, particularly the self-report measures, has been questioned).

The strength of initial findings, particularly in relation to heart disease was also gradually undermined by a number of studies finding negative results. For example, reviews of this...
research\textsuperscript{214} which included several, large scale prospective studies, found Type A was significantly related to CHD in just over half the studies examined. A number of meta-analyses have also been conducted\textsuperscript{215} which have shown that results varied depending on the methods used. Booth-Kewley and Friedman (1987) concluded that:

‘The picture of coronary-proneness revealed by this review is not one of a hurried, impatient workaholic but instead is one of a person with one or more negative emotions’ (p. 343)

They suggest that this may include someone who is depressed, anxious, angry, aggressively competitive or easily frustrated. The review by Matthews (1988) singled out the hostility component of Type A as particularly important. Dembroski, MacDougall, Costa, & Grandits (1989) also subsequently found hostility to be more predictive of CHD than a global measure of Type A. Since this time, a considerable body of work has focused exclusively on hostility and this variable has now been the subject of meta-analyses\textsuperscript{216} Miller et al. include 45 studies in their analysis and concluded that hostility is an independent risk factor for heart disease. When structured interview approaches to measuring hostility were used, the effects were equal to or greater than those reported for traditional risk factors for CHD such as elevated cholesterol levels, high blood pressure or smoking. Controlling for other risk factors did not reduce this relationship. When other measures are used the effect sizes are smaller but may still be important in reducing mortality. There is also evidence that a cognitive–behavioural intervention can be effective in reducing blood pressure in CHD patients\textsuperscript{217}.

Interestingly, more recent studies have tended to find weaker relationships than the earlier studies, just as they did in the case of Type A\textsuperscript{218}. Miller et al. (1991, 1996) suggest that methodological artefacts account for this and particularly the tendency for more recent studies to focus on only high risk groups which already have some form of CHD. This restricts the range of disease severity and biases the results.

The mechanisms whereby hostility might have an impact remain unclear. It may be that the hostile person provokes more stressors (the differential exposure hypothesis), or that they have worse reactions when faced with stressors (the differential reactivity hypothesis). It is also possible that hostile people are more likely to suffer strains as a result of poorer health behaviour and a less healthy lifestyle. However, the meta-analysis by Miller et al. indicates that this is not likely to be the sole explanation. The bulk of research considers predominantly direct effects of personality on disease and does not look specifically at the ways in which hostility impacts on stressor strain relationships.

\section*{Negative Affectivity}

Negative Affectivity (NA) as defined by Watson and Clark (1984), is a very broad dispositional dimension reflecting pervasive individual differences in negative emotionality and self concept.

High NA individuals are considered:

\begin{itemize}
\item[a)] more likely to report distress, discomfort and dissatisfaction;
\end{itemize}
(b) to be more introspective and dwell more on their failures and shortcomings;
(c) to focus on the negative side of the world and, therefore;
(d) to have a less favourable self-view and be less satisfied with themselves and with life (Watson & Clark, 1984).

NA is quite highly correlated with Type A and considered synonymous with the Eysenckian construct Neuroticism, a personality dimension identified consistently in studies. In relation to occupational stress, it is the most studied of all the major personality dimensions.

**How is NA related to other personality factors?**

Individuals high on internal locus of control (LOC) are considered to be more resistant to stress.

It has also been found that locus of control generally correlates with NA and, unsurprisingly, that controlling for NA reduces the previously significant relationship between LOC and strain to non-significance.

In Payne's 1988 study of unemployed men, for example, controlling for NA eliminated the previous significant relationship between LOC and a measure of depression and anxiety. Consequently it has been argued that the observed relation between LOC and strain is attributable to NA.

A similar argument has been raised in relation to the hardiness-stress relationship. However, NA and hardiness correlate reasonably well, leading some commentators to argue that NA subsumes hardiness, with the 'hardy' individual being one low on NA. Finally, it is also suggested that Type A is closely related to NA.

It should be apparent by now that NA is a central concept in personality research and I shall therefore discuss the relationship between NA and strain in a little more detail.

**The effect of NA on self-reports of stressors and strains.**

First, high NA individuals will appraise their environment more negatively than low NA individuals. Secondly, at any one time, high NA individuals will experience greater distress and dissatisfaction than low NA individuals regardless of the conditions. Hence, by definition, it is predicted that high NA individuals should report more stressors and greater strain across time than low NA individuals. This prediction is supported in the literature with a wide body of research showing NA to be significantly correlated with a range of both work and non-work measures of stressors and strains.

For example, occupational research has shown NA to be significantly correlated with a range
of work stressors:

- role ambiguity, role conflict, interpersonal conflict, situational constraints\(^ {226} \);
- control, social support\(^ {227} \), work demand\(^ {228} \), various strain measures such as turnover intent, organisational commitment\(^ {229} \);
- job satisfaction\(^ {230} \),
- absenteeism\(^ {231} \),
- burnout\(^ {232} \), and
- general psychosomatic distress\(^ {233} \).

**Does high NA really predispose people to greater strain reactions?**

This debate centres on whether NA functions purely as a partial confound in stress research, or whether it also functions as a substantive vulnerability factor.

- As a **confounding variable** NA is considered to spuriously inflate the observed relationship between self-report measures of stressors and strains. As such, it is considered a methodological nuisance factor and should be controlled in stress research\(^ {234} \). This is referred to as the ‘Confound Model’ (see below).

- As a **vulnerability factor**, however, NA is considered to play a substantive role in the stress process. Rather than confounding the stressor-strain relation, it acts as a moderator by altering the strength of the relationship. High NA individuals would thus be expected to have a heightened reactivity to stressors thereby increasing the intensity of their strain response\(^ {235} \). Such individuals are therefore considered more vulnerable to occupational stress than their low NA counterparts. This is known as the ‘Vulnerability Model’ (see below).

A bias in the literature towards the confound model of NA leaves its role as a vulnerability factor poorly understood.
Confound model

It is argued that self-report measures of stressors and strains are not measuring separate, meaningful constructs but instead are measuring indirectly the dispositional trait, NA (Dohrenwood, Dohrenwood, Dodson & Shout, 1984). This model has serious implications for stress research. If the association found between self-report stressors and strains is attributable to NA, not an underlying, causal relationship as is assumed, doubt is cast over the conclusions drawn from previous research (e.g. Burke, Brief & George, 1993). In the occupational context this undermines the main assumption underlying occupational stress models, that work stressors are causally related to the level of occupational strain. On a practical level this means that eliminating or reducing work stressors will have very little effect in eliminating or reducing occupational strain. If the assumption that work stressors cause occupational strain does not hold, then the principle underlying current workplace stress intervention practices is no longer valid: changing the work environment will be of very little benefit if self-report measures of work stressors and strain are surrogate measures of NA. For any real benefits to be observed on self-report outcome measures, the individual would first need to be changed.

Support for this confound model of NA comes from two main sources. The first is from studies showing remarkable consistency in strain measures across time and situations. For example, job attitudes show remarkable consistency across major career changes and major life changes. In the nine year longitudinal study conducted by Costa et al., (1987) enduring dispositional factors were found to be a better predictor of future well-being than major life changes (e.g., changes in marital status, employment, state of residence). While individual differences were found to account for 25% of the variance in well-being scores, life circumstances accounted for only 4-6% of the variance. These results suggest an underlying stable trait to be responsible for this relationship, as opposed to environmental variables.

The second source of evidence comes from studies examining the relation between NA and long-term indices of health. Watson & Pennebaker (1989), for example, found that while NA was significantly related to various self-report measures of health complaints, it was not related to either physiological measures (e.g. blood chemistry, blood pressure), nor to behavioural measures (e.g., dietary habits, physical fitness; number of health care visits). An extensive review of the literature by Watson and Pennebaker (1989) further showed NA was not related to indicators of cardiovascular health, risk factors for heart disease, heart related mortality, nor cardiac pathology. Hence, it was concluded that NA is neither a predictor of long-term health nor of health relevant behaviours.

Brief et al., (1988) in a study of managers reported most stress – strain relationships did not exist when one took NA into account. Further support comes from a longitudinal study investigating the psychological well-being of unemployed men, which showed that the observed relationships between various self-report stressors (life events, lack of social and organisational support) and strains (poor physical and psychological well-being) were eliminated after controlling for NA. Others more recently have found reductions that are not so dramatic indicating that NA is not the complete story.
Judge, Erez and Thoresen (2000) and Spector et al. (2000) are in agreement that NA should not simply be controlled for as a confounding variable, rather it should be investigated in its own right.

**Vulnerability model**

This moderator model predicts that under stressful conditions, high NA individuals will have a greater strain response compared to low NA individuals. In other words, high NA individuals are considered to have a heightened reactivity, or a stronger reaction to environmental stressors (e.g., McCrae & Costa, 1991; Deary et al., 1996). It follows from this that the difference between high NA and low NA individuals on psychological, behavioural, and physiological measures of strain should be greater under conditions of high demand. It is surprising then that the vulnerability model of NA has been so little researched, especially when its important implications are considered.

For example, according to the moderator model, as work conditions become more demanding, high NA individuals will be the first employees to exhibit symptoms of strain. Hence, NA should be associated with behavioural indicators of occupational strain whereby high NA individuals show greater work performance decrements, increased absenteeism and higher turnover. This model suggests then high NA individuals to be the more difficult and costly employees. Alternatively, the model also makes the important prediction that stress interventions aimed at alleviating or reducing work stressors should be effective in reducing the level of strain of high NA individuals. If, as proposed by the model, NA does interact with stressors in the work environment, then reducing these stressors should also reduce the increased strain associated with high NA individuals.

The few studies addressing this issue have generally obtained support for both models. An example can be seen in Marco and Suls’ (1993) study that investigated the relation between NA, daily mood and daily stressors. Firstly NA was significantly related to both the level of stressors and daily mood, with high NA individuals reporting both higher stressor levels and poorer mood compared to low NA individuals. In addition, high NA subjects reported a more severe strain reaction to the stressors compared to low NA subjects. In other words, in support of the vulnerability hypothesis, high NA subjects were more reactive to the stressors.

NA as a vulnerability factor for occupational stress appears to explain only a small portion of the variance in strain outcome measures. For example, a study by Cassar & Tattersall (1998) found that across 20 regressions, there were only three significant results that typically explained only about between 1.1% and 2.9% in magnitude. More recently Cooper (2001) in both laboratory and field studies using senior officials in a service organisation, found evidence for both models. However, again, the vulnerability model accounted for much less than 10% of the variance.

**Support for both models may indicate that NA affects different variables in different ways – as a moderator of impersonal stressors, and as a vulnerability factor for**
interpersonal stressors (Parkes 1990). In practical terms therefore, a person who is high in NA will tend to rate social support more negatively than his more positive colleagues. However, if he experiences deteriorating social support at work, he will not have any greater deterioration in well-being than his colleagues. This is not the case if he is faced with increasing workload. Here he will show greater deteriorations than his colleagues.

**Further approaches to NA**

Spector et al. (2000), referring primarily to the work context, suggest a number of other possible mechanisms on which there has been limited research:

- The selection mechanism. They suggest that those with negative affect may be selected into more stressful jobs (a differential exposure hypothesis).
- The stressor creation mechanism. People high in NA may actually create more stressors, for example, by getting into more conflicts, which may lead to them having higher objective stressors rather than biased perceptions. This is another form of differential exposure hypothesis - the stressor mediates the relationship between NA and strain.
- The mood mechanism. Mood, and not the disposition of NA, reduces stressor-strain relationships by influencing reporting of strains, stressors and NA.
- The causality mechanism. Exposure to job stressors actually increases NA. (Here NA mediates the relationship between stressors and strains).

They suggest that these are all plausible mechanisms to explain the relationships between NA and stressors and strains and further efforts need to be made to understand the role of NA and other personality variables in the stress process. Furthermore the practical significance of these models and their implications in terms of developing interventions needs to be investigated. For example, cognitive behavioural strategies to promote more positive thinking are frequently advocated as part of stress management training but we need to unpack the mechanisms whereby this might work. Does it simply induce a general positive bias that does not actually make any difference to the extent of reactions to stress, or does it have a real impact on reactions to stress by one of the mechanisms discussed above?
POLICY AND PRACTICE IMPLICATIONS

The focus of this paper has been unapologetically on the status of the research evidence currently available. I would argue that the currently available evidence suggests six clear policy and practice implications.

1. In the case of genetic and acquired individual difference factors such as age, gender, education or social support there is good evidence that these contribute to differences in vulnerability to stress. I have not covered the acquired differences in any depth, because there is a huge literature on topics such as social support and education which I believe to be beyond the scope of this paper. (Further coverage of these topics can be found in Jones and Bright (2001).

Although some of the reasons why these differences exist are not well understood, policies and practices that enhance social support in the workplace and education may reduce levels of workplace stress and hence claims. Other issues such as wealth of the individuals and families would seem to be beyond the scope of OH&S interventions or policies.

2. The evidence for reliable dispositional difference factors is so confused and beset with methodological problems on the one hand, and so small in practical significance on the other, that recruiting staff who are ‘stress-resistant’ or compensating staff for stress on the basis of psychological traits is not going to be very reliable or supported by existing evidence.

3. Clearly there are organisations that relatively successfully select psychologically robust staff – e.g. the SAS in the military. However this selection probably has more to do with self-selection, motivation, and interventions aimed at the acquisition of stress resistant qualities – e.g. physical fitness, social support through teamwork and bonding, and so on, than it has on any underlying reliable individual difference that we know of.

4. In the realm of compensation, a stronger focus on situational factors such as the work environment, levels of social support, training, etc. are likely to be more reliable than a focus on the individual.

5. The implication for recruitment is that past behaviour in similarly stressful environments may be a more reliable indicator of the ability to cope.
Finally, in terms of policy, it should be clear that funding of further well designed research investigating some of these issues in a more sophisticated way would be a highly recommended. However, this research will only be successful if unions and employer organisations provide a supportive environment in which these studies can be conducted.

**CONCLUSIONS**

The simple conclusion is that there are no simple conclusions. Clearly many of the attempts to tease out reliable individual difference factors have not been sufficiently powerful to achieve this objective with any confidence. Some of the reasons for this failure include:

- poor definitions of stress;
- poor measures of stress;
- failure to take account for factors such as negative affectivity; and
- failure to test for all the different ways in which intervening variables may influence the reported strain–stressor relationship.

From a practical point of view, it is intuitively appealing for some people to believe that we vary in terms of our vulnerability to stressors. However, the little existing evidence that addresses this question is contradictory and appears to be so small in effect that it is of little practical use.

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EXECUTIVE SUMMARY

The sophistication and theoretical bases of occupational stress intervention strategies have progressed significantly over the last 10-20 years; evaluation strategies have matured in parallel. The evidence to date is consistent with broad occupational health principles: that the closer the intervention is to the source of exposure (stressors), the more far-reaching the preventive impacts and outcomes—both to employees (e.g. decreased symptoms) and employers (e.g. decreased sickness absence). Nevertheless, there are complementary roles to play for primary (e.g. work reorganisation), secondary (e.g. training to improve coping skills), and tertiary (e.g. counselling for early return-to-work) preventive strategies. Secondary or tertiary interventions in isolation, however, are unlikely to fully compensate for the absence of primary preventive measures.

The body of evidence from evaluation studies to date, while demonstrating positive effects of various strategies in various contexts, needs to be expanded in order to work towards evidence based-practice. Evidence-based practice is possible when there is a large enough body of knowledge to enable the prediction of outcome under various sets of conditions as a result of particular theory-based interventions of various intensities and durations.

In line with the findings of evaluations of work stress interventions and insights gained from occupational health and safety (OHS) intervention research in general, the following policy and practice recommendations can be made:

the order of choice and frequency of intervention programs needs to be reversed—or at a minimum balanced—to be consistent with occupational health principles and to maximize preventive
potential. That is, primary preventive intervention should be the first priority, followed by secondary, then tertiary:

- the findings from secondary and tertiary programs need to be dynamically linked to primary prevention efforts through feedback or surveillance to enable tailored intervention in a given organisation, industry, or work context;

- the lack of intervention theory or rationale and the individualistic bias in work stress intervention research are reflected in the same pattern observed in OHS intervention research in general. Improvements in these regards would benefit worker as well as organisational health, and speed the development of adequate knowledge to support evidence-based practice;

- support needs to be organised through tripartite or other broad-based processes to develop, implement, and evaluate work stress interventions on industry-wide or other broad scales. Such efforts would help to address the daunting expense of evaluation to interested organisations;

- because comprehensive, participative interventions appear to achieve the best results—including benefits to both employees and employers—commissioning of further intervention evaluation studies in this area should be a priority;

- the development of economic studies in parallel with implementation and effectiveness evaluation should be a priority, as favourable results will stimulate the diffusion of effective intervention strategies;

- the recent European Heart Network report and the Tokyo Declaration on Work-Related Stress are consistent with the above recommendations and expand considerably on work-stress relevant policy issues, intervention, and evaluation strategies.

Identified gaps in knowledge on what works and why with respect to intervening on work stress can be addressed with expanded efforts in applied OHS intervention research. Mechanisms to facilitate communication between organisations planning interventions (companies, unions, government agencies etc.) and qualified evaluators (academics, consultants etc.) would speed progress in this area. NOHSC and other bodies could serve as facilitators in such a process.
**INTRODUCTION**

This paper provides an overview on the evaluation of work stress interventions. The findings presented are based on the rapidly expanding international research literature in this area. A brief overview rather than a comprehensive review of the topic is presented, with the aim of distilling out main points to inform interested non-researchers, and to guide practice and policy development in this area.

The first two observations below (which are summarised in detail elsewhere in the proceedings of this symposium), provide justification for the third:

- various measures of work-related stress predict adverse effects on health and other outcomes, even after accounting for other established causes of the same outcomes;
- there is a range of available strategies to prevent or control work-related stress;
- therefore, interventions should be conducted to prevent and control work-related stress and associated adverse health outcomes in accordance with moral and regulatory mandates to provide safe and healthful work environments for employed persons in Australia.

This paper takes off from the third point: intervention on work stress. Specifically, this paper presents *an overview of the findings* of published evaluations of these programs, and in so doing also provides insights on *what it takes to evaluate* work stress intervention programs.

Two complementary organising frameworks are applied to this task. The first is specific to work stress, and classifies intervention efforts into primary, secondary, and tertiary prevention, and by the level of intervention: individual employee, organisation, or work environment. The second is a general framework on intervention research in occupational health & safety (OHS) developed with a group of experts convened by the US National Institute for Occupational Safety & Health (NIOSH) to determine ways to progress the identified research priority of OHS Intervention Effectiveness Research.

**REVIEW AND FINDINGS**

**Work Stress Intervention Framework and its relation to broader OHS principles**

Work stress interventions are conveniently classified as:

- Primary;
- Secondary; and
- Tertiary prevention.
In brief, primary preventive interventions aim to prevent the occurrence of adverse health effects among healthy individuals by reducing exposure to stressful working conditions. These interventions address sources of stress in the workplace, or stressors, through alterations in physical or psychosocial work environment, or through organisational changes. Examples include changes in work pacing and job redesign, and the formation of joint labour/management health & safety committees.

Secondary prevention consists of anticipating or addressing the early signs of stress at the employee level, with the aim of preventing such employees from getting sick. These target the individual with the underlying assumption that focusing on individuals’ responses to stressors should be done in addition to—or in preference to—removing or reducing stressors. Examples of secondary prevention interventions include stress management classes to help employees to either modify or control their appraisal of stressful situations, such as the development of skills in coping with stress, conflict resolution, muscle relaxation, and meditation.

Finally, tertiary interventions aim to minimise the effects of stress-related problems once they have occurred, through ‘treatment’ or management of symptoms or disease. These include counselling (such as in the form of employee assistance programs), and return-to-work and other rehabilitation programs for people who have experienced serious stress-related health problems.

Moving from the specific realm of work stress to OHS in general, the unifying framework for the prevention and control of occupational exposure and disease is the ‘hierarchy of controls’. This hierarchy states, in brief, that the further upstream one is from an adverse health outcome, the greater the prevention effectiveness. Hence, primary prevention is more effective than secondary, and secondary is more effective than tertiary. Importantly, however, these are not mutually exclusive and can be used combination. Applying this general OHS principle to occupational stress: primary prevention through improvements in the work environment is complemented by secondary prevention to address individual factors and detect any effects of work stress in a timely fashion. This, in turn, would both minimize the need for rehabilitation or tertiary prevention programs and maximize their effectiveness. In summary, the work stress intervention framework described above is consistent with broader OHS principles.

**Work Stress Intervention and Evaluation Methods**

A general understanding of what sorts of work stress interventions are prevalent and how they can be evaluated is required as background to the summary of findings that follows.

Work stress interventions share the common goal of altering the sources of, responses to, or effects of stress. Accordingly, a wide range of intervention outcomes—following from the wide variety of intervention goals—are represented in the literature. However, the enormous variety in the ways that stressors, moderator variables, individual characteristics, health outcomes and other stress effects, and intervention activities have been measured or characterized makes systematic comparison of evaluation studies challenging. Thus, overall summaries of intervention approaches, evaluation strategies, and findings are necessarily generalizations.
INTERVENTIONS AND INTERVENTION TIMELINES

In practice internationally, tertiary intervention programs are most common, followed by secondary, with primary being the least common.\(^1\)\(^,\)\(^7\) Notably, this is in reverse order of their preventive potential. In other words, intervention efforts are disproportionately focused on addressing the effects of stress (worker-oriented approaches), rather than reducing stressors at work (work-oriented approach).\(^7\) Accordingly, the vast majority of published studies focus on the individual employee both as the target of intervention and evaluation.\(^1\)\(^1\),\(^1\)\(^2\) Generally speaking, intervention programs must last a minimum of several months to one year in order to reasonably expect to see effects.\(^1\)\(^3\) Changes in organisations and physical work environment tend to require longer intervention periods than for changes at the individual employee level.

Evaluation Timelines

And as one moves from intervention targeting the sources of (e.g. machine pacing), to the response to (e.g. symptoms, coping behaviours), and ultimately to the adverse effects of stress (e.g. cardiovascular disease, employee turnover rates), the appropriate period time required before measuring outcomes becomes progressively longer. For example, to measure effects on workers’ compensation claim rates or costs, one would need a couple of years just for the maturation of claims that entered the system before the intervention began. Only after such time could one expect to see effects of the program on claim rates. To evaluate the effects of a given intervention on cardiovascular disease incidence or mortality, a minimum of five years of follow-up on a minimum of hundreds of intervention subjects would be required. Thus for feasibility and expense reasons, many evaluations tend to measure shorter-term outcomes, while relatively few intervention studies measure longer-term effects.\(^2\),\(^1\)\(^3\)

Evaluation Designs & Strategies

Evaluation designs determine the degree to which we can be confident that observed effects are attributable to the intervention.\(^4\),\(^6\),\(^1\)\(^4\) The strongest are experimental designs or randomised, controlled trials. In experimental designs, baseline measures of outcomes are taken, then study subjects (e.g. individuals, worksites) are randomly assigned to an intervention or a comparison condition. Then, the corresponding intervention or comparison treatment is applied, and finally outcome measurement is repeated. Changes in the intervention groups are compared to those in the comparison, and the difference between them—assuming all other relevant factors remained equal between the groups—is attributable to the intervention. A quasi-experimental design is similar except that subjects are not randomly assigned. Longitudinal designs measure outcomes before (maybe during) and after intervention; in this case, changes observed could be attributable to factors other than the intervention. In addition, much has been learned—in most cases about interventions that increase work stress—from natural experiments (such as company downsizing or restructuring that results in reduced job security).\(^6\),\(^1\)\(^4\),\(^1\)\(^5\)

While quantitative evaluation methods inform us as to what happens in relation to a given intervention, qualitative approaches have the complementary strength of being able to tell us...
why. The most informative are those studies that combine quantitative and qualitative methods. Participatory action research is an approach to intervention and evaluation that balances the needs for research with action, recognising that rather than remaining artificially separated researchers and ‘study subjects’ can accomplish and learn more by working together. This approach, which often combines quantitative and qualitative approaches, is particularly powerful in optimising the potential for change and evaluating the influence of the wide range of contextual factors that come into play in various intervention settings (see example in Table 1).

**Intervention Targets and Evaluation Outcomes**

Primary preventive interventions target aspects of the physical work environment (e.g. noise, ergonomics), psychosocial work environment (e.g. job control), or the organisation (e.g. communication processes, participative management strategies). For primary preventive interventions, these targets can also be measured as intervention outcomes. For primary preventive interventions, it is also appropriate to measure downstream outcomes at the individual or organisational levels (e.g. individual symptoms, sickness absence rates, productivity). Secondary and tertiary interventions target and therefore tend to evaluate individual-level outcomes (e.g. coping behaviours, symptoms), but may also evaluate hypothetically related organisational-level outcomes (e.g. sickness absence or workers’ comp rates).

In general, it is optimal when conducting evaluation to include both worker-oriented and work-oriented measures, where possible from a range of types of data sources including employee reports from anonymous surveys, semi-structured or open-ended interviews, individual physiological measures, and measures of organisational attributes and physical working conditions.

**Findings of Work Stress Interventions**

Overall, it has been demonstrated that some individual-focused stress management interventions (e.g. progressive muscle relaxation, meditation, and cognitive behavioural skill training) can have positive effects at the individual level. These include the relief of somatic symptoms or alterations in physiological (e.g. blood pressure, cholesterol levels) and psychological outcomes (e.g. anxiety). Combinations of stress management training techniques seem to produce the most consistent and significant results across a range of health outcome measures. The details of an exemplary intervention and evaluation study on an individual-level intervention are presented in the first row of Table 1.

While individual stress interventions may have positive effects, if employees return to unchanged work environments, the beneficial effects of individual intervention are likely to be eroded. Further, individual stress management interventions are not consistently effective in producing effects on organisational- or environmental-level outcomes such as absenteeism, employee turnover, injury rates, or productivity.

In contrast to individual-focused secondary and tertiary interventions, primary preventive interventions targeting organisational and work environment outcomes have been show to have more far-reaching positive effects. Overall, the evidence suggests that
comprehensive (combined work-directed and worker-directed) approaches show the best results on individual, individual-organisational interface, and organisational outcomes. Further, participatory organisational change interventions can be particularly effective in reducing job stressors and positively affecting both individual- and organisational-level outcomes measures. However, participatory intervention approaches are relatively rare in practice, and participatory evaluation approaches are rarer still.

Examples of the range of primary preventive interventions and outcomes evaluated include:

- A Swedish intervention designed to reduce sickness absence due to repetitive strain injuries used a job enrichment strategy to increase task variety and employee control over the work process; evaluation results showed decreases in turnover and absenteeism, and an increase in productivity.

- Evaluation of an ‘inner quality management program’ showed increases in contentment, job satisfaction, and communication, and decreases in physical symptoms and blood pressure in hypertensive individuals.

- A study of white-collar employees showed decreases in job strain (a combination of low job control and high job demands) as employee control over various aspects of work increased.

Details of the intervention and evaluation strategies for an individual/organisational and a comprehensive intervention are presented in Table 1. These examples illustrate the range of intervention strategies available and corresponding possibilities for evaluation. It is important to note that choices of intervention and evaluation strategies are independent—a given intervention might be evaluated in a variety of ways. Intervention should be guided by OHS or stress theory and principles; whereas evaluation strategy should be guided by evaluation goals. The evaluation strategies presented cover the range of traditional experimental approaches (first row), the utility of natural experimental strategies for long-term study (middle row), and the use of a participatory action research with quantitative and qualitative methods (bottom row).

Importantly, each of the three examples presented based their intervention strategies on established work stress models or theories. This is always desirable, as this maximizes the chances for success. Theories or models and their associated measures become ‘established’ once they have been shown in empirical studies (e.g. epidemiology) to predict stress outcomes (e.g. cardiovascular disease, depression). This enables evaluators to measure these predictors of health or other outcomes (e.g. ‘need for control’, ‘job strain’) as intervention outcomes. Changes in validated stress measures can then be inferred to predict changes in longer-term outcomes, such as cardiovascular disease.

The examples in Table 1 also illustrate some of the complexities faced in evaluating stress interventions, including:

- ethical considerations around the use of control groups (cleverly addressed by the study design used in the first example, wherein controls received the intervention after the experimental group’s post-intervention assessment);
• the need to account for a wide range of non-work stress contributors to outcomes in longitudinal studies, such as age (in the second example); and
• the inability to fully control intervention conditions (the worksite in the third example was downsized and then split in two in the middle of the study).

Other challenges to intervention and evaluation include stakeholder commitment to the process, pre-existing labour-management relations, and expectations for short-term versus long-term benefits. A particular challenge associated with evaluation is the competition for limited resources between supporting intervention versus evaluation activity. The cost of evaluations of the sort described in this review often exceeds the cost of the intervention itself.

In this brief review, I have emphasised positive findings to illustrate the potential effectiveness of work stress intervention. In some cases, similar strategies that were successful in some contexts were unsuccessful in others. Other studies may observe favourable changes in intervention groups that are similar to changes in comparison groups, as occurred in a cardiovascular health promotion program for mass transit operators (suggesting little or no change attributable to the intervention). There is a wide range of factors that influence the implementation and effectiveness of various stress interventions, thus generalisation of specific findings to specific contexts (e.g. in adopting a certain strategy for a new context based on previously published findings) must be made cautiously.

**General OHS Intervention Research Framework**

The above review addressed intervention and evaluation questions using the work stress intervention framework. Viewing occupational stress intervention research through a broader OHS intervention research lens provides additional insights. Intervention research in OHS can be viewed as covering three broad phases:

• development: **deciding what to do** on the basis of rationale or theory, systematic problem analysis, needs assessment, etc. (such as developing a comprehensive program of work-directed and worker-directed intervention for teachers based on the effort-reward imbalance [ERI] model);

• Implementation: **doing it** (such as implementing a teacher stress and burnout prevention intervention across a city school district); and

• Effectiveness: **seeing if it worked** (such as measuring a set of ERI model-based work-directed and worker-directed measures before and after intervention in one school district and comparing the changes to the same set of measures collected on a teacher population that received no intervention).

Further, intervention research can be conducted at various scales or levels, ranging from:

• the individual (such as an individual referral for stress counselling);

• to the organisation (such as organisation-wide stress coping classes or job redesign);
to industry-wide (such as job stress programs for correctional facility officers); and on up to
state, national, or international policy level (such as national regulations addressing job stress).

This framework can be used to characterise research on any occupational health and safety intervention. Insights that emerge from applying a broad OHS intervention research framework to work stress intervention studies include:

- Thinking more broadly than effectiveness studies:

- When one thinks of evaluation, it’s natural to leap right to questions of effectiveness—what works and why? These are the most immediately important issues for people who are deciding upon intervention strategies in their workplaces. However, it is often the case that an intervention may not be ready for effectiveness evaluation, and that such an effort would be a bad investment of scarce resources. Evaluators have developed procedures for determining the ‘evaluability’ of interventions that can be applied to stress intervention studies in determining how they should be evaluated.\(^\text{4, 24}\) For sorting out the evaluability of the wide range of ongoing intervention efforts, for example, these criteria include assessing the degree to which the intervention has a clear rationale and goals (sound intervention development), the degree to which the intervention has been implemented as intended (process or implementation evaluation), the stability of the intervention, and whether the intervention seems to be achieving any positive results.

- Drawing from a broad range of evaluation methods and designs:

- Intervention research in OHS in general and work stress in particular can draw from a wide variety of disciplines.\(^\text{14}\) Traditional OHS and epidemiologic perspectives need to be complemented by more eclectic and action-oriented perspectives. Examples include borrowing from the field of program evaluation\(^\text{25, 26}\), adopting alternative research paradigms such as participatory action research, and expanding the use of qualitative research methods.\(^\text{27}\) In terms of evaluation designs, randomised, controlled trials are the accepted standard for assessing intervention effectiveness. However, such a design is sometimes not feasible because of practical, cost, ethical, or legal constraints.\(^\text{15, 28}\) A sensible and economical approach to progress from qualitative case studies as a first step, to pseudo-experimental studies, and—where feasible and justified—randomised, controlled experimental designs.\(^\text{15, 28}\)

- Other reviews of intervention evaluation methods and designs are available to guide interested readers,\(^\text{29}\) including an excellent work-injury intervention guide that is available online from the Institute for Work and Health in Canada (see http://www.iwh.on.ca/Pages/Publications/safetybook.htm).\(^\text{31}\)
• The need for intervention theory/rationale and broadening the focus from the individual employee:

• In OHS intervention research in general, the interventions described in most published studies lack a clearly-specified theoretical basis or articulated rationale, and tend to focus on the individual level of intervention and evaluation. This situation is mirrored in work stress intervention evaluation studies, suggesting that deficits in work stress intervention knowledge are symptomatic of a more general problem with deficits in OHS intervention research.

• Policy-level intervention and evaluation:

• The concept of policy level intervention and evaluation extends beyond company policies to include governmental regulatory policy, voluntary best practice guidelines published by non-governmental organisations, collective bargaining agreements, and more. Again, the dearth of policy level studies in OHS intervention research in general is mirrored in the work stress area. Nevertheless, the limited studies to date in this area demonstrate the potential of policy interventions to stimulate comprehensive work stress intervention efforts. For example, the Swedish Working Life Fund was set up by government to promote and fund programs to improve work environments and work organisation, to enhance productivity, and to improve rehabilitation. Evaluation using a random sample of 7,500 of the 25,000 major programs funded showed increases in productivity, decision latitude, and job satisfaction, and decreases in physical job strain. Notably, ratings by management and labour union representatives were almost equal.

• Dissemination of successful intervention strategies:

• After an intervention strategy for a certain work context has been replicated and evaluated a number of times and has been shown to have consistently positive effects, the next step is to diffuse such an intervention strategy to other similar work contexts. The potential impact of such an intervention strategy depends in large part on the extent to which the relevant population is exposed to it. ‘Diffusion research’ studies investigate the factors that hinder and facilitate the diffusion of effective intervention strategies, and how to improve the diffusion process. Diffusion research is very poorly developed in the general OHS area and even less well developed in the area work stress. Improvement in this regard could be modelled on the more extensive diffusion research efforts to date in the area of health education and health behaviour.

**IMPLICATIONS of EVALUATION FINDINGS for POLICY and PRACTICE**

In line with the findings of evaluations of work stress interventions, policy efforts—voluntary or mandatory—should address the following:
Evaluation of Occupational Stress Interventions: An Overview. Anthony D. LaMontagne,

**CONCLUSIONS**

The sophistication and theoretical bases of occupational stress intervention strategies have progressed significantly over the last 10-20 years; evaluation strategies have matured in parallel. The evidence to date is consistent with broad occupational health principles: that the
closer the intervention is to the source of exposure, the more far-reaching the preventive impacts and outcomes. Nevertheless, there are complementary roles to play for primary, secondary, and tertiary preventive strategies in comprehensive intervention programs. Secondary or tertiary interventions in isolation, however, are unlikely to fully compensate for the absence of primary preventive measures.

The body of evidence from evaluation studies to date, while demonstrating positive effects of various strategies in various contexts, needs to be expanded in order to work towards evidence based-practice. Evidence-based practice is possible when there is a large enough body of knowledge to enable the prediction of outcomes under various sets of conditions as a result of particular theory-based interventions of various intensities and durations. Process or implementation evaluation efforts need to be improved in effectiveness studies in order to help sort out which particular features of successful programs are responsible for the observed effects. This is a particularly important need for supporting evidence-based practice for small organisations and others that are unable to implement comprehensive programs. Evaluation efforts need not be restricted only to large organisations or study groups—for example, while small business contexts limit the feasibility of quantitative study, qualitative approaches can be productively applied.\(^{39}\)

Expanded financial support for applied OHS intervention research and improved communications between evaluators and those implementing programs would help to address identified gaps in knowledge on what works and why with respect to intervening on work stress.
About the Author

Dr Tony LaMontagne’s background includes Masters’ degrees in Molecular Toxicology (Harvard University) and Education (University of Massachusetts at Amherst) and a doctorate in Occupational & Environmental Health (Harvard School of Public Health). His research focuses on the evaluation and improvement of interventions to prevent and control occupational and other health hazards. He continues to serve as an adjunct member (since moving to Australia) on the US NIOSH Intervention Effectiveness Research Team, a group of experts convened by NIOSH to develop strategy for progressing this identified OHS research priority. His specific research interests include evaluation of OHS management systems, development and evaluation of integrated OHS and health promotion interventions, occupational stress and its relation to health behaviours, evaluation of OHS regulations, development and evaluation of exposure and medical surveillance programs, and workplace cancer prevention. He recently moved from a position at Boston’s Dana-Farber Cancer Institute to take up a Senior Lecturership in the Department of Epidemiology & Preventive Medicine at Monash Medical School in Melbourne.
Table 1. Examples of Work Stress Intervention and Evaluation Strategies: Illustrating Range of Intervention and Evaluation Types

<table>
<thead>
<tr>
<th>Intervention Type</th>
<th>Intervention Strategy</th>
<th>Evaluation Strategy</th>
<th>Key Findings</th>
<th>References</th>
</tr>
</thead>
</table>
| Individual-level, Secondary Prevention (with some Organisational-level, Primary Prevention) | Theory-based (ERI) 12-week stress management class for German inner-city bus drivers, including:  
- Relaxation  
- Coping with anger  
- Reduction of ‘need for control’ (related to Type A personality)  
- Suggestions for structural changes, communicated to OHS Committee | Experimental: 54 volunteers for program (randomly?) assigned to intervention (n = 26) or control (n = 28)  
Controls offered same intervention at end of 12-week period (for ethical reasons) | • ‘Need for control’ significantly reduced in intervention versus control group  
• Effect persisted for 3 months or more  
• No significant effect on mood or symptoms  
• ‘Need for control’ has been previously shown to predict CVD risk factors and outcomes | Intervention evaluation\(^{(40)}\)  
‘Need for Control’ and Effort-Reward Imbalance (ERI) Model \(^{(41}, (42)}\) |
| Individual and Organisational-levels, Primary and Secondary Prevention | Natural experiment tracking changes in:  
- Job strain (DCM)  
- Blood pressure  
- Health behaviours | Prospective Longitudinal Follow-Up:  
285 healthy men aged 30-60 at eight NYC worksites  
Data collected at 0, 3, and 6 years | • Job strain related to AmBP at each time point  
• Changes in job strain predict changes in AmBP, controlling for about 10 other factors  
• Decreasing job strain predicted higher smoking quit rates | Cornell Worksite AmBP Study\(^{(43-45)}\) |
| Individual, Organisational, and Environmental Primary, Secondary, and Tertiary Prevention | Theory-based comprehensive intervention directed by joint labour management researcher ‘Stress & Wellness Committee’ | Participatory Action Research:  
US auto manufacturing plant of approx. 1 000 employees, 1985-1992  
On-going qualitative, and periodic employee surveys | • Increased trust between hourly and salaried employees  
• Increased co-worker social support  
• Decreased job security (down-sizing and company split)  
• Overall negative feelings and some symptoms increased | Intervention\(^{(17}, (18)}\)  
Theoretical basis\(^{(11)}\) |
REFERENCES


EXECUTIVE SUMMARY

This paper reports results from a project in which levels of employee stress, arousal and fatigue were related to specific psychological and physical task demands, overall workload levels, the factors that paced work performance, acceptability of production targets or line speeds, job satisfaction, and job characteristics such as the extent to which employees felt they had a ‘say’ in things.

The strongest predictors of higher employee ‘stress’ scores (reflecting negative feelings) were: workload was higher, the job’s ‘motivating potential’ was lower, the task being performed had a short cycle time, and when performance was paced by the production process/machine time or line speed.

Employee ‘arousal’ scores (reflecting activation level) were higher when: work rates were influenced by the need to meet orders or deadlines, the job’s ‘motivating potential’ was higher, employee ratings of ‘required effort’ and ‘need to work carefully’ were higher, and postural stress scores were higher.

Employee fatigue ratings were higher when: work rates were not influenced by the need to meet orders or deadlines, employees rated the required production target or line speed as too high, workload was higher and their general satisfaction score was lower.

Implications for workplace management were identified, related to the need for:

- Managers and supervisors who understand employees’ task demands, based on use of simple but systematic task analyses, using employee input and participation, with occasional input from specialist analysts (if necessary), to achieve:
• accurate identification and assessment of task demands – particularly perceptual/cognitive aspects – so that enough time is allowed for task performance

• efficient work systems and optimal work rates.

• Good job design, communications and supervision, so that supervisors and employees are clear what the required optimal balance is between output and quality;

• Employees have adequate amounts of:
  • ‘say’ in things;
  • feedback on their own performance;
  • variety in the tasks that they do;
  • information and feedback about current work objectives and constraints.

• Good industrial engineering and system management, so that employees:
  • don’t often have to perform tasks with very short cycle times;
  • are generally able to vary their work pace and take short breaks when they choose;
  • don’t often have to cope with machine breakdowns, process delays and poor quality materials;
  • don’t have to spend a significant proportion of each cycle just waiting, or working well below a reasonable (and preferred) rate.
INTRODUCTION

This paper presents key results from a research project conducted in Melbourne during the late 1990s. Levels of employee stress and fatigue were evaluated for a range of repetitive work tasks in which work rates were largely determined by speed of the line, machine process time, or the need to meet a specified production target.

A key focus of the project was on the effects of varying task difficulty and perceived workload on levels of employee stress and fatigue because of pre-existing evidence that the formal methods sometimes used to set targets or line speeds for repetitive work may not take adequate account of the difficulty of the work. There was also some prior evidence that work rates or targets are experienced as more acceptable by workers who have participated in the process of setting their levels or who have a greater sense of control over their work pace.

CONCEPTUAL FRAMEWORK

Job demand – the workload that employees have to cope with – is recognised as a potentially important determinant of occupational stress. In the early Karasek model, for example, ‘demand’ was one of the two main factors, along with ‘Control’, found to be associated with stress-related health risks. A wide range of recent research substantiates the importance of such factors in relation to employee stress and related health problems, whether the terminology used is ‘job demand’, ‘job pressure’ or ‘workload’.

Given that excessive job demands can be a major source of stress, how should we diagnose problems and develop solutions for specific jobs and workplaces? Job demands, workload levels, staffing levels, working hours, and for some types of work, work rates – are closely related and industrially sensitive issues. In recent years there has been a lot of pressure to reduce staff numbers to a minimum. In these circumstances there is an increased need for job demands and workloads to be analysed and evaluated as objectively as possible, to ensure that people who remain in employment are not so overloaded that they develop chronic stress conditions and related illnesses.

This project was concerned with the measurement of job demands and workload experienced by people doing repetitive, ‘assembly line’ types of work. The ‘occupational stress’ research literature provides little help. The items used to quantify ‘job demand’ in measurement tools such as the Job Content Questionnaire, the Generic Job Stress Questionnaire, the Occupational Stress Inventory, or Occupational Stress Indicator (now Pressure Management Indicator), and so on, are too general to be of much value as a source of information for countermeasure development. Their applicability is particularly limited for ‘blue collar’ work – partly because of their inadequate coverage of job demands, but also because of the sophisticated vocabulary they require.

The tool used to measure ‘stress’ in this project was the Stress Arousal Checklist, which is described by Cox and Griffith as a direct method of tapping the individual’s experience of
Stress. It simply requires ratings of the applicability of a list of adjectives. From this, scores are derived to represent two dimensions: ‘stress’ and ‘arousal’. These are well established as valid constructs representing peoples’ mood or emotional state at work.

‘Stress’ is represented by feelings of pleasure-displeasure, and ‘Arousal’ by feelings related to general activation level. These two dimensions can be interpreted within four quadrants:

- high arousal and high stress (anxiety);
- high arousal and low stress (pleasant excitement);
- low arousal and high stress (boredom); and
- low arousal and low stress (relaxed drowsiness).

This framework, which has some parallels with the Demand-Control model of stress, is suitable for discriminating differences in the type of unpleasant (stressful) experiences associated with different types of work demands – for example, performing quite easy, highly repetitive work on a moving assembly line, compared with performing more difficult and varied work at a rate sufficient to achieve a high production target.

To measure job demands and workload, most of the measurement methods used in the present project were drawn from the field of ergonomics and human factors psychology, where ‘workload’ – also called ‘mental workload’ – has been a major area of research for several decades. Before describing this research, it is necessary to clarify some terminology related to task demands and workload.

**Workload Terminology**

In everyday language we understand what someone means if they say their workload is very high. But what exactly is meant, and how might we measure it? As with the concept of ‘stress’, there is general consensus among researchers that workload results from interactions between individuals and the demands of their work, and that workload is essentially an experience of the individual – as is the experience of ‘stress’ (or ‘strain’, if we use the engineering model of stress).
**Figure 1. Determinants of Workload**

<table>
<thead>
<tr>
<th>TASK &amp; JOB DEMANDS</th>
<th>PERSONAL CHARACTERISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tasks: Number, difficulty</td>
<td>Coping capacity: knowledge, abilities, skills</td>
</tr>
<tr>
<td>timing</td>
<td>Willingness to expend effort: values, attitudes, motives</td>
</tr>
<tr>
<td>Job: general requirements</td>
<td></td>
</tr>
<tr>
<td>Context: situational &amp; environmental influences</td>
<td></td>
</tr>
</tbody>
</table>

Workload Experienced

- balance between work demands & personal capacity
- effort expended
- perceived success/failure in achieving objectives

Possible Personal Costs, Benefits

**Stress, fatigue, job satisfaction**

CONSEQUENCES

- Acceptability of workload level; resultant motivation
- Perceived equity of personal effort/reward balance
- Absenteeism, turnover, productivity, quality
- **OH&S: stress-related illness/injury levels**
Task and Job Demands: consistent with ordinary usage, these are the objective characteristics of particular work tasks and of the whole job that make ‘demands’ on the person doing that job – that require some attention and the expenditure of some physical and/or mental effort.

Workload: in common usage this term refers just to the amount of work that has to be done, but in ergonomics/human factors usage it focuses on the demands experienced by the person performing the work. That is, our ‘workload’ is our experience of our ‘job demands’. Importantly, the workload experienced by an individual is a function of both the objectively measurable demands of the work and their own perceived capacity to cope with those demands, as shown in Figure 1 above.

The term ‘workload’ is also sometimes used to encompass the costs we incur in our attempts to meet those demands: the effort we have to expend, plus (according to some models of ‘workload’) related negative emotions. In Figure 1, emotions related to our workload are shown separately from it. If the work is easy but there is a great deal of it to be done, the workload experienced might be quite similar to that when there is less to be done but the work itself is more difficult.

It can be seen that this concept of workload has much in common with the transactional view of occupational stress, since a central element in both is the individual’s perceived capacity to cope with demands. Workload increases as the perceived margin between demands and coping capacity decreases so that more effort has to be expended to maintain performance. If someone feels overloaded, or close to overload, they are likely to experience stress. That is, ‘stress’ is among the possible personal costs of coping with workload, as shown in Figure 1 above.
Although there has been a great deal of research on the relationship between perceptual/cognitive task demands and mental workload, there has been virtually no OH&S-related research concerning relationships between these types of task demands and mental workload in the context of occupational stress. Notwithstanding this lack of research, ISO standards closely link the concept of mental workload with that of stress (ISO, 1991; 1994), and make clear that both physical and mental task demands are part of a larger set of potential stressors, as shown in Figure 2.
In Figure 2, the task and job demands that are the primary extrinsic sources of workload are shown as potential stressors within a broader ‘systems’ framework, wherein an employee at her work station is subject to many influences – some or all of which she may experience as ‘stressors’. These potential stressors include the quantity of work to be performed (quantitative demands), as well as the type of demands specific to her particular work tasks (qualitative demands), plus more general work and job design factors, the physical and psychosocial work environments, organisational characteristics, and the broader social, economic and legislative framework within which the work organisation operates and individual employees live.

For some types of work, identification and assessment of stressors at the level of specific task demands is essential if the aim is to establish appropriate staffing levels or work rates. This was the case in the project being described.

**SPECIFIC TASK DEMANDS**

In assessing identifying and assessing potential stressors, the following specific task demands were considered.

**Sensory/Perceptual Demand Factors**

- quality of stimulus information;
- form of stimulus information coding;
- compatibility between stimulus information coding/format and a person’s mental model(s);
- number of sources of stimulus information;
- stimulus uncertainty (number of possible types of stimuli, and their relative probabilities);
- rate of occurrence of stimuli;
- predictability of time/place of stimulus occurrence.

**Decision/Memory Factors**

- required decision rate;
- decision complexity (based on clarity of relevant issues, clarity of their inter-relationships);
- demands on memory (short term and long term);
- decision informational difficulty (uncertainty resolved per decision);
- attention-sharing – between different sources of information, different activities;
- concentrated attention;
• care to avoid errors or to get things exactly right – especially when errors or poor quality output can have major consequences;
• repetitiveness – short cycle time - induces monotony.

Response Factors

• response uncertainty (number of possible types of responses, and their relative probabilities);
• predictability of time of required response;
• response precision (target ‘tolerance’ in relation to distance moved);
• compatibility between required response and relevant mental model;
• required response rate;
• repetitiveness – short cycle time, small number of different action components - risk of ‘overuse’ injuries.

Associated physical demands

• significant force – e.g. lifting, pushing, pulling;
• significant local force – e.g. gripping, squeezing, trigger;
• physical effort causing faster breathing – e.g. because working quite fast
• postures that are awkward so require increased effort – e.g. twisting, bending;
• static postures – e.g. standing still; sitting; holding arms in set positions such as at a keyboard.

An additional category of demands – Emotional Demand Factors – is included in Figure 2 for the sake of completeness. The constituents of this category relate primarily to work in which interpersonal relationships are central to the tasks being performed, which was not the case for tasks in the present project.

Along with most of the factors in the three innermost categories shown in Figure 2 (Specific task demands, work and job design, and work environment), mental workload levels were also quantified. Relationships between these variables and levels of employee fatigue, stress and arousal were then investigated.

Employee Control, Participation and Stress

Apart from task and job demands and related workload levels, the degree of control that employees experience is also likely to influence their stress levels at work. Consistent with most theories in this field, stress is more likely when the person is constrained in the way they carry out their work and cope with its demands; when they have little control over their work.

Hockey et al (1989) presented a control model of stress regulation that suggests a reason why a degree of individual autonomy, sufficient to give some control over workload level, can be
important in controlling stress. Control over decisions about when and how to perform work is important because when people feel that the gap between the task demands and their own coping resources is becoming uncomfortable, those with greater control or autonomy are more able to adopt strategies that enable them to cope with high demands or to avoid boredom when demands are too low. Being able to do this helps to minimise stress stemming either from perceived coping difficulties, or insufficient stimulation to maintain a comfortable level of activation or arousal.

The present project assessed this variable by asking employees to rate the adequacy of their amount of ‘say’ in general workplace issues. In addition, and more importantly, their level of control was described in terms of how their performance was externally paced: by production processes, a moving line, or the need to meet set targets or deadlines. Typically, machine-paced work is simple and repetitious with short cycle times, which many people experience as highly monotonous and unsatisfying. A high level of external pacing is generally associated with increased stress254. For example, comparison of machine-paced and self-paced jobs in a sawmill showed that machine pacing was associated with higher levels of catecholamines – a physiological indicator of increased stress255.

There is evidence that participation in setting a standard work rate may to some extent counteract the negative effects of external pacing. Johansson (1981) had two groups perform the same laboratory task at the same work rate. For one group the rate was self-selected, changeable every five minutes, while the other group had it imposed on them (by pairing subjects across groups). The group who selected their own work rate reported much lower levels of both effort and stress, despite the fact that both groups performed the same task at the same rate. There is also laboratory evidence that when people participate in setting their own performance goals or standards, particularly when they receive performance feedback, they are more highly motivated and performance improves (see Shikdar & Das, 1995).

Overall, there is evidence that work-related stress is likely to be higher when work tasks are highly repetitive and performance is externally paced. In the present project it was also hypothesised that stress would be higher if the required work rate was relatively high in relation to the demands of the work.

DATA COLLECTION

STAGE 1. Information was collected by direct observations and by a questionnaire administered in personal interviews with 186 employees employed by 20 companies in 22 workplaces, obtaining information about a total of 82 work tasks. Additional information was obtained from questionnaire-interviews with 37 production managers or supervisors and with 12 staff who had some responsibility for occupational health and safety. Employee participants comprised 78 females and 108 males with an average age of 39 years; between them they reported speaking 43 languages, and their birthplaces were distributed over 50 countries.

Numbers of employees at each worksite ranged from 11 to approximately 1500, with a median of 100. Tasks included a wide variety of manufacturing, assembly and packing tasks.
and a few data entry tasks.

**Stage 2.** 36 work tasks within 10 of the companies were analysed in greater detail, allowing quantification of various dimensions of task difficulty, quality of job design, and levels of employee stress, arousal, fatigue and job satisfaction. Two concurrent video recordings of each task were made from fixed cameras at different angles, supplemented in most cases by a hand-held video camcorder. A range of other measures were also taken, including work station dimensions, task-related weights, distances and forces, and employee heart rate during task performance.

Using all of the above information, variables quantified included:

- postural demand (a composite measure was developed, utilising OWAS and/or RULA and making allowance for estimated exposure);
- forces demand (a composite score was derived using the Snook tables and the University of Michigan Static Strength Prediction Program);
- cardiac cost (difference between resting and working heart rate means);
- mental workload (five scales derived from the NASA-TLX, plus two additional scales);
- fatigue (single rating scale similar to TLX scales);
- Stress and Arousal (Stress Arousal Checklist);
- Job design (Motivating Potential Score) and job satisfaction (derived from the Job Diagnostic Survey);
- Actual work rate was assessed using standard cycle times for each task, calculated using Modapts (a predetermined motion time system).

**Measured Task, Job & Work Characteristics**

**Work Pacing And Work Rate Determinants**

Tasks were categorised according to the factors pacing their performance. Many of these factors were inherent in the production system itself; in varying combinations and to varying degrees they both paced performance and determined work rates. For most tasks more than one such factor was influential. Major factors were:

- machine operating or production process time – 62.3% of tasks (including 13.5% of all tasks where there was literally a moving ‘line’ speed, and 16% classified as ‘end of line’);
- production targets – 70% of tasks;
- production orders and/or related deadlines – 46% of tasks.
Formal methods of calculating appropriate levels for production targets or line speeds were reported for 48% of the tasks surveyed. Other factors sometimes affecting actual work rates included the need to look for rejects or be careful to ensure product quality, particularly when quality of materials or the production process was variable; variation in staffing level; process hold-ups; amount of work backlog; and the need or wish to finish by a particular time were also commonly reported.

The majority of actual work rates were fairly close to the Modapts-based standard times, with a substantial minority of tasks being performed faster than standard rates (tasks left of the zero point in Figure 3). For many other tasks the actual work rates were slower than the standard (right of the zero point). Reviewing the videotapes of task performance, it was evident that in many of the latter cases the factors limiting work rates were production process times rather than the rate at which people could perform the work.

**Figure 3. Difference between observed task performance times and Modapts-based times**

The vertical line represents the point where actual performance time equals Modapts time without inclusion of the normal 15% allowance. Inclusion of the allowance moved this line to the right, to a point coinciding with the modal value of actual times.

**Task demands and workloads**

Tasks were categorised in terms of the following physical and mental demands:

- **Physical demand factors**: heavy loads (lift/push/pull); local loads; static postures; metabolic demands;

- **Mental demand factors**: perceptual (inspection); motor control (precision); conscious memory; concentration.

Each of these eight task demand factors was allocated a sub-score, based on the joint decision of at least two of the research team: 0 (no significant demand), 0.5 (significant to some
degree, or for some of the time), or 1.0 (definitely a significant demand). From this, three scores were calculated for each task: Physical Demand Factors (maximum score = 4); Mental Demand Factors (maximum score = 4), and Total Demand Factors (sum of physical + mental; maximum score = 8). Thus, these scores reflect partly the variety of task demand factors, and partly the level of demand. Figure 4 shows the distributions of each of Physical Demand and Mental Demand scores for all tasks.

**Figure 4. Distribution of Physical and Mental Task Demand scores for all tasks**

![Distribution of Physical and Mental Task Demand scores for all tasks](image)

Over half the tasks had a cycle time of less than a minute, as shown in Table 1 below. Only 18% of the sample had cycle times longer than 5 minutes.

**Table 1. Percentage of tasks in each cycle time category**

<table>
<thead>
<tr>
<th>Cycle time</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-60sec</td>
<td>52</td>
</tr>
<tr>
<td>1-5 min</td>
<td>30</td>
</tr>
<tr>
<td>5+ min</td>
<td>18</td>
</tr>
</tbody>
</table>

For each of the Stage 2 tasks, specific aspects of physical demands were also evaluated: Forces Stress (only 40% of tasks scored above zero, and very few required substantial force); Cardiac Cost (elevations were generally below 30-35bpm), and Postural Demands (a high proportion of tasks required postures with some level of risk).

Employees rated all tasks on a 10-point scale of ‘overall task difficulty’. For the whole task set the mean rating of ‘overall difficulty’ was 5.4 (Standard Deviation (SD) = 2.4). The Stage 2 subset of tasks was not significantly different, with a mean of 5.2 (SD = 2.4). Employee ratings on this scale were significantly correlated with the task demand scores derived from separate analyses of the tasks by the research team. As described above, task demand scores reflected the variety as well as the intensity of task demands, so a perfect correlation with employee ratings of ‘overall difficulty’ would not be expected. In fact, the correlation between the two was 0.4 (p=.002).

In addition, Stage 2 tasks were rated by employees on each of seven scales (0-100) representing different components or dimensions of workload, based on the six NASA-TLX scales and other workload research literature. These scales were: physical demand, mental...
demand, time pressure, effort, frustration (see Hart & Staveland, 1988), plus two additional scales formulated specifically for the repetitive process work under investigation in this project: ‘working carefully to avoid errors’, and ‘working automatically or thinking things out’. The mean of these seven scales was used as a composite measure of overall workload for Stage 2 tasks. Data from the component scales were also used in analyses relating task demands to fatigue, stress and arousal.

The highest mean rating (74 on the 100-point scale) was in response to ‘How affected are you by knowing it is very important to get things right?’. The importance of this factor was clearly related to employee perceptions of the need to maintain quality standards rather than simply to maintain a high output or work rate. It was evident that in many tasks this factor was a major source of workload. Equal second in importance as sources of workload were Mental Demand and Effort, both with means of 70, followed by Physical Demand with a mean of 65, and Time Pressure with 63. The relatively low value for time pressure indicates that this was not generally experienced as a major determinant of workload, suggesting that on the whole, work rates were not excessive – which is consistent with the Modapts calculations relative to actual work rates.

Second lowest rating (49) was for the question ‘Are you able to work automatically, or do you have to consciously think things out’? This low value indicated a high degree of working ‘on auto’, as is typical of highly repetitive work. Lowest (42) was for the standard NASA-Tlx ‘Frustration’ dimension: ‘How frustrated, discouraged, irritated, annoyed, etc. do you feel?’, indicating that frustration was a relatively less important element in the workload experienced by this sample of employees.

It was evident that for most tasks, Forces Demand and Cardiac Cost were low. Only 40% of tasks scored above zero on the composite ‘Forces Demand’ score (range from 0 to 3) and very few tasks required forces that presented any significant injury risk. Heart rate elevations were generally below the maximum acceptable level of 30-35bpm, only 7.5% of tasks had heart rate elevations of more than 40 bpm. In contrast to results for Forces Demand and Cardiac Cost, an increase in injury risk was predicted by posture scores for a high proportion of tasks.

**FACTORS PREDICTING VARIATION IN ‘STRESS’ AND ‘AROUSAL’**

‘Stress’ is manifest in a variety of ways: physiological, psychological and behavioural. Consistent with this, indicators of stress levels can be obtained from physiological indices such as levels of adrenaline, noradrenaline and cortisol; from ratings of subjective experience, and from observations of changes in performance strategies.

In this project, focus was on the subjective experience of stress – employees’ level of ‘affective well-being’ as measured by the Stress Arousal Checklist (SACL) which quantifies two dimensions of experience: ‘stress’ (representing pleasure-displeasure) and ‘arousal’.
Stress, Arousal and Fatigue in Repetitive ‘Assembly Line’ Work by Wendy MacDonald, La Trobe University

NOHSC Symposium on the OHS implications of Stress

( representing attentiveness, sleepiness and energy level; e.g. lively, sluggish, vigorous). The average stress score was close to the mean of published normative data, although variance was quite high (mean = 6.5; SD = 4.0). The average arousal score was relatively high (mean = 7.4; SD = 3.1), consistent with a fairly high level of effort and activity.

Factors associated with variations in stress and arousal scores are described below. Stress was expected to increase both with very monotonous work (highly repetitive, externally paced) and when task demands were excessively high. Arousal was expected to be positively correlated with high levels of work rate and task demands, and negatively correlated with high levels of monotony. Within the constraints of this study it was not possible to measure or control for the undoubted variations in stress and arousal levels related to individual differences.

Figure 5. Relationship between ‘Stress’ and Cycle Time
Distributions of stress scores are shown separately for cycle times categorised as short, medium and long (percentages of employees within each stress score category)

Cycle time category 1

Stress score was found to be higher with:

- High Workload (mean of the following modified TLX scales: Physical Demands; Mental Demands, Time Pressure; Effort, Frustration and ‘Working Carefully’)
- Low Motivating Potential Score (MPS) from the Job Diagnostic Survey; this score represents a set of job characteristics that enhance both coping capacity and job satisfaction (autonomy, feedback, variety, opportunities to have a sense of ‘ownership’ and pride in the work performed)
• Short Task Cycle Time. This variable represented the monotony and repetitiveness of the work; categories of cycle time duration ranged from 0-30 seconds through to more than 10 minutes (see Figure 5).

**Work Rate Determined by Work Process or Machine Times or Line Speed.**

This represented a high level of external pacing; it did not make a large additional contribution to the regression equation due to its correlation with task cycle time, but it was one of the stronger bivariate correlates of stress scores. (see Figure 6).

The above factors accounted for 32% of variation in employee stress scores (Adj. $R^2 = .32$).

**Figure 6. Distributions of ‘stress’ scores, separately for tasks where rate is or is not determined by the production process (percentages within each stress score category).**

Other variables, not included in the regression equation but each having significant bivariate correlations with higher stress were: higher force demand score, higher fatigue rating, lower general satisfaction rating, larger worksite (where work tasks tended to be more demanding), and higher ratings on TLX scales of Mental Demand, Time Pressure and Frustration.

The other dimension of employee well-being quantified by the Stress Arousal Checklist is arousal. Using multiple regression analysis, the set of factors below accounted for 36% of variation in arousal scores (Adjusted $R^2 = .36$).

Arousal was higher with:

• work rate influenced by orders or deadlines (see Figure 7)
• higher Total Task Demand Score. Arousal was higher with higher total task demand scores. This variable had the strongest bivariate correlation
with arousal. It comprises the sum of researcher scores for eight different aspects of physical and mental task demands and provides a comprehensive, objective index of task demands;

- higher Motivating Potential Score (MPS). Arousal was higher with higher MPS scores. MPS represents the good job design in terms of its potential to increase job satisfaction. It was related both to decreased Stress (see previous section) and to increased arousal, probably associated with the use of active (more effective) strategies to cope with work demands;

- higher Effort. As would be expected, ratings on this standard TLX scale were one of the strongest predictors of arousal;

- higher Working Carefully. This scale required employees to rate: ‘How affected are you by knowing that when doing this task it is very important to get things just right, or to avoid errors?’ It had one of the highest bivariate correlations with Arousal, just slightly lower than effort;

**Higher Postural Stress score.**

This variable had the second highest bivariate correlation with arousal; it is a formal measure of the aspect of physical task demands which was found to be most in need of remedy to reduce risk of musculoskeletal injury.

Other variables, not included in the regression equation but each having significant bivariate correlations with higher arousal were: longer task cycle time, higher general satisfaction, higher ratings on TLX scales of Mental Demand, Physical Demand and lower rating on TLX scale Working Automatically.

**Figure 7. Distributions of ‘arousal’ scores, separately for tasks where the rate is and is not affected by deadlines and orders (percentages within each arousal score category).**
**FACTORS PREDICTING FATIGUE**

High levels of fatigue were expected in association both with high workload and high stress. Multiple regression analysis identified the following factors as most strongly predictive of higher fatigue ratings:

- high mental workload score (mean of modified TLX scales)
- low general job satisfaction (standard Job Diagnostic Survey scale)
- work rate not affected by the need to meet orders or deadlines (see Figure 8)
- work rate seen as acceptable.

The above factors accounted for a remarkably high 63% (Adjusted $R^2 = .63$) of the variance in fatigue ratings. Stress was significantly correlated with fatigue, as expected, but the association was *not* sufficiently strong for Stress score to be a major predictor of fatigue rating – possibly because on average, stress levels were not particularly high (as reported above).

Workload (mean of modified TLX scales) was the strongest single predictor of fatigue. Variables with some of the highest bivariate correlations were incorporated in this factor, including: frustration (correlation = .65); physical demands (correlation = .54); time pressure (correlation = .52); and effort (correlation = .33).

The finding that fatigue was *lower* when there were orders or deadlines to meet seemed somewhat surprising. The additional time pressure would add to mental workload – a factor with a significant *positive* correlation with fatigue, as expected. Also, the tasks in this study whose work rates were influenced by orders/deadlines were found to have significantly higher postural stress scores and total task demand scores. Despite these higher task demands, fatigue ratings were significantly lower for employees in these tasks.

Clearly, level of subjective fatigue was not simply a product of either physical or mental effort expenditure. It was influenced also by motivational factors – in particular, related to less repetition and monotony, and greater freedom to vary work rate over time. These tasks had longer task cycle times, higher levels of job satisfaction, and significantly higher arousal scores. The latter factors were evidently sufficient in this study to decrease subjective ‘fatigue’, despite the more demanding nature of the work.

This finding does not invalidate subjective ratings as a measure of ‘true’ fatigue, any more than ratings of ‘pain’ are invalidated when they are dissociated from observed physical lesions. Fatigue, like both pain and stress, is a multidimensional phenomenon with a variety of possible causal factors (see Toohey, 1995, for a comparison of ‘stress’ and ‘pain’).
DISCUSSION & CONCLUSIONS

Variation in levels of task demands and related mental workload, and in employee control over their own work pace, were found to affect the levels of stress experienced by employees performing repetitive, ‘assembly line’ work. The quality of job design, in terms of opportunities for job satisfaction, also had an influence.

Highly repetitive, monotonous work which is not difficult in the normal sense of the word can be stressful, in part due to the absence of sufficient stimulation to sustain arousal and motivation at the levels needed to maintain the required performance output. The finding that employees performing tasks with the shortest cycle times – that is, the most repetitive, monotonous tasks – had higher stress scores is consistent with this expectation. Also consistent with this was the finding that stress was significantly higher among employees with less satisfying work (lower MPS) and scoring lower on general satisfaction.

One of the key questions addressed by this research was: ‘Did required work rates make adequate allowance for the difficulty of the work?’ The evidence on this question was clear: employees performing the more difficult or demanding tasks experienced higher levels of stress, and were more likely to report the required work rate as too high. It was evident from other analyses related to acceptability of the work rates that there was more likely to be a problem for tasks where the demands were mental rather than physical – requiring them to ‘think it out’ rather than work more or less automatically. Results showed that higher levels of mental task demands appeared to have been inadequately recognised by those responsible for determining standard work rates.

Whether or not formal methods such as a PMTS were used in setting work rates had less effect on employee well-being than did the presence of production targets (70% of tasks), deadlines and orders (46% of tasks), and the external pacing of many tasks by the production process, machine operating time or line speed (62% of tasks). Stress scores were higher for tasks where the work rate was significantly influenced by the timing of the production process.
process, machine operating time or line speed – that is, where there was a high level of external pacing. This result was expected since external pacing results decreases employee control. On the other hand, arousal levels were higher where work rate was significantly influenced by orders or deadlines.

The hypothesis that stress would be lower with higher levels of employee participation or ‘say’ was not confirmed. It may be that with these tasks, where amount of ‘say’ was usually low in absolute terms, variation was unimportant relative to the much stronger influence of external pacing of performance.

As hypothesised, arousal scores were predicted by a different set of variables from those predicting stress scores. The strongest single predictor of higher arousal was the absence of orders or other such deadlines as a significant influence on work rates, whereas stress was most influenced by external pacing of work performance.

While excessively high levels of arousal are likely to be associated with stress and performance decrements, moderate levels are more likely to be associated with optimal task performance (see Matthews et al, 2000, chapter 9), which would be expected to be associated with higher job satisfaction. Consistent with this, higher arousal score was positively correlated with higher MPS and general satisfaction score (Job Diagnostic Survey). This association of good job design with higher arousal contrasts with results for stress, where there was a significant negative relationship with good job design.

These results suggest that, at least with this sample of tasks, working to meet deadlines may often have been experienced as positive, presenting an enjoyable challenge that might add interest to otherwise monotonous work, rather than an unpleasant stressor. However, such tasks also tended to have longer cycle times and higher MPS scores, making it difficult to identify the primary determinants of the lower levels of stress and fatigue, and higher job satisfaction, that were associated with them.

Overall, it was evident that a wide range of task and work characteristics interacted to influence different dimensions of employee well-being, including stress. It is beyond the scope of the present paper to elucidate the complexities of these interactions, but some clear conclusions can be drawn concerning workplace management strategies with the potential to improve employee well-being. Most of these strategies also have the potential to improve organisational efficiency.

**IMPLICATIONS FOR WORKPLACE MANAGEMENT**

To avoid excessive stress levels among people doing repetitive manufacturing work tasks, there is a need for:

- Managers and supervisors who understand employees’ task demands, based on:
- Use of simple but systematic task analyses, using employee input and participation, with occasional input from specialist analysts (if necessary), to achieve accurate identification and assessment of task demands – particularly perceptual/cognitive aspects – so that enough time is allowed
for task performance, as well as efficient work systems and optimal work rates.

- Good job design, communications and supervision, so that:
  - supervisors are clear – and make sure that employees are also clear – what the required optimal balance is between output and quality;
  - employees have adequate amounts of:
    - ‘say’ in things
    - feedback on their own performance
    - variety in the tasks that they do
    - information and feedback about current work objectives and constraints.

- Good industrial engineering and system management, so that employees:
  - don’t often have to perform tasks with very short cycle times
  - are generally able to vary their work pace and take short breaks when they choose
  - don’t often have to cope with machine breakdowns, process delays and poor quality materials
  - don’t have to spend a significant proportion of each cycle just waiting, or working well below a reasonable (and preferred) rate.
ACKNOWLEDGMENTS

Thanks are due to the National Occupational Health and Safety Commission for funding this research project and to the many people who contributed, particularly my co-researchers Gerri Nolan and Owen Evans. I also thank other members of the research team: Liz Pratt who undertook much of the Stage 2 ergonomics data collection and who was responsible for confidential reports to each participating company; Michael Hui who performed all Modapts analyses; David Caple who assisted in formulating the project and recruiting participating companies; Deborah Vallance of the Amalgamated Metal Workers Union, whose help in briefing union representatives was invaluable; Ann Taylor of the Metal Trades Industries Association and Sandra Cowell of the Australian Industries Group. Special thanks to all participating companies, unions and employees for their time and invaluable contributions.

Note: For more comprehensive accounts of project findings, see Macdonald et al (1999); Macdonald (2000), and http://www.latrobe.edu.au/ergonomics/workload.html for related information.
REFERENCES


Endnotes

245 see review by Kasl, 1998.
249 Williams & Cooper, 1998.
253 Cox & Griffiths, 1995.
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265 (see Macdonald et al, 1999).
Multi-level approaches to stress

DAVID MORRISON, UNIVERSITY OF WESTERN AUSTRALIA

Outline

- Industries, jobs & people – where does most of the stress lie?
- Stress as a multi-level problem
  - Practical (the benefits of organisational congruency)
  - Theoretical (appropriate tests of theories e.g., Karasek)
  - Statistical considerations (dancing on the head of a pin hurts and wrong statistics lead to wrong conclusions).
- The causality problem
- Some empirical studies

Where is all the stress?

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Standardised mortality rates 100=average risk
Slide 4

![Stress and Jobs Table]

Standardised mortality rates 100=average risk

Slide 5

Partitioning the variance

- There is large variation in the community
- Within social class there is large variation
- Within occupational groups there is large variation
Slide 6

What should be done to manage the effects of stress exposure?

- **Legislate** (societal solution)
- **Re-structure** (unlikely, expensive and risky)
- **Retrain** (expensive)
- **Select better people** (unknown quantity)
- **Job redesign** (expensive and threatening)
- **Individual stress management** (cheap, on-demand, seems caring)

Slide 7

Pick the most effective!

- No consistency in measures or approaches
  - **Measures**: ad hoc context-specific making it difficult to compare studies and to know where the sample lies in terms of stress exposure.
  - **Study Design**: predominantly cross sectional samples of convenience containing very few stressed people.
  - A recent study showed that when objective measures and longitudinal studies are examined they fail to support the most popular model of stress for the last 20 years!
How much variance in strain does each level account for

- **Study 1**: Australian Workplace Industrial Relations (n=20,000)
- **Study 2**: National Health Service (n=7,000)

Do changes in job design actually have an impact?

- **Study 3**: Sydney water (n=271)
And what about selection?

- What criteria would you select on?
  - Personality
  - Skill levels
- **Study 4**: Meat Processing data showing interaction between job design and personality (n=180)
- Demonstrates a mixed level effect (individual and job)

Individual level interventions

- Few long term effects observed
- What about a mixed level approach?
- **Study 5**: Education Department data (n=300) Work design and individual stress management study
Summing up

- A common theme is emerging: a mixed level approach seems logical.
- But there is a fly in the ointment!
- Are the effects of change from objective work characteristics or employee perceptions?
- We argue the latter

In support of perceptions

- Lischeron and Wall (1977) showed employees were just as happy with psychological participation as objective participation.
- Morrison and Payne (2001) have shown perceptions are more important than objective job characteristics (return to Study2)
- Study 6: Morrison, Upton and Cordery (1996) have shown how leader behaviour affects perceptions of jobs and climate.
Conclusions

- The effects of exposure to stress can be explained with reference to the company, the job and the individual.
- The variance explained by differences in companies and jobs is small.
- The variance in observed strain is accounted for largely by individual level variables (perceptions).

Conclusions cont’d

- Stress is a management problem
  - their problem is to manage the perceptions of individuals with regard to their jobs.
- Companies would better spend stress intervention money indirectly on employees through the modification of management behaviour!
EXECUTIVE SUMMARY

This paper discusses the history of the Queensland Occupational Stress Project and the range of strategies that were developed. It notes that risk assessment strategies were particularly useful.

The initial risk assessment model focused on climate and morale measures as a way of predicting likely stress claims and analysis of workers' compensation claims in terms of hot spots, costs, frequency, duration and accountability issues. The project, with its focus on Occupational Stress, ended by further developing the use of climate and morale measures and its links to other oncost measures such as absenteeism and turnover. The next step was to use a balanced scorecard concept and to place a number of the measures that had been developed into the learning and growth quadrant and to link them with a range of business outcome measures.

The concept of organisational health was introduced to replace the learning and growth quadrant and extended the array of analysis within an organisational health framework.

This was a concept that identified pathology measures such as absenteeism, turnover, grievances, accidents and incidents and industrial disputes, and wellness measures based in the climate and morale dimension that were in terms of sustainability and the capacity of an organization to withstand stress and to deliver business outcomes. This framework was developed into data integration concepts that demonstrated linkages between organisational health concepts and business outcome measures. It allowed the profiling of Human Resource Management activities as a key part of business strategy.

It also provided the opportunity for organisational diagnosis, specific targeting of interventions, and the evaluation of these interventions across a number of data sets. The key issue profiled in this paper, is that by measuring some key elements within the learning and growth (organisational health) quadrant (eg climate and morale), and by linking them to pathology measures (eg absenteeism, turnover, workers' compensation claims), as well as to business outcome measures (eg
client service results), people management issues can start to take centre stage. This approach has clear implications for the development and operation of a workplace health and safety agenda in terms of measurement, mainstreaming, and links to an overall business outcome framework.

INTRODUCTION

This paper will analyse the organisational options open to employers to reduce occupational stress and consequential oncost outcomes such as absenteeism, turnover and grievances.

It will provide a case study of the decision processes used by the Queensland State Government in determining its stress initiatives and will provide a conceptual analysis which will assist those in other situations to determine which factors are relevant to their situation. The paper will include an exploration of the linkages between occupational stress strategies and mainstream human resource management and will report on initiatives and results, which have been achieved since 1998. Specifically, the paper will focus on the use of a balanced scorecard model that links a range of Human Resource Management (HRM) practices to a variety of outcome measures.

The key notion underpinning the discussion is the significant role played by the collection of HRM and climate and morale data, and its integration and analysis into workforce information thus guiding strategy development and decision making.


Much of the literature on stress, and many activities of counsellors and trainers, focuses upon individual pathologies and how the stressed individual can be healed in order to return to, or stay at, work.

The Queensland Government initiatives took a different approach, based on the conceptualisation that:

- occupational stress is caused by both individual factors and environmental factors (both inside and outside work); and
- work environment factors are more conducive to change than other stressors, because they are less fixed than personality traits, and because they are more open to intervention by employers.

The paper identifies the framework for employer interventions. This framework focussed on the five areas of:

- Risk assessment
- Organisational change processes
- Manager/supervisor training
• Individual employee services and
• Claims management, including rehabilitation.

The Queensland State Government public sector stress initiatives between 1995 and 1998 included:

• dedicated funding ($2 million over three years) for nominated projects to the five agencies with the greatest costs on workers’ compensation stress claims;
• inter-agency projects in two non-metropolitan regions;
• the set up of a small central Occupational Stress Policy and Advisory Unit in the Public Sector Management Commission, and the assignment of a workplace health and safety adviser to concentrate on stress;
• a pilot occupational stress survey across a number of agencies, to develop baseline data and an instrument which all agencies may use;
• a requirement that all agencies prepare an occupational stress management plan; and
• amendments to the Workers’ Compensation Act to restrict eligibility for stress claims where work was not a significant contributing factor.

**Situational Analysis**

These initiatives occurred in a public sector environment at a time of high cost, high uncertainty and high confusion.

High cost was evident from the rapidly rising workers’ compensation expenditure of many state government agencies.

High uncertainty was evident from factors such as an imminent move for most government agencies from paying for workers’ compensation on a cost-plus basis to the payment of insurance premiums; and the unknown flow-on effects of a new legal precedent for stress compensation claims.

High confusion was due to limited information, expertise and coordination.

**Organisational Change Agendas**

In order to apply the preferred model to these circumstances in the Queensland Public Sector, it was necessary to encourage the employing agencies to move in certain directions, namely from healing the individual to healing the organisation, from leaving the issue with only occupational health and safety/counsellors/rehabilitation staff to acceptance of stress issues as part of mainstream human resource management, from unaccountable to accountable, from data free to data rich.
Organisational Change Strategies

The model for systemic change across the sector aimed at occupational stress issues was managed through the application of broad organisational development and change strategies. A number of strategies were introduced. These included: financial incentives; accountability mechanisms; the provision of central advice, support, and information; the development of a consultation, liaison and coordination process between central agencies and line agencies; and an overt linkage of the occupational stress agendas with mainstream human resource management agendas.

The role of the Public Sector Occupational Stress Policy and Advisory Unit was pivotal to many of these strategies, because it provided dedicated expertise, networking between agencies, and continuing momentum to the agendas.


The outputs include the development of a diagnostic instrument (Queensland Public Agency Staff Survey - QPASS), a climate and morale measurement tool suitable for benchmarking; distribution of best practice information; and comprehensive data on compensation stress claims. The full range of these best practice guidelines are available on the climate and morale web site noted in the references.

The outcomes include a substantial turnaround in workers’ compensation stress claims, in terms of the numbers lodged, incidence, cost and duration, and a significant enhancement in the quality and availability of HRM data. It should be noted that although legislation change probably had a role in the overall reduction in stress claims, the diminution was differentially greater in those targeted agencies that applied the stress management frameworks noted above.

Of the five strategies developed the most effective were those targeted at risk assessment and at claims management.

The risk assessment framework encouraged agencies to more systematically collect and link a range of HRM information including climate and morale measures, workers’ compensation claims, absenteeism and turnover. Specifically, the process of measurement in itself focussed management attention and energy.

The claims management and rehabilitation guidelines provided a useful means for both standardising the approach across the sector as well as an impetus for targeting an immediate cost reduction approach.

REFOCUS ON CLIMATE AND MORALE AND OTHER ONCOST MEASURES (1998 – 1999)

In 1998, the focus of the Occupational Stress Project moved away from the pathology orientation of occupational stress. It moved to the link between organisational climate, human resource efficiency and effectiveness benchmark measures (absence management;
turnover; workers’ compensation), and the development of organisational improvement strategies that are demonstratively linked to performance outcomes.

At this time, the Office of the Public Service developed a Workforce Management Strategy to provide agencies with a framework for managing people in a way that promotes a genuine performance culture linked to the achievement of business objectives.

The central feature of the model contained in the Strategy is that it was non-prescriptive. It was intended as a conceptual framework to help agencies determine what are the key elements for them in workforce management generally, and to think through potential responses to specific workforce management issues. It was provided to help senior executives in shaping and evaluating the people management strategies within their agencies with a view to improving overall performance.

Its primary objective was to shift the practice of people management away from the traditional transaction based, compliance oriented approach to one which links workforce management directly to the achievement of organisational goals. Put another way, it was to change the perception of people management from being a simple overhead cost to one which sees it as an investment which makes a vital contribution to the overall success of the agency.

Organisational Climate was a key part of this overall strategy.

**Effective management of people is a task for staff at all levels, even those without formal supervisory responsibilities. It is the day-to-day experience that people have of their workplace that is the single greatest influence on their willingness to commit to the achievement of demanding performance targets.**

Sustained high levels of performance depend on a workforce, which is well motivated and enthusiastic about its work.

The core component of the QPASS instrument is an organisational climate section that measures such factors as leadership, decision-making and role clarity. It creates a picture of how work groups operate and how improvements in management systems can be made. A number of agencies began to use QPASS and to start to measure their QPASS results against sector wide benchmarks and their own comparative results over time. Specific organisational improvement activities were developed based on these climate and morale results.

Similarly, the development of more effective Human Resource Information Systems allowed the more systematic collection and assessment of on cost measures such as absenteeism and turnover.

Although these forms of data were collected, they tended to be used in a fragmented way that did not take advantage of the capacity for integration, analysis and prediction. There was a need to develop a conceptual model that developed the linkages between these various data sets and link them to broader organisational performance measures.
BALANCED SCORECARD AND ORGANISATIONAL HEALTH (2000 – ONGOING)

The next evolution was to use a balanced scorecard concept and to place a number of the measures that had been developed into the learning and growth quadrant and to link them with a range of business outcome measures.

The balanced scorecard is a performance framework that argues that measurement across a number of areas is critical for evaluation and strategy development. It has similar features to a number of systems including the Quality Council Framework and the Triple Bottom Line. The four areas measured within a balanced scorecard are:

- financial (% return on revenue; share value);
- customer (customer satisfaction; returns);
- internal (cost per unit); and
- learning and growth (employee satisfaction; core competencies).

For the purposes of this project, the concept of organisational health replaced the learning and growth quadrant and extended the array of analysis within an organisational health paradigm.

This was a concept that integrated pathology measures such as absenteeism, turnover, grievances, workers’ compensation costs, and wellness measures based in the climate and morale dimension in terms of sustainability and the capacity of an organisation to deliver business outcomes.

This was developed into data integration concepts which demonstrated linkages between organisational health concepts and business outcome measures. Specifically, that the organisational health quadrant drives performance across the financial, customer and internal quadrants. The key dimension within the organisational health quadrant is that of climate and morale and that this is linked not only to the oncost measures noted above but also to the outcome measures identified within the balanced scorecard framework.

This allowed the profiling of Human Resource Management activities as a key part of business strategy.

It allowed the opportunity for organisational diagnosis, specific targeting of interventions, and the evaluation of these interventions across a number of data sets.

The key issue is that by measuring some key elements within the learning and growth (organisational health) quadrant (eg climate and morale), and by linking them to pathology measures (eg absenteeism, turnover, workers’ compensation claims), as well as to business outcome measures (eg client service results), people management issues can start to take centre stage. Specifically that a focus on Human Resource management issues has a direct impact on both productivity and on costs.

This approach has clear implications for the development and operation of a workplace health
and safety agenda in terms of measurement, mainstreaming, and links to an overall business outcome framework.

**Outcomes (2000 to the present)**

A conceptual model and the technical architecture has been developed to integrate data sources including: ABS data (demographic, density, socio-economic and location information); human resource benchmarks; occupational health and safety and workers’ compensation data; client service and satisfaction data; balanced score card (financial and non-financial) performance measures; Workforce Management Information (from MOHRI, a sector wide Human Resource Information collection system); and organisational climate data.

A range of partnership projects have been formed with agencies and universities (including two, three year SPIRT Grant projects for which money and resources have been committed) that are using data integration concepts for the planning and evaluation of organisational improvement and change management programs. Working in multiple Queensland Public Service environments with a range of researchers means that successes and strategies from individual projects will inform the work on other projects and add to our knowledge and experience.

There is now clear evidence that climate and morale data is predictive of a range of organisational costs and performance. That is, we are now in a position to relate information from a range of databases in ways which allow us to identify organisational issues, difficulties and consequent remediation strategies.

**POLICY AND PRACTICE IMPLICATIONS**

There are two specific implications for the management of occupational stress issues within organizations.

The first is that no matter what approach is taken to the management of stress issues, without a well developed risk management approach that collects data on predictive factors such as climate and morale and incidence factors such as cost, duration, frequency and location it is unlikely that a comprehensive management strategy can be developed and maintained over time. Secondly, through the integration of a range of human resource measurements and data sets within a framework such as the balanced scorecard, it is possible to mainstream a range of human resource remediation and management practices (including occupational health and safety) through tying them to business cost and business outcomes.
CONCLUSION

This paper has discussed the evolution of a project initially targeted at issues relating to occupational stress and its progression to the development of models and systems that link a range of human resource measures and concepts to organisational performance outcomes. The key learning is that organisational health at a systems level directly impacts on individual health issues. Therefore through the appropriate linkages of human resource measures, it is possible to develop and enhance mainstream human resource management practices. Additionally it is possible to make these HRM practices relevant in the management of a range of organisational costs and productivity.

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The web address, http://www.psier.qld.gov.au/orgclim/index.htm, provides the following reference documents:

- A Guide to Improving Organisational Climate using the Queensland Public Agency Staff Survey
- Employee Opinion Surveys - How to Guide
- How to improve Organisational Climate
- Improving Organisational Health - Management Guidelines for Queensland Public Sector Agencies
- QPASS Manual and Survey (for Queensland Government Internal use only)
- QPASS Practitioners Best Practice Workshop
- Queensland Public Sector Guide for Workers’ Compensation Claims Processing and Claims Management for Psychiatric/Psychological Injury Claims
JULY 2000

Why target stress?

According to the latest Australian Workplace and Industrial Relations Survey (1995), stress (formally known as mental disorders in many jurisdictions) was the second largest cause of workplace related injuries and illnesses, with 26% of all cases surveyed. Only strains and sprains were responsible for a higher proportion of injuries and illnesses, with 43% of all cases surveyed. The same figures showed that females suffered a higher proportion of stress injuries than males (31% of all injuries as opposed to 23%).

In Britain, it has been estimated that stress-related illness results in 9.1 million working days being lost each year at a total cost to British industry of 3.7 billion pounds in lost production. A survey by Industrial Society of 699 human resources professionals in Britain found that whilst 83% of the respondents felt that their organisation had a problem with stress, just 7% felt that stress was considered a valid reason for taking time off work.

However, stress at work is important not just because of the days lost through sickness and workers’ compensation claims. At an individual level, stress can sap productivity while at work. In a workplace environment, stress can lead to increased labour turnover, low morale and poor workplace relations.
WHAT CONSTITUTES OCCUPATIONAL STRESS?

Potential causes of stress

Some of the potential causes of work-related stress given by the various jurisdictions include:

- bullying/unfair treatment/harassment/discrimination
- violent incidents
- organisational change/re-structuring
- lack of job security
- lack of control in workplaces (poor communication and consultation),
- excessive workload (including long hours)
- insufficient deadlines
- lack of adequate reward for effort or lack of recognition
- conflicts of conscience
- fatigue
- boredom/monotony
- exposure to critical incidents (post traumatic stress)
- potential for violence (verbal or physical)
- physical environmental conditions (eg. noise, fear of injury, temperature)
- inappropriate management practices or style
- high intensity work accompanied by low autonomy
- low social support- poorly clarified goals or roles
- poor relationships at work

South Australian data published in WorkCover Corporation’s 1998/1999 Statistical Report indicates that the four main causes of stress are:

- work-related pressures such as excessive workloads and unreasonable time frames (30%);
- harassment and victimisation (26.3%);
- armed hold-ups and assaults (23.1%); and
- non-violent conflict (16.3%).
EFFECTS OF STRESS ON THE INDIVIDUAL

Some positive effects of stress include enhanced motivation and job satisfaction. On the other hand, negative symptoms resulting from stress can include:

- headaches,
- disturbed sleep,
- depression,
- coronary heart disease and/or high blood pressure,
- migraines,
- gastro-intestinal problems (eg ulcers),
- increased dependence on drugs such as alcohol or cigarettes,
- tiredness,
- musculoskeletal disorders including back or neck pain
- eczema,
- shingles,
- muscle twitches,
- blackouts,
- cramps,
- mental illness and symptoms other than depression (excessive anger, feeling distrustful, nervous breakdowns, memory loss)

Not all of these symptoms always result from stress alone. For some symptoms, stress may simply be one of the factors contributing to the symptom (this is particularly so for musculoskeletal disorders and coronary heart disease/high blood pressure) or it may be the sole contributing factor. Furthermore, stress will rarely result in all of these symptoms. While it is known that stress can lead to ill health, the specific illness outcome is difficult to predict.

Stress compensation claims may not accurately represent occupational stress for a variety of reasons. Firstly, some negative symptoms will more naturally fall into other ‘Nature of Injury/Disease’ codes. These symptoms include musculoskeletal disorders, coronary heart disease and/or high blood pressure, shingles, eczema and ulcers. Secondly, negative symptoms in some individuals may take a long time to become apparent, meaning that claims may not truly represent the risks within the current workplace (or industry) or may not be successfully made by affected individuals. Thirdly, some people who are exposed to stress-related problems will not claim compensation given the stigma that can be attached to ‘stress’. Such people may take their accrued sick leave or simply attend work with reduced effective capacity (or in a destructive capacity). Conversely, there may be people who claim for stress but are not actually suffering its negative effects (ie. fraudulent claimants).
Furthermore, some claimants may assert that the workplace is a significant contributing factor to their stress when that stress may be caused primarily by non-workplace factors.

**EFFECTS OF STRESS ON THE WORKPLACE:**

The effects of stress on the workplace can include:

- decreased productivity of the afflicted individual when still at work
- decreased productivity of other workers through poor morale;
- absenteeism where no claim is made or a claim falls below the threshold;
- medical costs for claims which fall below the threshold;
- high turnover where staff simply leave or claim prolonged sick leave;
- increased injury incidents.

In addition there are considerable costs to society which may not be readily recognised by employers. Many stressed individuals, who leave their workplace because of stress, both claimants and non-claimants, may end up receiving Commonwealth disability or unemployment benefits. Others may end up retiring early and being dependent on pensions earlier than would normally be the case. The other cost is that of ‘emotionally disabled’ people who were once emotionally fit existing in society. This problem will not depend on the people being out of the workforce, as many stressed workers will take their emotional problems to their home and into their social life causing distress to others.

**HOW STRESS IS DEALT WITH IN EACH JURISDICTION**

**COMCARE**

**Claim Numbers**

In 1998-1999 occupational stress claims represented 4% of accepted claims and 18% of total claims costs for Comcare.

**Legislation**

In general, stress claims are disease claims and are considered under the provisions of the Safety, Rehabilitation and Compensation Act 1988 (the SRC Act) relating to disease claims. In short, to be accepted claims for stress must be materially contributed to by a claimant’s employment. The Federal Court has found that the stress condition must be one which is ‘outside the bounds of normal mental functioning’. The Court found that it is not enough to have an altered emotional state, for example anger or disappointment. The SRC Act provides that claims for compensation are excluded where the condition arose as a result of reasonable disciplinary action or failure to obtain a promotion, transfer or other benefit in connection with employment. The SRC Act also precludes compensation where a condition is intentionally self-inflicted or is caused by serious or willful misconduct.
Initiatives

In 1995, in response to the increasing costs of stress claims, Comcare established a Stress Claims Management Centre (SCMC). The role of the SCMC was to implement improved operational processes in support of better outcomes relating to occupational stress claims. The main processes adopted by the SCMC were: consistency in decision making; effective use of resources on initial decision making; active management of internal review; and effective communication with stakeholders – providers, customer agencies and injured employees. In recent years Comcare has incorporated these processes into all claims management processes and stress claims are now managed within general claims teams.

In 1997 Comcare and the Australian National Audit Office developed a joint publication for Senior Managers in the Commonwealth on managing occupational stress. At the same time Comcare also developed a publication which gives assistance to Commonwealth agencies on implementing a prevention program for occupational stress. In February 2000 Comcare and Centrelink published the joint publication Applying Best Practices Principles to the Prevention and Management of Customer Aggression. The publication provides advice on assessing the risk of customer aggression, assessing the adequacy of risk response strategies and auditing the adequacy of the physical environment in preventing customer aggression.

Seacare

The Australian Maritime Safety Authority, which provides the occupational health and safety inspectorate function pursuant to the Occupational Health and Safety (Maritime Industry) Act 1993 has advised that it has undertaken, and is continuing with, research on fatigue among seafarers. At this stage, no detailed data is available.

VICTORIA

Claims

Approximately 5% of total claims were for stress in 1997/98. This represents 1585 stress claims reported (and 4249 stress claims incurred). This percentage for total stress claims out of total claims has remained fairly steady since 1994/95. Payments for stress claims have increased since 1993/94.

The biggest jump was between 1994/95 and 1995/96 but there has been a general increasing trend since then. By 1998/99, stress claims cost the Victorian WorkCover Authority over $50m. While the cost of stress claims have increased, its percentage of all claims’ costs has remained fairly static in the last ten years at between 4.6% and 5.5%. In 1998/99 it was 4.7%.

The average payment per claim was much higher for stress claims than for the overall average claim in both 1996/97 and 1997/98. Circulatory disease claims are higher and back injuries represent a similar expense per claim to stress. Otherwise, stress claims represent the highest average payment per claim. This difference between the average stress claim and the average claim is far more marked for males than females.
Stress was also claimed as the significant cause of 86 deaths (the great majority were males) since 1985 including 15 suicides.

**Legislation**

Included among the amendments of 1 December 1992, which replaced the WorkCare system with the current WorkCover system, were two provisions which directly affected the lodgement of stress claims. Section 82 (1) was amended and 82 (2A), specifically governing stress claims, was added to the Act. These sections now read as follows:

‘82(1) If there is caused to a worker an injury arising out of or in the course of any employment and if the worker’s employment was a significant contributing factor the worker shall be entitled to compensation in accordance with this Act.’

‘82 (2A) Compensation is not payable in respect of an injury consisting of an illness or disorder of the mind caused by stress unless the stress did not arise wholly or predominantly from –

a) reasonable action taken in a reasonable manner by the employer to transfer, demote, discipline, redeploy, retrench or dismiss the worker; or

b) a decision of the employer, on reasonable grounds, not to award or to provide promotion, reclassification or transfer of, or leave of absence or benefit in connection with the employment, to the worker; or

c) an expectation of the taking of such action or making of such a decision.’

These legislative changes were intended to significantly tighten the criteria for acceptance of stress claims. For any claim to be accepted, including a stress claim, the worker’s employment now had to be a significant contributing factor to the injury and certain types of stress claims were explicitly excluded.

There have been no subsequent amendments to these provisions.

**Initiatives**

The Victorian WorkCover Authority has undertaken a number of activities with regard to stress in Victorian workplaces as follows:

- raised awareness of violent harassment (bullying) of young people;
- 3 investigations are in progress for alleged bullying and harassment in the workplace, 2 of which deal with harassment of apprentices; and
- WorkSafe is currently developing a code of practice on the prevention of workplace bullying. An issues paper was released for public comment in
March 2001 and a total of 42 submissions were received. In October meetings were held with key stakeholders to seek their views on the structure and content of the draft code. A draft code incorporating comments received on the issues paper will be released for further public comment by the end of November 2001.

The following programs are currently being developed and implemented in Victoria –

**Workplace Intervention Project:** WorkSafe Victoria field officers will visit the majority of residential aged care facilities to assess compliance with OHS legislation and provide advice and potential solutions to complex OHS issues.

WorkSafe Victoria is developing protocols with the Aged Care Standards and Accreditation Agency to ensure clarity and consistency in regard to OHS management in Victorian High Care Residential Aged Care Facilities.

The Victoria Police has commissioned a study of the culture and climate of the organisation. The results of this study will be used to address identified causes of stress within Victoria Police.

The Authority provides general advice to its clients regarding stress which is to identify, assess and control the stress hazard and risk. This is standard advice and applies to any workplace hazard.

Internally, the Authority has a Critical Incident Stress Management program, which is compulsory for field staff who are exposed to critical incidents. It also provides anonymous psychological services to any staff who require it for work related and non-work related personal problems. In addition, new Operations staff receive a day with psychologists receiving training on relaxation and on how to deal with aggressive and abusive people.

**NEW SOUTH WALES**

**Claims**

In 1999/00 there were a total of 1,577 new major mental stress claims. This amounted to 17% of all occupational disease claims for that year. Major claims refer to those claims where the result of injury is permanent disability or temporary disability where five or more days have been paid for total incapacity.

The total gross incurred cost of mental stress claims was $33 million which amounted to an average cost of $20,617 per claim.

The total time lost caused by mental stress claims was 27,709 weeks with an average of 19 weeks for each case.

Mental stress claims comprised the majority of occupational diseases in the following industries: Education (58.8%), Finance and Insurance (55%), Personal and Other Services (46.1%) and Health and Community Services (44.7%). The largest proportion (20%) of
mental stress claims came from the Health and Community Services industry followed by Education (18%).

**Legislation**

In New South Wales, Section 11A of the Workers Compensation Act 1987 relates to psychological or psychiatric injury. According to this provision "No compensation is payable … [for psychological or psychiatric injuries] if the injury was wholly or predominantly caused by reasonable action taken or proposed to be taken by or on behalf of the employer with respect to transfer, demotion, promotion, performance appraisal, discipline, retrenchment or dismissal of workers or provision of employment benefits to workers".

A claim for weekly benefits in respect of incapacity for work resulting from psychological injury must be accompanied by a medical certificate, which uses accepted medical terminology and not terminology such as "stress" or "stress condition". If a claim is deficient because this requirement has not been complied with, the insurer must notify the worker in writing of the deficiency and what to do to comply as soon as practicable after receiving the claim. Until this requirement is complied with the claim is not "duly made", nor can court proceedings commence.

**Initiatives**

WorkCover NSW has identified mental stress as a strategic issue. In addition to dealing with the issues leading to mental stress through its usual enforcement activities, WorkCover NSW has initiated various projects and programs for dealing with these issues. As in the majority of instances mental stress is a direct result of workplace violence, most of these projects address the issues of abuse, harassment, bullying and other forms of violence including physical violence in the workplace. Following are some of the projects undertaken:

- Internally WorkCover has addressed the issue of workplace violence by developing policies and procedures (as described in a booklet Managing workplace violence, a guide for WorkCover inspectors) and initiating a training program on handling violence and aggression in the workplace.
- WorkCover was also the leading participant in a project which involved thirteen government agencies, identified on the basis of relative risk, for the purpose of developing a whole of government approach to workplace violence management. WorkCover audited each agency’s capacity for dealing with workplace violence. The audit provided WorkCover with information needed to assist the agencies to improve their capacity for dealing with violence.
- WorkCover has been approached by the Ombudsman’s office to work on procedures that would shorten the time involved in carrying out official inquiries (for instance, leading from disciplinary action, fraud and charges of sexual misconduct) in order to cut down the number of stress claims that result from such delays.
• WorkCover has addressed the issue of workplace bullying specifically for young workers through a grant to the National Children and Youth Law Centre. The aim of this project is to reduce the incidence of workplace bullying of young people by raising the awareness of employers of the existence of workplace bullying and providing them with effective and practical strategies to reduce the likelihood of bullying occurring in their workplace.

• WorkCover has given a grant to the Baptist Community Services to examine the prevention and management of aggressive incidents by residents in nursing homes. The project has developed guidance material and resources for the aged care nursing home industry, which focuses on the management and rehabilitation of staff involved in aggressive incidents with residents.

South Australia

WorkCover Corporation Advisory Committee on Occupational Stress identified the following organisational and work related issues as the main contributors to the development of a work-related condition:

• Organisational/workplace change;
• excessive workload, harassment and bullying;
• lack of control;
• inappropriate management practices;
• workplace violence and trauma,
• lack of support from management or peers and adverse physical environment.

The employer should address most of these risk factors before the worker makes a Mental Disorder ("stress") claim. Employers can also assist the worker to better recognise symptoms of stress and to utilise stress management strategies to cope better or change inappropriate health behaviours. WorkCover training programs for employers provide support for these preventative strategies.

Claims

The number of stress related claims for mental/psychiatric disabilities has declined to 162 claims in 1998/99 or about half of the 1991 figure. The reduction in the number of such claims occurred prior to legislative amendments in 1995. Occupational "stress" related claims (Mental Disorder Claims) accounted for 2% of all injuries and 3.5% of all income maintenance costs in 1998/99. Stress claims are approximately three times more expensive than other claims.

Work related pressures such as excessive workloads and unreasonable time frames were identified as causes of 30% of all Mental Disorder claims in 1998/99 with additional 26%
arising from harassment or victimisation. Trauma in the workplace (violence, hold-ups) caused 23% of all stress claims. The majority of trauma claims (ie: 60%) were directed at "elementary clerical sales and service workers". This group includes banking and service station employees.

Work pressures accounted for the most significant number of claims by managers, administrators and professional workers (or 40-50% of their stress related claims.) Claims by intermediate clerical staff identified harassment as the most significant contributor.

**Legislation**

Legislative amendment in 1995 saw the introduction of Section 30A of the Workers Rehabilitation & Compensation Act 1986. This section covers psychiatric disabilities:

"A disability consisting of an illness or disorder of the mind is compensable if and only if-

a) the employment was a substantial cause of the disability; and

b) the disability did not arise wholly or predominantly from –

i) reasonable action taken in a reasonable manner by the employer to transfer, demote, discipline, counsel, retrench or dismiss the worker; or

ii) a decision of the employer, based upon reasonable grounds, not to award or provide a promotion, transfer or benefit in connection with the workers employment; or

iii) reasonable administrative action taken in a reasonable manner by the employer in connection with the worker’s employment; or

iv) reasonable action taken in a reasonable manner under this Act affecting the worker."

The above section outlines the test for compensability relating to psychiatric disabilities and is much more detailed than for other disabilities.

Any mental disorder listed in either the:

- Diagnostic and Statistical Manual of Mental Disorders – 4th edition (Revised),
- American Psychiatric Association (DSM IV) or the
- International Classification of Diseases; Classification of Mental and Behavioural Disorders – 10th edition, Geneva World Health Organization 1992 (ICD10) is considered an “illness or disorder of the mind” covered by Section 30(A).

However, it must be noted that "stress" is not a condition or a diagnosis and therefore a diagnosis of stress on a Prescribed Medical Certificate is not accepted for a workers
compensation claim. A correct diagnosis consistent with DSM IV or ICD 10 classifications is required.

Claims managers may undertake further medical or other investigations as required to determine claim eligibility in accordance with section 30(A).

Claims managers may also provide rehabilitation services prior to claim determination if required (eg critical incident debriefing in the case of a violent incident).

**Initiatives**

**Injury Treatment and Rehabilitation**

In partnership with the University of Adelaide Medical School, a specific workers compensation component has been introduced into the medical undergraduate curriculum. Corporation personnel work with the university in preparing and delivering the subjects. The program is designed to compliment existing education initiatives for medical providers.

A service fee and package for medical practitioners was developed in consultation with the Australian Medical Association that links fee increases to value added strategies. The strategies focus on improved communication methods, education and the adoption of enabling technology.

A pilot program focussing on early identification of psychosocial issues has been instigated in South Australia. The pilot is expected to contribute to improved claims outcomes by facilitating the early identification of high-risk claims and barriers to return to work.

A detailed study into suicides and depression within the South Australia workers compensation environment has been undertaken. The study identified a number of risk factors that need early intervention to minimise the risk of suicide. As a result of the study a ‘Crisis Intervention Plan’ was developed to assist case managers and members of the medical profession to better deal with people at risk within the workers compensation environment.

An ‘Early Intervention Strategy’ has commenced with Claims Agents. The focus of the strategy is to intervene as early as possible in ‘time lost’ injuries, involving the employer, injured worker and treating doctor to assist the injured worker in early return to work.

The Corporation undertook a project to review long-term claims (injury dating from 1987 to 1993). This resulted in approximately 20 percent of claims still receiving income payments in 1999-2000 being finalised.

**Business Transformation**

In recognition of the need to continue to improve the way in which we deliver our services to customers, and to emphasise the crucial importance of focusing on safe work in our State’s workplaces, WorkCover South Australia has invested in a business transformation program, focussing on the five key areas:
Customer Relationship Development

Concentrating on the development of targeted relationships with specific customer segments, to maximise safe work outcomes. Service delivery will be increasingly personalised through the chosen channel of each customer.

Knowledge Management

Customers will have enhanced access to information, safe work products and an increasing range of on-line services. Access to specific knowledge and tools will be provided through a variety of channels to ensure customers are well placed to make effective safe work decisions.

Streamlined Customer Systems

All processes and activities within the system will operate to enhance the customer experience. Processes will be automated, where appropriate, to ensure ease of use and quick turn-around times for customers.

Access and Equity

High quality service delivery will be provided to all customers, regardless of cultural background, gender, disability or language.

Community

WorkCover Corporation will be working to facilitate integrated community networks focused on all South Australians benefiting through safe work.

Further information may be obtained at our website: www.workcover.com

Western Australia

Claims

Overall, there were 27,470 lost-time workers' compensation claims lodged in 1997/98, and of these claims, 601 claims were for work-related stress. This represented 2.2% of all lost-time claims in Western Australia. However, work-related stress claims accounted for a disproportionate amount of claim costs. In 1996/97 the average work-related stress estimated claim cost was $23,399, compared to $10,421 for the average lost-time claim. In addition, there has been an increase of 34.5% in the number of work-related stress claims from 1996/97 to 1997/98, and since 1994/95 the number of work-related stress claims has increased on average by 20% each year.

Legislation

Section 5(1) of The Workers’ Compensation and Rehabilitation Act 1981 states that "disability" means –
a) a personal injury by accident arising out of or in the course of employment, or whilst the worker is acting under the employer’s instructions;

b) a disabling disease to which Part III Division 3 applies (specified industrial diseases);

c) a disease contracted by a worker in the course of his employment at or away from his place of employment and to which the employment was a contributing factor and contributed to a significant degree;

d) the recurrence, aggravation, or acceleration of any such pre-existing disease where the employment was a contributing factor to that recurrence, aggravation, or acceleration and contributed to a significant degree; or

e) a disabling loss of function to which Part III Division 4 applies (schedule 4), but does not include a disease caused by stress if the stress wholly or predominantly arises from a matter mentioned in Section 5(4) unless the matter is mentioned in paragraph (a) or (b) of that subsection and is unreasonable or harsh on the part of the employer;

(4) For purposes of the definition of "disability", the matters are as follows –

(a) the worker’s dismissal, retrenchment, demotion, discipline, transfer or redeployment;

(b) the worker’s not being promoted, reclassified, transferred or granted leave of absence or any other benefit in relation to the employment; and

(c) the worker’s expectation of –

a matter; or

a decision by the employer in relation to a matter, referred to in paragraph (a) or (b).

Initiatives

A research project by the Royal Australian College of General Practitioners, in conjunction with WorkCover WA, entitled "Stress, Compensation and the General Practitioner" has been finalised and is available from WorkCover WA's Internet site at [www.workcover.wa.gov.au](http://www.workcover.wa.gov.au). The project aimed to develop recommendations for strategies that will optimise the management of work-related stress claims at a general practice level.

A research project by the Centre for Human Services, Griffith University, and WorkCover WA is currently underway. This project is entitled "Containing economic and human costs in occupational stress cases: a new approach to identifying, defining, preventing and effectively managing lowered psychological functioning arising from stress in the workplace". The project aims to examine the barriers and success factors that are experienced by each of the
key stakeholders to improve the process of managing stress claims and enhance the systemic communication between the various parties. The research will also result in the development of reliable and valid measure of stress in the workplace, the types and severity of workplace stressors that are typically viewed as stressful by the majority of workers, the role of social and personal factors in determining perceived stress, and the factors that distinguish claimants from non-claimants. The first phase of the project has been completed and a literature review titled "Occupational Stress: Factors that Contribute to its Occurrence and Effective Management" has been published and is available from WorkCover WA's Internet site.


Queensland

Claims

Psychiatric/psychological ‘stress’ claims, have increased substantially over the past two years with a 19% increase being observed in 1999/2000 and a 28% increase in 2000/2001. Stress claims, although representing a relatively small number of all claims, are generally more costly and of longer duration than claims for other injuries. The average cost and duration of finalised ‘stress’ claims was $17,249 compared to $8,849 for fractures which are the next most expensive claims. Psychological/psychiatric claims had an average duration of 96.1 days compared to the scheme-wide average of 28.9 days.

In Queensland the highest incidence of stress claims is evident in the personal and other services (includes the Police Service, Corrective Services and Fire and Rescue Authority), Government, Health and Community Services, Education and Mining Industry.

Legislation

The meaning of ‘injury’ is prescribed in s.34 of the WorkCover Queensland Act 1996 and includes:

34. (1) An "injury" is personal injury arising out of, or in the course of, employment if the employment is a significant contributing factor to the injury.

(5) Despite subsection (1) and (3), "injury" does not include a psychiatric or psychological disorder arising out of, or in the course of, any of the following circumstances—

(a) reasonable management action taken in a reasonable way by the employer in connection with the worker’s employment;
(b) the worker’s expectation or perception of reasonable management action being taken against the worker;

(c) action by WorkCover or a self-insurer in connection with the worker’s application for compensation.

Examples of actions that may be reasonable management actions taken in a reasonable way—

- action taken to transfer, demote, discipline, redeploy, retrench or dismiss the worker
- a decision not to award or provide promotion, reclassification or transfer of, or leave.

Initiatives

WorkCover Insurer Strategies

Research has been undertaken into the case management of psychiatric/psychological claims. A pilot program has been implemented in Cairns to facilitate early GP and employer contact with case manager. The pilot also aims to provide identification of flexible claims investigation methods and practitioners available to provide examinations and reports. Evaluation is expected to be completed March/April 2002.

WorkCover Insurer have implemented a project to investigate and evaluate telemedicine and it’s use to obtain greater access to specialists in regional and remote areas. The project commenced in the Brisbane region on 7 November 2001 and is expected to be rolled out statewide on 1 February 2002.

A specific government case management liaison person has been appointed to ensure a consistent and cooperative approach between WorkCover Insurer and Government Departments.

The number of psychiatrists available for assessment has been increased by accessing a network of psychiatrists across the state who provide pre-booked appointments for examination and reports.

Q-COMP strategies

Q-COMP is working to actively discourage use of the terms “stress claim” or “stress leave” and encouraging the use of appropriate terminology such as psychiatric/psychological claim and definitive diagnostic terms.

A review of the Table of Injuries has commenced and is due for completion in 2002. The review content will include specific provisions for psychiatric/psychological injuries.

Permanent Impairment Assessment Training for Medical Specialists commenced in November 2001 and will continue through to December 2002.
An education program for General Practitioners is being developed to assist GP understanding of psychiatric/psychological injuries in the workers’ compensation environment with the program planned for the period January – June 2002.

A Public Sector Risk Management Conference was held in Brisbane in May 2001. A conference paper and workshop was presented by Q-COMP and WorkCover Insurer with specific focus on rehabilitation and management of psychiatric/psychological claims.

**Tasmania**

**Legislation**

- Section 25(1A) of the Workers Rehabilitation and Compensation Act 1988 imposes a limitation on entitlement to compensation in respect of a disease (including but not limited to stress related conditions).

- Compensation is not payable under this Act in respect of a disease which arises substantially from –

  (a) reasonable action taken in a reasonable manner by an employer to transfer, demote, discipline or counsel a worker or to bring about the cessation of a worker's employment; or

  (b) a decision of an employer, based on reasonable grounds, not to award or provide a promotion, transfer or benefit in connection with a worker's employment; or

  (c) reasonable administrative action taken in a reasonable manner by an employer in connection with a worker's employment; or

  (d) the failure of an employer to take action of a type referred to in paragraph (a), (b) or (c) in relation to a worker in connection with the worker's employment if there are reasonable grounds for not taking that action; or

  (e) reasonable action under this Act taken in a reasonable manner affecting the worker.

- To be compensable a disease must arise out of and in the course of employment and the worker's employment must be the major or most significant contributing factor.

- No lump sum is payable under the Table of Maims unless the disease causes:
  - "Total and incurable loss of intellectual capacity resulting from damage to the brain”
  - There are no specific strategies for handling stress-related illnesses.
**Northern Territory**

**Legislation**

Under the Work Health Act (Section 29) the employer is ultimately responsible for ensuring that a safe workplace and safe systems of work are in place and maintained. The implementation of a safety management system in the workplace is intended to assist in ensuring the employer’s responsibilities are met.

Under the Act (Section 31) workers also have a "duty of care" to take reasonable care of their own health and safety and not to endanger the health and safety of their fellow workers.

**Initiatives**

Work Health, as part of their prevention program have developed and implemented a comprehensive education program. This includes a program of continuing education seminars as well as the provision of information bulletins and booklets.

In regard to stress in the workplace the Northern Territory has produced a publication called ‘Managing Stress in the Workplace’. This booklet is specifically aimed at employers. It provides information on the nature of stress, identifies common workplace stressors and in particular focuses on the development and implementation of an occupational stress management program.

Work Health recommends that the implementation of a stress management program should form part of an overall safety management program.

In addition to the prevention program Work Health also encourages workers compensation insurers to provide for early rehabilitation for stress claims by way of supporting rehabilitation on a without prejudice basis.

**Australian Capital Territory**

**Legislation**

The ACT Workers’ Compensation Act 1951 provides that:

"where a worker suffers personal injury arising out of or in the course of the workers’ employment, the employer is liable to pay compensation in accordance with schedule 1."

The Act also provides that:

"in the definition of injury a reference to mental injury or stress shall not be taken to include a mental injury or stress wholly or predominantly caused by reasonable action taken or proposed to be taken by or on behalf of an employer with respect to the transfer, demotion, promotion, performance appraisal, discipline, retrenchment or dismissal of a worker or the provision of an employment benefit to a worker."
Initiatives

The Act is under review. Meetings and consultation has been undertaken with stakeholders of the scheme and they have been invited to provide comments on what they see as improvements to the present Act particularly in the area of claims for stress as a work related injury.

New Zealand

Legislation

The Accident Insurance Act 1998 specifically provides cover for mental injury in two circumstances:

1) mental injury suffered by an injured person because of physical injuries suffered by the injured person. s29(1)(c)

2) mental injury suffered by an injured person caused by certain criminal acts (sexual abuse), as defined in Sch 3 of the Accident Insurance Act 1998. s29(1)(d), s40.

These claims, if work related, can be deemed as non-work related.

All other work-related stress related claims are excluded.

Mental injury is defined as "clinically significant behavioural, cognitive, or psychological dysfunction." s30.
Additional information suggested by the chairman
INTRODUCTION

The following summaries are of intervention case studies undertaken by the University of Nottingham. These are included with the background briefing papers for the symposium as part of the ‘chairman’s contribution’. They illustrate the application of the ‘risk management approach’ to organisation interventions for work stress. Where it was considered helpful additional quotations from the original text have been added to the summaries.

CASE STUDY 1 - CUSTOMER CONTACT STAFF

SUMMARY

The project was carried out in the customer contact centre of a large utility firm. The employees involved were those dealing with telephone enquiries from customers (telephone billing) and those dealing with written correspondence from customers (post billing).

PHASE 1: RISK ASSESSMENT

During June and July 1997, the likely risks to employee health and organisational effectiveness were identified. Employees in both post billing and telephone billing reported a large number of problems related to the design and management of their work (stressors). Some problems were also evident when the health profile of the group was examined. On average, staff reported being more ‘worn out’ than was desirable. Many wanted to leave the company and job satisfaction was low. Absence levels were moderate to high, and a relatively large proportion of employees reported work-related musculoskeletal pain.

These poor organisational and individual health profiles tended to be associated with several of the following likely risk factors and stressors:

- Unrealistic performance targets, and a lack of praise and recognition.

1Pages 81-82
- Poor communication with senior management.
- Slow movement of information around the organisation.
- Having to deal with multiple tasks of equal importance.
- Lack of support from, and poor availability of, line managers.
- Lack of time to complete tasks.
- Inadequate time for breaks during the day.

**PHASE II: TRANSLATION AND RISK REDUCTION**

Feedback of the results of the risk assessment dove-tailed with ambitious plans for change announced by the organisation for the customer contact centre. The steering group produced an extensive package of interventions that targeted the identified risk factors, the stressors and their underlying pathologies.

The interventions included:

- Changes in the management of performance targets.
- Instigation of more regular, structured and purposeful team meetings.
- Measures to improve organisational communication.
- Introduction of new training initiatives.
- Introduction of quality monitoring.
- Introduction of 'Best Practice' guidelines and changes in working procedures.
- A review and updating of staffing levels to meet increased public demand.
- Formal break-taking arrangements.
- Changes in IT systems and introduction of new systems.

**PHASE III: EVALUATION**

The evaluation phase was carried out in November 1998.

Although some problems remained, a number of positive findings emerged:

- There was a high level of awareness of a number of interventions.
- Staff reported that many of the interventions had made their work better.
- When compared to 1997, there was a drop in the number of staff reporting the stressors and risk factors.
- There was evidence of more positive well-being among those who indicated that the interventions had improved their work.
- Absence was reduced and remained steady at around 5%.
The positive results of the intervention is further illustrated by the graph below where all ten risk factors were reduced.

Additionally the changes in the performance of the section were impressive with 95% of calls were answered in less than 30 seconds in July 1998, compared with only 25% in the same month of 1997. Only 2% of customers were abandoning their calls, compared with 12% the year before, even though call volume had actually increased over the year.

Given the initial problems identified in the risk assessment and the demanding nature of the work being carried out by the customer contact staff, these results were received as encouraging. However, bearing in mind the rapidly changing nature of work in the customer contact centre, it was recommended that stressors remaining at the evaluation stage be monitored and further attempts made to tackle them.
CASE STUDY 2 - RETAIL STAFF

SUMMARY

The study was carried out among two groups of employees from a large retail Organisation in the south of England: Customer Services staff and Night/Evening Shift staff.

PHASE 1: RISK ASSESSMENT

The risk assessment was carried out in September 1997, using versions of the Work Environment Survey tailored to the needs and contexts of the two groups of employees. The risk assessment survey identified different profiles of likely risk factors for the two groups of staff.

Customer services staff

In comparison to similar work groups, customer services staff reported a relatively good health profile, except for high levels of musculoskeletal disorders. However, a number of stressors relating to the design and management of their work were reported. These included issues to do with time pressures, performance monitoring, lack of support and lack of appreciation by management, and lack of training. Some of these proved to be likely risk factors in terms of some of the health problems reported by the group.

Night/evening shift staff

The health profile of this group contrasted sharply with that of the customer services staff. A relatively large proportion of staff reported poor well-being, musculoskeletal disorders, lack of sleep, job dissatisfaction, intention to leave the company and recent involvement in a workplace accident.

A number of stressors and likely risk factors (problems associated with problems in the health profile) were targeted for intervention. These included time pressures; poor communication with management; high demands from management, colleagues and cover staff; poor quality equipment; lack of support from store managers; absence amongst colleagues; lack of flexibility in hours; lack of communication about new procedures; and intimidation at work.

PHASE II: TRANSLATION AND RISK REDUCTION

The results from the risk assessment were used to design specific interventions and shape on-going and planned future changes. Through steering group meetings and employee consultation, a plan of action was agreed in August 1998. Many of the interventions were cross-cutting changes that were designed to impact upon more than one group of employees and on the underlying pathology of a cluster of the likely risk factors and stressors described above. A broad package of interventions included staff and management meetings; open surgeries with store managers; store newsletters; overlapping shifts; increased access to e-mail; information on methods of best practice; harassment awareness and management training; 'return to work' interviews for absentees; swap sheets for shift

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staff; flexi-hours for supervisors; separate customer services desks managed by an experienced member of staff; improvements in store equipment; and changes in customer complaints policies.

**PHASE III: EVALUATION**

The evaluation was carried out in December 1998. Inevitably, some stressors remained. However, Customer Services staff felt, on average, less 'worn out' but slightly more 'tense' than at the time of the original risk assessment. Within the health profile, the most noticeable change was in the percentage of staff who reported work-related musculoskeletal pain, with a drop of 24% (from 60% to 36%). There was also a slight drop in the number who intended to leave their job (from 40% to 30%). Overall, job satisfaction remained moderate to high, and absence low.

There were a number of changes in their expert judgements on the design and management of their work, fewer were dissatisfied with their training, fewer reported excessive interruptions, and fewer had difficulties with the available space at their workstations. There were also positive changes in reports on time pressures, demands, consultation, harassment and intimidation, appreciation and performance monitoring.

The evaluation revealed:

- Reasonable levels of awareness of, and involvement in, the interventions.
- Positive reactions to a number of the interventions.
- Improvements in employees' perceptions of the adequacy of their working conditions.
- Employees involved in some interventions tended to report the most positive well-being.

Bearing in mind that the interventions were only in place for a short period of time, these results were received as encouraging. Although further work needed to be done to address stressors within the organisation, it is evident that significant progress was made during the case study.
CASE STUDY 3 – RAILWAY STATION SUPERVISORS

1. SUMMARY

This case study was carried out among station supervisors: shift work staff who managed the day-to-day running of railway stations on one of Britain's rail networks. 160 Supervisors were involved in the study, which was carried out over a period of just over two years. Together they were responsible for nearly 30 stations covering a wide geographical area. At the time of the study, the railway company was entering a period of uncertainty over its future structure.

1.1 PHASE 1: RISK ASSESSMENT

The station supervisors reported 'worn out' and 'tense' scores that were higher than comparative norms. Many wanted to leave the company and job satisfaction was low. Absence levels were high, with a large proportion reporting work-related musculoskeletal pain. Many staff reported poor quality of sleep and low levels of exercise as well as irregular eating patterns.

The risk assessment provided evidence of the existence of a number of stressors and likely risk factors (aspects of work associated with problems identified in the health profile).

These were:

- Poor relationships with management, and a perceived lack of praise and recognition.
- A need to spend much time juggling tasks of equal importance.
- A lack of opportunities to use skills and develop a career.
- The effect of shift work on family and leisure activities.
- A lack of opportunities to take breaks.
- Poor absence control procedures.
- A lack of involvement in, and consultation about, decisions affecting the job (both in terms of day-to-day decision making and consultation about far-reaching changes).
- Inadequate staffing levels.
- Intimidation from the public and, at times, other staff.
PHASE II: TRANSLATION AND RISK REDUCTION

Through a series of meetings with the project Steering Group, and subsequently with Station Supervisors, that explored the underlying problems, a specific plan of action was designed. Many of the difficulties were believed to relate to communication problems within the company and a lack of trust.

The interventions were:

- Action planning groups to address issues of communication and those of roles and responsibilities.
- Team get-togethers, advance briefings, de-briefings, written communication briefings, and a station supervisor presence at senior management meetings.
- A new communication link between train operations and station staff.
- Competence based workshops to facilitate career progression.
- Improved administration procedures for acknowledging and tracking correspondence.
- Communication, clarification and expansion of roles and responsibilities.
- An anti-intimidation poster campaign, and enhanced training for dealing with physical and verbal assault.

1.3 PHASE III: EVALUATION

While the interventions were being introduced, the organisation entered a period of great uncertainty, which was accompanied by industrial unrest. This difficult industrial climate, combined with the geographical spread of station supervisors and the company's long standing problems, inevitably meant that the impact of the interventions was reduced.

However, despite the turbulent background, the large number of stressors and likely risk factors identified in the risk assessment, and the demands of the work carried out by station supervisors, a number of improvements were noted. A smaller proportion of supervisors rated career development as a problem. Shift length was seen as a problem by a slightly smaller proportion of staff in 1998 than in 1996. In 1996, over 70% of the supervisors reported that lack of opportunities to take breaks was a problem. This figure had reduced to 40% in 1998. A far greater proportion of supervisors reported that their shift patterns were predictable, with 20% fewer reporting this area of their work as a problem.

There was evidence to suggest that some of these positive results appeared to be linked to an awareness of, or involvement in, some of the interventions.

Responsibility enlargement through the checking of contractors' work and fault reporting were the most positively received of interventions. Over a third of those who were aware of
them, and the majority of those who had been affected by them, said that their job had improved as a result. Staff who were aware of the enlargement of responsibility through fault reporting indicated feeling less 'worn out' and 'tense', and were less likely to report musculoskeletal pain, than those staff who were not aware of the change. Awareness of this intervention was also linked to positive evaluations of a number of aspects of the job including satisfactory control over the allocation of work, acceptable workload, reasonable time pressures and a lower incidence of harassment.

Many supervisors also indicated that the intervention had improved their job.

These supervisors were less likely to be dissatisfied with their job. The perception that the job had improved through the intervention was accompanied by positive evaluations of consultation, senior management communication and support, and feedback from line management.

The key findings were:

- Moderate, and sometimes low, awareness of the interventions.
- Mixed, but generally positive, reactions to interventions from those staff who were aware of them.
- Evidence that those supervisors who were affected by the interventions viewed their work more positively.
- Evidence of more positive well-being among those supervisors who were involved in at least some of the interventions.
INTRODUCTION

In this paper the authors analysed and compared 10 projects from several branches of Dutch industry. These projects were all aimed at the reduction of work stress, physical workload and absenteeism due to illness.

The authors stated that most stress prevention programmes are predominantly reactive and aimed at individuals, despite the clear evidence that focusing on primary or secondary interventions is likely to be more effective.

Four factors were thought to contribute to this bias in interventions. These were the:

- opinions and interests of company management;
- nature of psychology itself with its emphasis on subjective and individual phenomena;
- difficulty of conducting methodologically 'sound' intervention studies; and
- profession of psychology which tends to be less interested in examining the cost/benefits of stress prevention.

Kompier et al noted that to increase the impact of organisational level interventions, the potential benefits need to be clearly demonstrated on issues that are of central interest to senior managers. These may include:

- quality of products and services;
- organisational flexibility;
- organisational productivity; and
- reduced sickness and absenteeism rates.
The authors then determined the key factors that seem to underlie the successful approaches in stress prevention.

**Success Factors**

- Stepwise and systematic approach
- Active role of employees and other `parties'
- Recognition of employees as `experts'
- Clear structure (tasks, responsibilities)
- Emphasizing the responsibility of management
- Adequate diagnosis of the problem and a proper risk assessment
- Assessment of risks for whole company and certain departments/positions
- Well-balanced package of measures: work and employee
- Recognition of absenteeism as a normal company phenomenon
- Continuity: `business as usual'

However, of these factors five were reported to be critical to a successful stress intervention approach. These were the inclusion of:

- a stepwise and systematic approach to the problem;
- an adequate diagnosis or risk analysis phase;
- use of a combination of measures (i.e. both work-directed and person-directed);
- use of a participative approach (i.e. worker involvement); and
- senior management support and commitment.

In conclusion these authors noted that the potential benefits to the organisation usually exceeded the cost of the stress interventions.