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**Applying the Biopsychosocial Approach to
Managing Risks of Contemporary Occupational
Health Conditions: Scoping Review**

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EXECUTIVE SUMMARY

Objectives

As part of a wider review exploring the utility of the risk management process for contemporary occupational health conditions, this literature review was commissioned by the Health and Safety Executive's Policy Group to identify:

1. Employer's current practices in applying risk management, as advocated by HSE, to common health problems¹ that are without a clear dose-response relationship between exposure and harm. Stress, anxiety, depression and musculoskeletal disorders are examples of such conditions
2. The biopsychosocial mechanisms by which such health problems arise. This refers to the interactions between biological, psychological and social or contextual variables implicated in the development and maintenance of contemporary occupational health conditions.
3. Important individual, work environment and socio-demographic influences upon well-being in the workplace, and interactions between these influences.

This literature review is occurring against a backdrop in which:

- A national health, work and well-being strategy is endeavouring to harness the potential benefits of work for well-being.
- Common health problems and management of associated sickness absence remain a stubborn challenge.
- HSE is emphasising the merits of *sensible* risk management to employers. Sensible risk management is about practical steps that manage the risks that cause real harm and suffering, not bureaucratic back covering.
- The Department of Work and Pensions, as part of its welfare reform programme, is providing additional support to help people off incapacity benefit and to return to work.
- Ageing population predictions highlight the growing need for employers to accommodate people at work who have less than perfect health.

Approach

A systematic methodology for identifying relevant literature, and synthesising findings from a disparate evidence base was used. The review was broken down into four stage. An initial orientation stage (Section A) was followed by stages focussing on risk management (Section B), biopsychosocial mechanisms (Section C), and well-being influences (Section D) respectively. Search strategies varied between sections to balance need for comprehensiveness where a paucity of evidence was anticipated (risk management practices) with more stringent strategies prioritising recent good quality reviews and investigations for areas more extensively searched (biopsychosocial mechanisms and well-being influences). Evidence statements were produced

¹ Common health problems refer to health conditions that have high prevalence rates within the adult population, but do not appear to have a readily definable physical basis.

to capture the main findings of each section, and weighted according to the quality of underpinning evidence. Broad weighting criteria were developed to accommodate the disparate evidence base. Inter-rater² reliability checks were incorporated into article selection, data-extraction and evidence statement stages. This flexible approach allowed the review's aims to be tackled within the pragmatic constraints surrounding the review.

Main Findings

1. Application of risk management to common health problems (from Section B):

- In spite of utilising a broad-brush search strategy, employer's actual practices in applying risk management to common health problems were found to be poorly documented.
- Where undertaken, risk management has mainly been applied to the physical rather than psychosocial aspects of common health problems. Those practices appeared to align with the HSG65 risk management guidance (Health and Safety Guidance concerning policy, organisation, planning, monitoring, auditing and review) and principles of sensible risk management. The paucity of evidence in this area means that this finding is indicative and not necessarily representative. However, it is expected that this situation will change as employer's experiences in implementing HSE's Management Standards for Stress becomes more widely documented.

2. Biopsychosocial Mechanisms (from Section C):

- According to this review uptake of the biopsychosocial approach has been hampered by (1) practical difficulties in assimilating it into all aspects of medicine, (2) lack of intra and inter-disciplinary working, and (3) difficulties in reducing complex interactions between biological, psychological and social factors into reliable models. This is despite the approach's greater scope in explaining the development and progression of common health problems compared to biomedical or psychosocial perspectives.
- Even so, biopsychosocial mechanisms can be implicated in the onset of most, if not all occupational health conditions. Conditions can be distinguished according to whether the main cause concerns physical or psychosocial hazards. Common health problems appear to fall into the latter category. The biopsychosocial mechanisms that maintain occupational health conditions, by comparison, appear more consistent across all conditions, regardless of original cause.
- Onset of psychosocial-induced symptoms appears predisposed by a vulnerability generated from a combination of biological, psychological and environmental risk factors. A sudden increase in, or continuation of external stressors can act to 'tip the balance' and precipitate symptom expression. Social gradient³, job control, effort-reward balance, social support and health behaviours appear to strongly predispose vulnerability. Stressors either (1) directly

² See glossary, section 11, for full definition of inter-rater reliability checks.

³ See glossary, section 11 for full definition

cause health problems through adoption of harmful health behaviours or through underlying psychophysiological mechanisms, or (2) indirectly contributes to health problems through suppressing immunity or aggravating the course of existing conditions.

- Evidence is emerging for a physiological basis to ‘non-specific’ symptoms, such as fatigue, headaches and nausea. Non-specific symptoms have previously been regarded as without a clear physical footing.
- Beliefs⁴ about the cause, consequences and controllability of common health problems are an important determinant of the ways in which employees respond to a health condition and maintenance of the condition. External reinforcers such as compensation, sickness benefits, avoidance of situations perceived as pain inducing, avoidance of unwanted responsibilities or undesirable situations can also help maintain ‘being sick’ where the underlying physiological pathology indicates otherwise.

3. Well-Being Influences (from Sections A & D)

The following factors emerged as potentially important well-being influences:

Social/societal influences: Social gradient is an important external determinant of well-being at work. The pathways by which social factors affect well-being are obscured by a multitude of interactions with other variables. However, it seems that expectations of social capital⁵ and wealth, driven by perceptual comparisons with some other referent group, contributes substantially to this gradient.

Organisational Influences: Emerging evidence suggests that the psychosocial contributors to positive well-being have independence from those that cause stress. Morale⁶ appears to be an important example, in that high morale boosts well-being, but low morale does not cause adverse stress outcomes. Morale appears to be strongly mediated by the organisational climate⁷, referring to the organisations value system as perceived by its employees. Preventing stress therefore does not appear sufficient for securing occupational well-being.

Individual Influences: The match between (a) employee and organisational values, and (b) job expectations and job reality are increasingly being recognised as potentially important contributors to well-being. Providing appropriate work place modifications and adjustments are in place, instilling positive workability beliefs⁸ in those with common health problems is also more likely to ensure they remain at work, or return to work earlier, where physical limitations permit.

Recommendations:

A predominance of cross-sectional research, over-reliance of self-report measures, and wide variations in the way by which well-being is defined and measured, may impact upon this review’s findings. Pragmatic constraints also limited use of a fully comprehensive and rigorous review process. Nonetheless, this review contains enough rigour and contemporary research to

⁴ See glossary, section 11 for full definition

⁵ See glossary, section 11 for full definition

⁶ See glossary, section 11 for full definition

⁷ See glossary, section 11 for full definition

⁸ See glossary, section 11 for full definition

allow recommendations to be made for promoting attendance, rehabilitation, and future research.

1. Promoting Attendance

To optimise well-being and enable those with health conditions to remain in work wherever reasonable:

- Human resource management should seek to optimise the fit between employee's job expectations and job reality, as well as between skills, experience and job requirements.
- Organisational policy should convey that (1) well-being is a joint responsibility of staff and managers, (2) and that working with health limitations can be a normal part of working and organisational life. As the foundation of an organisations value base, such messages should instil stronger workability beliefs. However, they should not be delivered without willingness to also provide suitable workplace modifications for health limitations. Otherwise a culture based on 'presenteeism' (working when genuinely sick) may then arise.
- Policies that allow for flexible working, flexible sickness absence management, flexible rehabilitation, performance gauged according to quality not quantity, worker involvement in decision making, equal opportunities, opportunities to practice positive health behaviour, and social networking opportunities should be more likely to foster well-being.
- Well-being audits, and management peer observation techniques could be harnessed to ensure consistency between 'what is said', and 'what is done' as way of securing a positive organisational climate. Training that improves the way by which health conditions are managed by line managers may then be necessary.
- The risk assessment process underpinning HSE's Management Standards for Stress may need to be broadened out to include important well-being domains, since well-being appears to be more than the absence of stress. This would include health behaviours, work/life balance, health beliefs and reinforcers, social equity, and organisational climate/culture. Due to its independent relationship with morale, reinstatement of an organisational culture/climate standard would force systematic consideration of important contextual influences upon employee's well-being.
- In the event that biopsychosocial risk factors cannot be reduced, ensuring the presence of well-being resources, such as increased social support, or positive health behaviours, should buffer any adverse effects of stressors.
- A holistic well-being monitoring approach would require quality of life judgements, physiological health indicators and health beliefs to be measured alongside standard stress indicators.

2. Rehabilitation

According to this review, current understanding of what constitutes good practice in rehabilitation, such as graded assumption of work activities and work place modifications, should also recognise that:

- Comparisons between lay and expert interpretations of health can be used as a means of highlighting unhelpful or unrealistic beliefs that can be targeted through cognitive behaviour therapy.
- Systematic assessment of any secondary gains may be necessary to identify factors that may be reinforcing illness behaviour where unwarranted by underlying physical pathology.
- Consideration of employee's stage of readjustment to their condition could be used to facilitate readjustment and development of adaptive expectations.

3. Research

To advance understanding of this area, useful avenues for research would include:

1. A large scale cohort study (similar to Whitehall II) based on a positive approach to well-being as opposed to deficit⁹ stress model. As part of its remit, this study would seek to clarify the relationships between morale determinants and well-being outcomes, and the relationship between morale and coping. Achieving such clarification would require periodical time series analysis. Such an undertaking would require substantial investment in terms of time and financial resources. However, this type of research is likely to be the best available method for providing the evidence base necessary for testing positive well-being determinants.
2. Cross sectional comparisons of organisational and well-being characteristics of organisations belonging to the same industry sector, of similar size, but with different sickness absence rates.
3. Economic evaluation of the business benefits associated with improved well-being and morale.
4. Direct investigations of employer's risk management practices for common health problems through surveys or case studies.

Since an organisation cannot be divorced from its wider context, it is not until policy based on a holistic view of well-being is actually implemented that the true value of the biopsychosocial approach to occupational health management will become apparent.

⁹ *Approaches that concentrate on the causes of stress.*

1 INTRODUCTION

1.1 BACKGROUND

The traditional medical model of ill health is increasingly recognized as having achieved limited success in tackling occupational health conditions such as stress, anxiety, depression and musculoskeletal disorders¹⁰ (MSDs) (White, 2005). These conditions do not have a clear underlying physical basis nor do they demonstrate a linear relationship between injury, pain and disability. Instead, they appear to be strongly mediated by psychosocial factors. Accordingly, Waddell (2004) categorized such conditions as ‘common health problems’, and described them as:

“...having a high prevalence rates within the adult population, are essentially subjective, and have limited evidence of objective disease or impairment (Waddell & Burton, 2006)”.

The challenges presented by common health problems contrasts with the past success of occupational medicine in dealing with conditions that have an identifiable cause and a clear relationship between dose and response (Waddell & Burton, 2006). Such challenges have sparked a debate in occupational health circles on the applicability of the medical model to common health problems. Coggon (2005) outlined the central issues that underpin the debate in contemporary occupational medicine:

- The most common occupational ill-health conditions in developed countries are attributable to musculoskeletal and occupational stress conditions.
- The above conditions are better regarded as occupational illnesses rather than occupational diseases.
- Occurrence rates of certain conditions, such as lower back pain, have developed over a time period in which work has become less physically demanding, suggesting that other causal factors are also important.
- Common health problems are more accurately described as illnesses, mediated by psychosocial factors and individual differences, occurring as a response to external triggers.

Coggon acknowledged that these are not new ideas. In championing a biopsychosocial approach as an explanation for such conditions, Coggon’s 2005 paper can be seen as provocative: challenging the traditional way occupational medicine is practised when faced with such issues. Some concerns have also been raised that emphasis on psychological causes, as embodied by somatisation explanations of illness¹¹, may disproportionately blame the individual for their health problems at the expense of other explanations.

The biopsychosocial approach¹² to health takes an holistic view of health, regarding it to be a function of the interplay between **biological** (e.g. physical stress on tissues), **psychological** (e.g.

¹⁰ Some musculoskeletal disorders such as osteoarthritis of the hip or knee conform more closely with the traditional medical model than others, such as lower back pain.

¹¹ See glossary, section 11, for definition.

¹² The term ‘approach’ is used to denote the breadth of explanations and range of models used to explain biopsychosocial interactions.

coping strategies, personality), **social** (e.g. social support, organisational culture) and macro (e.g. socio-economic status, policies and ethnicity) levels. These relationships are summarised in figure 1.

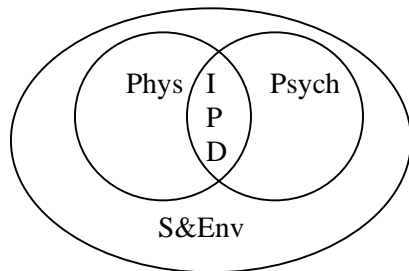


Figure 1: Representation of the Biopsychosocial Model (from Dunstan & Covic, 2006) (I=Illness, P= Pain D=Disease, Phys=Physical, Psych = Psychological, S&Env = Social and Environment Factors)

The biopsychosocial approach implies that:

- Complex multi-cause and multi-effect pathways mediate health and well-being, that are not accommodated by the medical model
- The simple “dose-response” model of occupational disease breaks down when applied to common, non-specific health conditions.
- The traditional risk-prevention approach for occupational health may need modification e.g. to take account of social and psychological factors.

Common health problems are the major cause of time lost from work or ‘worklessness’. Forecasts of an ageing populating, rise in retirement thresholds and high levels of employment (Lunt, Bowen & Lee 2005) will place increased pressure on the work place to accommodate common health problems. Gaining a better understanding of the mechanisms by which they arise and progress is, therefore, an important contribution to HSE’s health work and well-being policies.

HSE organised an expert workshop in September 2005 with partners from Department of Work and Pensions (DWP), HSE (Health and Safety Executive), Department of Health (DH) and representatives from occupational health medicine, social science, industry and academia to scope the potential value of biopsychosocial approaches in accommodating contemporary occupational health, work and well-being needs. At this workshop delegates called for:

- Risk assessment for occupational health issues to be evolved rather than replaced.
- Greater collaboration between public health and occupational health.
- Focus on the commonalities between the various models falling under the umbrella of a biopsychosocial approach.
- More widespread evaluation of occupational health services.
- More widespread positive framing of health messages.

Three key developments relevant to this debate have occurred since this workshop.

Firstly, the government launched a Health, Work and Wellbeing Strategy (DWP, DH & HSE, 2005) which aimed to bring together, under one strategy, the activities of DWP, HSE and the NHS in relation to well-being. Secondly, a recent large-scale literature review undertaken by Waddell and Burton (2006) concluded that work, *in general*, is

- good for people's physical and mental well-being;
- therapeutic in terms of reversing the negative effects of unemployment.

Thirdly, the Health and Safety Commission and HSE launched their Sensible Risk Management campaign, intended to promote the principles outlined in box 1

1.2 AIMS

In view of the workshops conclusions, and these recent developments, this current literature¹³ review was undertaken to identify:

- Employer's current practices in applying risk management to common health problems. At the outset of this review, common health problems were inferred as relating to the same conditions (stress, anxiety, depression, MSDs, cardiorespiratory conditions) as used in Waddell and Burton's (2006) review.
- The biopsychosocial mechanisms underpinning development and maintenance of common health problems. Important determinants or influences on well-being at work, with emphasis on isolating positive influences and important interaction between well-being predictors.

The specific research questions are provided in box 2.

As a way of tackling the above areas, this report is divided into four main sections. A methodology description and results section is provided for each section. The final discussion draws on findings from each of the sections.

Section A: Orientation: This profiles contemporary views on the concept of well-being, positive approaches to well-being at work, current issues on coping with health problems and behaviour change. It was undertaken as a platform for guiding later stages of the review.

Section B: Application of risk management to common health problems: This reports on publicly available literature informing employer's practices in managing the risks associated with common health problems.

Section C: Biopsychosocial (BPS) Mechanisms: This provides a distillation of the biopsychosocial mechanisms by which common health problems arise and progress.

¹³ This literature review is part of a wider 'health models' review undertaken by HSE to explore the utility of risk management approach for 'common health conditions' (Bowen, Lunt & Lee, 2006). The wider review is intended to scope the viability of generating a flexible decision-making framework for HSE that appropriately handles the spectrum of health issues arising in the 21st Century workplace.

Section D: Well-Being Influences: This summarizes contemporary research addressing the links between individual, work environment, and socio-demographic factors upon well-being, drawing on positive influences in particular.

Box 1: HSC Principles of a Sensible Risk Management Approach
(<http://www.hse.gov.uk/risk/principles.htm>)

Sensible risk management **is** about:

- Ensuring that workers and the public are properly protected
- Providing overall benefit to society by balancing benefits and risks, with a focus on reducing real risks – both those which arise more often and those with serious consequences
- Enabling innovation and learning not stifling them
- Ensuring that those who create risks manage them responsibly and understand that failure to manage real risks responsibly is likely to lead to robust action
- Enabling individuals to understand that as well as the right to protection, they also have to exercise responsibility
-

Sensible risk management **is not** about:

- Creating a totally risk free society
- Generating useless paperwork mountains
- Scaring people by exaggerating or publicising trivial risks
- Stopping important recreational and learning activities for individuals where the risks are managed
- Reducing protection of people from risks that cause real harm and suffering

Box 2: Research Questions

Risk Management Practices:

- How do employers and employees apply the risk management process for common health problems?
- How does this vary from the HSE's view of a sensible and broad-minded risk assessment approach?
- What impact do these variations have on perceptions of common health problems and their management in the workplace?

Biopsychosocial Mechanisms:

- What are the biopsychosocial mechanisms by which common health problems arise and are maintained?

Well-Being Determinants:

- What are the important individual, work based (e.g. job design, ergonomic, organisational, good job) and external factors (e.g. life events, lifestyle, support etc¹) that influence well-being at work for employees with and without common health problems?
- How do these factors interact positively and negatively to determine well-being at work?

SECTION A: ORIENTATION PHASE

2 ORIENTATION PHASE: METHOD

2.1 Purpose

The prime purpose of the orientation phase is to identify latest research developments in the main topics to be covered by the review, and help direct ongoing literature search priorities at later stages of the review.

2.2 Topic Selection Criteria

The orientation phase focuses on the following key topic areas, selected for their relevance to the wider review:

- **Worker well-being/ Positive Psychology:** To cover, e.g. well-being at work, happiness at work, psychological contract, 'eustress', and worker engagement.
- **Health Prediction/Behaviour Change/ Coping/Intervention Models:** To identify latest research on corresponding models, focussing on information that could inform well-being interventions.

A literature review and citation searches for key authors was undertaken for each topic area. Key search terms included well-being, wellbeing, well being, happiness, eustress, quality of life, engagement, sense of coherence, resilience, psychological contract, coping, illness representations and health beliefs. Behaviour change articles were derived from an existing database of behaviour change research at HSL. Search sources included Pubmed, Psychinfo, CINAHL, Science Direct, HSE and HSL internal reports, and searches undertaken by HSE library information service. Recent literature reviews and meta-analyses were prioritised for reading.

2.1 EVIDENCE WEIGHTING:

The evidence base for non-standard¹⁴ approaches to understanding work and well-being were broadly assessed using the criteria provided in table 1. These criteria gauge the quality of supporting evidence.

Table 1: Weighting system for orientation phase

Evidence type	Description
Strong	Evidence that the approach has been tested either qualitatively or quantitatively using longitudinal research, and has demonstrated consistent relationships with health/well-being outcomes.
Moderate	Evidence that the approach has been tested either qualitatively or quantitatively using cross-sectional investigations, <i>or</i> research (longitudinal or cross sectional) that demonstrates inconsistent relationships with health/well-being outcomes.
Weak	No evidence of the approach having been tested qualitatively or quantitatively. Largely theoretical or descriptive

¹⁴ *i.e. not based on a deficit view of stress*

3 ORIENTATION PHASE: RESULTS AND DISCUSSION

3.1 NON- STANDARD APPROACHES TO WELL-BEING AND WORK

3.1.1 Background

Despite an acknowledgement within well-being literature that work has the potential to lead to both positive and negative outcomes, researchers have chosen to focus most on the harmful impact of work (Briner, 2000). In spite of generating useful knowledge about the relationship between the individual and work environments, much of this research has an implicit emphasis on the negative effects of work. The occupational stress literature is an influential, although not unsurprising, example of this observation. Fitting in well with established and successful risk assessment methodologies used in many organisations (HSE, 1997), and with the dose-response concept that has traditionally underpinned the “medical model” of occupational health, this pre-occupation with the negative effects of exposure to work has led to a focus on the prevention of ill health rather than on the creation of well-being.

A selection of the contemporary work/health/well-being literature is presented in order to assess the utility of a more positive perspective on well-being at work. By reversing the traditional negative standpoint on work and well-being, the intention is to explore the complex links between work, the individual and well-being using positive perspectives.

3.1.2 Health and Well-being: Definitions and Conceptualisation

Dodu, (2005) discusses definitions of the terms health and well-being. Starting with a definition by the World Health Organisation (1948), which defined health as “a state of complete physical, mental and social well-being, and not just the absence of disease”, Dodu makes the distinction between:

- health as an “objective” condition, defined and described by the medically qualified and
- well-being, a more subjective concept described and defined by the individuals themselves, and related to quality of life.

Dodu reports the work of Szalai and Andres (1981), who describe well-being as a “composite measure of how good an individual feels at the physical, mental and social level” and a “dynamic state of mind characterised by reasonable harmony between an individual’s physical and mental states”.

Considering the above definitions, it is reasonable to assume a distinction between the related concepts of health and well-being. Health and its inverse, ill health, tend to be defined objectively as medical states. In contrast, well-being is a subjective, more comprehensive and encompassing state, defined by the individual himself or herself. It is a natural step, therefore, to draw the following conclusions regarding an operational definition of well-being at work:

- Health is a desirable, but not necessary condition for a state of well-being at work.
- Well-being at work is more than just the absence of illness.
- The subjectively grounded nature of well-being at work suggests it results from a complex interaction between the work environment and the orientation of individual employees.

3.1.3 Approaches to Understanding Well-Being:

Four approaches for well-being in general are profiled. These concern quality of life, happiness and resilience.

3.1.3.1 *Happiness*

This material from happiness has been selected from Layard's (2006) book on happiness. Using an economics perspective, Layard explores the concept of happiness in the modern world. Crucially, Layard observes that in, the Western economies, despite large, measurable increases in material wealth over the past 50 years, average levels of happiness have not risen. In the UK, levels of happiness are similar to what they were in the mid-1970s and no higher than 1950s levels despite being better off.

Layard defines happiness as feeling good; its inverse is feeling bad and wishing for a different experience. Layard argues that happiness is measurable in several ways, including through the use of surveys/questionnaires and by scientifically measuring brain activity through techniques such as FMRI (Functional Magnetic Resonance Imaging) scanning.

A number of factors are identified that affect our levels of happiness. These are, in order of importance:

1. Family relationships
2. Our financial situation
3. Work
4. Community and friends
5. Our health
6. Personal freedom
7. Personal values

In contrast, Layard identifies factors that do not influence levels of happiness in a significant way:

1. Age
2. Gender
3. Looks/ physical appearance
4. IQ/intelligence
5. Education

The thesis propagated by Layard to explain our lack of happiness relative to increases in wealth lies in a sort of law of diminishing returns. While people who have very little derive relative high levels of happiness in return for small material gains, increases in happiness diminish as a function of overall material wealth. In practical terms, this means that, as people get better off, they need more material wealth/money in order to generate the same levels of happiness. The effect is analogous to addictive drug use – more is required to produce the same effect.

Evidence:

Layard draws on a range of scientific disciplines to argue his case, including positive psychology, neuro-psychology, medicine and psychiatry, sociology, philosophy and economics. Whilst this book provides an insightful account of various influences on happiness, it should be borne in mind that it may be somewhat selective in the evidence it presents.

3.1.3.2 Quality of Life

Quality of life (QoL) has a number of definitions ranging from philosophical statements to pragmatic definitions. One general definition is:

‘Quality of life is what the individual says it is’ (Joyce, 1988)

Other definitions identify QoL as a perceived comparison between the present and an aspirational state:

‘Quality of life measures the difference, or the gap, at a particular time, between the hopes and expectations of the individual and the individuals present experiences’ (Calman, 1984)

or :

‘QoL is an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals and expectations, standards and concerns. It is a broad ranging concept affected in a complex way by a person’s physical health, psychological state, level of independence, and their relationships to salient features of their environment’ (WHO QoL Groups, 1995).

The latter definition, in particular, emphasises the interplay between health and other psychosocial and contextual factors. Other approaches prefer to focus on measurable improvements health interventions can create on overall functioning:

‘Health related quality of life is the value assigned to the duration of life as modified by the impairments, functional states, perceptions and social opportunities that are influenced by disease, injury, treatment or policy’ (Patrick and Erickson, 1993).

Collectively these definitions highlight quality of life, to be a subjective state that encompasses physical, psychological, and social functioning. A defining feature of QoL is its basis on the perceived gap between actual and desired living standards. Debate still continues about definitions.

Quality of life overlaps with other contemporary interpretations of happiness. According to Layard (2006), happiness has its roots in the social comparison peoples make between their own lives and that enjoyed by another reference group. This explains why, despite the stepwise improvement in living standards enjoyed by developed countries since the 1950’s, people are no happier. In relative terms, richer people are happier than poorer people, since for poorer people,

the gap between how life is, and what it could be had they greater earning power, is that much greater.

A number of measures have been developed to measure quality of life. Garrett et al. (2002) divided these measures into five main categories; generic, disease or population specific, dimension specific, individualises and utility. Despite the existence of a large number of QoL models and definitions there has been a relative lack of evaluation. Tailefer et al. (2003) in their systematic review, concluded that from 1965-2001 there is a general improvement in the quality of QoL models. However for many models, the questions used to analyse models were not always clearly defined. They concluded that overall the field needs more sophisticated models and better definitions provided of the content and boundaries of the QoL concept.

In their evaluation of health status instruments, Lohr et al, (1996), identified two key pieces of information often lacking altogether or only partially available. These concern (1) the responsiveness of instruments to changes in health status over time and (2) data that will facilitate the interpretation of scores in terms that are meaningful for clinicians, lay persons and policy makers. They also identified that developers tend to be focussed on the conceptual and statistical properties of the measures and issues of the practicality of the instrument get short shrift.

QoL allows for the development of a greater understanding of the people's experience of illness using a common language. Many measures are really assessing various aspects of health status, yet quality of life is something that is perceived by each patient individually. Perhaps the most useful measures are those that capture how individuals perceive and react to their health status and to other non-medical aspects of their lives. These perceptions and reactions might best be determined if individuals were asked directly to rate both their 'overall' quality of life and the importance of individual items affecting their quality of life.

Evidence:

The Quality of Life concept is very subjective and relativistic in nature. It is valuable, however, for its potential to capture individuals perceptions of what matters for their own health and well-being. Inconsistencies within the underlying evidence base renders a moderate weighting necessary.

3.1.3.3 Resilience

Building on the WHO perspective on health and well-being, resilience as a concept focuses on positive issues e.g. why certain individuals do not succumb to illness. Bartley, Schoon, Mitchell and Blane (1985) discuss the advantages of focussing on assets as opposed to deprivation. Similarly, Garmezy and Werner (1992) look at the strengths of exposed individuals and the characteristics of positive adaptation.

Various models of resilience exist that tend to focus on the relative balance between risks to health, and assets that can buffer them. These include:

- Compensatory – considers the cumulative effect and joint influence of different assets/resources
- Protective - supposes an interactive link between protective factors, risk exposure and outcomes.

- Challenge – assumes low exposure levels have a “steeling” effect that helps an individual mobilise resources

Resilience has been described as a context dependent characteristic, in that what enables resilience in one environment may be less adaptive in another. For example, being aggressive can help ‘survival’ in an environment where ‘toughness’ is more of a norm. However, there are certain health assets that apply to all. These include diet, exercise, social skills, social opportunities, time, health lifestyle knowledge, and community cohesiveness (Bartley et al, 2006).

Evidence:

Most of this material has been extracted from a recent narrative review awaiting publication. More in depth exploration of resilience is required to fully explore it’s true value for work-place well-being interventions.

3.1.3.4 Antonovsky’s Salutogenesis Model and Sense of Coherence Scale

Antonovsky’s Salutogenesis Model (1979) is a perspective that emphasises the origins of good health, in contrast with other medical model based perspectives that focus on the pathogenesis of illness. The approach reverses typical questions asked in relation to health. Rabin, Matalon, Maoz and Shiber (2005) quote Antonovsky as posing a number of interesting questions, including:

- What are the influential factors that enable people to cope with stress and deal with adversity?
- What are the factors that promote health rather than disease?
- How is health preserved (salutogenesis)?

Rabin et al (2005) summarise Antonovsky’s salutogenesis perspective as “*how people use their resources in health maintenance, often in the wake of very difficult circumstances*”.

Antonovsky went on to operationalise the salutogenesis approach using the concept of Sense of Coherence (SOC). SOC is about an individual’s orientation towards the outside world. It can be described using the sub-concepts of:

- Comprehensibility – the environment providing a stream of information that an individual can structure and make sense of;
- Manageability – the mode by which an individual copes with controlling with their environment and
- Meaningfulness – what makes sense at the individual level.

A broad rule of thumb is that comprehensibility is the cognitive component, manageability the behavioural component and meaningfulness the emotional and spiritual component of SOC. Rabin et al. (2002) argue that there are a number of actions associated to the salutogenesis perspective to explaining health and that these include “coping positively, actively, functionally and successfully with life stressors”. SOC is negatively associated with anxiety, and depression (Antonovsky & Sagy, 1986; Bernstein & Carmel, 1991; Geyer, 1987).

Antonovsky has successfully developed the SOC concept into 29 and 13 item scales, which has been applied in several studies to demonstrate an association between SOC and psychological health (Flensburg-Madsen, Ventegodt & Merrick, 2005).

3.1.4 Approaches to Understanding Well-being at Work

A number of contemporary well-being at work approaches are profiled. These comprise:

- Engagement/disengagement
- Positive Psychology
- Flow/Engagement
- Eustress

3.1.4.1 Engagement/Disengagement

Hillier et al (2005) attempt to define employee engagement through efforts to measure performance and productivity. Crude representations of productivity (such as output volume) miss many of the nuances of the work experience, and can impact negatively on the perceptions of employees. This sort of situation can lead to employee disengagement, signs of which include many of the contra-indications of well-being e.g. high staff turnover, high sickness and absence rates, high incidence of employee stress etc.

The Gallup Organisation's Employee Engagement Index survey reported by Flade (2003) makes for depressing reading. Flade concludes that more than 80 per cent of the British workforce show low levels of commitment to their jobs and about a quarter of this group are "actively disengaged". The Gallup survey, conducted in 2001 using a 12-item questionnaire that measures engagement across 12 workplace dimensions, describes the British workforce in terms of the following statistics:

Engaged, loyal, productive	19 per cent
Not engaged	61 per cent
Actively disengaged	20 per cent

Gallup has obtained similar results in surveys of the Singapore workforce in 2005 (Gopal, 2005), quoting the proportion of consistently engaged workers at 6 percent.

Levels of engagement can vary between workgroups. Gallup explains this in terms of the success or otherwise of managers meeting employees needs. Gallup defines these needs as including:

- Role clarity - clear expectations of what is expected of them
- Resource availability – providing the tools for the job
- Talent utilisation – opportunities to use their talents regularly
- Recognition – for what they achieve and contribute
- Communication – receive regular feedback on performance
- Development – opportunities to learn and grow

Evidence:

The concept of engagement has been operationalised through the development of several questionnaires, most prominently the Q¹² instrument developed by the Gallup organisation. This development has supported a number of empirical studies and surveys concerned with the measurement of worker engagement and disengagement. A search of the Psych Lit reveals at least 10 cross-sectional, predictive and exploratory studies, some of which link engagement to burnout¹⁵.

The Gallup organisation conducts regular, methodologically robust, surveys on the UK and Singapore workforces using its Q¹² instrument.

However, the identified evidence has to be offset against the lack of evidence for controlled and/or longitudinal studies. This suggests that the evidence (see table1) for this approach is moderate.

3.1.4.2 Positive Psychology

Positive psychology, championed by Seligman and Csikszentmihalyi (2000), is an attempt to shift the emphasis in psychology away from a preoccupation with the pathological, adverse and abnormal aspects of human behaviour and experience. The positive psychology movement aims to redress this balance by answering questions such as “under what conditions do people perform to their full potential at work?” rather than “how can we cure the pathological outcomes of badly designed work?”

The positive psychology literature, offers a number of useful perspectives that help with understanding how well-being can arise in work situations:

Csikszentmihalyi’s Flow-Engagement Approach

The concept of flow was introduced by Csikszentmihalyi (1990, 1996, 1998). Flow can be defined as a subjective condition where an individual is fully absorbed in the task he or she is carrying out. Csikszentmihalyi regards being “in a state of flow” as an optimal state of intrinsic motivation where the individual is fully engaged with the task in hand, promoting an experience of competence and fulfillment.

Csikszentmihalyi describes someone in a state of flow as experiencing a number of conditions, which apply directly to work situations:

- Having clear goals
- Concentrating and focusing on the task in hand
- Direct and immediate feedback
- Balance between ability and task demands
- A sense of personal control
- The task activities are intrinsically rewarding

Clearly, Csikszentmihalyi’s Flow/Engagement approach has much in common conceptually with the Gallup research described above.

Evidence:

¹⁵ See glossary for full definition

Csikszentmihalyi is the main proponent of the flow engagement approach. Although Csikszentmihalyi and colleagues have developed a methodology (the Experience Sampling Method) for measuring flow, searches on Psych Info, Psyc Articles and Pub Med revealed only 3 empirical studies, one of which was a longitudinal study¹⁶.

Much of Csikszentmihalyi's work in the area of flow appears to be of a descriptive rather than empirical nature. Therefore, the weight of evidence for the flow-engagement approach is at best moderate.

3.1.4.3 Eustress

As with flow, the concept of eustress also hails from the field of positive psychology. Having origins in the stress literature of Selye (1976), eustress can be defined as the opposite of distress in situations where individuals are subjected to demands by their work environment. Operationally, eustress occurs where there is a positive psychological response to work environments and demands. The eustress concept acknowledges Selye's crucial observation that the "stress" response is non-specific i.e. it can have both positive as well as negative outcomes.

Eustress is important because it offers up a practical approach to answering questions such as "Why do certain individuals cope with a particular work environment (i.e. demands, tasks) whereas others do not?" Nelson and Simmons (2002) make effective use of the eustress concept in describing a holistic model of stress. The model posits the central role of individual differences (in areas such as optimism, hardiness¹⁷, locus of control¹⁸ and self reliance) in mediating between work demands and outcomes.

Nelson and Simmons go on to posit the worker attitudes that indicate the presence of eustress. Making use of the positive psychological response definition, they argue that eustress "reflects the extent to which cognitive appraisal of a situation or event is seen to benefit an individual or enhance his or her well-being". These authors go on to describe the indicators of eustress as including:

- Positive affect¹⁹ – a state of pleasurable engagement with the work situation.
- Meaningfulness – the extent to which work makes sense emotionally.
- Manageability – whether or not the resources at one's disposal are adequate to meet the demands of the work situation.
- Hope or optimism.

Nelson and Simmons comment that although the above indicators of eustress are "conceptually distinct", they all suggest the presence of an overarching state of engagement or being engaged.

¹⁶ See glossary, section 11, for full definition

¹⁷ See glossary, section 11, for full definition

¹⁸ See glossary, section 11, for full definition

¹⁹ See glossary, section 11, for full definition

Evidence:

The concept has been operationally defined by Nelson and Simmons (2002) and indeed these authors write much of the literature on the topic. However, literature searches for eustress on Psych Info, Psyc Articles and Pub Med revealed only one cross sectional study plus several other descriptive articles. Although there is no evidence of tailored measurement instruments, the operational definition of the concept make it straightforward to adapt other indicators (e.g. measures of positive affect), so one possible conclusion is that the evidence does exist, but it is catergorised under alternative headings/categories.

However, at face value, these findings suggest that the literature on eustress is rather sparse, and as a consequence, eustress as a concept may be under-researched. Therefore, the weight of evidence for this approach would be described as weak.

3.1.4.4 *The Psychological Contract*

Popularised by Rousseau (1996), the term psychological contract is the informal and “unwritten” counterpart to the standard legal employment contract. Guest and Conway (2002) define the psychological contract as “the perceptions of the two parties, employee and employer, of what their mutual obligations are towards each other”. The psychological contract is thus about the balance between obligations and expectations of both employer and employee, but emphasising a strong sense of “natural justice”.

From the employee perspective, breaches of the psychological contract occur when they perceive that they, or their colleagues, have been poorly treated (efforts goes unrecognised) or, alternatively, the employer breaks promises (not paying the usual Christmas bonus).

Breaching the psychological contract, intentionally or not, can have a negative impact on well-being due to the strong negative feelings and emotions evoked. In contrast, if employees perceive that their employer upholds the spirit and practice of the contract, then employee well-being will be a more likely outcome (Briner 2000).

Cooper (2002) argues that major changes in employment practices over the last 20 years (e.g. privatisation, outsourcing, short-term contracts, longer hours etc.) have undermined the foundations of the traditional psychological contract because, across the economy, opportunities for full-time, permanent employment have reduced during the 1990s.

Cooper goes on to argue that these major structural changes in employment practices have changed fundamentally the basis of the psychological contract so as to invalidate models of well-being at work that make assumptions about the nature of organisational structures and environments.

Evidence:

The psychological contract is a very subjective approach to linking well-being to the work environment. However, literature searches reveal that the concept is well researched in terms of its relationship with numerous employment and work issues (e.g. workplace attitudes) as well as a concept in its own right.

It appears that the range of evidence is generally consistent, but literature searches suggest that these are mainly cross-sectional and descriptive studies. Therefore, the weight of evidence for this approach would be described as moderate.

3.1.5 Comparing Non- Standard Approaches to Well-being at Work

All of the approaches discussed recognise subjective interpretation of circumstances as central, and this fits well with the operational definition of well-being developed earlier. The following table attempts to further compare these ‘non-standard’ approaches to well-being in the workplace. The “factors” in the first column are simply a list of the important attributes of all the non-standard approaches. Each approach is then considered against each factor in terms of whether that factor is important or not.

Table 2: Comparing Non-Standard Approaches to Well-being at work

	Engagement	Flow/Engagement	Eustress	Psychological Contract
Factor				
Goal and role clarity	*	*		
Need for clear and timely feedback	*	*		
Balancing of abilities and task demands		*	*	
A sense of personal control		*		
Tasks are intrinsically rewarding		*	*	
Adequate resources are made available	*	*		*
Employee talents adequately utilised	*			*
Adequate opportunity to learn and develop	*			*
Job security				*
Employee efforts are recognised	*			*

* Factor is relevant to a particular approach

Although the above factors are not exhaustive, it is felt that they describe the important components of the approaches to well-being at work considered in this paper. Using concepts

from mainstream occupational psychology, it is possible to further categorise these factors using the following simplified structure (see table 3).

Table 3: Breaking Down Non-Standard Well-Being Variables into Individual, Job and Cultural Variables

Individual Differences	Job Design	Employer Cultural Norms
Tasks are intrinsically rewarding	Need for clear and timely feedback	Adequate opportunity to learn and develop
Employee talents adequately utilised	Balancing of abilities and task demands	Job security
	A sense of personal control	Employee efforts are recognised
	Adequate resources are made available	
	Goal and role clarity	

This further categorisation has been made on a judgemental rather than an empirical basis but it may offer a useful heuristic framework for the broader understanding of well-being at work.

3.1.6 Comparisons between the Non-Standard and Standard Approaches to Well-being at Work

Research into well-being at work since the early 1980s has been influenced heavily by a number of approaches, described in Briner (2000). Excluding general stress models advocating a traditional stress-strain perspective which, according to Briner (2000), is over simplistic and “raises more questions than it answers”, the work of Warr (1987) and Karasek (1979) has been highly influential.

Karasek’s narrow but widely tested (Briner, 2000) job-demands-control model has proved highly influential. Similarly, Warr’s “vitamin” model has stimulated interest in the environmental underpinnings of well-being at work. Comparing the non-standard approaches to well-being at work with these established perspectives should help in making judgements about the latter’s scope and efficacy.

The following table allows a direct comparison of the key features of the non-standard approaches with the Warr and Karasek models and the HSE Management Standards for Stress (Mackay et al, 2004).

Table 4: Comparison of Standard Approaches to Stress with Non-Standard Approaches

Factor	HSE Stress Management Standards	Warr (1987) Vitamin Model	Karasek (1979) Job-Demands-Control Model
Goal and role clarity (role)	*		
Need for clear and timely feedback (support)	*	*	
Balancing of abilities and task demands (control)	*	*	*
A sense of personal control (control)	*	*	*
Tasks are intrinsically rewarding			
Adequate resources are made available (support)	*		
Employee talents adequately utilised (demands)	*	*	
Adequate opportunity to learn and develop (support)	*		
Job security (change)	*		
Employee efforts are recognised (Support)	*		

The above table suggests that the established approaches lack breadth of scope when compared with the non-standard approaches to well-being at work.

3.1.7 Summary of Evidence Evaluation

Table 5: Evidence Weighting for Well-Being Constructs Based on the Orientation Phase

Approach	Very strong	Strong	Moderate	Weak
Engagement/ Disengagement			*	
Flow- engagement			*	
Eustress				*
Psychological contract			*	
Quality of Life			*	
Resilience				*

Although at first glance the evidence base supporting these non-standard approaches to well-being (see table 5) is at best moderate, it is as well to bear in mind the following comments:

1. Non-standard approaches to well-being at work are exactly that i.e. non-standard. This implies that, in terms of the research community/economy, they have/are/will be in competition (for interest and funding) with the more standard approaches. This situation could function to limit the scope, depth and quantity of research into the non-standard perspectives.
2. That just because the existing body of evidence is at best moderate, it does not imply that future research programs, using one or more of the non-standard approaches, could not supply stronger evidence, particularly if a ‘hybrid’ approach was taken that involved combining two or more of the non-standard approaches.

3.1.8 Main Messages

The well-being evidence reviewed implies:

- A high proportion of the workforce are currently disengaged from their work
- Well-being is subjective status, health is objective, and is more closely tied with physical status rather than perception.
- The same situation can create positive or negative well-being/health outcomes depending on how the individual appraises the event.
- The closer the fit between an individual's expectation's of their job, and the reality of the job, the more likely they are to experience well-being at work.
- The closer the fit between what individual's expectations of life, and what they experience, the more likely they are to enjoy a good quality of life. Happiness is not about prosperity, it is about how wealth and prosperity allows individuals

the living standards they would like to have. Therefore, job satisfaction has to be considered in the wider context of life satisfaction.

- The main concept differentiating non-standard well-being approaches from stress-based approaches appears to concern how ‘intrinsically rewarding’ a job is, or the extent to which the job aligns with the individual’s value systems.
- None of the well-being constructs examined appear to have strong evidence base. It should be borne in mind, however, that a non-standard and difficult to define term such as well-being is less amenable to validation by standard methodology.
- Health assets available at work and home can potentially be used to buffer the effects of risks encountered at work. Such assets would include diet, exercise and social support.

3.1.9 Implications

Evidence derived from recent reviews and work undertaken by key authors in the area of well-being appear to have a range of strategic and research implications:

3.1.9.1 Strategic:

1. Well-being at work interventions aimed at enhancing well-being in the workplace should address:
 - Individual differences
 - Job design features
 - Organisational cultural norms

Addressing these three facets should be undertaken in a coordinated and synergistic manner.

2. Employers should seek to optimise the fit, not just between their employee’s skills and the job, but also between their expectations and the reality of the job as way of creating greater work engagement. This pertains to:
 - Selection – ensuring that applicants have a realistic impression of what the job will be like.
 - Appraisal – checking how well employee’s actual experience of their work complements their expectations and values as they progress through their career.
 - Performance issues – Explore any disappointed expectations, for example, by applying cognitive- behavioural principles at times when job performance appears affected.

3. Any well-being at work strategy could accommodate the interaction between the job and external influences on well-being such as lifestyle, social inequality, and social demographics. In other words, occupational health policy and practices needs to reflect a holistic interpretation of health. Interventions may therefore need to encompass:

- Health promotion activities at work, such as diet and exercise.
 - Redressing unavoidable risks by improving resources, or ‘risk buffers’ such as social opportunities at work, increase collaboration in work activities, and generally ensuring social harmony at work. Consistency in expectations and values across the organisation’s could help create harmony.
3. Use individual focussed quality of life measures to evaluate well-being interventions since these can capture individual impressions of what matters in terms of the their health and well-being.

3.1.9.2 Research:

1. Applying knowledge/techniques gleaned the non-standard approaches in terms of these “traditional” perspectives from occupational/health psychology could provide a platform upon which to design workable and practical methods to assess, adjust and monitor employee well-being. However, this would best be done on the back of a well-founded research programme that described adequately how these factors relate to one another and which are most important and why.
2. Undertake job analysis to isolate those aspects of work that relate to expectations and job fit and well-being.
3. Collate case studies to provide examples of how well-being at work can be improved.
4. Identify interventions that balance organisational with individual focussed approaches. In so doing, they combine the resource benefits of targeting a group of employees with ensuring individual relevance.

3.2 COPING AND REPRESENTATIONS OF ILLNESS

3.2.1 Background

Illness and disease are not uniform in their impact on individuals. It is possible for the same disease to affect two people in different ways, suggesting a key role for individual differences in determining the course and outcome of an illness episode. This overview aims to explore the relationship between illness (particularly progression and outcome) and individual differences by considering the utility of the coping and illness representations approach to understanding illness progression. After outlining a selection of coping models, the evidence base will be explored by considering the conclusions from recent meta-analyses and significant studies. Where appropriate, the implications for work and employment will be discussed.

3.2.2 Models of Coping

3.2.2.1 Transactional Model of Stress:

A number of attempts have been made to explain how people cope with illness and disease. Lazarus and Folkman’s (1984) Coping/Transactional Model of stress with primary and secondary appraisal elements, emphasises the “dynamic” links between the individual and the world. Transactions between the person and the world, which involve feedback and re-evaluation, allow for events to be appraised as either stressful or not stressful.

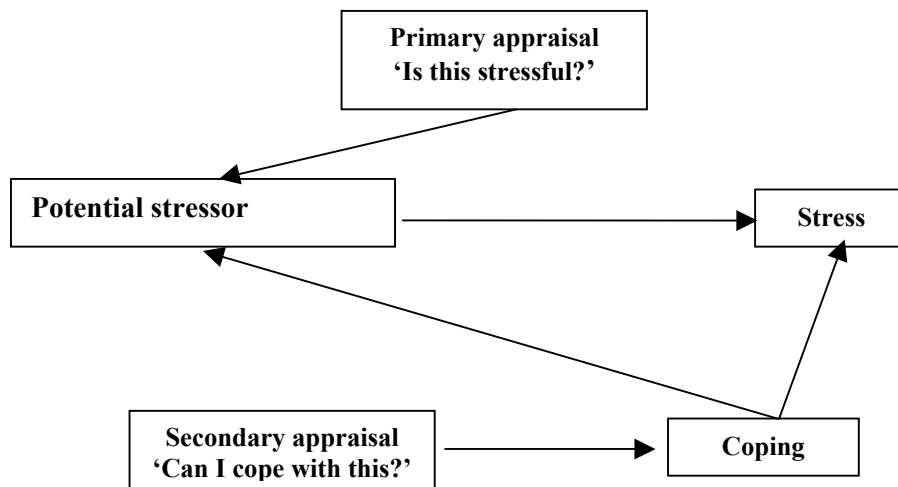


Figure 2: Lazarus and Folkman's (1984) Coping Model.

However, the model has the following shortcomings:

- No precise mechanisms are described to explain how transactions occur.
- It does not explain the links between physiological, psychological and behavioural variables and health/ill-health.

3.2.2.2 Self-Regulatory Model

Promoted chiefly by Leventhal, and Cameron (1987), the Self Regulatory Model of coping emphasises the cognitive representations of illness. People faced with illness are seen as active problem solvers dealing with their situation by:

1. Interpreting the situation by considering symptoms, causes and consequences.
2. Coping with the situation using a range of options e.g. seeking medical attention.
3. Appraising their actions to determine effectiveness and future actions.

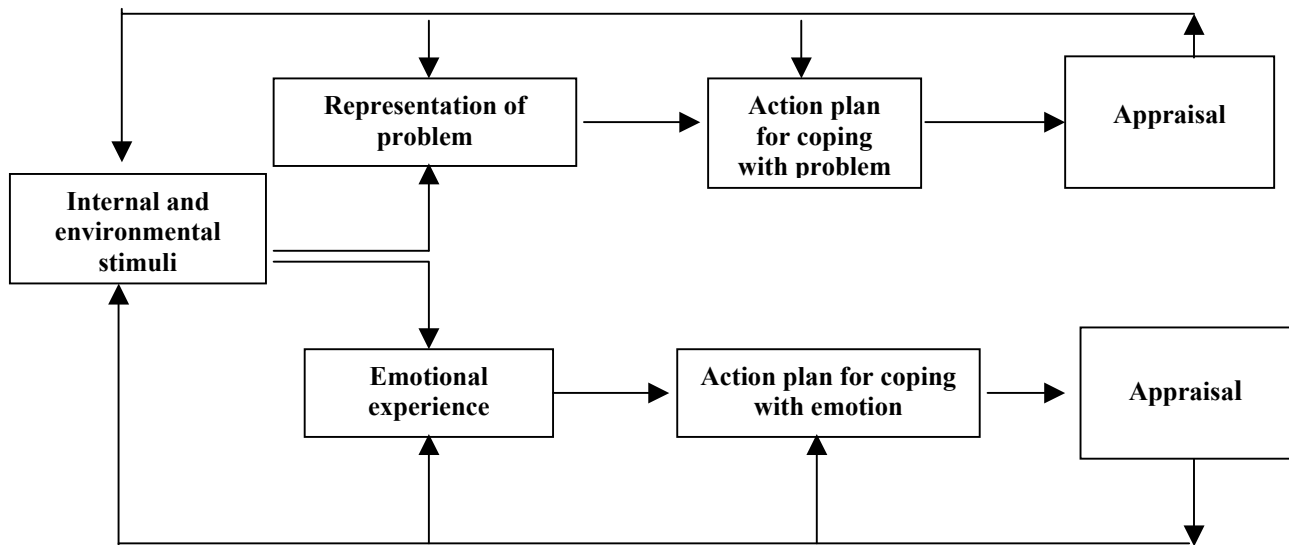


Figure 3: Leventhal and Cameron's self-regulatory model of illness behaviour (1987)

The process is iterative, with representations of the illness differing according to situational and cultural context. The Self Regulatory Model has been extended by Leventhal to explain chronic disease coping patterns.

As with the Coping Model, the Self Regulatory Model emphasises the importance of the interaction between the person and their environment. The potential for coping strategies to influence outcomes of illness is an important feature. Although not amenable to exhaustive empirical testing, the Self Regulatory Model has been used as a theoretical tool to study illness representations and coping strategies.

Evidence:

Carlisle, John, Fife-Scaw and Lloyd (2005) used the Self Regulatory Model to study representations and coping strategies in women with rheumatoid arthritis. The key findings from this study were:

- Strong relationships exist between illness representations and outcomes.
- Interventions that change unhelpful illness representations may result in more positive outcomes e.g. the authors use the example of educating sufferers about symptoms that are not caused by arthritis.
- No strong correlations were seen between measures of illness activity and illness representations.

The authors speculate that if illness representations are not addressed in certain clinical settings, opportunities may be lost to positively influence illness outcomes. This finding is important, as it suggests that treatment interventions should be thought of as much more than the typical diagnosis-treatment-review approaches to illness management e.g. the ethos and approach of the medical and other professionals matters.

The Self Regulatory Model emphasises the key role of attributions in the initial stages of illness. Roesch and Weiner (2001) conducted a meta analysis²⁰ of 27 studies in order to review the relationship between causal attributions, coping and psychological adjustment. Roesch and Weiner define coping as “an individual’s cognitive/behavioural efforts to manage stress”. The study was conducted using a factor structure of coping “inventories” i.e. approach versus avoidance coping techniques and whether the techniques adopted were method, problem or emotion focused. The more positive approach coping strategies contrast with the less desirable and more negative avoidance forms of coping. The data from this study were analysed using structural equation modelling techniques.

Roesch and Weiner reach the following conclusions:

- Internal, unstable and controllable attributions²¹ are indirectly associated with positive psychological adjustment through the use of approach²² and emotion focused²³ coping
- Stable and uncontrollable attributions are indirectly associated with negative psychological adjustment via the use of avoidance coping.

The findings from this meta-analysis support past research i.e. that positive re-appraisal/re-interpretation of the illness situation promote, or are antecedents to, the more helpful problem focused forms of coping.

²⁰ See glossary for full definition

²¹ Attributions are reasons or causes that people use to explain situations or events. Internal, unstable and controllable attributions in this context describe a person who is open-minded about illness causation, and who believes that they have a degree of control over events.

²² Approach focused coping involves active, purposeful activity (e.g. taking charge of the situation), in contrast to avoidance focused coping which involve passivity and withdrawal.

²³ Emotion focused coping is defined as a form of “approach” focused coping, other examples being behavioural, and problem focused coping. For example, emotion focused coping may involve seeking emotional support and problem focused coping would involve direct efforts to solve a problem e.g. taking steps to adapt one’s work situation so as to fit with an illness.

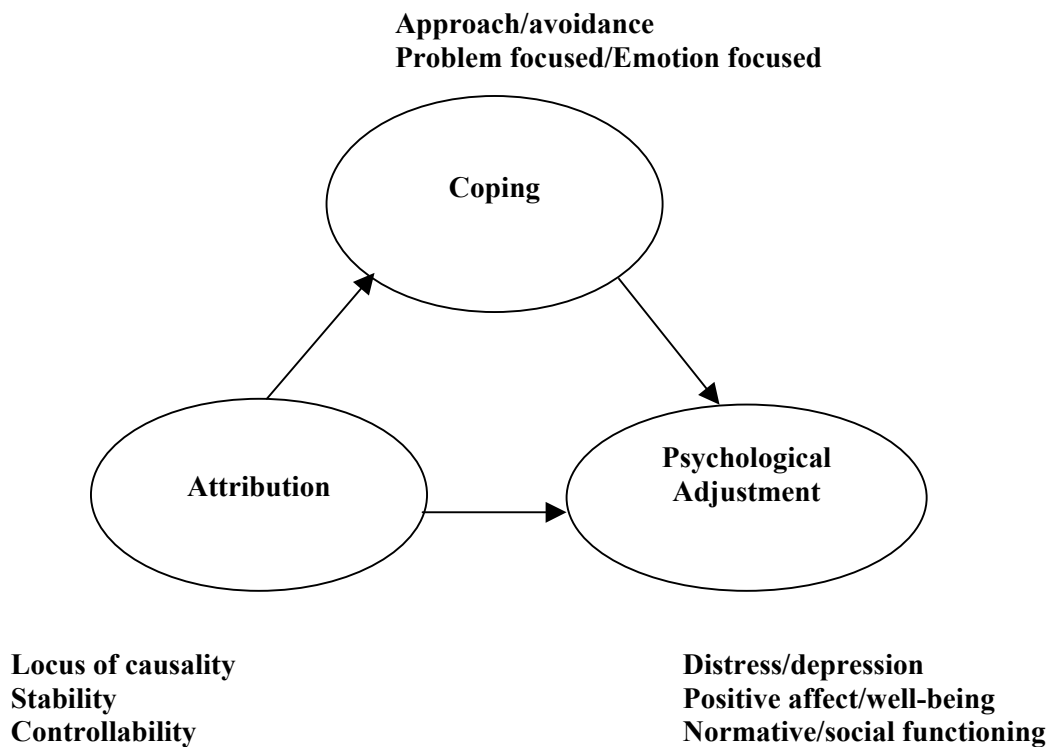


Figure 4: Roesch and Weiner (2001) – Attribution/Coping /Psychological Adjustment Model

3.2.2.3 *Lay Versus Expert Models of Illness*

This perspective examines differences in the way experts and lay people regard illness and the risks associated with illness. Experts tend to have a “sophisticated” view of illness and health risks e.g. they make full use of modern research techniques and medical knowledge to explain the risk and occurrence of illness. Lay people, however, will be more likely to take a “common sense” view towards illness and health. Lay people are likely to place much greater emphasis on the influence of chance factors and will tend to have a much more straightforward view of risk e.g. high or low risk in contrast to numerical probabilities cited by the expert community.

A simplistic lay model of risk was proposed by Misselbrook and Armstrong (2001) (see figure 5). The Misselbrook and Armstrong model attempts to explain health outcomes at the level of the individual. As it emphasises a key role for “luck”, this model implies that the more sophisticated expert perspective breaks down at the individual level .

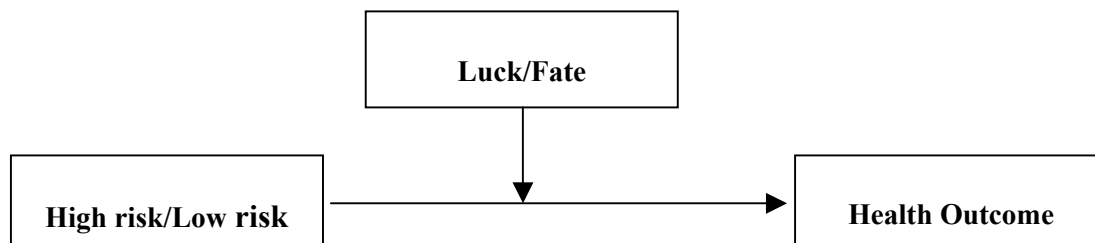


Figure 5: Misselbrook's simplified Lay Model Of Risk (2001, cited by Berry, 2004).

Evidence:

Ferguson et al. (2006) argue that better knowledge about lay beliefs are needed in order to fully understand the basis of occupational illness. Their large-scale study of the difference between expert and lay perceptions of illness identified the following important expert/lay differences:

- Experts are more likely to see stress as caused by work conditions.
- Experts are more likely than lay people to implicate demographic factors as causes of illness.
- Lay people are more trusting of informal sources of information (e.g. friends) about illness.
- Experts are more inclined to trust official/impersonal sources of information about illness.

Fergusson et al go on to conclude that Lay and Experts differ in terms of the perceived cause and representation of illness. In particular, they conclude:

- Lay people perceive differences between illnesses derived from occupational and non-occupational factors i.e. non-occupational illness seen as medically explicable whereas occupational illness seen as a mix of medically explicable plus “other” causes (e.g. stress). This is consistent with many aspects of occupational illness having “non-specific” symptoms.
- Cognitive mapping work indicates that experts have more complicated representations of illness.

Compared to experts, lay people are more likely to see the occupational future negatively for people with multiple sclerosis, lung cancer, asthma and stress²⁴.

3.2.2.4 Common Sense Models of Illness

Common Sense Models of illness and behaviour promoted by Leventhal et al, (1980) also emphasise the importance of lay representations of illness. The Common Sense Model promotes the hypothesis that people have mental representations of their illness based on various sources of information, including:

- Lay information,
- Perceived significant others’
- Their current experience of the illness.

Combining information from these sources helps the individual make sense of the illness and serves as a basis for the way illness is represented.

Evidence:

In a meta-analysis of the Common Sense Model literature Hagger and Orbell (2003) set out to determine if there is any consistency in the way people cognitively represent illness. Their

²⁴ Stress was chosen due to its strong association with work, lung cancer because it can have work related causes, asthma because it is flagged by experts as being a common work related illness and multiple sclerosis as it has no obvious work related cause.

research hypothesis suggested that people reporting strong illness identity²⁵ would report their illness as:

- Having a “chronic timeline,”
- Less controllable,
- Having more serious consequences.

A secondary aim of the meta-study was to examine links between illness representation, coping behaviours and illness outcomes.

Hagger and Orbell report that their results support the view that:

- High perceived control of illness is consistently and positively correlated with psychological well-being and vitality.
- Adaptive outcomes (e.g. social/physical functioning, psychological well-being) are associated with lower perceived consequences²⁶ and weaker illness identity.
- Illness identity and perceptions of symptoms explain most of the variance in illness outcomes.

In summary, Hagger and Orbell’s meta-study offers evidence to support the existence of moderate to strong links between illness cognitions, coping behaviours and illness outcomes.

3.2.3 Comparing the Models: Main Messages

The models of coping reviewed above attempt to explain coping with illness from different perspectives. While the models are different in terms of assumptions and emphasis, a common theme running through the evidence base is the importance of personal attributions in the interpretation of illness. Furthermore, the evidence base suggests the following picture:

- The links between illness representations and outcomes are strong. How people cope with a condition is not a direct function of the severity of the condition. It is mediated by how they appraise or judge the conditions, and its perceived ramifications on their ability to function as usual.
- Coping is a dynamic iterative process in which individual judge their condition, and ability to control it against the context of the ongoing experiences in living with the condition.
- High-perceived control of illness is positively correlated with psychological well-being.
- The larger a repertoire of coping skills the more able the employee is to cope effectively with their conditions, and use either problems solving or palliative strategies when it suits the context.

²⁵ Illness identity refers to statements about the sufferer’s belief about the illness label and knowledge about its symptoms e.g. “I have the flu and it makes my muscles ache”.

²⁶ i.e. they perceive potential outcomes as less adverse.

- Positive re-appraisal/re-interpretation promotes positive coping behaviours.
- Interventions to change negative representations of illness can positively affect illness outcomes.
- Lay and experts differ in terms of the perceived cause and representation of illness.

3.2.4 Implications for Occupational Health Interventions

The literature review suggests there is an evidence base to support the active management of illness in an occupational context.

The evidence base suggests that an individual's attributions of ill health has a significant effect on the way that person comes to terms with their illness. The evidence suggests that positive attributions result in a more helpful approach to coping, and in turn on illness outcomes. From an assessment angle, this suggests that information about factors such as cognitive outlook (i.e. internal or external locus of control), preferred coping styles²⁷, resilience levels, beliefs, trusted information sources and levels of optimism may be worth exploring as indicators of coping style and behaviours.

Assuming the desired outcome is to positively influence illness outcomes, it should be possible to design targeted interventions that aim to:

- Increase the psychological well-being of employees regardless of whether they are ill or not by addressing their health beliefs and illness representations.
- Promote positive representations of illness and health conditions among employees who become unwell as way of empowering them to take control over their condition, where appropriate. This would need to be complemented by appropriate work place modifications.
- Promote positive coping behaviours among employees who become unwell by optimising their coping resources.
- Convey positive messages about what can still be achieved in spite of a given condition. This applies to occupational health advice, occupational health consultation, condition management, education or information material provided to employees and their significant others, and media in general.
- Accommodate variations in lay and expert perceptions of illness causality, controllability and duration

3.3 PREDICTING AND CHANGING HEALTH BEHAVIOURS

3.3.1 Background

Changing behaviours having a direct bearing on health is a powerful way of influencing health outcomes at the level of the individual. Understanding the relationship between actions, and

²⁷ See glossary for full definition

their impact upon health, is important in the formation of health policies and in the framing of messages designed to support policies.

This brief overview of the health behaviour literature is intended to highlight important results and conclusions from the current research base with a view to defining the salient aspects of the intervention components necessary for generating behaviour change.

3.3.2 Factors Affecting Health Behaviours

Health behaviours are important because they have an impact on health outcomes. There is an implicit assumption that:

1. Health behaviours form part of a causal chain that link to health outcomes i.e. that behaviours influence morbidity.
2. Behaviours are modifiable.
3. Interventions that change behaviours can affect health outcomes.

The medical evidence is overwhelming to support the view that certain behaviour pattern influence health; smoking, regular exercise, getting enough sleep, limiting alcohol consumption are well known examples of behaviours that can affect health outcomes (Belloc & Breslow, 1972; Connor & Norman, 2005).

Based on data from 14 health behaviour models, Cummins et al (1980) identified a number of factors affecting health behaviours at the individual level including:

1. Accessibility of health care services
2. Attitudes to health care
3. Perceptions of disease threat
4. Knowledge about disease
5. Social network characteristics
6. Demographic factors

Cognitive factors are disproportionately represented in this list (2 to 5) and this should be no surprise given that a large proportion of health behaviour models have a social cognition component (Connor & Norman, 2005).

High levels of stress and limited access to resources (e.g. money) increase the likelihood of engaging in behaviours detrimental to health outcomes (Taylor 1991; Adler and Matthews, 1994). Personality traits (Furnham and Heaven, 1999) are also implicated as determinants of health behaviours.

The picture is therefore, a complex one and is further complicated by the recent meta-analysis findings of Webb and Sheeran (2006) of the indistinct linkage between intentions and behaviours, implying that motivation is a necessary but not sufficient precursor to behaviour change. The evidence examined by Webb and Sheeran suggests that intentions to change are more likely to become actions if they are:

- Stable over time and
- Planned with regard to when, where and how they will be carried out

3.3.3 Predicting Health Behaviours

Although there are several different Social Cognition Models of health behaviour in the literature, there is little empirical evidence that compares the predictive power of these models, making it difficult to say which of the implicated variables are the strongest predictors of health behaviours. However Connor & Norman (2005) identify one common theme across the evidence base; self-efficacy, Connor argues that this is an important predictor construct that stands out as a key health behaviour predictor.

An attempt by Fishbein et al to integrate the important elements of theories by Beck, Bandura and Fishbein (cited in Conner & Norman, 2005) resulted in the following meta-model of behaviour change:

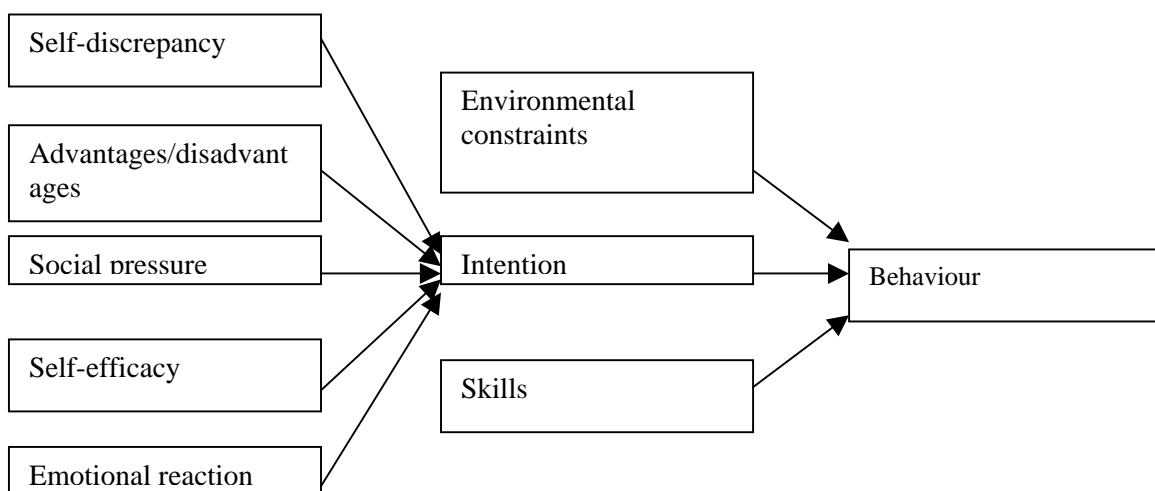


Figure 6: Major Theorist's Meta-Model of Behaviour Change

This (untested) meta-model suggests that strong intentions combined with possession of the required skills along with the absence of environmental constraints are necessary and sufficient conditions to achieve behaviour change. Intentions, are, according to this model, are a complex construct, determined and influenced by a range of factors.

A UK based expert panel (Michie et al, 2005) has generated a not dissimilar range of factors that are **necessary** in order to generate behaviour change. These factors are:

- Nature of behaviour (specify what needs to be changed)
- Knowledge and skills
- Goal intention (what to aim for)
- Beliefs about consequences
- Beliefs about own capabilities
- Goal plan
- Environment – physical and social
- Memory/attention/decision making process
- Beliefs about controls/guidelines

Combining these necessary conditions for behaviour change with Prochaste and DiClemente's (1986) Stages of Change framework, suggests a sequence of interventions aimed at effective behaviour change (after Lunt, Lee and Carter, 2006) (see figure 6). According to this approach behaviour change arises from progress through precontemplation, contemplation, preparation, action and maintenance stages. When in a *precontemplation* stage, change is not considered. During *contemplation*, preliminary considerations of the need to change are made at a remote, often non-committal, level. The individual then engages in *preparation*, whereby they actively plan for the implementation that occurs in the *action* stage. The subsequent *maintenance* stage reflects efforts in sustaining change over time.

STAGE OF CHANGE

BEHAVIOURAL COMPONENT

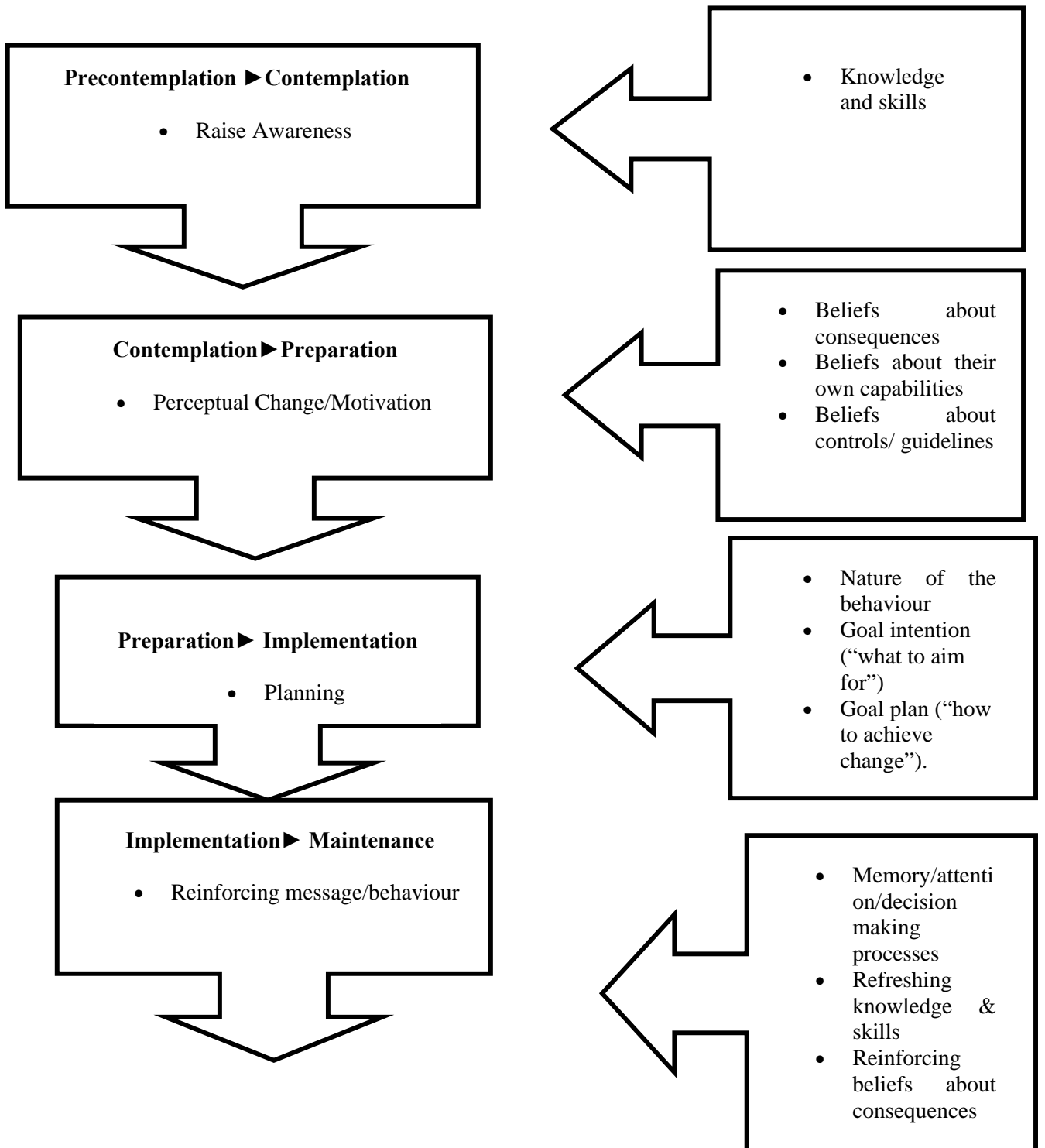


Figure 7: Template for sequencing behavioural change components

3.3.4 Main Messages:

- Awareness is not enough for securing behaviour change
- Detailed planning, in terms of who, what, when and how behaviour change is to occur more likely to precipitate actually behaviour change.
- Health behaviours are another mechanism by which health status and well-being is influenced.
- Behaviour change is dependent on individual having the right knowledge, the right attitude, environmental support in terms of relationships and psychosocial factors (software), structures and systems (hardware), skills, self-confidence in their ability to control their environment, planning, and maintenance.

3.3.5 Implications

- Behaviour change research can be used to guide how well-being interventions are implemented.
- Interventions should address the interaction between the work environment, systems and policies and employees behaviour.
- Interventions should be planned in detail.
- Every effort should be made to maintain the momentum propelling well-being improvements over time, through sustaining awareness, reviewing and refining interventions, and sustaining publicity levels.
- In keeping with a well-being/positive psychology ethos, interventions emphasise the benefits of well-being interventions, rather than focus on the negative consequences that might arise if they are not followed.
- Employees must believe that the intervention can work, that they have the necessary skills to affect well-being improvements, and that they have sufficient control over their environment.
- Tackling anyone stage without considering any of the others is unlikely to produce lasting change.

**SECTION B: RISK MANAGEMENT PRACTICES FOR COMMON
HEALTH PROBLEMS**

4 RISK MANAGEMENT PHASE: METHOD

4.1 OBJECTIVES

This phase of the review sought to identify employer’s current practices in applying risk management to common health problems (CHPs).

4.2 BACKGROUND

For the purpose of this review, the policy, organisation and planning and implementation stages of HSE’s ‘key elements of successful health and safety management’ guidance (HSG 65) was used to benchmark risk management practices. The term risk management therefore encompasses hazard identification²⁸, risk assessment (RA)²⁹ and risk control strategies as well as the wider policy and organisation issues relating to common health problems.

Comparisons were also made between the risk management practices described in the literature, and principles of a sensible risk management approach outlined in box 1 (see page 4) (see box 2, page 4 for corresponding research questions).

4.3 SEARCH STRATEGY

It was anticipated that relevant literature informing ‘how’ employers are actually managing the risks associated with common health issues would not be readily accessible, and require access to ‘grey’ literature. Therefore an inclusive literature search strategy was adopted covering a comprehensive range of academic, human resource, occupational health and health and safety databases along with web-based and public library searches.

Key words used within the search strategy are summarised in table 6 below. When searching academic and internet databases risk terms were combined with health and occupational terms to ensure results were specific to the work place. For health and safety databases occupational terms were omitted due to their being a redundant concept for such databases. Websites of organisations identified as potentially being more forward thinking in adopting more holistic approaches to risk assessment were also assessed, such as those falling in the “Sunday Times 100 Best Companies to Work For in the UK 2006”.

Table 6: Search structures for risk management searches

Risk Term	Health Term	Occupational Term
Risk	Common Health Problem	Occupation*
Risk Assessment	Occupational Health	Occupational
Risk Management	Stress	Work
Risk Control	Musculoskeletal Disorder	Job
	Anxiety	
	Depression	
	Cardiorespiratory	

* Denotes wild card expression

²⁸ In this context hazard identification refers to identifying what the potential sources of harm relevant to common health problem

²⁹ In this context risk assessment refers to the procedures used for assessing the likelihood of harm presented by those common health hazards.

To keep the volume of literature searched manageable, and to optimise relevance, published searches extended back to 1995. It was inferred that the above search terms would also reveal reasons for any variations between HSE's view of a sensible risk management approach and that which is actually applied by employers. Actual variations were explored through comparing what was applied with questions based on HSE's guidance on policy, organisation and planning stages (HSE Successful Health and Safety Management, HSG 65). Comparisons were also made with the principles of sensible risk management outlined in box 1 (page 4).

4.3.1 Selection Criteria:

Two researchers worked together in identifying potentially relevant articles retrieved by the search strategy on the article titles. In order to isolate those articles that were directly relevant, the selection criteria listed below were applied. One researcher led in applying these criteria, the second double-checked their decision to include or exclude. On the basis of content, articles were included where they:

- Provided any information demonstrating an employer's actual risk management practices relevant³⁰ to common health problems, and
- Related to the prevention of occupational health conditions falling into the common health category as defined by Waddell & Burton (2006). Included interventions are described in table 9.
- Provided potential explanations for any variations in risk management practices from HSE's view of a broad minded risk management approach.

Articles were excluded if they:

- Concerned clinical/medical risk assessment (ie medical management).
- Concerned exclusively work place health promotion exercises.
- Were descriptions of risk assessment/management guidance published by HSE.
- Concerned exclusively violence, safety or traditional safety hazards.
- Concerned explication or evaluation of a risk assessment tool by an academic or research institution.
- Did not reflect practices in British organisations.

4.3.2 Data Extraction:

Given the evolving and unpredictable nature of this work, the data was extracted using the following broad categories and the specific questions, relating to the risk management stages, listed in table 7.

- Article type (review, study, commentary/opinion).
- Review type (meta-analysis, systematic, critical, narrative).

³⁰ Articles describing an organisation's (a) risk management practices particular to a common health problems, or (b) and organisation's overall risk management practices which would include common health problems, were included.

Table 7: Risk management questions used for the data extraction

POLICY

- 1a. Do they have policies that directly address common health problems?
 - 1b. If so, how?
 - 1c. If not, do they have policies for occupational health in general?
- 2a. Do the policies demonstrate integration with human resource management?
 - 2b. If so, how?
- 3a. Does the policy reflect a 'total loss approach' (i.e. accommodate/consider full costs associated with occupational health management).
 - 3b. If so, how?
- 4a: Does the policy reflect a proactive rather than reactive approach to the management of common health problems?
 - 4b. If so, how?
- 5a. Does the policy set standards for the prevention and management of common health problems?
- 5b. To what extent are these tailored to the risks of the organisation in question?

ORGANISING: CONTROL

- 1a. Is Senior Management Commitment Secured?
 - 1b. If yes, how?
2. Are responsibilities for the prevention and management of common health problems specified (in terms of who and what staff are responsible for)?
- 3a. Do staff know what they need to do to avoid and manage common health problems?
 - 3b. If yes, how?
- 4a. Can performance for the prevention and management of common health problems to be measured?
 - 4b. If so, how?

ORGANISING: COOPERATION

- 1a. Has the cooperation of the workforce been secured for the management of common health problems?
 - 1b. If so, how?

ORGANISING: COMMUNICATION

1. How does information concerning the prevention and management of common health problems 'flow' within the organisation? (prompts written and verbal communication/behaviour?)
- 2a: Are the different forms of communication consistent?
 - 2b. If not, why not?

COMPETENCY

1. How is competency in the management and prevention of common health problems ensured?

PLANNING AND IMPLEMENTATION (RISK CONTROL)

- 1: How does the organisation identify the hazards associated with common health problems in terms of:
 - Sources of information
 - Differentiating physical from psychosocial hazards?
 - The work/life interface
 - Who conducts it?
2. How does the organisation assess the risks associated with common health hazards in terms of:
 - Sources of information
 - Differentiation of physical from psychosocial hazards
 - The work/life interface
 - Who conducts it
- 3: How are common health risks controlled to an ALARP extent in terms of :
 - Differentiation of physical (task/work environment) from psychosocial (individual/culture) hazards
 - The work/life interface:
 - Elimination
 - Combat and source
 - Minimisation

- General methodology (qualitative/quantitative).
- Country in which it was applied.
- Employer name.
- Approach name.
- Occupational health hazard addressed.
- Target Audience.
- What does the article say about employees/employers perceptions of risk assessment/common health problems?

For each of the research questions, evidence statements were produced based on the information extracted from included articles. Each statement was weighted using the system described in below.

Weighting:

Each of the statements were weighted according to the criteria specified in table 8 below. These criteria were kept deliberately broad to accommodate the breadth and varying methodological quality of articles considered. Asterisks are provided alongside each statement to indicate the level of supporting evidence.

Table 8: Weighting System	
Stronger***	Supporting evidence is generally consistent, and has been tested qualitatively and/or quantitatively.
Mixed**	Supporting evidence is inconsistent, but has been tested qualitatively and/or quantitatively.
Weaker*	Not tested qualitatively or quantitatively. Supporting evidence is anecdotal or based on case studies.

4.4 SOURCES

The following sources were accessed:

1. Academic databases:
 - Pub Med/Medline
 - CINAHL
 - DHSS Data
 - British Nursing Index
 - Emcare
 - Global Health
 - Inside Conferences

- Allied and Complimentary Medicine
- Psychinfo

2. Health and Safety Databases:

- OSHROM/HSL Line
- Embase/Science Direct
- ROSPA
- Gale Group Health and Wellness
- HSE/HSL reports

3. Local Government:

- Accompline

4. Internet Searching

- Google Scholar
- Web-based searches of such as those falling in the “Sunday Times 100 Best Companies to Work For in the UK 2006”.
- The following websites as supplied by HSE information services:

<http://www.admin.cam.ac.uk/offices/safety/risk/stress/>

<http://www.rospa.org.uk/drivertraining/managementinfo/driverprofiler.htm>

<http://www.eef.org.uk/york/mediacentre/mediareleases/regional/2005/workorganisationassessmenttool.htm>

http://www.yorkhealthservices.org/downloads/stress_management_policy_and_procedure.pdf

<http://www.patient.co.uk/showdoc/40024566/>

<http://www.hebs.com/workpositive/case.cfm>

5 RISK MANAGEMENT PHASE: RESULTS

Despite taking an inclusive approach to the literature search, the number of articles considered to have relevant content was 31. The content of these 31 papers were then considered potentially relevant according to article titles and abstracts. After applying the selection criteria, 22 articles were excluded leaving a final total of 10 papers (Table 9). Two of these, however, referred to the same case study (Devereux, 2005; Devereux & Manson, 2005).

Of these 10, 8 reported initiatives in 'real' organisations. The other 2 papers reported academic studies in the workplace and were selected due to their potential ability to explain variations from the HSG 65 risk management model (Clarke & Cooper, 2000; Weel, Broersen, & van Dijk, 2000).

5.1 APPLICATION OF RISK MANAGEMENT BY EMPLOYERS

The 10 studies reviewed show that risk management methodologies have been used by a number of large employers in order to mitigate the impact of certain common health problems in the workplace.

Policy

* Policies developed in relation to CHPs have focussed on the physical and ergonomic risks associated with MSDs *Blaney (2000), Smyth (2003), Devereux & Manson (2005), Devereux (2005), IRS Nottingham City Council (1998)*.

*** Psychosocial aspects of CHPs have not been proactively managed. *Blaney (2000), Smyth (2003), Devereux/Manson (2005), Devereux (2005), Drennan & Beck, (2001), IRS Nottingham City Council (1998), Martin, Kilfedder & Power, (2004)*.

Of the 10 included articles, 4 documented policies directed at the reduction of CHPs. All of these 4 policies (GlaxoSmithKline, Boots Contract Manufacturing, Packard Bell and Nottingham City Council) targeted physical basis aspects of musculoskeletal disorders MSDs. Two articles reported on the risk assessment/management of CHPs. These were exclusively within the "stress" arena (Drennan & Beck, 2001; Martin & Kilfedder, 2004). We speculate that since the introduction of HSE's Management Standards, there has been an increase in the deployment of stress related policies driven by increased regulation.

* *Senior management are becoming increasingly aware of the full costs of not effectively managing CHPs. Blaney (2000), IRS Nottingham City Council (1998), Devereux/Manson (2005), Devereux (2005), Smyth (2003)*.

Previously senior management only took action on CHPs if they tangibly affected performance and productivity. One article describes labelling work related upper limb disorders as a 'slow accident' to persuade management as to their seriousness *IRS Nottingham City Council (1998)*.

* *Policies aimed at preventing or managing CHPs have tended not to be fully integrated into human resource management. Blaney (2000), Smyth (2003), Devereux & Manson (2005), Devereux (2005), IRS Nottingham City Council (1998), Hood and Thompson (2000)*.

Where documented, CHP policies appeared to have been developed without obvious input from a human resource function.

Organising (a) Control

* Where policies had been developed for CHPs, senior management commitment had been secured. *Blaney (2000), Devereux & Manson (2005), Devereux (2005), IRS Nottingham City Council (1998), Smyth (2003).*

* Responsibilities for the prevention or management of common health problems are allocated to specific individuals. *Blaney (2000), Devereux & Manson (2005), Devereux (2005), IRS Nottingham City Council (1998).*

Organising (b) Cooperation

* *Risk management practices for CHPs that utilize worker involvement strategies are more successful due to their inclusion of workforce representation. Devereux & Manson (2005), Devereux (2005), IRS Nottingham City Council (1998), Smyth (2003).*

By allocating responsibility for managing ergonomic risks to a ‘ergonomic improvement team’, comprising health and safety, engineering and procurement personnel, Devereux speculates that workers at GlaxoSmithKline were more receptive to their recommendations because they stemmed from colleagues undertaking similar tasks (Devereux/Manson, 2005; Devereux, 2005).

Organising (c) Competency

* A prescriptive risk management process combined with poor training can undermine effective control of CHP risks. *Devereux/Manson (2005), Devereux (2005) Hood and Thompson (2000), Smyth (2003).*

Planning & Implementation (Hazard identification, risk assessment, risk control)

* Benchmarking work-based psychosocial risks for CHPs against a wider population norm has been advocated as a method for isolating the psychosocial risk factor severity operating in a given work setting. *Weel, Broersen & van Dijk (2000), Clarke/Cooper (2000).*

* Typical risk assessment methodologies included self-administered questionnaires, assessments by trained personnel (e.g. display screen equipment) and specialised techniques such as participatory ergonomics. Often, combinations of techniques were used. *Blaney (2000), Devereux/Manson (2005); IRS Nottingham City Council (1998), Smyth (2003).*

* Risk control strategies have focused on addressing physical rather than psychosocial aspects of CHP risk, for example ergonomic improvements. *Blaney (2000), Devereux/Manson (2005), IRS Nottingham City Council (1998), Smyth (2003).*

Generally, there appeared to lack a consistent understanding across employers of the differences between risk assessment and risk management.

Table 9: Article Summary

ARTICLE	AIM	SUMMARY OF CONTENT	MAIN FINDINGS	IMPLICATIONS
Blaney, S (2000). <i>Are you sitting comfortably? Safety Management</i> . Mar.2000, 44-45.	To describe the initiatives taken by Packard Bell to manage the risk posed by the use of information technology.	Article describes steps taken by company to mitigate risks posed by long-term use of IT. Measures taken include Display Screen Environment (DSE) assessments, provision of equipment, training and general H&S procedures.	That the steps taken have been beneficial in improving general levels of musculoskeletal health.	That basic interventions and RA methods are effective in the management and control of musculoskeletal based CHPs.
Clarke, S.G.; Cooper, C.L. (2000). The risk management of occupational stress; <i>Health, Risk & Society [Health Risk Soc. 2 (2), pp. 173-188.</i>	To propose a risk management methodology to identify hazards and assess level of risk associated with those hazards.	RA is applied to occupational stress using a combination of diagnostic questionnaires (Occupational Stress Indicator scores and General Health Questionnaire). Staff complete these and the RA is performed using correlation methods. Uses general RA principles but with modifications to identifying the hazards.	A risk management approach to dealing with stress is informative and cost effective.	High risks, can be differentiated from lower risks which may be effectively controlled through stress management interventions or employee assistance programmes.
Devereux, J, Manson, R. (2005), Ergonomic improvement teams at GlaxoSmithKline: <i>Occupational Health Review</i> March/April 2005 pp 29-30	Describes a participatory strategy used at GlaxoSmith Kline to reduce musculoskeletal injuries.	Sets out the details of the participatory ergonomics initiative at a GSK manufacturing site. Describes background details, the initiatives (e.g. introducing new ways of working, ergonomics improvement team) and the benefits accrued.	Best ever employee health and safety performance in 2003 – 3.4 million work hours unhindered by lost time illness/injury.	Suggests the same RA methods should be used for initial and post intervention assessments and that employees should be included in development of improvements.
Devereux, J. (2005). The workplace risk; <i>Occupational Health</i> , Sep 2005 pp 20-21	To emphasise the importance of psychosocial factors and stress in the development of work-related musculoskeletal complaints, and the consequent benefits of worker participation in intervention initiatives.	Describes approach, including RA, for managing work-related musculoskeletal complaints. Uses the GSK case study (see above) to illustrate benefits of a participatory approach, including RA.	See above	That worker participation offers definite benefits in terms of reducing the incidence of work related musculoskeletal complaints. Implies a link between this finding and the psychosocial dimension of the onset of MSDs.

Table 9: Article Summary

ARTICLE	AIM	SUMMARY OF CONTENT	MAIN FINDINGS	IMPLICATIONS
Hood, J & Thomson, J. (2000) The utility of risk assessment within a local authority: a case study. <i>Journal of the Institution of Occupational Safety and Health</i> . 4, (1), pp. 23-31	Reports on a case study examining risk assessment development and use within a Local Authority	Describes risk assessment drivers, understanding, application and implementation of control measures across a Local Authority.	Inconsistent understanding across the local authority in the understanding of risk assessment, varying standards in completion of risk assessment and implementation of controls. Attributed to lack of senior management commitment, and poor training	Demonstrates intra-organisation variations in risk management standards for large public sector establishments. Claims that a combination of an overly prescriptive risk management and poor training is detrimental to risk control.
IRS Employment Review (2001). Health, Safety and Well-being, Nov 2001, Issue pp 41	Summarises findings of an employments risk survey (Drennan & Beck, 2000).	A survey by Marsh UK found just over a quarter of 170 private and public sector organisations undertook risk assessments for stress compared to 84.4% for physical exposures.	Fear of litigation and were concluded as the main drivers for risk assessment.	Further indication of employers finding physical risks easier to assess than psychosocial.
IRS Employment Review (1998); Preventing and tackling upper-limb disorders at Nottingham City Council <i>Employee Health Bulletin</i> Issue 653, p6,	To describe preventative measures taken at Nottingham City Council to reduce and prevent the incidence of RSI	Describes context and background to initiative such as training, inspections, equipment provision and audit assessments. Also covers issues such as education, line management and employee perceptions.	No findings as such. The initiative was not formally evaluated.	That RA methods can be deployed over a large organisation. That RA needs to take into account staff perceptions and the cultural context of the organisation.
Martin, B., Kilfedder, C & Power, K. (2004). Stress risk assessments in Scotland's NHS. <i>Occupational Health Review</i> , 110, pp 32-34	Surveyed Scottish NHS Occupational Health Services prior to the launch the management standards for stress.		Occupational stress risk assessment required substantial improvement.	
Smyth, J (2005). Corporate ergonomics programme at BCM Airdrie: <i>Applied Ergonomics</i> , 34 pp39-43	To describe the corporate ergonomics programme at Boots Contract Manufacturing (BCM)	Details the programme that has evolved to proactively manage MSD risks in the design of new equipment and processes.	Shop floor involvement is considered to be an essential part of the programme, including the RA element.	Interventions, including RA, need the full involvement and participation of the workforce.
Weel, A.N.; Broersen, J.P.; van Dijk, F.J. (2000). Questionnaire surveys on health and working conditions: International Archives of <i>Occupational and Environmental Health</i> 73 (1), pp. 47-55.	To describe a method to identify and evaluate work risks and health problems in groups of workers.	Health is assessed across groups of workers in companies and/or departments by comparing questionnaire data to reference data e.g. data for a particular economic sector. Comparisons made using statistical methods.	Methods described in the paper are considered to be part of a broader approach towards risk assessment.	Has the potential to offer alternative risk assessment methodology using combinations of questionnaire data, workplace surveys and sickness absence data. Has the potential to deal with the complexity of risk assessing full range of CHPs.

5.2 COMPARISONS WITH THE HSG 65 RISK MANAGEMENT MODEL AND WITH SENSIBLE RISK MANAGEMENT PRINCIPLES

* At a very minimum, employers are broadly using the assess, plan, implement and evaluate stages as advocated by HSG 65's risk management model to control for the physical aspects of CHP risk. *Blaney (2000), Devereux/Manson (2005), Devereux (2005), Hood and Thompson (2000), IRS Nottingham City Council (1998), Smyth (2003).*

* Departures from the sensible risk assessment approach were found only in the academic literature, where the emphasis was not on practical application. *Clarke/Cooper (2000), Weel, Broersen & van Dijk (2000),*

In summary, with the exception of the stress example, no cases were found of risk management being directly applied to mild/moderate mental health issues or cardio-respiratory ailments.

No examples of employers utilising alternative risk management methods were found. References to such methodologies were confined to the academic literature in which risk quantification approaches were profiled.

5.3 REASONS FOR ANY VARIATIONS FROM HSE'S RECOMMENDED APPROACH

Since departures from the HSE risk management model or principles of sensible risk management were not identified within the included articles, establishing reasons for such variations became a redundant exercise. However, evidence was found within the included articles accounting for employer's historical tendency not to assess the psychosocial characteristics of CHPs.

* When considering psychosocial factors, risk management is not as straightforward as hazards relating to musculoskeletal complaints. *Clarke/Cooper (2000), Weel/Broersen/van Dijk (2000).*

One example was found citing reasons for employees' reluctance to fully engage in risk management processes. This stemmed from fears over the consequences of reporting symptoms in terms of job retention, conflict with other job priorities, and underestimation of the disabling effects of the MSD condition in question. *IRS Nottingham City Council (1998).*

5.4 GENERAL CONCLUSIONS

Information that sheds light on how employers are, in practice, employing risk assessment to common health problems appears to be poorly reported in both academic and 'grey' literature. Consequently, the evidence base used in this review of risk management practices is small and, in some instances, dated. Therefore the evidence statements produced and conclusions drawn must be viewed with a degree of caution.

Employer's actual practices with regard to risk management and common health problems appear to be restricted to the more straightforward physical complaints such as upper limb problems and repetitive strain injuries. In no instances was there clear evidence of associated psychosocial hazards being addressed. Nonetheless, these conclusions cannot properly represent efforts undertaken in controlling stress since the launch of HSE's Management Standards for Stress. Anecdotal and confidential evidence from HSE inspectors implies that employers are making advances in managing for stress in ways that align with a sensible risk management approach. However, it seems that accounts describing *how* precisely they are implementing the management standards have yet to emerge in published articles.

No examples were found of risk assessment being applied to the *management* of common health problems once they have arisen to prevent condition deterioration for employees who are remaining at work.

We speculate that a familiarity with the traditional health and safety domain, within which common health problems with predominantly physical origins fall, are a key driver of employer's risk assessment practices when dealing with common health problems.

5.5 RISK MANAGEMENT: DISCUSSION

Undertaking this review has exposed poor documentation within the academic and grey literature of employer's actual practices in utilising risk management for common health problems. What evidence there is tends to be based on case studies, and predates the launch of the management standards for stress. Therefore the evidence statements made, and conclusions drawn must be viewed as indicative rather than representative. However, this review has demonstrated that, historically, employer's risk management practices are consistent with a HSG65 risk management model when addressing physical aspects of MSDs. More significantly, it seems that employers have tended to overlook the psychosocial characteristics of common health problems. This provides further evidence that employers have found the physical basis of these conditions are much more amenable to quantification and control than their psychosocial origins (Rick & Briner, 2002).

Whilst it might be safe to assume that, since the launch of the Management Standards, employers are now more driven to manage 'stress' in order to avoid litigation, this does not mean that they are also generalising that approach to address the psychosocial hazards attributable to other common health problems. Equally it cannot be inferred that the psychosocial hazards and mechanisms that give rise to stress are consistent with those that propagate other common health problems such as musculoskeletal disorders or cardiorespiratory complaints. Attempts to isolate the biopsychosocial mechanisms by which common health problems arise and are maintained occur in the next phase of this review.

SECTION C: BIOPSYCHOSOCIAL MECHANISMS

6 BPS MECHANISMS PHASE: METHOD

6.1 OBJECTIVES

This phase of the literature review sought to inform the biopsychosocial mechanisms by which common health problems arise.

6.2 SEARCH STRATEGY

Electronic searches were undertaken by:

- (a) Combining the terms biopsychosocial or psychosocial with the term occupational health or common health terms (stress, musculoskeletal disorder, pain, cardiovascular, respiratory, anxiety, depression).
- (b) Combining specific mechanisms terms (health behaviour, appraisal, belief, perception, coping, risk taking, psychoneuroimmunology, somatization, hypochondriasis, psychosomatic) with occupational terms (job/employee/employer/occupation/work) or the term review.
- (c) Combining specific mechanisms terms (health behaviour, appraisal, belief, perception, coping, risk taking, psychoneuroimmunology, somatization, hypochondriasis, psychosomatic) with the term review

Wherever possible wild cards were used to capture international variations in spelling. Searches were undertaken by both HSE and HSL to ensure rigour. A combination of health and safety, occupational health, medical, social science, and economic literature databases were searched. These comprised Heal Safe, Oshrom, Medline, Embase/ScienceDirect, Allied & Contemporary Medicine, British Nursing Index, Nursing and AlliedHealth, DH Data, Emcare, Psychinfo, CINAHL, Global Health, and Google Scholar. Database searches were supplemented with:

- Recent academic biopsychosocial related books listed within British Psychological Society and Occupational Medicine circulars
- Bibliographies of articles used within the orientation phase.
- Citation searches of key figures in occupational psychosomatic research such as David Coggon.

6.3 SELECTION CRITERIA

To keep the volume of research manageable within the time and budget constraints of the review, priority was given to articles that provided a conceptual review or model describing biopsychosocial mechanisms undertaken since the launch of HSE's Management Standards for Stress (ie from the beginning of 2003). The corresponding system for accepting and rejecting articles is capture by figure 8. Selection decisions were jointly undertaken by two researches based on the title and abstracts of articles derived from initial searches, and on the content of full articles once received. Include articles were then subjected to data extraction.

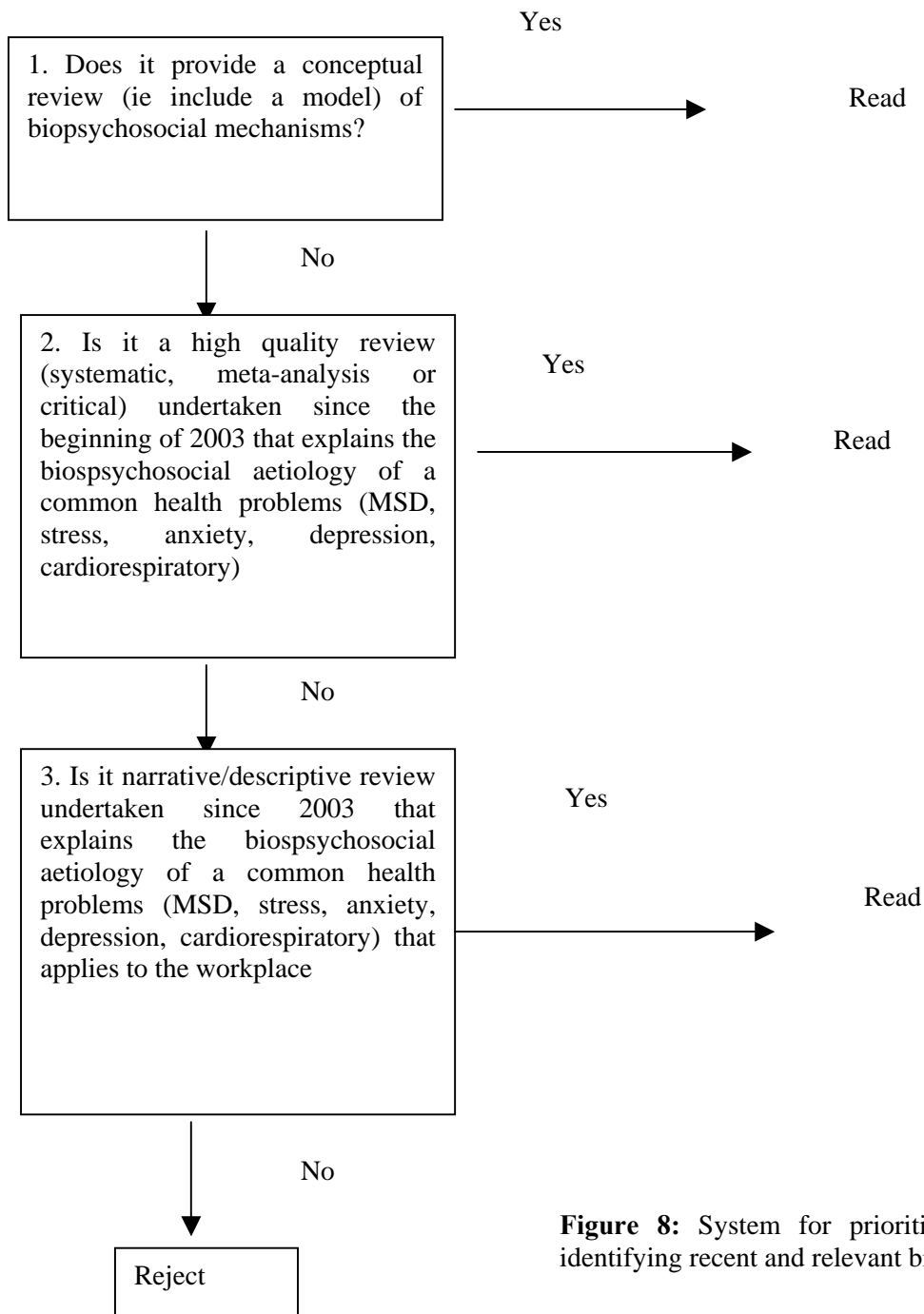


Figure 8: System for prioritising selection criteria for identifying recent and relevant biopsychosocial reviews.

6.4 DATA EXTRACTION

Spreadsheets (see appendix 1) were set up that allowed data from each article to be extracted according to the following categories:

- Article name
- Review type (systematic review, meta-analysis, critical review, narrative/descriptive review)
- Common health problem (MSD, stress, anxiety, depression, cardiovascular, generic)
- Pathway description
- Evidence base (based on quality of evidence)

6.5 WEIGHTING

The quality of evidence underpinning statements produced from biopsychosocial based literature was weighted according to the criteria specified in table 10 below. An asterisk system was used to differentiate different levels of evidence. When producing these statements, a second reviewer would double-check the decisions and phrasing produced by the first.

Strong	Generally consistent evidence provided by (systematic reviews of multiple scientific studies).
Moderate	Generally consistent evidence provided by (reviews of) fewer and/or methodologically weaker scientific studies
Weak	Mixed or conflicting evidence or provided by (reviews of) a single scientific study

³¹ Represents an adaptation of the weighting system used by Waddell & Burton (2006).

7 BPS MECHANISMS PHASE: RESULTS

7.1 WHAT ARE THE BIOPSYCHOSOCIAL MECHANISMS UNDERPINNING COMMON HEALTH PROBLEMS?

7.1.1 Evidence base for the biopsychosocial approach

Definition: A central tenant of the biomedical approach is that disease is directly attributable and proportionate to underlying physical pathology (Alonso, 2004; Dunstan & Covic, 2006; Suls & Rothman, 2004; White, 2005). The biopsychosocial approach (Engel, 1977) provides an explanation of clinical observations that could not be wholly accounted for by the biomedical model of disease. These included:

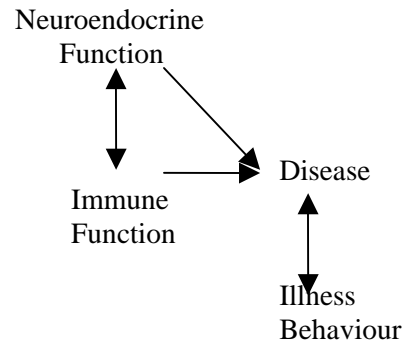
- (1) Individual differences in symptom presentation and experience despite consistencies in underlying physical pathology, as can occur in pain perception (White, 2005; Dunstan & Covic, 2006; Skevington, 2005; Sarafino, 2005, Sperry, 2006).
- (2) The presence of 'non-specific' physical symptoms without a discernable physical cause, otherwise known as 'somatization' (Creed & Barsky, 2004; Coggon, 2005; De Gucht & Maes, 2007).

The biopsychosocial approach represents a more holistic model of health, where the onset and progression of common health problems (or the preservation of wellbeing) is driven by the dynamic interplay between physical, psychological and social (contextual), or environmental variables

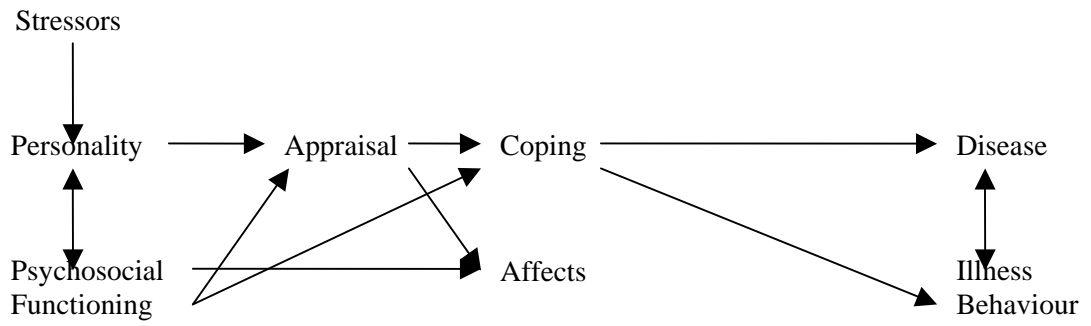
The biopsychosocial approach also offers a broader perspective on the psychosocial explanations for mental health conditions and behaviours that has previously prevailed within social sciences (Esler & Bock, 2004; Sperry, 2005). Research in areas such as Psychoneuroimmunology (PNI) has allowed greater understanding of the inter-relationships between an individual's nervous and hormonal pathways, their behaviours and their environment. In summary, the biopsychosocial approach offers a more holistic interpretation of physical and mental health than is provided by either the biomedical model or purely psychosocial explanations. Figure 9 contrasts psychosocial, biomedical and biopsychosocial models of the pathogenesis of rheumatoid arthritis.

**The biopsychosocial approach has more scope than purely biomedical or psychosocial perspectives in explaining the onset and progression of common health problems and in providing options for their prevention and management (Alonso, 2004; Borrell-Carrió, Suchman, Epstein, 2004; Dunstan & Covic, 2006; Sperry, 2006; Suls & Rothman, 2004; White, 2005).

Biomedical Model



Psychosocial Model



Biopsychosocial Model

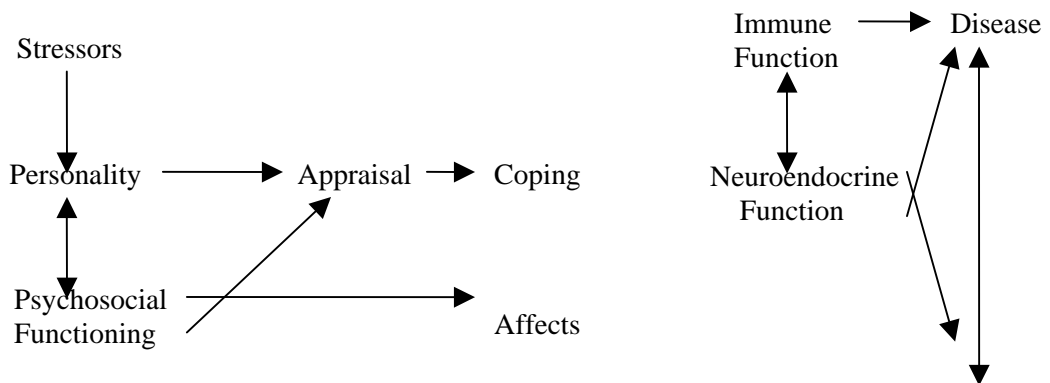


Figure 9: Three models of the pathogenesis of rheumatoid arthritis. Taken from Walker, Jackson, and Littlejohn (2004) (Cited in Sperry 2005)

Uptake: Despite its apparent explanatory potential, the biopsychosocial approach has been slow to penetrate all aspects of medical research and practice (Alonso, 2004; Suls & Rothman). When comparing Lancet publications between 1978–1982 with those published between 1996–2000, Alonso (2004) found no increase in the use of holistic definitions of health. Three main reasons may account for this slow uptake:

- *Practicalities:* Assimilation of biomedical-based approaches into medical treatment requires a cultural shift in the medical community away from the established biomedical tradition (Alonso, 2004; Suls & Rothman 2004). To change behaviours would incur additional resource demands in terms of time, investment or retraining. This is a barrier in medical practice where such resources are often scarce.
- *Complexity:* To produce a diagrammatic and parsimonious portrayal of the biopsychosocial framework, that retains its reliability across different health conditions, individuals, contexts and time is perhaps an impossible task, because of varying nuances and complexities of the biological, psychological and social interactions (Epstein & Borell-Carrio, 2005; Malmgren, 2005; Borrell-Carrió, Suchman, Epstein, 2004). Many models³² that have been produced can be criticized for being over-simplified and excessively linear, and not accommodating sufficient moderating and mediating relationships or feedback loops (Malmgren, 2005). Equally it is argued that, whilst they may be overly simplistic representations of reality, such models provide pragmatic tools for organising research and interventions that then allows for a more complete understanding of the aetiology, progression and treatment of modern health problems (Marmot, 2005; Sperry, 2006).
- *Silo thinking:* A systematic review of research investigating biopsychosocial mechanisms (Suls & Rothman, 2004) found a tendency for research to focus on either the psychosocial or psychobiological interface. Not enough integration of psychobiological with psychosocial research appears to have occurred (Suls & Rothman, 2004; Sperry, 2005). However, the addition of a social component (for example, tackling return to work barriers) is important because rehabilitation interventions that also address contextual or social contributors to health problems may be more effective than those that comprise medical and psychological treatment alone (Dunstan & Covic, 2006; Sperry, 2005). In a similar vein, lack of intra-disciplinary research and intervention has also hindered progression of the biopsychosocial approach (Alonso, 2004; Biderman, Yeheskel & Herman, 2005; Suls & Rothman, 2004, Sperry, 2006, White, 2005).

³² In this context, models refer to diagrammatic portrayals of relationships between psychological and/or social variables and health outcomes.

***Since its inception, uptake and application of the biopsychosocial approach has been slow to progress (Alonso, 2004; Suls & Rothman, 2004).

***Progression of biopsychosocial approach necessitates more integrated intra and interdisciplinary research and practice (Alonso, 2004; Suls & Rothman 2004).

**There is a trade-off between the pragmatic benefits of reducing biopsychosocial mechanisms into models for guiding risk prevention and sensitivity to individual, context, condition and temporal variations in these mechanisms (Epstein & Carrio, 2005; Marmot, 2005; Malmgren, 2005).

**Rehabilitation interventions that also address contextual or social contributors to health problems are more effective than those that comprise medical and psychological treatment alone (Dunstan & Covic, 2006; Sperry, 2005).

Which health conditions? The biopsychosocial framework has been applied to help explain the aetiology and progression of a wide range of health conditions. These include digestive complaints, recurrent headaches, respiratory conditions, coronary heart disease, pain, and common mental health conditions (Kaptein & Weinman, 2005; Sarafino, 2005). Of these, musculoskeletal disorders, stress, anxiety and depression are particularly important in the occupational health domain, due to their high prevalence and sickness absence rates (Waddell & Burton, 2006, Waddell, 2004). Additionally other work-related conditions that are normally more closely aligned with physical causes, such as occupational asthma and occupational dermatitis, are increasingly recognized as having biopsychosocial factors implicated in their onset and progression (Lunt & White, 2005). For example, the risk of exposure to asthmagens can be exacerbated by erroneous risk perceptions, inadequate knowledge of asthmagens, or poor safety culture (Smith, Karsh, Carayon & Conway, 2003).

If it is accepted that biopsychosocial factors play an important role in some, if not all, occupational health conditions, then these conditions need to be distinguishable in order that more clear cut avenues for risk prevention and management can be applied. One possible solution would be to distinguish health problems in terms of their principle cause or origin.

While the risk of exposure for occupational asthma and dermatitis may be exacerbated by biopsychosocial variables, the principle causal factor is exposure to a physical agent. For common health problems the causal agent can more confidently be asserted as psychosocial. Due to their physical as well as psychological basis, musculoskeletal disorders could be regarded as falling on a continuum between purely psychosocial and physical origins (i.e. biopsychosocial).

However the literature on 'coping' (reviewed in the orientation phase) implies that the biopsychosocial factors that maintain health conditions are more consistent across conditions.

Therefore, occupational health conditions can be distinguished according to whether they originate from initial exposure to either physical or psychosocial agents/hazards (see figure 10).

****Biopsychosocial factors can be implicated in the onset of most, if not all, occupational health conditions (Kaptein & Weinman, 2005; Lunt & White, 2005; Sarafino, 2005; Smith, Karsh, Carayon & Conway, 2003).**

**** Occupational health conditions can be distinguished according to whether the principal causal event or events is a physical or psychosocial hazard (Lunt & White, 2005; Smith, Karsh, Carayon & Conway, 2003).**

****The biopsychosocial factors that contribute to the progression and maintenance of occupational health conditions are more consistent across conditions than those associated with their onset (Kaptein & Weinman, 2005; Lunt & White, 2005, Sarafino, 2005).**

However the coping literature reviewed in the orientation phase implies that the biopsychosocial factors that maintain health conditions are more consistent across conditions. Figure 10 summarizes of biopsychosocial-related health conditions occurring in the workplace can be classified according to biopsychosocial role.

****The biopsychosocial factors that contribute to the progression and maintenance of occupational health conditions are more consistent across conditions than those associated with their onset (Kaptein & Weinman, 2005; Hagger & Orbell, 2003; Lunt & White, 2005, Sarafino, 2005).**

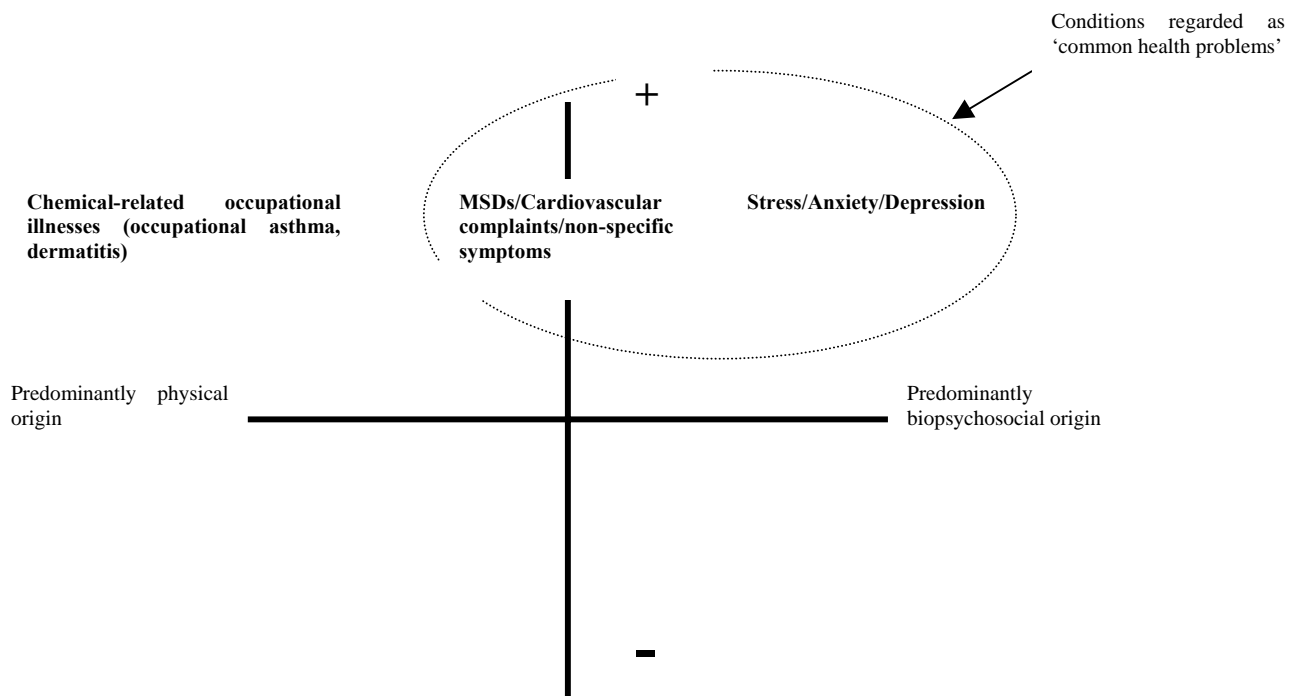


Figure 10: Distinguishing occupational health conditions according to the role of biopsychosocial factors in condition onset and progression

7.2 THE MECHANISMS

Appendix 1 summarises the content of articles upon which the following description of pathways is based. As way of providing a clearer explanation of the biopsychosocial mechanisms underpinning contemporary occupational health, descriptions are broken down into predisposing, precipitating and progression categories:

Predisposing factors: Those biopsychosocial risk factors that create a vulnerability to occupational health conditions (de Gucht & Maes, 2006).

Precipitating mechanisms: Those biopsychosocial mechanisms that contribute to symptom onset.

Progression mechanisms: Those biopsychosocial mechanisms that contribute to the maintenance and progression of occupational health conditions.

The following descriptions focus on conditions labelled ‘common health problems’ whose origins are predominantly psychosocial. It therefore excludes occupational asthma, occupational dermatitis or cancer. Nonetheless, it should be reiterated that the progression mechanisms also apply to chemical-induced occupational diseases.

7.2.1 Caveats

- Since there are few properly integrated biopsychosocial models the explanations will focus on the mechanisms operating at the psychosocial and psychobiological³³ ‘interfaces’, and then endeavour to draw the interfaces together.
- Within the scope of this review, it would be impossible to properly capture all the research that has been undertaken exploring the sociodemographic and psychobiological causes of condition onset and progression. This area is vast, constantly evolving and many issues are hotly debated. The mechanisms portrayed therefore represent a distillation of contemporary research in a way that can support policy development. They should be regarded as ‘rules of thumbs’, and certainly not rules without exception.
- The mechanisms presented are *possible* causal mechanisms, based on available evidence and theory. Confident assertions as to cause are prohibited by too many methodological weaknesses such as over reliance on self-reported data, cross-sectional investigations, exclusion of the undiagnosed unwell, and poorly defined variables (Briner 2000, 2005; Steptoe 2005). For example, understanding of the psychophysiological pathways has been constrained by the investigation techniques available. As techniques have advanced, so too has understanding of the mechanisms (Steptoe, 2005).
- As a reflection of contemporary research, the mechanisms presented focus on explaining how negative psychosocial influences affect health, rather than positive influences. Biopsychosocial research investigating the latter is not as well advanced.
- Explanations are based on a combination of empirically tested evidence and theoretical conceptual models. Evidence statements are produced for observations that have undergone some degree of testing.

³³ Interface between psychological factors and biological/physiological processes.

7.2.2 Predisposing Factors

Those biopsychosocial factors that appear to predict predisposition or vulnerability to common health problems can be divided under biological, cognitive-affective (emotional), immediate work environment, organisational, behavioural and societal/macro categories:

Biological: Age, gender, ethnicity, heredity/genetics, early life stressors, previous exposure to viruses, exposure to carcinogens/toxins, medical treatments, stress reactivity, previous injuries, previous history of illness have been implicated (Lutgendorf & Constanzo, 2003; Lightman, 2005).

Cognitive-affective: Health anxiety (tendency to be pre-occupied with bodily symptoms), health beliefs (regarding the causes and consequences of illness), anxiety, depression, and negative affect³⁴, fear of failure, and perfectionism are predictive of stress related conditions. Low job satisfaction, enthusiasm and enjoyment of work have also been found predictive, distress (Creed, Barsky, 2004; De Gucht, Maes, 2006; Marcus, Gurely, Marchi, Bauer, 2007). Hostility, as a component of Type A personality type³⁵ appears an important predictor of coronary heart disease (Kop, 2003; Everson-Rose & Lewis, 2005; Orth-Gomer, 2007;).

Work environment: Low job control, high job demands, effort-reward imbalance, monotonous work, negative supervisor co/worker responses, low social support, management style, lack of participation in decision making, long hours, and work/life conflict, consistently emerge as predictors of stress-related conditions (Ferrie, 2004; Marmot, 2005; Michie & Williams, 2004; Silcox, 2005).

Behaviour: Risk taking behaviour, coping behaviours and health behaviours such as smoking, diet, exercise, alcohol, drugs, participation in screening can exacerbate vulnerability (Conner-Smith & Compas, 2004).

Organisation: Organisation change (regardless of direction), perceived organisation justice, job status, job insecurity have been cited as predictive (Deely, 2006; Ferrie, 2004; Marmot, 2005; Michie & Williams, 2004; Silcox, 2005; Siegest, 2004).

Social: Socio-economic-status, social support outside work, culturally held beliefs about illness (Sperry, 2005) may conspire with other factors to create vulnerability to common health problems (Deely, 2006; Marmot; 2005 Orth-Gomer, 2007). Fennell (2003, cited Sperry, 2006) described six culturally held beliefs characteristic of Western Culture, particularly the US that may affect vulnerability and the support available to those with chronic illness. These comprised intolerance of suffering, intolerance of ambiguity, intolerance of chronic illness, cultural perceptions of disease such as social stigma to AIDS, disease enculturation or acceptance and media portrayal of illness.

This lists concerns those factors that can help to predict vulnerability to acquiring common health problems, which overlap with, but are not consistently the same as those that predict disability or return to work (Dunstan & Covic, 2006; Franche, Frank & Krause, 2006; Waddell, 2004). Nor is the list exhaustive. Inconsistencies and methodological shortcomings within the available evidence undermines the predictive strength of most of these factors. For example, a systematic review by Harvingsen, Lings, Leboeuf and Bakketeig (2004) of psychosocial factors predictive of low back pain, found no evidence linking 'work perception factors' such as job satisfaction, social support, work characteristics. Nonetheless, large, longitudinal studies, such as the Whitehall II, underway since 1985, and initially involving over 10,000 male and female

³⁴ See glossary for full definition

³⁵ Characteristics include high achiever, perfectionist tendencies and strong time urgency.

civil servants, provides more conclusive evidence of the relative importance of psychosocial risk factors. Significantly, it was found that social gradient³⁶ (job status) predicted differences in mortality and morbidity rates for a range of conditions, including heart disease, some cancers, chronic lung disease, gastrointestinal disease, depression, suicide, sickness absence, back pain, and general feelings of ill-health. This relationship was independent of other confounders such as cholesterol levels. Other psychosocial factors such as obesity, smoking, physical exercise, and job control mediated at least part of this relationship. However, job control, effort-reward imbalance (high effort, low reward), job security, organisational change, health behaviour, social support outside work and work-life conflicts all exerted independent effects on health. Such findings have been found in other European large scale studies.

Which predictors are important to which common health problems? With some exceptions, it seems that common health problems share many of the same biopsychosocial risk factors. This is perhaps because the experience of psychological strain is an intermediate state from which physical and mental health symptoms then arise. In general terms, the majority of these factors may therefore predict stress, and not directly other common health problems per se. Hostility, as personality disposition, appears particular to cardiovascular conditions (Kop, 2003; Orth-Gomer, 2007) and health anxiety appears more relevant to somatization³⁷ tendencies (Chaturvedi, Desai, G. & Shaligram, D. (2006); Creed, Barsky, 2004; De Gucht, Maes, 2006; Marcus, Gurely, Marchi, Bauer, 2007; Esler, Bock, 2004).

Which factors are amenable to control through risk management? HSE's Management Standards for Stress already tackle potent risk factors such as high demands, low control, effort-reward imbalance³⁸ and social support. Health behaviours can be improved through health promotion activities in the workplace that encourage, for example, exercise, healthy eating and smoking cessation. Social gradients effects might be reduced through policies encouraging participation and transparency in decision-making and fair career progression opportunities (Marmot, 2005; Davey-Smith, 2005).

Apart from ethical arguments, the range and complexity of biopsychosocial risk factors predisposing common health problems precludes screening 'out' 'vulnerable' individuals at the selection stage. All people have the potential to experience one or more factors to varying extents.

³⁶ See glossary, section 11, for full definition

³⁷ See glossary, section 11, for full definition

³⁸ Where the amount of effort is inadequately rewarded.

**Those biopsychosocial factors influencing predisposition to common health complaints stem from biological, cognitive, emotional, immediate work environment, organisation and work/life interface sources (Dunstanm & Covic, 2006; Schotte, Van-Boschhe, De Doncker, Claes, Cosner, 2006; Lutgendorf & Constanzo, 2003).

*Current understanding of the biopsychosocial factors creating predisposition to common health complaints is generally consistent across the different common health problems (Lutgendorf & Constanzo, 2003).

***A higher job status provides improved health status and life expectancy. Absence of harmful health behaviours such as smoking, poor diet and high level of job control can explain at least part of this relationship (Ferrie, 2004; Silcox, 2005; Marmot, 2005).

***Common work based stressors, such as low social support, effort-reward imbalance, and low job control can adversely affect health outcomes independently of job status. (Ferrie, 2004; Silcox, 2005; Marmot, 2005; Michie & Williams, 2004) These are already tackled by HSE's Management Standards for Stress

**Health behaviour risk factors imply that supplementing HSE's Management Standards with health promotion initiatives, would provide more complete protection against common health problems (Biddle & Ekkekias, 2005; Gesch, 2005).

*** Supplementing HSE's Management Standards with worker involvement, and equal opportunity policies could provide more complete protection against common health problems by reducing the adverse effects of social inequality (Biddle & Ekkekias, 2005; Gesch, 2005; Siegest, 2004, Michie & Williams, 2004, Radcliff, 2005, Tuomi et al, 2004).

7.3 PRECIPITATING MECHANISMS

7.3.1 At the Psychosocial Interface

*Cognitive mediation*³⁹: Once vulnerability has been created, subsequent interaction with external stressors can then precipitate symptom onset. This has been termed a 'diathesis-stress' process in which vulnerability can remain latent unless triggered by the occurrence of psychosocial risk factors (Bronzina & Abela, 2006; Lutgendorf & Constanzo, 2003; Schotte, Van-Boschhe, De Doncker, Claes, Cosner, 2006). The influence of protective factors such as social support and positive health behaviours can offset this transition. Triggering conditions can be distinguished according to whether they are a sudden increase in demand (acute), recurrent demands (episodic) or ongoing demands (chronic), with each condition generating different physiological responses (Kop, 2003; Lightman, 2005; Magiakou & Chrousos, 2006; Steptoe, 2005; Strike & Steptoe, 2004).

Whether a given set of conditions produces a stress response is principally determined by cognitive appraisal. This refers to the individual's judgements as to the severity of the stress, and ability to respond to the stressor (Lazarus & Folkman, 2004). A multitude of

³⁹ See glossary for full definition

other psychological factors operating at a conscious and sub-conscious level (Ferrari, Kwan & Freil, 2006) can influence this judgement. These include:

- Prior learning from dealing with previous similar or dissimilar situations (de Gucht & Maes, 2006; Sarafino, 2005; Nieuwenhaisjen, Zemper, Miner & Epstein, 2005; Sperry, 2006; Stewart-Williams, 2004)
- The expectations that this prior learning has created (for example, in ability to cope or standards to achieve) and causal attributions in favour of these expectations (for example, overestimating available time) (de Gucht & Maes, 2006; Kirsch, 2006; Stewart-Williams, 2004).
- Beliefs, for example about (a) the consequences of unmet demands, and whether those consequences personally matter (attitudes) (de Witte & Stroebe, 2004 or health beliefs (b) susceptibility to health problems, and (c) severity of those problems (Nieuwenhaisjen, Zemper, Miner & Epstein, 2005; Sheeran & Abraham, 1996). Such beliefs may account for why a given situation may be construed as a threat by some, but challenge by others (Nelson & Simmons, 2002).
- Confidence in ability to tackle those demands, given the individual's perceptions of their own skill-base (self-efficacy), the options available within their work environment (perceived control) or conflict with other goals (Gucht & Maes, 2006; Schwarzer & Fuchs, 2004; Stewart-Williams, 2004). Self-efficacy in turn is affected by prior learning and expectations.
- Social or cultural norms (organisational, familial or societal) about how such stressors should be handled (de Wit & Stroebe, 2006; Schwarzer & Fuchs, 2004, Myers, Newman and Enomoto, 2004).

Appraising a situation as stressful will also engender an emotional response. Which one will depend on the interaction between context and personality predispositions such as optimism, positive or negative affect, and hostility. Anger may arise if there is a sense of injustice, depression if a sense of hopelessness prevails, and associated with each may be anxiety (Sarafino, 2005). Ongoing mental health and physical health problems are often co-morbid making it difficult to determine cause and effect (Von Korff, 2005). However, the potential psychophysiological pathways by which persistent depression, anxiety, and to a lesser extent hostility mediate health outcomes is becoming increasingly apparent (Strike & Steptoe, 2006).

7.3.2 At the Psychobiological Interface:

The pathways by which psychological strain affects health can broadly be divided under two categories (a) behavioural, and (b) psychophysiological responses.

Behavioural: Harmful health-related behaviours such as smoking, lack of exercise, poor diet, alcohol consumption and poor compliance with treatment regimes are direct and important routes by which psychosocial variables such as depression can affect physiology (references). Whether as part of a usual lifestyle, or undertaken as a means of coping with stressors, their relative impact upon health cannot currently be separated out from other physiological pathways, and is complicated due to their interaction with such pathways (Nieuwenhaisjen, Zemper, Miner & Epstein, 2005; Steptoe, 2005; Steptoe & Wardle, 2004).

(b) Psychophysiological responses: Stress can directly affect health outcomes through interactions between the immune, neuroendocrine (hormones or chemical messengers) and the autonomic nervous system (Sarafino, 2005). Under conditions of acute stress these

systems interact to mobilize the body's resources in order to meet these additional demands through, the fight-flight response. It is under conditions of episodic or chronic stress that these normal responses become disrupted (Lutgendorf & Constanzo, 2003; Magiakou & Chrousos, 2005; Vale, 2004). Establishing a precise understanding of such disruptions and the harmful pathways by which these disruptions exert their effects has, until recently, been complicated by methodological shortcomings (Steptoe, 2005; Steptoe & Wardle, 2004). These limitations are summarized in box 3. Nonetheless, sufficient evidence has now accrued to allow the effects of these disruptions upon health to be grouped as causal, immune suppressive or illness modulatory (Steptoe, 2005, Steptoe & Wardle, 2004).

Box 3: Previous methodological drawback of psychophysiological research.

These include insufficient recognition of the role of coping resources, omission of undiagnosed health problems; measurement of personality determinants as using frequency rather than scale based measures, technique limitations and under-appreciation of the two way interactions between biological and psychological processes. Furthermore the evidence base revolves around measuring the amount or function of underpinning biomarkers, when in fact these are products of physiological interactions rather than interactions per se.

Causal: Psychological stress has been found to potentially induce damage in the endothelial tissue of blood vessels, which causes an inflammatory response that initiates plaque⁴⁰ development, or atherogenesis⁴¹ (Kop, 2003; Vale, 2004, Strike & Steptoe, 2004). Atherogenesis may be enhanced by other processes such as increased presence in the blood of lipids, or coagulation of platelets under conditions of stress (Strike & Steptoe, 2004 (Orth-Gomer, 2007, Vale, 2004). Heightened stress reactivity (physiological responsiveness to stress) has been found to increase susceptibility to this process (Steptoe, 2005, Vale, 2004). Where atherogenesis is well developed, an acute stressor (e.g. outburst of anger) may then cause part of the plaque to rupture, block the blood vessel (thrombosis) and then bring about a cardiac event (Kop, 2003).

Psychosocial factors have been hypothesized as causing musculoskeletal disorders through raised plasma stress hormone levels leaving muscles vulnerable to mechanical loads, or through increased muscle tension altering spinal loading and subsequent nutrition of spinal tissues (Hartvingsen, Lings, Leboef-Yde & Bakketeig, 2004). These hypotheses have yet to be substantiated.

Immune suppressive: During chronic stress and depression, aspects of the immune response may become down-regulated leaving the body vulnerable to infectious diseases by reducing host resistance (Lutgendorf & Constanzo, 2003, Steptoe, 2005; Vale, 2004).

Illness modulation: Psychophysiological reactions to stress may also exacerbate the severity and worsen the prognosis of pre-existing conditions. This has been seen in autoimmune conditions such as arthritis and steroid resistant asthma. (Lutgendorf & Constanzo; 2003, Steptoe, 2005; Vale, 2004).

⁴⁰ Fatty deposits

⁴¹ See glossary for full definition

7.3.3 Feedback and Integration:

So far the mechanisms described have been downstream. They paint an excessively linear portrayal of how psychosocial stressors effect health, and of the individual as a passive recipient of those stressors. However, there are two main upstream influences that can mediate the adverse impact of stressors. These operate at a behavioural and biological level and characterize the bi-directional relationships between the individual and their environment:

- Firstly, the individual may respond to the stressors in such a way that either exacerbates or undermines their severity. This may be through for example seeking support, going into withdrawal, problem solving, or engaging more or less in health behaviours. Their appraisal of external stressors, and choice of handling those stressors is an ongoing process that changes over time in light of experience. This process captures the transactional nature of individual's interactions with their environment (Mackay et al, 2004).
- Secondly, new evidence is emerging that upsurge in certain stress-induced biomarkers such as proinflammatory cytokines⁴² may actually cause depressive symptoms (Dantzer, 2005; Steptoe, 2005; Von-Korff, 2005). A self-perpetuating cycle of depression, physiological response and more depression may then ensue (Von-Korff, 2005).

⁴² *Non-antibody proteins that mediate communication between cells. They differ from hormones because they are produced by a number of tissues or cell types rather than by specialised glands.*

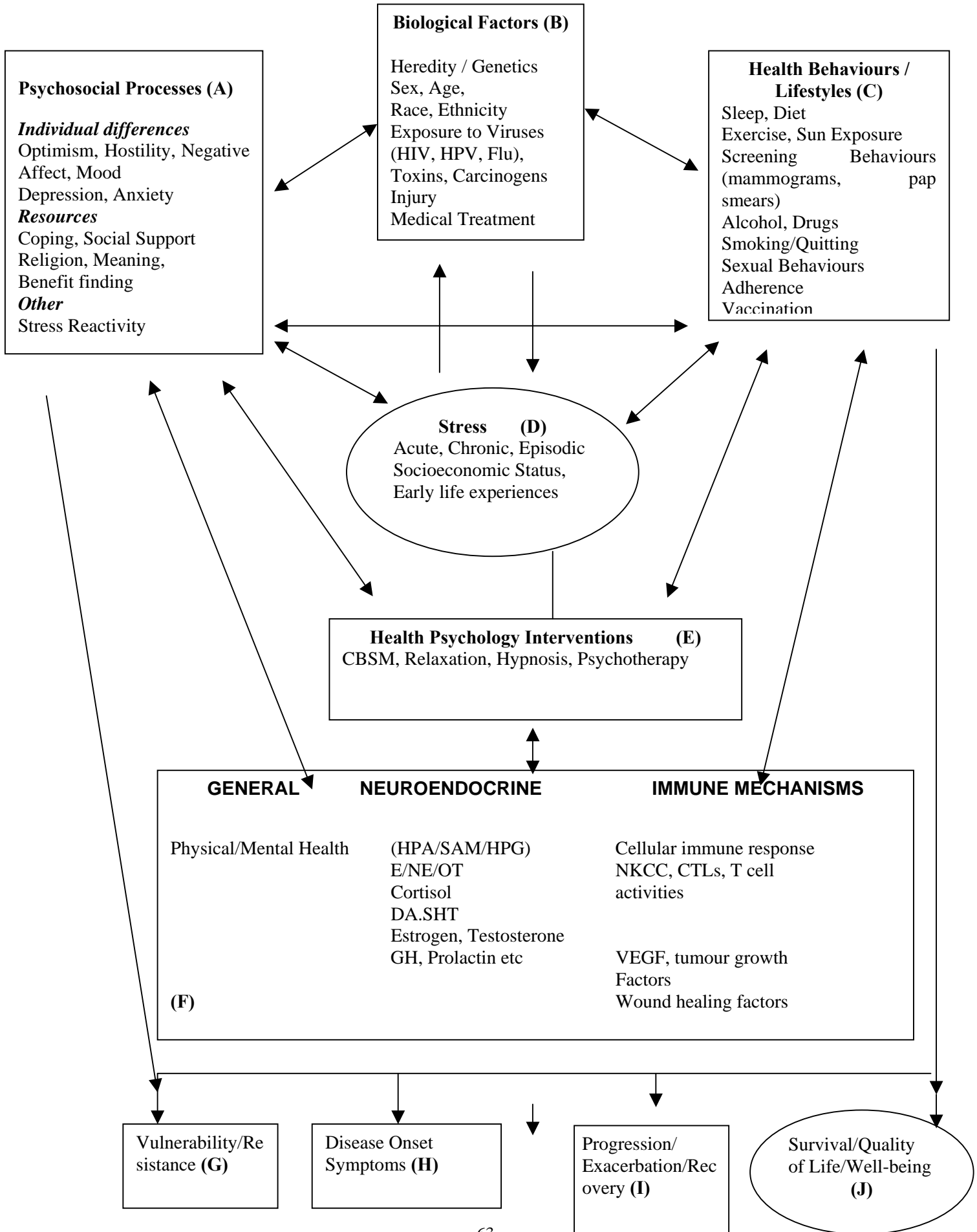


Figure 11: Example of a Biopsychosocial Model.

The interaction between psychosocial processes (Box A), biological factors (Box B), and health behaviours (Box C) leads to a vulnerability/predisposition (resistance) to illness (Box G), disease onset and symptoms (Box H), progression, exacerbation, recovery, and quality of life (Box I) and survival with concomitant quality of life (Box J) via processes involving neuroendocrine and immune mechanisms (Box F). Effects of life stress (Box D) are filtered through psychosocial processes (Box A) and health behaviours (Box C). Psychology interventions (Box E) can modulate effects of psychosocial processes and health behaviours on neuroendocrine and immune mechanisms and on resultant health outcomes. Psychosocial processes (A) encompass psychological and social factors, particularly those involve appraisal of and response to life stressors. These include personality variables (e.g., optimism, hostility, and negative affect), mental health and mood variables (e.g., depression and anxiety), coping, social support, spirituality, and sense of meaning. Health behaviours (C) include drug and alcohol use, smoking, sleep, nutrition, exercise, adherence to medical regimes, physical examinations, risk screenings and risky sexual behaviours, among others. Interventions (E) can be used to alter psychosocial processes (A: e.g., decrease depression, increase coping) or improve health behaviours (C: e.g., smoking cessation) to provide a more positive influence on neuroendocrine and immune factors and perhaps slow disease progression/exacerbation (from Lutgendorf & Costans, 2003).

7.3.4 Explaining non-specific symptoms:

Contemporary explanations of non-specific symptoms (also known as somatizing conditions) draw on the biopsychosocial perspective. A preoccupation with health concerns, or health anxiety can increase physiological arousal, the resultant symptoms of which may be interpreted as indicative of disease (Chaturvedi, Desai & Shaligram, 2006; Duddu et al, 2006). This interpretation is reinforced by a tendency to ignore contradictory evidence (confirmation bias) (Gucht & Maes, 2006; Marks, 2006; Stewart-Williams, 2004). Ironically, the perception of a threat triggers release of proinflammatory cytokines that then perpetuates a generalized sickness response such as fatigue, depression, pain, and loss of appetite (see figure 12). Such symptoms correspond to, non-specific symptoms (Dantzer, 2006, Fergusson, 2006).

***Cognitive processing accounts for individual differences in physiological responses to stress (Lutgendorf & Constanzo, 2003, Kop, 2003; LeFevre et al, 2003; Magiakou & Chrousos, 2005, Steptoe, 2005).

(Author observation) To mitigate the harmful effects of stress on health biopsychosocial evidence confirms that risk management should simultaneously seek to both reduce potential stressors and increase employee's coping resources.

**Mental health problems such as depression may cause, and be maintained by stress-induced pathophysiological processes. This relationship is difficult to verify due to co-morbidity of mental and physical health conditions (Dantzer, 2006; Von-Korff, 2005).

***Stress may cause or exacerbate common health problems through adoption of harmful health behaviours or non-uptake of beneficial health behaviours (Nieuwenhaijsen, Zemper, Miner & Epstein, 2005; Steptoe, 2005; Steptoe & Wardle, 2004).

**Stress can cause common health problems through inflammatory physiological mechanisms (Kop, 2003; Vale, 2004, Strike & Steptoe, 2004).

**Stress may reduce the body's resistance to infections by suppressing the immune system (Lutgendorf & Constanzo, 2003, Steptoe, 2005; Vale, 2004).

**Stress may aggravate the course of pre-existing health conditions via pathophysiological mechanisms (Lutgendorf & Constanzo, 2003, Steptoe, 2005; Vale, 2004).

*Evidence is emerging for a physiological basis to symptoms with non-specific aetiology (cause) in anxious people (Dantzer, 2005).

Author's observations: Continual advancements in understanding of the biopsychological pathways by which stress affects health widens the potential options for communicating health risks to employers and employees.

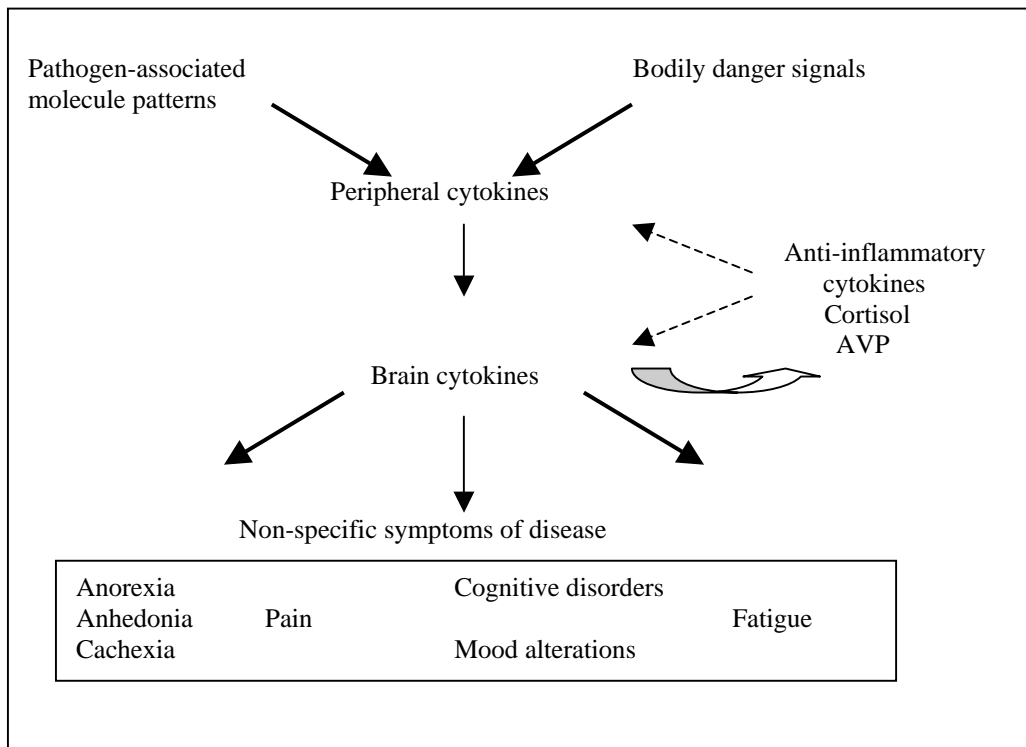


Figure 12: Cytokines are produced by immune cells that are normally activated by pathogen - associated molecular patterns (PAMPS). They can also be activated by endogenous danger signals such as stress (from Dantzer, 2006).

7.4 PROGRESSION MECHANISMS

7.4.1 At the Psychosocial Interface

Cognitive Mediation (Processing): Literature reviewed in the orientation phase emphasised that the way in which symptoms are interpreted as pivotal to coping choices. Leventhal's illness representations provide a useful framework for organizing the type of beliefs⁴³ that can interact with underlying pathology to determine coping behaviour. To recap, illness-representations comprise (1) identity or label for the health threat, (2) time line, (3) causes (internal or external), (4) consequences (real or imagined) (5) cure or control (de Gucht, & Maes, 2006). A systematic review of 45 studies investigating the relationship between different components of illness representations and health outcomes found that beliefs that (a) the consequences of illness would be serious, and (b) would last a long time, were negatively related to adaptive health outcomes such as well-being, social role functioning and vitality. In contrast, high perceived control was positively correlated with adaptive health outcomes (Hagger & Orbell, 2003). Factors that help shape these beliefs include the following:

⁴³ In this context the term belief is used to capture various cognitive constructs within psychosocial literature such as expectations, attitudes, schema (mental representations of understanding), and illness representations

- *Consequences:* In addition to actual impairments in physical functioning, catastrophic thinking can lead to an overestimation of the adverse consequences that may follow symptom onset. This can characterize pain behaviour. This may encourage employees to avoid activities they think may aggravate their condition such as being at work (Dunstan & Covic, 2006; Franche, Frank & Krause, 2006; Waddell, 2004). Fears over potential job and financial loss may delay a diagnosis being sought (Lunt & White, 2005).
- *Control:* Beliefs about: the effectiveness of treatment; availability of occupational health provision; perceived suitability of work place modifications job characteristics such as job control and time pressure; organisational climate⁴⁴ (extent of people orientation); perceived legitimacy of symptoms; and ability to work with health problems can all influence the individual's sense of control over their condition (Franche, Frank & Krause, 2006, Stewart-Williams, 2004, Waddell, 2004, Wade, 2006). Attributing the cause as unstable and external can undermine sense of control and increase helplessness (Roesch & Weiner, 2001).

Conscious and sub-conscious interactions between the environment appear to underpin choice of coping behaviour. Generally, tackling problems directly or tackling the emotional reaction is considered more adaptive than avoiding the problem (De Gucht et al, 2006). Exceptions may be where the problem is irresolvable, such as terminal cancer, in which case denial can actually facilitate more adaptive responses (Conner, Smith & Compas, 2006).

7.4.2 At the Psychobiological Interface

Non-Specific Symptoms: Section 7.3.4 explained how anxiety could perpetuate non-specific symptoms through causal attribution biases⁴⁵, cytokine release, and sickness response process. Symptom onset may add further anxiety.

Pain perception: Pain often accompanies MSD complaints. This makes it difficult to separate progression of MSD complaints from pain perception (Dunstan & Covic, 2006). In the short-term pain processes are believed to produce physiological adaptations that prevent aggravation of any underlying injury. These adaptations can result in excessive sensitivity to pain (hyperalgesia) and pain stimulation by normally benign stimuli (allodynia). In the long term, cognitive-affective variables such as catastrophic thinking and resultant anxiety states may sustain these temporary adaptations, thereby producing chronic amplification of pain signals (Dunstan & Covic, 2006). As an example of classical conditioning, repeated pairing of pain sensations with negative emotional states, solicitous carers or colleagues, or work activity may mean that these states, when reencountered can trigger pain perception independently of original pain-generating situations (Dunstan & Covic, 2006, Turk et al, 2002). Other sets of cognitive conditions can raise the threshold at which pain is perceived, for example in order to meet a temporary challenge or physically escape danger. Expectations, in these instances may trigger release of pain-suppressant endorphins (Stewart & Williams, 2004).

Allostatic load: Having illness in itself can be stressful (Clark, Bond & Hecker, 2007). Thus the stress that is secondary to symptom onset and progression can actually exacerbate symptoms through the chronic stress pathways described in section 3.3.2. This process draws on the concept of "allostatic load". McEwan & Stellar (1993) described this as the general wear and tear imposed on the body through ongoing exposure to physical or psychological challenges. Due to definition and measurement difficulties, allostatic load appears to remain a largely theoretical explanation for how symptom onset can progress to lasting disability (Clark, Bond & Hecker, 2007).

⁴⁴ See glossary for full definition

⁴⁵ Tendency to focus on information that confirms existing beliefs

7.4.3 Feedback and Integration

Feedback mechanisms can explain how symptom onset progresses into lasting disability:

- Sickness behaviour or pain behaviour may be reinforced by social/environmental based responses such as attention and empathy, participation in passive rather than proactive behaviour, avoiding unwanted responsibilities, or access to compensation pay-outs (Dunstan & Covic, 2006).
- Prolonged medical investigations in pursuit of a physical cause may reinforce illness beliefs that there must be a physical pathology. This is known as an iatrogenic effect (Dunstan & Covic, 2006; Waddell, 2004).
- 'Fear avoidant behaviour' stemming from a wish to avoid situations believed to cause pain, such as return to work. This can mean that underpinning beliefs that work causes pain persist because they are never proven wrong (Dunstan & Covic, 2006; Waddell, 2004).
- Similarly, co-morbid mental and physical health conditions may continue to reinforce each other through brain-cytokine pathways and a generalized sickness response (Dantzer, 2005; Von Korff –2005).
- An inappropriate coping behaviour, such as continuation of smoking, or lack of physical exercise, will worsen the overall prognosis.

These feedback mechanisms underscore the bi-directional interactions that characterize the biopsychosocial approach.

***Individual differences in beliefs about the cause, consequences and control over health problems can explain variations in disability outcomes where the underlying pathology is constant. This effect is mediated by coping behaviours (*Hagger & Orbell, 2003, Creed & Barsky, 2004, De Gucht & Mane, 2006; Esler & Bock, 2004*).

***Belief in ability to control symptoms can, in general, be an important component of an adaptive response to common health problems (*Hagger & Orbell, 2003; Wade, 2006*)

**Practices such as salary-commensurate compensation or prolonged medical investigations may reinforce illness behaviour (*Dunstan & Covic, 2006; Franche, Frank & Krause, 2006*).

*Stress due to having a common health problem can exacerbate symptoms through the psychophysiological pathways associated with stress (*Clark, Bond & Hecker, 2007; Lutgendorf & Constanzo's 2003*).

*Mental and physical common health problems are often co-morbid because they may share similar psychophysiological pathways (*Dantzer, 2005; Von-Korff, 2005*).

*Remaining off-sick due to fears that return to work may worsen a condition can be self-reinforcing. An individual's choice not to return to work means that the underlying assumption is not then tested (*Dunstan & Covic, 2006; Franch, Frank & Krause, 2006*).

SECTION D: WELL-BEING INFLUENCES

8 WELL-BEING INFLUENCES PHASE: METHOD

8.1 OBJECTIVES

This phase sought to identify:

- The important individual, work based (e.g. job design, ergonomic, organisational, good job) and external factors (e.g. life events, lifestyle, support etc) that influence well-being at work for employees with and without common health problems.
- A positive and negative interaction between these factors that mediate and moderate impact on well-being at work.
- How people who remain at work differ from those who go off-sick due to common health problems of similar severity.

8.2 SEARCH STRATEGY

Literature searches were undertaken by both HSL project team staff and by HSE information services. Search terms were constructed by combining well-being related terms identified in the orientation phase (subjective well-being, resilience, hardiness, quality of life, sense of coherence, morale⁴⁶, engagement, flow) with domain terms (employer, occupational, job, work, occupation, social, society, individual). Where unwieldy numbers of results were produced, causal related terms were added to the search string (cause, mediator, moderator⁴⁷, antecedent, contributor, interactions, predictor).

A combination of health and safety, occupational health, medical, social science, and economic literature databases were searched. These comprised Health Safe, Oshrom, Medline, Embase/ScienceDirect, Allied & Contemporary Medicine, British Nursing Index, Nursing and AlliedHealth, DH Data, Emcare, Psychinfo, Global Health, Gale Health and Wellbeing and Google Scholar. Database searches were supplemented with:

- Recent academic well-being books listed within British Psychological Society and Occupational Medicine circulars
- References from Waddell and Burton's (2006) "Is Work Good for your Well-being" report.
- Bibliographies of articles used within the orientation phase.
- Citation searches of key figures in occupational well-being search such as Gordon Waddell, and Keith Palmer.

8.3 SELECTION CRITERIA

To keep the volume of literature handled management within the time and budget constraints of this review, selection criteria was prioritised using the system portrayed in figure 13 below. This enabled:

- Focus on research undertaken since the launch of HSE's Management Standards for Stress (i.e. 2003 onwards) (Mackay et al, 2004). This should, in principle advance upon earlier research in this field.

⁴⁶ See glossary for full definition

⁴⁷ See glossary for full definition

- Inclusion of reviews published within this time frame, since these provided potentially useful distillations of contemporary research in well-being.
- Should reviews provide an incomplete picture of well-being predictors, longitudinal research that might address positive and negative precursors of well-being. Longitudinal research was prioritised over cross-sectional research due to its increased ability to capture potentially causal relationships.
- In the event that reviews and longitudinal research failed to adequately profile positive relationships, cross-sectional investigations of positive well-being antecedents (whose presence increases well-being).

Recent cross sectional research of traditional stressors was therefore excluded. Decisions to include or exclude were jointly undertaken by two researchers. Data was extracted from a total of 78 articles fulfilling the inclusion criteria.

A separate sift of articles was undertaken to identify literature factors differentiating those whose remain at work from those who go off sick with common health problems. This drew on literature identified by the well-being and biopsychosocial mechanism research strategy. Articles were included that, according to their title and abstracts, endeavoured to predict sickness absence for people with common health problems.

8.4 DATA EXTRACTION

Spreadsheets were set up that allowed data from each article (see appendix 2 for selected articles) to be extracted according to the following categories:

- Article Name.
- Article type (systematic review, meta-analysis, critical review, narrative/descriptive review, longitudinal study, cross-sectional study).
- Level (individual, work environment, socio-demographic, interaction/model).
- Factor/variable name.
- Relationship description
- Evidence base (comments based on the quality of evidence).
- Comments on any evidence differentiating those who stay at work from those who go off sick.

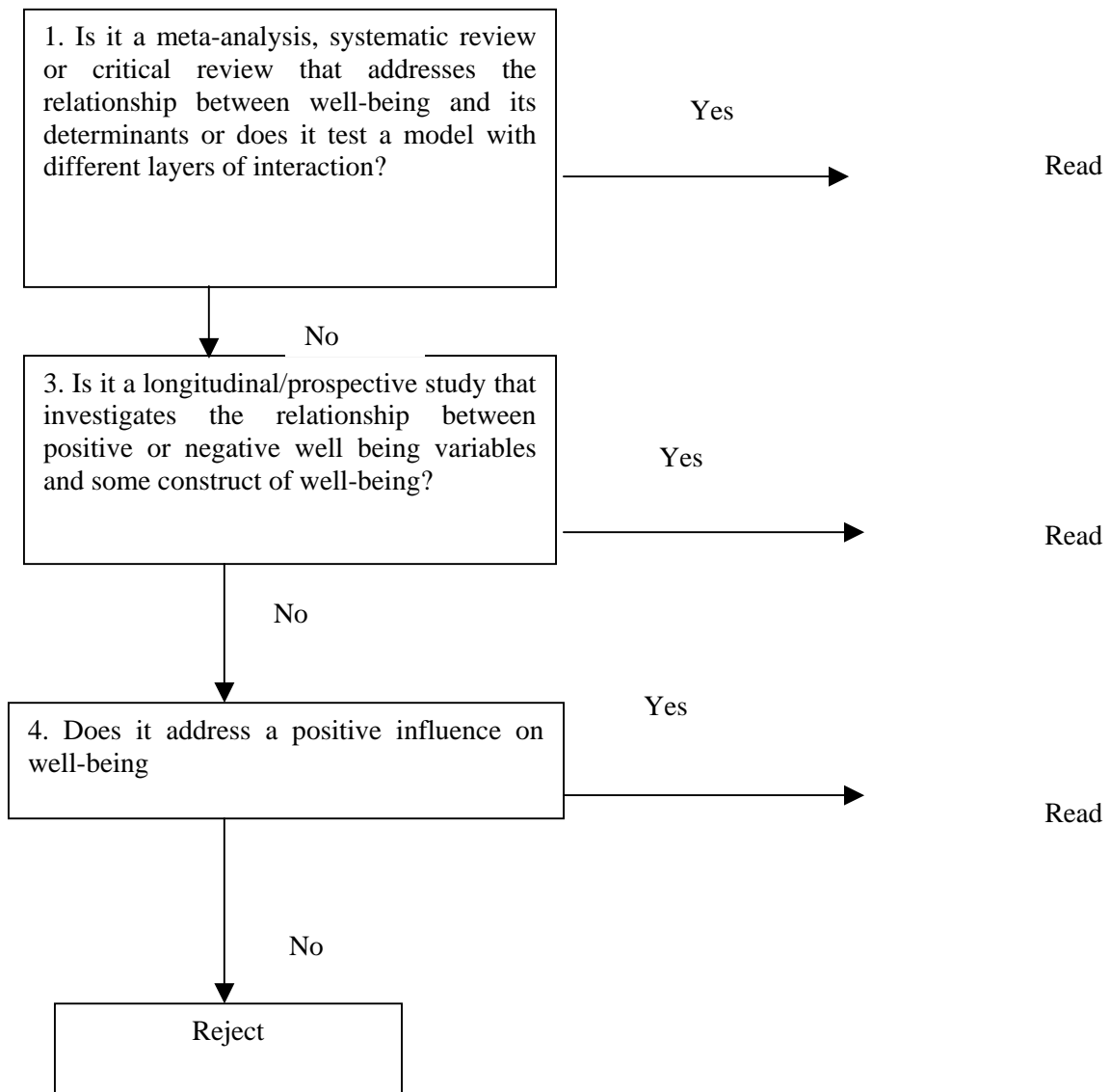


Figure 13: System for prioritising selection criteria for identifying recent and relevant well-being research.

8.5 EVIDENCE WEIGHTING

Evidence statements were produced to capture the main findings of the review. The quality of evidence supporting each statement was ranked using the criteria specified in the table below. An asterisk system was used to denote the level of quality. When drawing up these statements, a second reviewer double-checked the decisions and phrasing of the first.

Table 11: Weighting System for well-being based evidence statements	
Strong***	Generally consistent findings provided by (systematic reviews/meta-analysis of) multiple scientific studies or multiple longitudinal studies.
Moderate**	Generally consistent findings provided by (reviews of) fewer and/or methodologically weaker scientific studies or fewer longitudinal studies..
Weak*	Supporting evidence is inconsistent. Or (for positive relationships only) supporting evidence is based on cross-sectional studies only. Or (for sickness absence prediction only) supporting evidence is based on cross-sectional studies only.

The quality of evidence associated with each factor or antecedent was also weighted using the criteria specified in box 4.

<p>Box 4: Evidence quality weighting system for individual well-being antecedents</p> <p>Articles were rated using the following three-part classification scheme:</p> <ul style="list-style-type: none"> • Strong evidence: Antecedents supported by evidence from systematic reviews, meta-analyses or multiple longitudinal studies demonstrating consistent findings from multiple studies • Moderate evidence: Antecedent supported by evidence from critical/narrative reviews or fewer longitudinal studies • Weak evidence: Antecedent supported by inconsistent evidence or evidence derived from cross-sectional studies
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9 WELL-BEING INFLUENCES PHASE: RESULTS

9.1 WHAT DETERMINES WELL-BEING AT WORK?

9.1.1 Occupational Well-Being in Context

Limitations within the evidence base: The contemporary literature on occupational well-being is extensive. Appendix 2 summarises the content of articles used in this review. Searches of relevant electronic databases for this review yielded hundreds of articles concerned with well-being at work. However, a number of themes are detectable that are deemed important and relevant to this literature review:

- The well-being at work literature cross links with the occupational stress literature and is dominated by the “stressors and strain” approach to occupational stress research. Hence, the underlying assumption in many of these studies is a deficit approach: where poor work experiences give rise to stress/strain and cause low levels of well-being (Cotton & Hart, 2003).
- Many studies of occupational well-being use the cross-sectional study design. Although longitudinal studies are more powerful in explanatory terms, this type of study is less common, presumably because of cost and time implications. Briner (2005), and Kompier and Toon (2005), criticise the limitations of much of the empirical research in the field for its over reliance on cross-sectional study designs, limited use of objective measures and the use of over-sophisticated statistical techniques.
- These shortcomings in research design and measurement have led to poor uptake of such occupational well-being interventions in the workplace. A typical consequence being poor predictive validity of many of the widely used measures (Rick et al, 2001).
- Finally, a rather narrow focus along with the circular reasoning implicit in the stressor-strain approach (Briner, 2005) suggests it may be of limited value in developing a fuller and more complete understanding of occupational well-being..

These shortcomings are a feature of much of the occupational well-being literature, and therefore limit understanding of how occupational well-being is derived, maintained and eroded. For example, Cotton and Hart (2003) point out the short-comings of the standard approach to stress-strain research:

- The broader organisational context is often not considered
- Stress/strain is typically assumed to be an employee issue
- The effects of stress/strain are viewed independently of performance outcomes e.g. profits

The methodological limitations dominating well-being literature makes it difficult to determine causality. For this reason, when interpreting evidence, potential well-being determinants are described as antecedents i.e. as events, situations or circumstances that are associated with and precede increases or decreases in levels of well-being. Determinants implies more causality than the evidence base allows.

Positive antecedents: The deficit approach taken by much of the literature fails to consider the potential of occupational well-being having both positive and negative dimensions. For example, of the several hundred research articles considered by this review, only 78 met the inclusion criteria, on the basis that they reported positive relationships. None of these used a longitudinal study design.

Well-being definitions: Occupational well-being is defined and measured in a variety of ways. The most common indicators of occupational well-being were self-reported job satisfaction, burnout⁴⁸ and raised levels of depression and/or anxiety, measured, for example, using variations of the General Health Questionnaire (Huppert & Whittington, 2003). Typically, these well-being indicators are measured using self-report questionnaire. More objective measures of well-being were also assessed, such as sickness absence levels or physical health indicators including morbidity rates for particular health conditions e.g. lower back pain.

Hart and Cooper (2001) suggest occupational well-being also has emotional and cognitive components. Positive and negative affect comprise the emotional component of well-being and are operationalised by the concepts of morale and distress respectively. Job satisfaction comprises the cognitive element of well-being.

Collectively, contemporary evidence suggests that reliable measures of well-being should encompass objective and subjective indexes of emotional, cognitive and physical functioning, and cover positive and negative dimensions.

A dichotomous concept: Huppert et al, (2003) present empirical evidence that well-being has both positive and negative components, and that these components function independently and in different ways. These authors found that mortality was predicted by an absence of positive well-being (as measured by a modified version of the GHQ) rather than by psychological symptoms of stress, and suggest a need to include specific measures of positive well-being in health outcomes.

In the same vein, emerging evidence implies distress and morale are distinct and independent influencers of individual behaviour and experience (Cotton and Hart, 2003). For example, the research conducted by George (1989, 1996) showed that employee absenteeism correlate more strongly with morale than with distress. Furthermore, Hart and Cotton's (2003) research indicates that morale and distress are determined by different sets of factors. The picture is further complicated by empirical support (Griffin et. al, 2000; Hart and Wearing, 1995) for the view that morale and distress may operate differently at individual and group levels.

By implication, this suggests that the stress-strain approach underpinning much well-being at work research, may be over-simplistic in emphasis. Harnessing the positive and negative well-being dichotomy makes possible alternative explanations of the adverse outcomes typically labelled as stress e.g. that these outcomes might arise not from the presence of stressors per se, but from the absence of positive experiences at work, such as low morale for example. This approach offers up the possibility that the drivers of positive and negative well-being are conceptually different, playing independent roles in their influence on well-being (Lightsey, 2006). Overall, this evidence suggests that positive well-being is contingent on minimisation of stress, and optimisation of morale and physical health.

⁴⁸ See glossary for definition

**The well-being concept allows a different perspective on issues traditionally explained by the stress-strain approach to negative outcomes from work (*Hart, 1999, Hart and Cotton, 2003, Huppert & Whittington, 2003; Lightsey, 2006*).

**Emerging evidence suggests that well-being and its inverse (i.e. stress symptoms, ill health) may not be a unitary concept work (*Hart, 1999, Hart and Cotton, 2003, Huppert & Whittington, 2003; Lightsey, 2006*).

**Preventing stress appears necessary but not sufficient for securing occupational well-being optimisation of morale and physical health are also important and independent factors (*Hart, 1999, Hart and Cotton, 2003, Huppert & Whittington, 2003*).

The following account of well-being antecedents divides them into individual, work environment and external categories. The factors with potential to discern between those who with common health problems who remain at work and those who take sickness absence are then discussed. These various influences are then integrated to highlight important interactions contributing to well-being.

9.1.2 Individual Antecedents

This review cites a variety of antecedent variables that may impact on occupational well-being at the level of the individual. These antecedents break down into the categories demonstrated in table 12. Some concepts, such as emotional labour or self-esteem, can span more than one category.

This four-part classification used in table 12 proves useful in terms of understanding the relative impact of these various antecedents. Examining the articles reviewed in terms of relative quality of evidence for individual antecedents produces the classification below (see box 4, page 73) for weighting system). Research appears to have focussed most on the negative affect (distress/stress) and cognitive (job satisfaction) aspects of the phenomenon.

Table 12: Examples of individual well-being antecedents encountered within the literature review.

Category	Example Antecedents*
Personality	<ul style="list-style-type: none"> • Emotional intelligence (Furham & Petrides, 2003). • Extraversion⁴⁹ and neuroticism (Lynn & Steel, 2005) • Cognitive hardiness (Beasley et al, 2003; McCalister et al, 2006) • Locus of control (Spector et al, 2002) • Positive/negative affectivity • Dispositional optimism (Deiner et al, 2003)
Behaviour	<ul style="list-style-type: none"> • Coping behaviour (Park et al, 2003) • Physical exercise (Penedo et al, 2005; Peterson et al, 2006)
Cognitions	<ul style="list-style-type: none"> • Intrinsic work motivation⁵⁰ (Vaananen et al, 2005) • Intrinsic orientation e.g. value work as a means to intellectual fulfilment (Malka & Chatman, 2003) • Organisational identification (Wegge et al, 2006) • Coping appraisal • Personal goal facilitation (Doest et al, 2006) • Emotional labour (de Castro et al, 2004; Zammuner et al, 2005) • Resilience/Meaning (Lightsey et al, 2006).
Emotions/affect	<ul style="list-style-type: none"> • Positive/Negative affect (Pavot et al, 2004, van Horn et al, 2004) • Optimism (Makinkangas et al, 2003) • Self esteem (Deiner et al, 2003; Makinkangas et al, 2003)

* See glossary, section 11, for definitions

⁴⁹ See glossary for full definition

⁵⁰ See glossary for full definition

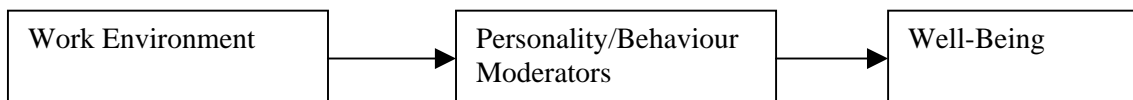
Table 13: Summary of Quality of Evidence Supporting Individual Antecedents

Quality of Evidence	Example Antecedents
Strong	<ul style="list-style-type: none"> • Self esteem
Weak to moderate	<ul style="list-style-type: none"> • Positive/Negative affect • Self esteem • Optimism
Weak	<ul style="list-style-type: none"> • Emotion work⁵¹/labour • Locus of control

How individual antecedents exert their effect of well-being differs in two main ways:

1. *Mediation:* The impact of antecedents involving some degree of cognitive processing appears to be dependent on the work environment characteristics (Kompier & Taris, 2005). For example, emotional labour (Zapf, 2002) may have an adverse effect on well-being such as where a service employee is required to retain a cheerful disposition in the face of frequent customer hostility. Likewise, a proactive coping style may not work if a problem cannot be solved. In other words, the work environment mediates the impact of these individual variables upon well-being:

2. *Moderation:* Other individual antecedents moderate (increase or decrease) the extent to which environment influences affect health, as shown below. These include personality dispositions. For example, the tendency to construe events in a negative way (negative affectivity) can magnify stressor effects. Other individual moderators can act as buffers by reducing stressor effects. High self-esteem, high internal locus of control, or positive affectivity can operate in this way.



*The impact of cognitive-affective variables upon well-being at work is mediated by the environment/context (Kompier & Taris, 2005).

*Personality can moderate the effect of environmental influences upon well-being (Nelson & Simmons, 2005).

⁵¹ See glossary for full definition

9.1.3 Work Environment Antecedents

The literature discusses a number of work environment antecedents of occupational well-being. These include the following:

Good relations with management	Gilbreath et al, 2004; Harter et al 2002; Houkes et al, 2003; Lorretto et al, 2005; Souza-Poza et al, 2002
Interesting job	Houkes et al, 2003; Malka et al, 2003; Souza-Poza et al, 2002
Conflict	Carsten et al, 2005; Lorretto et al, 2005
Job demands	de Lange, 2004; Kuper et al, 2003; Lorretto et al, 2005; Michie & Williams, 2003; Nielson et al, 2004; Souza et al, Toumi et al, 2004
Job control	Godin et al, 2004; Grebner et al, 2005; Michie & Williams, 2003; de Lang, 2005; Kuper et al, 2003; Neilson et al, 2004; Rydstedt et al, 2006; Neidhammer et al, 2006
Social support	Bough et al, 2004; de Lange et al, 2004; Godin et al, 2004; Hupport, 2004; de Lange, 2005; Lowe et al, 2003; Lorretto et al, 2005; Michie & Williams, 2003; Rydstedt et al, 2006; Nezelek et al, 2006
Exposure to shift and night work	Costa et al, 2003
Organisational climate	Cotton & Hart, 2002; de Joy et al, 2003; Le Ferre et al, 2003; Huppert & Whittington, 2003; Kenny et al, 2005; Kivimake et al, 2003, Wilson et al, 2004
Job & task design	Costa et al, 2004; de Croon et al, 2005; DeJoy, 2003; Grebner et al, 2003; Michie & Williams, 2004; Tuoini et al, 2004; van Mierlo et al, 2005; Wilson et al, 2004

Several environment determinants are consistent with those recognised as contributing to stress such as job demands, job control and support. There is considerable overlap with the HSE Management Standards for Stress regarding of demands, control, support and relationships (Mackay et al, 2004). Organisational climate is not overtly represented in the HSE Management Standards, and is subsumed by other standards, although certain aspects of this concept (e.g. change) are included. However the concept of organisational climate is broader than change per se (see box 5).

The quality of evidence concerning these environmental determinants was **weak**, mainly due to the methodological short-comings described earlier (i.e. cross-sectional research designs, questionable sampling schemes and narrative/descriptive reviews). Michie & Williams (2003) systematic review of the stress literature identified long hours, work overload, pressure, impact on personal lives, lack of participation in decision making, poor social support, unclear management and work role as consistently predictive of psychological ill health. Less clear cut evidence was found for the significance of job design and possession of an interesting job

Box 5: Organisational Climate Characteristics:

The ways in which an organisation impacts on the perceptions of its employees e.g:

- managerial practices,
- worker involvement
- leadership behaviours, and
- organisational processes such as the appraisal and reward systems.

Cotton and Hart (2003) link organisational climate with distress and morale. They found organisational climate to be the strongest predictor of morale (a key aspect of positive well-being) and quality of working life in police officers. Lesser predictors were positive and negative work experiences, coping behaviours, emotionality and extraversion. A sense of organisational injustice may prevail where organisational practices are perceived as unfair. Longitudinal evidence has linked low organisational injustice to poor well-being. Organisational justice could be regarded as a product of organisation climate (Kivimaki, Ferrie, Head, Shipley, Vahtera & Marmot, 2004).

***The immediate work environment determinants of occupational well-being overlap to a considerable extent with the HSE stress management standards (*Michie & Williams, 2004*).

** Emerging evidence demonstrates that organisational climate is also a key characteristic of positive well-being due to its positive impact upon morale (*Cotton & Hart, 2003, Dejoy & Wilson, 2003*).

9.1.4 External Antecedents

There are relatively few papers published in this area. Nonetheless certain external determinants of occupational well-being appear to be more important than others. Income has a much stronger relationship with well-being than does neighbourhood, for example (Burns, 2005; Frank et al, 2005). Two issues are central to this:

- Firstly, difficulty in defining or measuring certain constructs may hamper investigation. Income in itself is a complex construct: is a successful income measured against what an individual previously earned, what the average person in their neighbourhood earns, the national average etc? Income is part of social status and of social hierarchy (Dolan et al, 2006), but problems in extrapolating a simple mediating/moderating/main effect relationship arise due to the volume of interaction that any external determinant will have with other external determinants.

- Secondly, their impact appears to be a function of how an individual perceives their external environment in terms of social status, income, quality of life etc. Research suggests that all individuals view their circumstances in a unique way, influenced by their own previous experiences and the experiences of others close to them. These perceptual ‘yardsticks’ thus make objectifying these ratings very difficult as each individual has a different life history and a different set of expectations (Dolan et al, 2006).

To summarise, it seems apparent that the influences of external determinants on well-being are mediated substantially by comparison with other referent groups or states (e.g. past experiences or future aspirations). The vastness of external determinants, the methodological difficulties in measuring such constructs, and the influences of individual comparison limit the conclusions that we are able to draw about this aspect of occupational well-being.

Nonetheless, the following social determinants consistently appear as influential:

Income – Various authors have specified the link between income and well-being status (Arthaud-Day & Near, 2005; Dolan, Peasgood & White 2006, 2006; Frank, 2005). Other investigations have not borne out this relationship (e.g. Gasper, 2005). Importantly, income has a number of different connotations and is linked to other factors such as absolute wealth, saving, debt, social capital⁵²/networks and living status. Research suggests that certain components of income have an impact on well-being, however the conclusion asserts that income is at present inexplicably linked with a number of other external determinants, making it difficult to pinpoint a definite main effect (Dolan et al, 2006).

Age – Well-being varies with age, with minimum levels occurring between the ages of 35 and 50 (Dolan et al, 2006.)

Social Class, and Standard of Living – The concept of social class is an important external influence on well-being. The general consensus in the literature is that disadvantaged groups in society suffer from poorer health outcomes (Hauck et al, 2004; Malka & Chatman, 2003; Marmot, 2005, Martikainen et al, 2003; The Working Foundation, 2006; Weich et al, 2003). A number of research papers focus on this construct, although once more it is bound by complexity (Ihelebrack et al, 2003). Firstly, an individual’s definition of their social class may differ from what is found using a measurement system. Standard of living is again a complex issue, where the type of neighbourhood people live in is not as important as how they conduct their lives in private (Propper et al, 2005). This suggests that trying to categorise individuals according to their social standing does not result in an accurate interpretation of their well-being status.

Social Networks: Social capital, referring to the extent of social networks or social bonds between people, has recently emerged as a concept important to well-being. Its effect upon well-being depends on the level of trust within the network. Where trust is present, evidence is accruing demonstrating the beneficial effects that the breadth and depth of social-networks have upon well-being outcomes. (Helliwell & Putman, 2005).

Beliefs – Emotional acceptance of some proposition, statement or doctrine.

Active Lifestyles – This construct suggests that partaking in physical activity can promote better well-being. Interestingly the research on this construct again highlights the complexity of the factors that contribute to well-being outcomes, as being able to partake in an active lifestyle is thought to be moderated by income levels, where individuals defined as belonging to lower socio-economic groups have less active lifestyles (Peterson et al, 2006).

⁵² See glossary for full definition

Work-Life Balance –Western cultures tend to be characterized by a work-to-life interference as opposed to the reverse. Home life therefore pays the price for psychological involvement in work, and the time demands it generates. Full understanding of this area is again undermined by a lack of longitudinal research and time sampling methods (Poelmans, Driscoll, Beham, 2005).

* *The external/societal determinants of occupational well-being are less well documented in the occupational well-being literature, however this should not detract from the potentially important influences that these variables have on well-being (*Delle-Fave, 2005; Ihlebaek & Eriksen, 2003*).

***External/societal well-being determinants appear to be influenced by individuals' comparing their experiences to other referent groups, their own previous experiences or to a future desirable state (*Andrea et al, 2003; Arthaurd-Day & Near, 2005; Burns, 2005; Dolan et al, 2006; Frank, 2005; Marmot, 2004, Hauck & Rice, 2004; Radcliff, 2005*).

***Social class can be considered to be an important external determinant of occupational well-being, although its effect appears strongly mediated by other social factors (*Helliwell & Putman, 2005; Marmot, 2004; Martikainen et al, 2003; Propper et al, 2005, The Working Foundation, 2006*).

9.1.5 What differentiates those who remain at work from those who go off sick?

One would reasonably expect increases in levels of occupational well-being to be associated with decreases in sickness absence (SA) rates. A recent UK labour force survey (LFS) covering 60,000 households conducted by the Office of National Statistics (Barnham and Begum, 2005) showed that SA is highest in the following occupations and industries. Common to all these areas is the job requirement of dealing extensively with other people.

Table 15: Occupations and Industries at High Risk of Sickness Absence

Occupations	Industries
1. Personal service	1. Financial intermediation
2. Process, plant and machine operatives	2. Health and social work
3. Administrative and secretarial	

Using logistic regression, Barnham and Begum investigated a number of socio-demographic characteristics including age, sex, industry, occupation, region, public or private sector, age of youngest dependent child, disability and workplace size. The factors showing significant associations with all causes of SA were:

- Disability
- Occupation
- Workplace size
- Age
- Age of youngest dependent child

SA was found to occur most often in employees who:

- are women
- are young people
- work for public sector employers and
- work in large workplaces

***Sickness absence rates are highest in jobs and industries that demand high levels of contact with people (*Barnham & Begum, 2005*).

***Those at risk high SA rates generally tend to be women, young people, public sector employees and employees in large work places although their relative importance may vary between different common health problems (*Barnham & Begum, 2005*).

Variation: A systematic review to ascertain sickness absence predictors selected 18 investigations of sick leave due to low back pain from an original 1063 articles published between 1966-2003 (Steenstra, Verbeek, Heymans & Bongers 2005). The review found the highest risk of long-term absence amongst older women, those with radiating pain, those with high levels of physical disability and high physical work-load. However, the relative importance of predictors may vary between common health problems. In the case of MSDs, being older appears strongly predictive of sick leave (Steenstra et al, 2005). This contrasts with Barham & Begum's 2005 survey where youth was found to be a predictor.

The most important clinical, psychosocial and socio-demographic predictors of long term incapacity isolated by Waddell's systematic review (Waddell, Burton & Main 2003) are listed in box 6. A tendency to remain at work when the individual should otherwise be off-sick (presenteeism) is predicted by feelings of responsibility, being subject to monitoring systems, being female, middle-aged, and without high job control. Once again, the work environment determinant determines coping behaviour.

Box 6: Important Clinical, Psychosocial and Socio-demographic Predictors of Back Pain (Waddell, 2004)

Clinical predictors of long-term incapacity in back pain sufferers:

- Previous back problems
- Previous medical consultancy
- Attribution of blame
- Severity of current pain
- Physical demands of work
- Getting on with co-workers
- Expectations of ability to manage work in the next six weeks/months

Psychosocial predictors of long-term incapacity

- Age
- Pain Intensity/Functional Disability
- Poor perception of general health
- Fear avoidance
- Catastrophising

Socio-demographic predictors of long-term incapacity

- Gender
- Age
- Marital/Family Status
- Health Conditions
- Social class/occupational education level
- Time since last worked
- Occupational Status
- Local Unemployment Rate

Work Place Stressors: Lower levels of job control appear to be the most important predictor of work-based psychosocial predictor of sickness absence. Job demands and social support tend to have less predictive power (Andrea, Beurkskenz, Metsmaker, Amelvoort, Schayck, 2003; Fuererstein, Baldwin, Harrington, Lopez & Haufler, 2006; Head, Kivimaki, Martikainen, Ferrie, Marmot, 2006).

Beliefs: Belief-related variables figure strongly in Waddells' (2003) list of clinical predictors of disability (see box 6). In a longitudinal survey of 3,725 young Finnish employee, Kujela, Tammelin, Remes, Vammavaara, Ellen & Laitman (2006) found a strong significant association between beliefs about inability to work with a health problem, and sickness absence. Sperry (2006) emphasises that such beliefs vary according to whether individuals are in a crisis, stabilisation, resolution or integration stage of chronic illness (Fennell, 2004, cited in Sperry, 2005). This has parallels with the flags system used in back pain rehabilitation (Dunstan & Covic; Waddell, 2004). During the resolution stages, individuals start to accept the limitations posed by their illness. This evolves into a readiness to re-engage with employment or social networks during the integration stage. Accommodating employees' changing 'workability' beliefs could therefore be an important component of a successful rehabilitation intervention.

Nonetheless, efforts to prevent absenteeism should not encourage presenteeism⁵³. This will require dual emphasis on the individual's workability beliefs⁵⁴ and appropriate work-place modifications in the event of symptom development

***Low levels of job control and the presence of long term disease/disability are strong predictors of SA rates (*Andrea, Beurkskenz, Metsmaker, Amelsvoort, Schayck, 2003; Fuererstein, Baldwin, Harrington, Lopez & Haufler, 2006; Head, Kivimaki, Martikainen, Ferrie, Marmot, 2006*).

**Belief in the ability to work with common health problems is an important determinant of remaining at work, or returning to work early (*Tammelin, Remes, Vammavaara, Ellen & Laitman; 2006*).

9.1.6 Interaction

Hart and Cooper (2001) offer an organisation health framework that draws on positive determinants of well-being (see figure 14). This combines the cognitive-relational (Folkman and Lazarus, 1984) and dynamic equilibrium (Hart 1999) theories of stress with quality of life and well-being perspectives. The model specifies both individual and organisational factors in the following ways:

- Individual factors: emotionality, extraversion, emotion and problem focused problem solving
- Organisational factors: organisational climate, employee's positive and negative experiences

The organisational health model brings together these individual and organisational factors to form an integrated approach to understanding the combined impact of individuals and organisations on well-being. Hart et al (2003, 1999, 1996) claim empirical support for the model across a range of contexts and occupational groups. Reporting the outcomes of a cross-sectional study on positive determinants of well-being, Cotton and Hart (2003) argue that organisational climate, positive work experiences and extraversion impact strongly on levels of morale. Levels of distress were correlated with emotionality, organisational climate and positive/negative work experiences. No evidence was found for the impact of coping strategies on well-being.

In separating the positive and negative determinants of well-being, Cotton and Hart suggest that occupational well-being is a multifaceted phenomenon. Distress, the facet of well-being typically studied in the stress literature, was found to be determined strongly by the tendency to be emotional. Organisational climate, positive work-experiences and extraversion were found to positively influence morale. This finding is supported by the work of Wilson et al, (2004) who highlighted the fundamental role of organisational climate on organisational effectiveness. These factors appear to independently influence well-being and organisational climate has a powerful influence at the general organisational level.

⁵³ See glossary, section 11 for definition.

⁵⁴ See glossary for full definition

Cotton and Hart go on to conclude:

- Obtaining significant improvements levels of occupational well-being will be achieved only by improving aspects of organisational climate e.g. having an appropriate approach to leadership
- That targeting psychosocial hazards using traditional risk assessment approaches are likely to achieve patchy outcomes at best because they do not embrace important characteristics of the occupational climate.

In summation, individual determinants affect well-being by either moderation or mediation of workplace (or situational) influences. The workplace influences most frequently related to well-being are largely consistent with those that determine stress. The exception is organisational climate. Emerging evidence suggests that organisational climate is closely linked with morale, and it is morale that determines positive well-being over and above the absence of stressors. Pathways by which social factors affect well-being are obscured by a multitude of interactions with other variables but it seems that social gradient directly correlates with an improved occupational well-being. Also, expectations of better living standards, driven by referent comparisons are an important component of this relationship. On succumbing to a common health problem, positive workability beliefs, complemented by appropriate workplace modifications, appear pivotal to reducing SA.

Personal and Organisational Characteristics

Employee Well-being

Organisational Performance

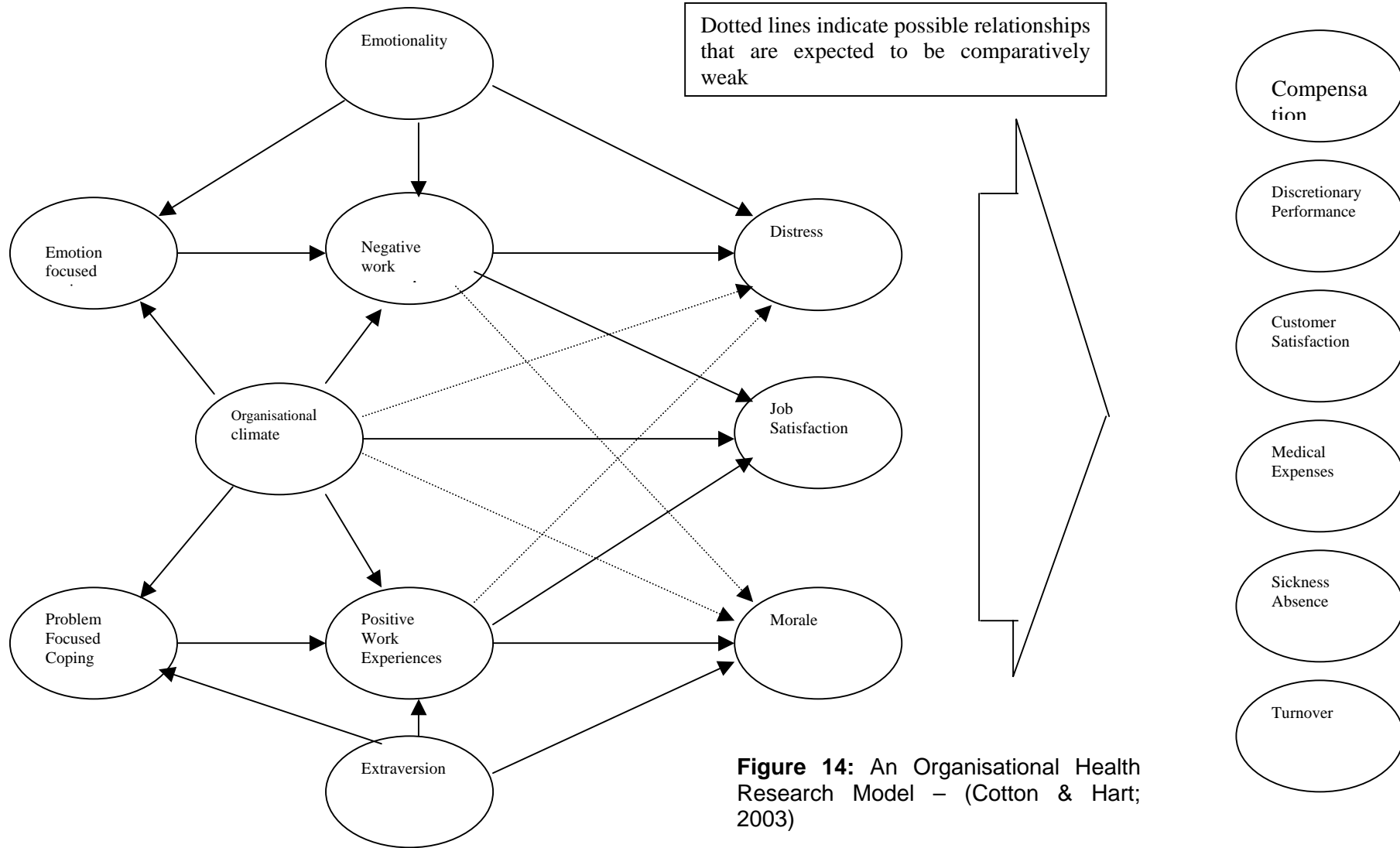


Figure 14: An Organisational Health Research Model – (Cotton & Hart; 2003)

10 DISCUSSION

10.1 WHAT ARE THE MAIN FINDINGS?

This review spans a range of issues concerning the development and control of common health problems. The main messages from each of the four phases can be summarised as follows:

Orientation Phase:

- *Subjectivity:* Well-being is a subjective composite of physical, psychological and emotional functioning.
- *Expectations and values:* Positive perspectives of well-being at work differ from standard approaches to stress according to the significance attached to intrinsic motivation. The match between the individual's and organisation's values is an equally important contributor to occupational well-being. Psychological contract research increasingly demonstrates a match between job expectations and job reality as another potential driver of occupational well-being.
- *More nebulous than stress:* The evidence base for positive approaches to well-being is weaker than for stress. This may be because the field is relatively new, and because it does not lend itself to usual empirical testing. Well-being is a more nebulous construct than stress.
- *Lay and Expert Differences:* Assessing differences between expert and lay persons' representations of illness offers a method for optimising adjustment to chronic common health problems.
- *Perseverance:* Well-being interventions must be planned in detail and be sustained if they are to be effective.

Risk Management Phase:

- *Unwritten application:* Employers' practices in managing the risk of common health problems are poorly documented.
- *Physical preference:* Where undertaken, it seems that risk management processes have been applied to the physical rather than psychosocial aspects of common health problems. Practices appear to align with the HSG 65 risk management model.

Biopsychosocial Mechanisms of Common Health Problems:

- *Scope:* The biopsychosocial approach has more scope in explaining the development and progression of common health problems than purely biomedical or psychosocial perspectives.
- *Uptake barriers:* Uptake of the biopsychosocial approach has been hampered by practical barriers to assimilating the approach into medical practice and lack of intra and inter-disciplinary working.
- *Diverse interactions:* Wide variation in the interactions between biological, psychological and social variables across different individuals, contexts and over time mitigates

production of a reliable 'one size fits all' biopsychosocial model. Such a model would not be sufficiently sensitive to the nuances of different common health problems.

- *Differentiating causal mechanisms:* Biopsychosocial processes potentially apply to the development and or progression of all occupational health conditions. Causal mechanisms vary according to whether the precipitating event is mainly psychosocial or physical in origin. Biopsychosocial mechanisms underpinning the progression of symptoms are, by comparison, more likely to be consistent across all occupational illnesses. The main cause of common health problems is mainly psychosocial. This precludes conditions such as occupational asthma, occupational dermatitis and chemical-induced cancers.
- *Realised vulnerability:* Onset of psychosocial-induced symptoms is predisposed by a vulnerability generated from a combination of biological, psychological and environmental risk factors. A sudden increase in, or continuation of external stressors can act to precipitate symptom expression. Social gradient, lack of job control, effort-reward balance, social support and poor health behaviours strongly predispose vulnerability.
- *Psychophysiological routes:* Stress either (1) directly causes physical health problems through adoption of harmful health behaviours or through underlying physiological inflammation mechanisms; or (2) indirectly contributes to health problems through suppressing the immune system or aggravating the course of existing conditions.
- *Risk reduction versus asset enhancement:* In the event that biopsychosocial risk factors cannot be reduced, ensuring the presence of health assets, such as increased social support, or health behaviours should buffer any adverse effects on well-being.
- *Co-morbidity:* Physical and mental common health conditions are often co-morbid, possibly due in part, to shared psychophysiological pathways.
- *Non-specific physiology:* Evidence is emerging for a physiological basis to 'non-specific' (somatic) symptoms, such as fatigue, headaches and nausea. Non-specific symptoms have not previously been regarded as having a clear physical origin.
- *The power of belief:* Beliefs about the cause, consequences and controllability of common health problems are important determinants of how employees respond to a health condition.
- *Reinforcing illness behaviour:* External reinforcers such as compensation, sickness benefits, avoidance of situations perceived as pain inducing, avoidance of unwanted responsibilities or undesirable situations can help maintain ill health even if an underlying physiological pathology is not evident.

Well-Being Influences

- *Separating morale from stress:* Emerging evidence suggests the psychosocial contributors to positive well-being have some independence from those that cause stress. Morale is an important example, as high morale boosts well-being, but low morale does not cause adverse stress outcomes.
- *Organisational climate is key:* Morale appears to be a product of the prevailing organisational climate.
- *More than absence of stress:* Preventing stress is not sufficient for securing occupational well-being.

- *Relative social capital*: Social class appears to be an important external determinant of well-being at work. Its impact is strongly mediated by many other social factors. Comparisons with other preferred referent groups or states of being seemed to account for much of its effect. Reducing social inequality should therefore improve well-being across the population.
- *Rehabilitating workability beliefs*: Instilling positive workability beliefs for those with common health problems is more likely to ensure they remain at work, or return to work earlier providing appropriate workplace modifications are in place and they are physically able to do so.

10.2 CAVEATS

There are certain limitations within the underlying evidence base:

- This review draws on literature published since the beginning of 2003. Although closely aligned with the launch of HSE's Management Standards for Stress, this time frame may mean that earlier work has been underrepresented. Nonetheless, recent work is likely to have built upon and developed the findings of earlier investigations. Emphasis on reviews and longitudinal studies for well-being research may mean that good quality, well-controlled cross-sectional studies may have been underrepresented.
- Stress research is widely recognized as being undermined by a predominance of cross-sectional research, self-report measures, and inadequate definitions of stressors. These same problems impede the reliability of well-being research. Large discrepancies in how well-being interventions have been conducted and measured hamper attempts to synthesise findings across studies. Even so, by its very nature, well-being may not lend itself to standard empirical testing.
- The circular argument that applies to stress also applies to well-being. The point at which a given factor stops being a contributor, and becomes a component of well-being is hard to define.

10.3 WHAT DOES A HOLISTIC VIEW OF WELL-BEING OFFER THAT STRESS DOES NOT?

The Management Standards for Stress offers a national framework for controlling many of the psychosocial risk factors encompassed by these studies. This review aims to add value by offering a holistic view of well-being where bio psychosocial and well-being concepts are combined. According to this review, a holistic view of well-being tells us that:

1. The risk factors for common health problems cannot properly be understood, nor mitigated through risk management, if the wider context in which they arise is not taken to account. This means that the organisational climate and work-life interface may need to be systematically factored into the risk assessment and management processes. A typical approach to stress reduction perhaps focuses on stressors in the immediate work environment operating at a team or local level, at the expense of more peripheral but significant psychosocial hazards.
2. Rehabilitation interventions encompassing all components of the biopsychosocial model would be exponentially more effective than those containing one or two of its components. This is an example of the 'whole being more than the sum of its parts'. A

rehabilitation approach combining conventional medical treatment with cognitive behavioural therapy is likely to flounder unless it practically considers how precisely return to work will unfold (Sperry, 2006). This calls for more integrated working between occupational health, psychology and human resource services. Likewise, employees with non-specific symptoms may be alienated by psychosocial driven interventions that omit conventional medical treatment. Such employees might feel that they are not believed and lead to disengagement from their workplace (Elser et al. 2004).

In addition, important well-being drivers operating at the psychosocial interface imply that:

1. Well-being will be boosted if work-place stress reduction strategies are complemented by practices that deliberately target morale. As exemplified by the low suicide rate during World War II (Cotton & Hart, 2003), high morale buffers the effects of stress. This is not to say that boosting morale is the complete answer. Rather, it means that as well as reducing psychosocial risk factors, efforts should also focus on 'well-being assets' that enhance resistance to stressors. As well as morale, this review has highlighted other factors such as realistic job expectations, a good fit between personal and job values, finding intrinsic meaning in work, physical fitness, good nutrition, flexible coping styles, flexible working practices, and positive social support as likely examples of well-being assets that should systematically be assessed alongside stressors.
2. The effects of social gradient cannot be ignored in attempts to improve well-being at work. Worker involvement and equal opportunity policies could help reduce the perceived gap between different job ranks within the work place. Integration with policies aimed at reducing social and health inequality in society at large should have a larger impact upon well-being.

Clearer understanding of psychobiological pathways also implies that current risk management practices for common health problems could be enhanced by:

1. Allowing employees genuine opportunities to engage in positive health behaviours, such as exercise, healthy eating and health surveillance/screening through the workplace.
2. Utilizing biomarker evidence as a risk communication tool for demonstrating to employers the effects that stress or negative well-being has on health. To protect individual's identity this would have to be based as averages across groups.
3. Accommodating the role of beliefs on how adaptively common health problems are managed. Health beliefs operate at an individual and organisational level as part of its climate of culture. Providing suitable adjustments are made in the work environment, policies and practices that help instil positive beliefs about controllability of symptoms should help reduce sickness absence.
4. Systematically examining how job-specific factors such as physical demands, colleagues attitudes to sickness and work load may reinforce illness behaviour, or sickness absence.
5. Systematically examining how wider societal factors such as compensation payments, and sickness benefit payments reinforce illness behaviour.

The main differences between a standard approach to stress, and a holistic view of well-being, is summarised in box 7.

Box 7: Contrasting Holistic Well-Being with Stress

- A holistic view of well-being would require risk management processes to consider all important biopsychosocial influences upon well-being, including organisational climate, health behaviours, and social gradient. Stress prevention/management tends to focus on stressors in the immediate work environment.
- Well-being at work is more than the absence of stress. Well-being also requires the presence of morale as a consequence of a positive organisational climate, met expectations, physical fitness and a fit between job and personal values.
- A holistic view of well-being also draws attention to the role of health beliefs in determining how adaptively an employee, or employer responds to health problems. Stress management tends to overlook the role of health beliefs.
- A holistic view of well-being emphasises the importance of contextual reinforcers upon 'well-being' behaviour. Again stress management tends to overlook the impact of reinforcing factors.

10.4 WHAT ARE THE IMPLICATIONS FOR PROMOTING ATTENDANCE?

The following recommendations aim at promoting attendance rather than preventing common health problems or poor well-being because:

- In principle, it should be possible to remain working with a common health problem, although perhaps with modified job role or activities.
- The presence of subjective well-being does not mean the absence of common health problems.

These recommendations are therefore also about encouraging well-being with or without a common health problem. These are broken down according to the HSG 65 risk management POPMAR model as follows:

1. *For human resource management:* As well as identifying a suitable match between skills and experience and job requirements, recruitment practices should also establish a match between a candidate's job expectations and job reality as well as between personal and organisational values. Job promotion material should avoid painting an unrealistic picture of the environment in which a prospective employee will be working. The match between job expectations and values and job reality could also be reviewed during subsequent performance appraisal, particularly if dips in performance become problematic.
2. *For risk management at the policy level:* As the foundation upon which organisational culture or climate is built, the phrasing of organisational policy should convey that:
 - i. Well-being as the joint responsibility of management and staff. Employees are expected to actively manage well-being at work. Directing the responsibility exclusively towards management could undermine the sense of control

employees have over their own health. Sense of control has been identified by this review as, in general, a key feature of an adaptive coping response to health problems. Conversely, focussing responsibility exclusively on employees may reinforce a blame culture and run counter to the HSE's Management Standards efforts to encourage employers to prioritise their staff's welfare. For optimal well-being, evidence suggests that responsibility should be fairly balanced between employees and managers so that neither party fails to act because they assume it the responsibility of the other. The organisational policy should convey this balance.

- ii. Within reason, working with a health condition can be a norm, where appropriate modifications can be made and appropriate support offered. Reinforcing health anxiety by negative responses to ill health might contribute to a culture that perpetuates common health problems (Halligan & Aylward, 2005). Accommodating health limitations needs to be seen as usual practice if the workplace is to contend with the health needs of a workforce where common health problems are a regular feature of everyday life. Factors such as the aging workforce increase this imperative.
 - iii. Being at work is generally good for well-being (Waddell & Burton, 2006) where there is an appropriate person-job fit. Policy should increasingly be positively framed in such a way that emphasises the benefits of preserving well-being (for example in terms of vitality, efficiency, morale for individuals) rather than exclusively focus on the adverse consequences of exposure to psychosocial hazards. This applies as much to HSE guidance as it does to wording within an organisations policy.
3. *For risk management at the organisation level:* This review has also emphasised a positive organisational climate as essential for good morale and well-being at work. Box 5 listed the domains of organisational climate. To steer a positive organisational climate it is essential that policy arrangements are consistent with underlying wording. Policies that allow for flexible working, flexible sickness absence management, flexible rehabilitation, performance gauged according to quality not quantity, worker involvement in decision making, equal opportunities, opportunities to practice positive health behaviour, and social networking opportunities is more likely to build a healthier, more resilient and more adaptable work force.

Key to a positive organisational climate is consistency between managerial practices and well-being policy and rhetoric. Consistency will provide employees clearer understanding of what their organisation values and what to expect from their job. It will also foster trust. Consistency between management practices and well-being policy could be audited in the following areas:

- i. Selection and recruitment
- ii. Positive health behaviour opportunities
- iii. Organisational values
- iv. Flexible working
- v. Work load management
- vi. Corporate wide communication

- vii. Worker involvement/equal opportunities
- viii. Performance measurement/monitoring
- ix. Staff support structures
- x. Rehabilitation and sickness management
- xi. Communicating success

Managers at all levels could also undergo peer-observation⁵⁵ to check that their actual behaviours are consistent with well-being messages. Training may then need to be offered to managers to ensure they properly manage the needs of employees with health needs. Well-being checks and targets could also be built into performance appraisals to ensure employees reasonably fulfil responsibility towards their own well-being, while at the same time respecting the boundaries of confidentiality concerning well-being influences operating outside the workplace. Employees could be provided with the tools and knowledge to review their own situation with respect to their well-being outside the workplace, e.g. proportion of ‘quality time’ in home life.

4. *For risk management at the planning level.* A holistic view of well-being would require that the risk assessment process underpinning HSE’s Management Standards for Stress be extended to include other factors or standards that appear to drive well-being over and above that achieved by the prevention of stress. These are listed in table 16 below.

Table 16: Supplementary Well-Being Domains

‘Holistic’ Well-Being Domain*	Examples	Rationale
Health Behaviour Opportunities (Availability, accessibility)	Nutrition, physical exercise, health surveillance/screening.	Boost resilience.
Organisational Climate	Consistency between ‘what is said’ and what is done, well-being role models/ leadership, communicating success, performance measurement, transparency in decision making	Independently related to morale.
Work/life balance (overlaps the Management Standard ‘role’)	Flexible working practices	Encourage consideration of contextual well-being influences.
Social equity/parity	Worker involvement, equal opportunities	Encourage consideration of contextual well-being influences.
Health beliefs/reinforcers	‘Workability’, symptom controllability, symptom cause	Adaptive adjustment to health limitations by employee and employer.

Addition of these factors is intended to supplement the existing stress risk assessment process, and not supplant it. Risk assessment should therefore provide a more robust baseline upon which well-being improvements can be built.

⁵⁵ Managers would need to be trained in constructive feedback techniques.

It could be argued that many of the solutions generated by the model underpinning HSE's Management Standards⁵⁶ would also tackle these well-being domains. For example, greater worker involvement would also enhance job control. Increased social support would help prevent stress and enhance well-being. However, this assumes that solutions generated for tackling stress will inadvertently also promote positive psychological well-being. The addition of these factors to the assessment process to directly improve wellbeing would:

- Force employers to tackle systemic or organisational wide influences upon well being that might otherwise be overlooked in stress prevention.
- Mean that solutions for improving well-being might be generated that would not have arisen under a stress prevention framework. For example, the importance of finding a fit between job expectations and job reality might not be captured as a solution for stress reduction.
- Emphasise that well-being is more than the absence of stress. For example, even where stress has been reduced as far as reasonably possible, additional efforts to increase social support and networking might still be necessary to boost well-being.

For this reason, it is suggested that organisational climate/culture be reinstated as an assessment criteria, due to its potential independent influence on morale. Previously it had been removed as a standard due to being subsumed by the other Management Standards for Stress (Mackay et al. 2004)

Addition of the above factors to the risk assessment process underpinning the Management Standards would provide a *well-being risk assessment*. Poor attention to these factors combined with low scores on the management standards puts workers at risk of poor well-being. Nonetheless, at the expert workshop preceding this review it was argued by some that the term risk might reinforce a risk averse, and, by implication, work averse culture for those with common health problems (Bowen, Lunt & Lee, 2006). In other words, use of the word risk in the context of common health problems might hamper development of more proactive workability beliefs. As an alternative the term 'well-being assets' would more positively frame those factors, which through their presence (as opposed to absence), better ensure occupational well-being. This suggestion would have to be balanced against risk assessment's strong foothold within employers understanding of health and safety. If the risk terminology is fixed, perhaps a compromise solution would be to integrate a well-being assessment into the current process.

5. *For monitoring risk management:* Direct and indirect indicators of stress (such as self-reported stress, sickness absence rates) could be supplemented by quality of life measurements to capture subjective well-being judgements, and physiological well-being indicators such as body mass index, heart rate variability and stress biomarkers. Recommendations for promoting attendance are summarised in box 8.

⁵⁶ Currently covering demands, control, support, relationships, conflict and role

10.5 WHAT ARE THE IMPLICATIONS FOR REHABILITATION?

Since rehabilitation is a more individually focussed exercise, it requires consideration of the complex biopsychosocial interactions that affect return to work or maintenance of illness behaviour, where it is unwarranted by physical pathology. In addition to current understanding of good practice in this area, such as ensuring tailored solutions and graded resumption of work activities, this review has told us that:

1. Assessing underlying health beliefs or illness representations concerning the cause, course and controllability of symptoms, and comparing those with expert views could provide a useful tool for instilling more adaptive health beliefs. Providing suitable work modifications are made, this could include enhancing workability beliefs through cognitive behaviour therapy.
2. Systematically assessing the secondary gains of staying away from work to identify reinforcers of illness behaviour that can be countered or managed. This would be warranted where underlying pathology would otherwise allow return to work.
3. Taking into account employee's stage of rehabilitation, adjustment to their condition, and expectations as an important element of rehabilitation. Modified cognitive behaviour could facilitate readjustment and development of adaptive expectations.

Sperry outlines a range of assessment measures that would form a comprehensive biopsychosocial based rehabilitation assessment approach (Sperry, 2006) (see table 17).

Box 8: Recommendations for Promoting Attendance

1. Selecting the right person for the job should be done on the basis of establishing a fit between expectations and values with job reality, as well as between skills and experience and job requirements. This match can subsequently be managed at performance reviews.
2. More HSE guidance needs to balance highlighting risks inherent in the workplace with positively framing the benefits of being at work.
3. As the foundation for organisational culture, the phrasing or organisational policies should (a) emphasise well-being as the joint responsibility of management and staff, and (b) 'normalise' common health problems as part of the course of working and organisational life.
4. Policies that allow for flexible working, flexible sickness absence management, flexible rehabilitation, performance gauged according to quality not quantity, worker involvement in decision making, equal opportunities, opportunities to practice positive health behaviour, and social networking opportunities is more likely foster well-being.
5. Well-being audits, and management peer observation techniques could be harnessed to ensure consistency between what is said, and what is done for well-being as way of securing a positive organisational climate. **Managers may then need to be trained to improve the way by which they manage employees experiencing health problems.**
6. Well-being issues could systematically be factored into performance appraisal to help employees and management to work together towards improving well-being.
7. Improving well-being within the workplace would require that HSE's Management Standards for Stress be broadened out to include other important well-being influences identified by this review. Due to its independent relationship with morale, this would require reinstatement of an organisational culture/climate standard to force systematic consideration of contextual influences upon employee's well-being.
8. A holistic well-being monitoring approach would require quality of life judgements, physiological health indicators and health beliefs to be measured alongside standard stress indicators.

10.6 WHAT ARE THE POTENTIAL RESEARCH OPTIONS?

The conclusions drawn in this literature review suggest a number of ways forward for future research. This research programme would serve a number of purposes:

- Formally test the various hypotheses relating to factors such as organisational climate, moral etc.
- Generate new knowledge and insights into the concept of occupational well-being and its determinants.
- Generate more accurate knowledge of employers' practices in applying risk management to common health problems and associated business benefits.

This research programme would need to be an evolving rather than a fixed entity, being reviewed and revised at key stages to reflect the findings and changing needs of employers and policy makers.

Specific examples of possible approaches to research include the following:

5. **Large Scale Cohort Studies:** Longitudinal in-depth exploration of relationships between well-being antecedents, well-being outcomes and business outcomes based on a positive as opposed to deficit model of well-being. This would ideally be on a similar scale to Whitehall II. Such an undertaking would require substantial investment in terms of time and financial resources. However, this is likely to be the best available method for providing the evidence base necessary for testing positive well-being determinants.
- **Comparing similar organisation types with different sickness absence rates:** This would involve enlisting the support of a number of organisations that differ in terms of their organisational climate and sickness absence rates, but are from the same industry sector or organisational type, and are of the similar size. An organisation with a considered approach to selection, with low staff turnover, that employs innovative approaches to organising its people and their work would be hypothesised to generate a more positive organisational climate than organisations using more traditionally derived business models. The hypothesis would be that absence rates for common health problems across a specified period should be lower in organisations with more positive climates. Further comparisons to elucidate key features, characteristics and practices could also prove useful in reaching a deeper understanding of the links between occupational well-being, organisational climate and the business costs of common health problems.
 - **Risk Management:** The paucity of evidence within the literature concerning application of risk management to common health problems suggests that a more direct investigation would be necessary to attain a true picture of employers' current practices. Possible approaches might include audits, surveys or case studies.

Table 17: Components of a comprehensive biopsychosocial assessment for individual rehabilitation (Sperry 2006)

Biopsychosocial Domain	Rationale	Example of Measures (From Sperry, 2006)
Disease course and progression	Diseases differ in the nature of the course they take. As the interpretation of progression is subjective, it is useful to measure illness progression, course and impact.	Millon Behavioural Medicine Diagnostic (MBMD, Millon, Antoni, Millon, Mengher & Grossman, 2001)
Illness representation	People differ in their psychological reactions to illness and their interpretation of the disease process. The quality of these perceptions can affect mood state.	Illness Perception Questionnaire (Moss-Morris et al. 2002), pictorial representations (PRISM, Vingerhoets et al. 2004), multidimensional health locus of control inventory (Wallston et al. 1978).
Adequacy of Health Behaviours and Exposure History	Some behaviours can effect adverse health outcomes e.g. if these result in exposure to adverse conditions/situations	Various health behaviour measures
Early Parental Bond and Adverse Childhood Experiences	Evidence exists linking the quality of an individual's upbringing, including parental relationships, with vulnerability to the later development of chronic illness in mid-life onwards.	Gauge in context of therapeutic relationship
Personal Schemas and Family Narratives	Maladaptive schemas can create vulnerability to chronic illness.	Gauge in context of therapeutic relationship
Psychopathology and Personality Style or Disorder	Presence of certain personality style/disorders creates vulnerability and complicates treatment	Personality measures
Patient Resources and Self-Capacities	Resources patients bring to treatment can impact positively on treatment process and hence on outcomes.	Self efficacy measures
Phase of illness	Can impact upon how patient adapts to chronic illness	Fennell's four phase model (see section 9.1.5)

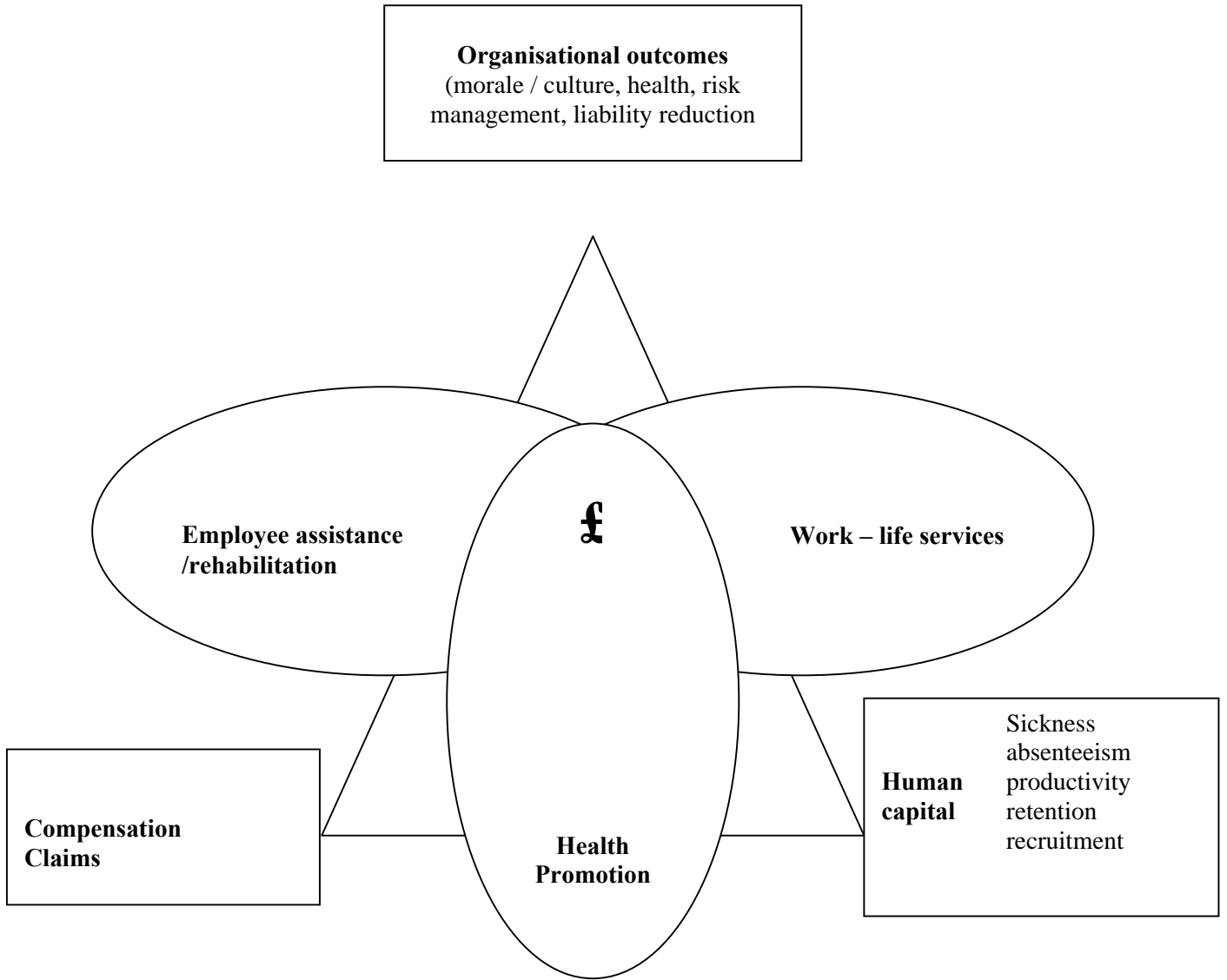


Figure 14: American Business Value model for
Integration of employee assistance, health
promotion; work – life practices

10.7 WAYS FORWARD

An assumption throughout these recommendations is that a healthier, happier workforce automatically means improved productivity. Difficulties in isolating causality have previously thwarted attempts to verify this relationship. However, American based evaluations of the relationship between effective human capital management and business outcomes are beginning

to isolate benefits (Attridge, 2004). For example, longitudinal analysis of 51 companies produced a large correlation ($r=0.41$) between human capital index scores in 1999 and financial performance in 2001 (Attridge, 2004). According to Attridge (2004), effective human capital management requires integration of employee assistance (trouble-shooting emotional issues affecting an employee), work-life balance services (flexible working policies, paid and unpaid time-off, caring for dependents, financial education, support, community involvement) and health promotion (strategic disease prevention planning, health screening, health risk management). Resultant business benefits can be evaluated using the framework provided in figure 14. However, much more work needs to be done to understand the true business benefits of work related well-being based on a British Business Model.

Even if the business benefits of a biopsychosocial approach becomes clearer, establishing a watertight evidence base informing its potential value to risk management is not straightforward. Due to complexity of the relationships between biological, psychological and social variables, designing fully controlled organisational interventions based on the biopsychosocial model would be impossible because the organisation cannot be divorced from its context, namely society. Not until any policy based on the model is implemented, will the true value of the biopsychosocial model and holistic well-being become apparent.

11 GLOSSARY

Atherogenesis: Formation of fatty deposits, or plaques, alongside blood vessel walls.

Beliefs – Emotional acceptance of some proposition, statement or doctrine.

Burnout – A state of complete emotional, physical and mental exhaustion.

Coping styles – typical ways in which people cope with difficult situations that invoke anxiety e.g. dealing with an illness by taking a positive view with regard to outcomes.

Cross-sectional study – Research design that measures a sample at one time point only.

Cytokines – Non-antibody proteins that mediate communication between cells. They differ from hormones because they are produced by a number of tissues or cell types rather than by specialised glands.

Confirmatory Bias – Tendency to focus on information that confirms existing beliefs.

Emotion work/emotional labour – Describes an aspect of some jobs that require the jobholder to display emotions to clients, customers, service users etc. that they may not be feeling themselves e.g. showing empathy, staying calm under provocation.

Extraversion – Personality trait or dimension where an individual's energies are directed outwards towards the social environment

Hardiness – Capacity to be resilient when faced with challenging or demanding circumstances.

Intrinsic work motivation – Aspects of job performance driven by factors that result from interest in, and satisfaction from, aspects of the job. Contrasts with extrinsic work motivation where job performance is seen to derive from factors outside the job tasks e.g. pay.

Inter-rater reliability checks - A method for improving reliability of findings by using a second reviewer to double-check the decisions of a first in identifying relevant literature, and extracting and synthesising data.

Locus of control – Perceived source of control over one's behaviour measured on a continuum between high internal (belief that one has control over own future) and high external (belief that control over own future lies elsewhere).

Longitudinal study - Research design that measures a sample more than once, at different points in time.

Mediation – Intervening stage or variable between two or more other variables or processes

Meta analysis – A statistical based technique to combine the findings of more than one research study. Allows the combination of many studies in order to detect trends and patterns in a particular topic/area of study.

Moderator – A variable that changes the size of the relationship between two or more other variables or processes.

Morale – The spirit of a group that makes the members want the group to succeed.

Negative Affect – Tendency to view the world in a negative light.

Organisational climate - Individual perceptions and cognitive representations of the work environment, particularly with regard to the way their workplace functions. Thus, the practical components of organisational climate include things such as leadership and management practices, organisational processes such as the staff appraisal system, the clarity of roles and decisionmaking styles.

Positive Affect – Tendency to view the world in a positive light. Synonymous with morale

Presenteeism – Tendency to remain at work when an employee should otherwise be off-sick.

Social Capital – Referring to the social networks to which an individual belongs. The potentially beneficial effects of social capital are contingent on the presence of social trust within the network. Distinction can be made between ‘bonding’ capital which links people of similar socio-demographic groupings, and ‘bridging’ capital which links people from different socio-demographic groupings.

Social Gradient – Reflects health inequalities between different levels of socioeconomic status.

Somatisation – Presentation of physical symptoms without a clear cause.

Workability Beliefs – Beliefs in ability keep working despite having a health problem.

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13 APPENDICES

13.1 APPENDIX 1: ARTICLES SUMMARY - BIOPSYCHOSOCIAL MECHANISMS

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Chaturvedi, S.K., Desai, G. & Shaligram, D. (2006). Somatoform disorders, somatization and abnormal illness behaviour. <i>International Review of Psychiatry</i> , 18, 75-90	Narrative-descriptive	Generic	Somatisation-illness behaviour-somatisation: (a) Increased physiological arousal due to perception of threat to health thereby increasing autonomic mediated sensations which in turn are interpreted as further evidence of disease (b) Focussing attention to normal variations in body functioning and these are assumed pathological (c) Avoidant behaviour minimises anxiety provoking situations (d) Body checking and reassurance seeking forcing focus on fears and prevention of habituation (e) Beliefs and misinterpretations of symptoms, signs and medical communications. Interpret external information in line with illness representations	Theoretical
Conner-Smith, J.K. & Compas, B.E. (2004). Coping as a Moderator of Relations Between to Interpersonal Stress, Health Status, and Internalizing Problems. <i>Cognitive Therapy and Research</i> , 28, 347-368	Narrative-descriptive	Generic	Active coping (primary control) - health outcomes Tackling problem source or reaction through problem solving, emotional expression, emotional regulation has predicted decreased distress and better physical health and immune functioning in experimental studies.	Effectiveness context dependent

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Conner-Smith, J.K. & Compas, B.E. (2004). Coping as a Moderator of Relations Between to Interpersonal Stress, Health Status, and Internalizing Problems. <i>Cognitive Therapy and Research</i> , 28, 347-368	Narrative-descriptive (Cross Sectional Study)	Generic	Secondary coping - adapt to current conditions through strategies such as distraction, acceptance and positive thinking. Appears beneficial in uncontrollable situation.	Effectiveness context dependent
Conner-Smith, J.K. & Compas, B.E. (2004). Coping as a Moderator of Relations Between to Interpersonal Stress, Health Status, and Internalizing Problems. <i>Cognitive Therapy and Research</i> , 28, 347-368	Narrative-descriptive (Cross Sectional Study)	Generic	Disengagement - avoidance	Generally but not universally maladaptive.
Creed, F. & Barsky, A. (2004). A systematic review of somatisation disorder and hypochondriasis. <i>Journal of Psychosomatic Research</i> , 65, 391-408	Systematic	Anxiety & Depression	Comorbidity between hypochondriasis and somatisation disorder	Concludes that somatisation disorder and hypochondriasis cannot be regarded as definite psychiatric disorders. None of the symptom clusters fulfil the psychiatric criteria of characteristic onset, course and prognosis. Some evidence that numerous somatic symptoms may be associated with impairment and high health care utilisation.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Dantzer, R. (2005). Somatization: a psychoneuroimmune perspective. <i>Psychoneuroendocrinology</i> , 30, 947-952	Narrative-descriptive	Generic	Somatisation-proinflammatory sickness (anorexia, anhedonia, cachexia), pain, cognitive disorders, mood alterations. Proinflammatory cytokines produced by cells of the innate immune system in response to pathogen-associated molecular patterns and to endogenous danger signals act on the central nervous system via afferent and humoral pathways to trigger a brain cytokine system that organizes the sickness response in its subjective, behavioural and metabolic components.	Emerging
Dantzer, R. (2005). Somatization: a psychoneuroimmune perspective. <i>Psychoneuroendocrinology</i> , 30, 947-952	Narrative-descriptive	Generic	Somatisation-depression: Prolonged activation of the brain cytokine system can precipitate development of depressive disorders.	Emerging
de Gucht, V & Maes, S (2006). Explaining medically unexplained symptoms: Towards a multidimensional, theory-based approach to somatization. <i>Journal of Psychosomatic Research</i> , 60, 349-352	Narrative-descriptive	Generic	Social learning models of somatisation. Somatic symptoms are learned through social reinforcement and modelling.	Cites twin study by Levy et al (2003) showing that social learning had equal contribution to irritable bowel syndrome as heredity.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
de Gucht, V & Maes, S (2006). Explaining medically unexplained symptoms: Towards a multidimensional, theory-based approach to somatization. <i>Journal of Psychosomatic Research</i> , 60, 349-352	Narrative-descriptive	Generic	Stress- passive coping and non-specific symptoms	Cites evidence that passive coping for IBS or stress is associated with less favourable outcomes, while problem-focused coping is associated with better functioning.).
de Gucht, V. & Maes, S. (2006). Explaining medically unexplained symptoms: Towards a multidimensional, theory-based approach to somatization. <i>Journal of Psychosomatic Research</i> , 60, 349-354	Narrative-descriptive	Generic	Illness-representations and non-specific symptoms: (1) identity or label for the health threat, (2) time line, (3) causes (internal or external), (4) consequences (real or imagined) (5) Cure or control	Cites Heijmans (1998) study of CFS patients who considered their illness a serious condition, who thought they had not control over their illness, who believed it to be incurable, and expected that their illness would have severe consequences coped with their illness in a more passive way and reported higher level of impairment in physical and social functioning (association, not cause and effect).
de Gucht, V & Maes, S (2006). Explaining medically unexplained symptoms: Towards a multidimensional, theory-based approach to somatization. <i>Journal of Psychosomatic Research</i> , 60, 349-354	Narrative-descriptive	Generic	Self-regulation theory and non-specific symptoms: Personal goals in the self-management of disease - more highly valued the goals, the more likely they are to be pursued	Cites fibromyalgia (Affleck et al, 2001)

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
de Gucht, V. & Maes, S. (2006). Explaining medically unexplained symptoms: Towards a multidimensional, theory-based approach to somatization. <i>Journal of Psychosomatic Research</i> , 60, 349-354	Narrative-descriptive	Generic	Social learning theory – and non-specific symptoms: family scripts and personality (fear of failure, perfectionism) may collude to predispose somatisation.	Hypothetical
de Gucht, V. & Maes, S. (2006). Explaining medically unexplained symptoms: Towards a multidimensional, theory-based approach to somatization. <i>Journal of Psychosomatic Research</i> , 60, 349-354	Narrative-descriptive	Generic	Stress generated by reaction to a life event and non-specific symptoms.	Hypothetical
de Gucht, V. & Maes, S. (2006). Explaining medically unexplained symptoms: Towards a multidimensional, theory-based approach to somatization. <i>Journal of Psychosomatic Research</i> , 60, 349-354	Narrative-descriptive	Generic & Cardio-respiratory	Stress generated by disturbance in self-regulation of life goals. Personal goals in the self-management of disease – the more highly valued the goals, the more likely they are to be pursued.	Hypothetical
de Witte, J. & Stroebe, W. (2004). Social cognition models and illness behaviour. In A. Kaptein, & J. Weinman, <i>Health Psychology</i> . BPS Blackwell: Oxford, (pp 52-83).	Narrative-descriptive	Generic	Behaviour Prediction: Profiles social cognition models of behaviour, including attitudinal models.	Cites supporting evidence.
Deely, D. (2006): The cognitive anthropology of belief. The Power of Belief: Psychosocial Influences on Illness, <i>Disability and Medicine</i> , pp 34-55	Narrative-descriptive	Generic	Culturally mediated beliefs Influences the relative effectiveness of a medical trial in different, culturally disparate countries.	Cites supporting evidence.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Duddu, V., Isaac, M.K., Santosh, K. & Chaturvedi, S.K. (2006). Somatization, somatosensory amplification, attribution styles and illness behaviour: A review. <i>International Review of Psychiatry</i> , 18, 25-33	Critical	Generic	Symptom amplification and somatisation: tendency to experience somatic sensations as intense, noxious and disturbing. Belief that one has a disease, suggestibility and negative expectations about the future course of the disease, the sick role and stressful events.	Only partly accounts for somatisation.
Duddu, V., Isaac, M.K., Santosh, K. & Chaturvedi, S.K. (2006). Somatization, somatosensory amplification, attribution styles and illness behaviour: A review. <i>International Review of Psychiatry</i> , 18, 25-33	Critical	Generic	Symptom attribution and somatisation: Events are attributed to situational factors, and if this does not provide sufficient explanation, events are attributed to dispositional causes for the symptom.	Some evidence that frequent GP attendees have fewer normalizing attributions. Only partly accounts for somatisation.
Duddu, V., Isaac, M.K., Santosh, K. & Chaturvedi, S.K. (2006). Somatization, somatosensory amplification, attribution styles and illness behaviour: A review. <i>International Review of Psychiatry</i> , 18, 25-33	Critical	Generic	Illness behaviour and somatisation: Patterns of health care utilization, urging doctors to undertake investigations, requesting medications/treatments, being disabled at work, avoidance of physical activity, expression of symptoms to family members and significant others. Mediated by previous experience of symptoms, appraisal and attribution of current symptoms to normal or non-normal causes, and socio-cultural beliefs.	Inconsistent - e.g. some studies have not shown high medical users to have more somatic symptoms than average utilizers.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Duddu, V., Isaac, M.K., Santosh, K. & Chaturvedi, S.K. (2006). Somatization, somatosensory amplification, attribution styles and illness behaviour: A review. <i>International Review of Psychiatry</i> , 18, 25-33	Critical	Generic	Other explanations of somatisation: emotional state, cultural background, quality of doctor-patient interaction, neuroticism and negative affectivity.	Not tested.
Dunstan A.B., Covic, T. (2006). Compensable work disability management: A literature review of biopsychosocial perspectives. <i>Australian Occupational Therapy Journal</i> , 53, 67-77	C (Critical)	MSD	Demographic predictors of disability. (older age >55, occupation (unskilled), work history, employment status (unemployed) and length of time off.	
Dunstan A.B., Covic, T. (2006). Compensable work disability management: A literature review of biopsychosocial perspectives. <i>Australian Occupational Therapy Journal</i> , 53, 67-77	C (Critical)	MSD	Social predictors of disability: Pre-injury dissatisfaction, local unemployment rate, financial incentives (e.g. benefits).	
Dunstan A.B., Covic, T. (2006). Compensable work disability management: A literature review of biopsychosocial perspectives. <i>Australian Occupational Therapy Journal</i> , 53, 67-77	C (Critical)	MSD	Biological predictors: Previous history of a similar condition generalised functional disability.	

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
<p>Dunstan A.B., Covic, T. (2006). Compensable work disability management: A literature review of biopsychosocial perspectives. <i>Australian Occupational Therapy Journal</i>, 53, 67-77</p>	C (Critical)	Pain	<p>Iatrogenic effects upon symptom progression: Continuation of medical investigation due to assumption of an as yet undiagnosed medical pathology. Results in injured workers remaining in a medically intensive phase while costs escalate. Psychosocial determinants remain unexplained.</p>	Appears untested (quotes Wadell, 2004)
<p>Dunstan A.B., Covic, T. (2006). Compensable work disability management: A literature review of biopsychosocial perspectives. <i>Australian Occupational Therapy Journal</i>, 53, 67-77</p>	C (Critical)	Pain	<p>Psychological moderators or pain perception: Neoplastic adaptations for short-term pain, such as hyperalgesia (excessive sensitivity to pain) and allodynia (pain stimulation by normally inert stimuli) are maintained by cognitive (e.g. catastrophic thinking) and affective (fear, anxiety) states, by amplifying pain signals.</p>	Critical review

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Dunstan A.B., Covic, T. (2006). Compensable work disability management: A literature review of biopsychosocial perspectives. <i>Australian Occupational Therapy Journal</i> , 53, 67-77	Critical	MSD	Psychological predictors of work disability: emotional distress, depression, fear avoidance beliefs, catastrophic thinking, poor coping, pain behaviours, negative expectations of returning to work and perceived poor general health.	Cites a systematic review by Waddell, Burton & Main (2003). Strongest weighting according to predictive strength and consistency of evidence.
Esler, J.L., Bock, B.C. (2004). Psychological treatments for noncardiac chest pain. Recommendations for a new approach. <i>Journal of Psychosomatic Research</i> , 56, 263-269	Critical	Cardiovascular	Attributional Model – Non-Cardiac Chest Pain. Pain is interpreted (by patients) as evidence of serious illness, interpreted catastrophically, giving rise to increased anxiety and exacerbation of symptoms.	Not evaluated directly. Article explains that attributional model is used to explain symptoms to clients, but is then rejected by patients as 'being too psychological', resulting in treatment non-compliance.
Everson-Rose, S.A., Lewis, T.T. (2005). Psychosocial Factors and Cardiovascular Diseases, <i>Annual Review of Public Health</i> , 26, 469-500	Critical	Cardio-vascular	Low socio-economic status: Increased risk of CHD morbidity and mortality. Mediated by hypertension, smoking, sedentary lifestyle, depression & social isolation.	Cites Whitehall II and Stockholm prospective study of middle-aged women.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Everson-Rose, S.A., Lewis, T.T. (2005). Psychosocial Factors and Cardiovascular Diseases, <i>Annual Review of Public Health</i> , 26, 469-500	Critical	Cardio-vascular	Low social support –CHD risk , emotional appraisal, information and guidance and tangible support.	Mechanisms poorly understood.
Everson-Rose, S.A., Lewis, T.T. (2005). Psychosocial Factors and Cardiovascular Diseases, <i>Annual Review of Public Health</i> , 26, 469-500	Critical	Cardio-vascular	Being female & CV Risk - delayed onset by 10 years. Although prognosis worse, women have more complications - diabetes, hypertension, heart failure.	Cites supportive studies.
Everson-Rose, S.A., Lewis, T.T. (2005). Psychosocial Factors and Cardiovascular Diseases, <i>Annual Review of Public Health</i> , 26, 469-500	Critical	Cardio-vascular	High demand, low control, effort reward imbalance and CVD Risk (material, social or psychological) imbalance, risk factors for men and women.	Cites supportive studies.
Everson-Rose, S.A., Lewis, T.T. (2005). Psychosocial Factors and Cardiovascular Diseases, <i>Annual Review of Public Health</i> , 26, 469-500	Critical	Cardio-vascular	Type D behaviour-CVD Risk (negative affectivity and social inhibition).	Cites supportive studies. Unsubstantiated.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Everson-Rose, S.A., Lewis, T.T. (2005). Psychosocial Factors and Cardiovascular Diseases, <i>Annual Review of Public Health</i> , 26, 469-500	Critical	Cardio-vascular	Hostility & CVD risk - core component of CVD strong predictor of cardiac events in patients with established CVD	Cites supportive studies. Unsubstantiated.
Everson-Rose, S.A., Lewis, T.T. (2005). Psychosocial Factors and Cardiovascular Diseases, <i>Annual Review of Public Health</i> , 26, 469-500	Critical	Cardio-vascular	Depression & CVD risk – Mediated by non-compliance with medication regimes, nervous system, medication, cardiac rhythm disturbance, systemic and local inflammation and hypercoaguability.	Cites supporting evidence
Ferrari, R. Kwan, O. & Freil, J. (2006). Placebo: the role of expectations in generation and alleviation of illness. In P. Halligan, & M. Aylward, (editors) <i>The Power of Belief: Psychosocial Influences on Illness, Disability and Medicine</i> , (pp 34-55)	Narrative-descriptive	Generic	Illness beliefs: Beliefs driving illness and sick role behaviour operate at a preconscious and a conscious operative level.	Cites supporting evidence.
Ferrie, J. (2004). Work, stress and health. Findings from the Whitehall II study. <i>Occupational Health Review</i> , 111, pp 26-29	Narrative-descriptive (Whitehall II)	Generic	Social gradient – health outcomes: Mediated by smoking, lack of physical activity, obesity, and other cardiovascular risk factors such as plasma cholesterol and high blood pressure. Health and life expectancy improve as you move up the social gradient. Also mediated by high demands/low control and health behaviours.	Strong

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Ferrie, J. (2004). Work, stress and health. Findings from the Whitehall II study. <i>Occupational Health Review</i> , 111, pp 26-29	Narrative-descriptive	Generic	Effort-reward imbalance.	Strong
Ferrie, J. (2004). Work, stress and health. Findings from the Whitehall II study. <i>Occupational Health Review</i> , 111, pp 26-29	Narrative-descriptive	Generic	Organizational change. Mediated by job insecurity.	Strong
Franche, R., Frank, J & Krause, N. (2006). Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. GatchellSpringer: U.S.A.	Critical	Generic	Impact of workplace - disability Management Practices on Return to Work (RTW): Availability of disability management services can facilitate earlier return to work. RTW proxy for disability.	Critical: Undermined by lack of controls over work site exposures to job conditions, sociodemographic characteristics.
Franche, R., Frank, J & Krause, N. (2006) Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. Gatchell, Springer: U.S.A.	C (Critical)	Generic	Impact of work accommodation and RTW: Work Modifications	Mainly Positive effect due to anxiety reducing, redesign of job tasks. Negative where increase risks of injury. Returning back to same job context improves self-efficacy
Franche, R., Frank, J & Krause, N. (2006) Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. Gatchell, Springer: U.S.A.	C (Critical)	Generic	Impact of job characteristics and RTW: Low job control, work, rest schedule, high job demands, monotonous work, high job strain, supervisor co worker responses, other perceived legitimacy of their symptoms,	Stronger predictors of poor RTW outcomes.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Franché, R., Frank, J & Krause, N. (2006) Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. Gatchell, Springer: U.S.A.	C (Critical)	Generic	Impact of organisational factors upon return to work: Work place culture (greater interpersonal and value-focused atmosphere/ people-orientated).	More conducive to earlier return to work.
Franché, R., Frank, J & Krause, N. (2006) Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. Gatchell, Springer: U.S.A.	C (Critical)	Generic	Impact of firm size upon return to work: Larger firms allow more opportunities for earlier RTW.	Strong predictor
Franché, R., Frank, J & Krause, N. (2006) Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. Gatchell, Springer: U.S.A.	C (Critical)	Generic	Impact of access to health care provider and RTW: Availability encourages earlier RTW.	Moderated by experience of health care provider.
Franché, R., Frank, J & Krause, N. (2006) Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. Gatchell, Springer: U.S.A.	C (Critical)	Generic	Impact of physical factors upon RTW: Functional impairment, pain intensity hampers RTW.	Cites Waddle et al's systematic review, 2003.
Franché, R., Frank, J & Krause, N. (2006) Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. Gatchell, Springer: U.S.A.	C (Critical)	Generic	Impact of psychological factors in RTW: Distress, expectation on RTW, depression, fear avoidance and catastrophising, self-efficacy predictive of poorer RTW outcomes.	Emphasises positive expectations and increased self-efficacy about RTW, low levels of depressive symptomatology and low levels of fear avoidance as conducive to earlier RTW.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Franché, R., Frank, J & Krause, N. (2006) Prediction of Occupational Disability. In <i>Handbook of Occupational Disability Claims</i> I. Z. Schultz & R.J. Gatchell, Springer: U.S.A.	Critical	Generic	Impact of the insurer of RTW: Higher rate of compensation does not necessarily translate into longer time on benefits. Delays in processing of claims can have a strong impact on the probability of chronic work disability.	Moderated by job security, previous earnings, tenure and number of dependents.
Halligan, P & Aylward, M (editors), <i>The Power of Belief: Psychosocial Influences on Illness, Disability and Medicine</i> , (pp 34-55)	Narrative-descriptive	Generic	Publicity-symptom reporting. Emphasis on health and health promotion may contribute to propagation of common health problems	Editor's opinion, untested.
Kirsch, I (2006). Placebo: the role of expectations in generation and alleviation of illness. In P. Halligan, & M. Aylward, (editors) <i>The Power of Belief: Psychosocial Influences on Illness, Disability and Medicine</i> , (pp 34-55).	Narrative-descriptive	Generic	Placebo effect: Belief in the effectiveness of a 'neutral' intervention can exert the same effect as a medical intervention in for individuals who believe that they are receiving medical treatment	Placebo response produced the same effect as the drug apomorphine on objective performance indicators and neuroimaging in Parkinson's disease Sufferers
Kop, W.J. (2003). The integration of cardiovascular behavioural medicine and psychoneuroimmunology: New developments based on converging fields. <i>Brain, Behaviour and Immunity</i> , 17, 233-237	Narrative-descriptive	Stress and Cardio-vascular	Acute stressors (states) such as anger can trigger myocardial infarction by inducing cardiac ischemia and promoting plaque rupture in advanced stages of CAD (high atherosclerotic build up). Underpinned by sympathetic nervous system mediated increases in catecholamines, cardiac demand & stress-induced states of plasma volume and coronary constriction.	Cites supporting evidence.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Kop, W.J. (2003). The integration of cardiovascular behavioural medicine and psychoneuroimmunology: New developments based on converging fields. <i>Brain, Behaviour and Immunity</i> , 17, 233-237	Narrative-descriptive	Stress and Cardio-vascular	Episodic risk factors: Increased risk of first and recurrent cardiac events. Encourages transition from stable to unstable atherosclerotic plaques. Mediated by immune suppression, activation of infections, pro-inflammatory cytokines, depression.	Conceptual - not tested.
Kop, W.J. (2003). The integration of cardiovascular behavioural medicine and psychoneuroimmunology: New developments based on converging fields. <i>Brain, Behaviour and Immunity</i> , 17, 233-237	Narrative-descriptive	Stress and Cardio-vascular	Chronic stressors: (e.g. hostility, low SES) are associated with elevated risk of first myocardial infarction. Mediated by macrophage phagocytosis exposure to infection giving rise to monocyte deposition, cytokine activation and plaque development.	

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Lightman, S (2005). Can neurobiology explain the relationship between stress and disease. In P. White (ed) Biopsychosocial medicine. <i>An Integrated Approach to understanding illness</i> . Oxford University Press: Oxford. pp77-102	Narrative-descriptive	Stress	Early life stressors (possibly prolonged) can have a permanent effect on biological processes. Change is mediated by the Central Nervous System and affecting neurotransmitter concentrations, the hypothalamic pituitary axis (HPA) and autonomic nervous system. Differential reactions for acute and chronic stressors. Under chronic stress, the normal stress response to acute stress (mediated by corticotrophin-releasing hormone (CRH) is replaced by a different mediator (Arginine Vasopressin, AVP) in activating the HPA axis.	Based on laboratory evidence.
Lutgendorf, S.K & Constanzo, E. (2003). Psychoneuroimmunology and health psychology: An integrative model. <i>Brain, Behaviour and Immunity</i> , 17, 225-232	Critical	Generic	Observational learning- coping style: Verbal persuasion, observational learning, common factors in therapy (e.g. therapist). Mediated by individual differences, mood, resources, religion, meaning and stress reactivity.	Cites supporting evidence.
Lutgendorf, S.K & Constanzo, E. (2003). Psychoneuroimmunology and health psychology: An integrative model. <i>Brain, Behaviour and Immunity</i> , 17, 225-232	Critical	Generic	Biological Vulnerability to Common Health Problems. Arising from sex, age, ethnicity, exposure to viruses, toxins, carcinogens, medical treatment. Once vulnerability has been established, continued interaction with positive or negative psychosocial factors, disease	Cites supporting evidence.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
			factors, adaptive/maladaptive health behaviours, and stress will contribute to the expression of disease symptoms, disease free intervals, and quality of life (e.g. functional, physical, emotional and social well-being).	
Lutgendorf, S.K & Constanzo, E. (2003). Psychoneuroimmunology and health psychology: An integrative model. <i>Brain, Behaviour and Immunity</i> , 17, 225-232	Critical	Generic	Impact of health behaviours upon health. Included sleep, diet, exercise, sun exposures, screening behaviours, alcohol, drugs, smoking, quitting, sexual behaviours, adherence, vaccination.	Cites supporting evidence.
Lutgendorf, S.K & Constanzo, E. (2003). Psychoneuroimmunology and health psychology: An integrative model. <i>Brain, Behaviour and Immunity</i> , 17, 225-232	Critical	Generic	External stressors – Sympathetic Adrenal Medullary (SAM) /Hypothalamic Pituitary Axis (HPA) activation: Interaction of psychological factors, biological factors, health behaviours, moderations, social support, coping style and meaning.	Cites supporting evidence.
Lutgendorf, S.K & Constanzo, E. (2003). Psychoneuroimmunology and health psychology: An integrative model. <i>Brain, Behaviour and Immunity</i> , 17, 225-232	Critical	Generic	SAM/HPA dysregulation: inflammatory diseases, cardiovascular diseases, infectious diseases, cancer, diabetes, osteoporosis, muscle wasting. Mediated by neuroendocrine indicators (e.g. cortisol, epinephrine, norepinephrine), immune mechanisms (cytokines, T cells), and humeral mechanisms (wound healing factors).	Cites supporting evidence.
Magiakou, M & Chrousos G.P.(2005). Biological basis of stress-related diseases. In Stamatois, A., Antoniou, G. & Cooper, C.L. <i>Research Companion to Organizational Health Psychology</i> . Edward Elgar: Cheltenham, UK	Critical	Stress	Biological basis of stress: Describes stress as a state of ‘disharmony of threatened homeostasis underpinned by hyper or hypofunction of the underlying physiological stress. Profiles normal and chronic stress responses in depth.	Rigorous consideration of the evidence base, although not systematic.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
<p>Malmgren, M. (2005). The theoretical basis of the biopsychosocial approach. In P. White (edtr) <i>Biopsychosocial medicine. An Integrated Approach to understanding illness</i>. Oxford University Press: Oxford. pp77-102</p>	<p>Narrative-descriptive (expert opinion)</p>	<p>Generic</p>	<p>Conceptual basis to BPS model: Specifies the conceptual bases for a philosophically sound BPS theory. Divides consciousness into cognitive, experiential & functional components. Implies role of sub-conscious processes. Recommends: 1. biological and psychological elements should remain conceptually independent (i.e. a purely linear model is avoided), 2. that BPS mechanisms do not have to be fully explicated in order to understand their consequences.</p>	<p>Philosophical specification for BPS model.</p>
<p>Marcus, D.K., Gurely, J.R., Marchi, M.M. & Bauer, C. (2007) Cognitive and perceptual variables in hypochondriasis and health anxiety: A systematic review. <i>Clinical Psychology Review</i>, 27, 127-139</p>	<p>Systematic</p>	<p>Generic</p>	<p>Health Anxiety – Symptom Progression: Health anxious people have different beliefs and assumptions about their health and illness than non-health anxious people (more likely to make catastrophic interpretations of bodily sensations, assume that to be healthy is to be without symptoms, and believe that they have less control over the occurrence of illness).</p>	<p>Consistent, but the causal mechanism is unclear (i.e. little evidence that health anxious people accurately perceive the situation. Few studies have examined how hypochondrial concerns have emerged.</p>

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Marks, D. (2006): Biased beliefs: Subjective Validation Effect. In Halligan, P & Aylward, M.(editors) <i>The Power of Belief: Psychosocial Influences on Illness, Disability and Medicine</i> , pp 21-33	Narrative-descriptive	Generic	Confirmation bias: Personal beliefs that are sustained by a confirmation bias in which supporting information is more heavily weighted than contradictory evidence.	Cites supporting evidence.
Marmot, M. (2005) Remedial or preventable social factors in the aetiology and prognosis of mental disorders. In P. White (edtr) <i>Biopsychosocial medicine. An Integrated Approach to understanding illness</i> . Oxford University Press: Oxford pp 39-59	Narrative-descriptive (expert opinion)	Generic	Social gradient: Affects differences in mortality and morbidity rates after controlling for confounders (e.g. cholesterol). Low job control is a likely mediator of this relationship.	Reviews Whitehall II studies. Focuses on CHD risks. Health behaviours such as smoking and obesity may help mediate this relationship. Age and development factors may act as a moderator. Primate studies suggest that the biological causal mechanisms vary between genders.
Myers, L.B., Stanton, P. N. & Enomoto, K (2004). Coping. In Kaptein, A. & Weinman, J. <i>Health Psychology</i> . BPS Blackwell: Oxford, pp (111-113).	Narrative-descriptive	Generic	Coping with health problems: Dispositional models (personality based) now replaced by situational models (context dependent) in identifying adaptive coping behaviour.	Gaps in evidence base due to conceptual and measurement difficulties.
Nieuwenhuijsen, E.R, Zemper, E., Miner, K.R. & Epstein, M. (2006). Health behaviour change models and theories: contributions to rehabilitation. <i>Disability and Rehabilitation</i> , 28(5), pp 245-256.	Critical	Generic	Health Beliefs & Behaviour: Review health behaviour change theories to rehabilitation. Concludes 1) health behaviour change (beliefs, attitudes, perceived control, social norms, intentions) variables should regularly be used as outcome measures in evidence-based rehabilitation research; (2) there should be a better understanding of the role of the rehabilitation provider as a facilitator in eliciting healthy behaviors, and (3) there is a need to expand the HBC concept into a more	Beliefs explain part of the variance in behaviour change.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
			comprehensive view encompassing a person's functioning within the environmental context. Conclusions: A conceptual merger between HBC theories and rehabilitation practice can have major implications for individuals with disabilities, their functioning, health, and well-being.	
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Depression - major depression, current depressive symptoms and history of depression & Cardiovascular Disease (CVD) morbidity & mortality. Mediated by excess glucocorticoid secretion and chronic dysregulation of the HPA axis. Contributes to hypertension insulin resistance, visceral obesity, co-agulation, changes in lipid levels. Serotonergic abnormalities may promote atherosclerosis.	More work needed to assess impact on racial and ethnic minority populations.
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Hostility & CVD: - toxic component of Type A personality independent risk factor for all causes of mortality.	Inconsistently associated CVD.
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Anxiety & CVD:	Positive risk factor for men, less clear for women.
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Acute stressors & CVD: - sharp increase in the number of cardiac deaths.	Cites supporting evidence.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Chronic stressors & CVD:	Fairly consistent relationship.
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Social ties & CVD:	Protective role.
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Social support & CVD:	Cites supporting evidence.
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Social Conflict & CVD:	Risk factor.
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Negative emotional states - atherogenesis. Potentially mediated by endothelial injury & proinflammatory cytokinine activation.	Cites supporting evidence.
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Cytokinines - negative emotions state	Cites supporting evidence for the relationship between emotions, stress and health.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Orth-Gomer, K (2007). Psychosocial and behavioural aspects of cardiovascular prevention in men and women. <i>Current Opinion in Psychiatry</i> , 20, pp147-157	Critical	Cardio-vascular	Cytokine release - sickness behaviours (fatigue, anorexia, anhedonia, reduced psychomotor activity)	Cites supporting evidence.
Schotte, C.K.W., Van-Den-Bossche, B., De-Doncker, D., Claes, S & Cosyns, P. (2006). A biopsychosocial model as guide for the treatment of depression. <i>Depression & Anxiety</i> , 23(5), pp 312-324.	Critical	Depression	Diathesis stress explanation of depression: The pathogenesis of depression is symbolized by a negative downward loop, in which interactions among symptoms, vulnerability, and stressors drive the patient toward a depressive condition.	Cites supportive evidence
Sheeran, P. & Abraham, P. (1996). The Health Belief Model. In M. Conner & P. Norman (edtr) <i>Predicting Health Behaviour</i> Open University Press: Buckingham, pp 23-160	Critical		Health Beliefs and Health Behaviour	Explains part of the variance in behaviour change.
Schwarzer, R. & Fuchs, R. (1996). Self-efficacy and Health Behaviours. In M. Conner & P. Norman (edtr) <i>Predicting Health Behaviour</i> Open University Press: Buckingham, pp 121-163	Critical	Generic	Self-Efficacy and Health Behaviours: Self-efficacy cognitions are important in establishing strong readiness to change behaviour.	Explains part of the variance in behaviour change.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Siegest, J. (2004). Psychosocial work environment and health: new evidence. <i>J. Epidemiol. Community Health</i> , 58, 888	Narrative-descriptive	Generic	Perceived organisational injustice (unfair treatment from supervisor) cites Kivimali (2004) Whitehall II study.	1.12-1.53 ODDS RATIO (modest), design flaws, proxy indicator of organisation injustice, inconsistent relationship with generator and potential unreliability of external measure.
Silcox, S. (2004). Work design, reorganisations and employees health. Attendance and Absence. <i>IRS Employment Review</i> 806	Narrative-descriptive (Whitehall II)	Generic	Psychosocial risk-factors-health outcomes: Social gradient, job control, effort reward imbalance.	Summarises Whitehall II
Sheeran, P. & Abraham, C. (1996). The Health Belief Model. In M. Conner & P. Norman <i>Predicting Health Behaviour</i> Open University Press: Buckingham, pp23-61	Narrative-descriptive	Generic	Health Beliefs: Profiles the health beliefs model which posits that behaviour is a cost-benefit trade-off between beliefs about the severity of illness and susceptibility combined with ability to avoid illness.	Profiles strengths and limitations.
Steptoe, A. & Wardle, J. (2004). Health-Related Behaviour: Prevalence and Links with Disease. In A. Kaptein, & J. Weinman, <i>Health Psychology</i> . BPS Blackwell: Oxford (pp 21-51).	Critical	Generic	Pain Perception: Profiles the biopsychosocial influences upon pain perception including personality, history of illness and pain, beliefs and attitudes about health and health care, information sources, secondary gains and coping behaviour.	Expert review. Cites a range of supportive evidence.
Steptoe, A. (2005). Remedial or preventable psychological factors in the aetiology and prognosis of medical disorders. In P. White (edtr) <i>Biopsychosocial medicine. An Integrated Approach to understanding illness</i> . Oxford University Press:	Narrative-descriptive (expert opinion)	Cardio-vascular	Psychosocial – causal role in hypertension/Coronary Heart Disease	Expert Opinion. Cites supporting experimental investigations.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Oxford p. 59-77				
Steptoe, A. (2005). Remedial or preventable psychological factors in the aetiology and prognosis of medical disorders. In P. White (edtr) <i>Biopsychosocial medicine. An Integrated Approach to understanding illness</i> . Oxford University Press: Oxford (pp 59-77)	Narrative-descriptive (expert opinion)	Infections	Stress-resistance: Psychosocial factors can inhibit a host's resistance to infections.	Expert Opinion. Cites supporting experimental investigations.
Steptoe, A. (2005). Remedial or preventable psychological factors in the aetiology and prognosis of medical disorders. In P. White (edtr) <i>Biopsychosocial medicine. An Integrated Approach to understanding illness</i> . Oxford University Press: Oxford (pp 59-77)	Narrative-descriptive (expert opinion)	Auto-immune diseases	Stress-aggravation: Of the course of existing diseases.	Expert Opinion. Cites supporting experimental investigations.
Steptoe, A. (2005). Remedial or preventable psychological factors in the aetiology and prognosis of medical disorders. In P. White (edtr) <i>Biopsychosocial medicine. An Integrated Approach to understanding illness</i> . Oxford University Press: Oxford (pp 59-77)	Narrative-descriptive (expert opinion)	Generic	Biomarkers of stress pathways:	Accruing evidence - biomarkers indicate rather than prove pathways.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Step toe, A. (2005). Remedial or preventable psychological factors in the aetiology and prognosis of medical disorders. In P. White (edtr) <i>Biopsychosocial medicine. An Integrated Approach to understanding illness</i> . Oxford University Press: Oxford (pp 59-77)	Narrative-descriptive (expert opinion)	Depression	Pro-inflammatory cytokines – depression: Pro-inflammatory cytokines present in CHD patients may directly cause depression.	Emerging experimental evidence.
Step toe, A & Wardle, J (2004). Health-Related Behaviour: Prevalence and Links with Disease. In A. Kaptein, & J. Weinman, <i>Health Psychology</i> . BPS Blackwell: Oxford (pp 21-51).	Critical	Generic	Health Behaviours & Disease: Discusses several major health behaviours, including tobacco use, food choice, physical activity, alcohol consumption, cancer screening, sexual behaviour, and hazardous driving behaviour. that impact health. Impact can vary according to gender, age, culture and socio-economic status.	Cites a range or supportive evidence.
Stewart-Williams, S. (2004). The Placebo Puzzle: Putting Together the Pieces. <i>Health Psychology</i> , 23, pp 198-206	Critical	Generic	Conditioning & Placebo Effect: Pairing of the placebo with unconditioned stimulus. Direct, i.e. subconscious, or mediated by conscious expectations learning.	Conceptual. One of various sorts of learning that can produce placebo effects
Stewart-Williams, S. (2004). The Placebo Puzzle: Putting Together the Pieces. <i>Health Psychology</i> , 23, pp 198-206	Critical	Generic	Verbal persuasion, observational learning & placebo effect: Common factors in therapy. Mediated by conscious expectations.	
Stewart-Williams, S. (2004). The Placebo Puzzle: Putting Together the Pieces. <i>Health Psychology</i> , 23, pp 198-206	Critical	Generic	Conscious expectations - immune function/analgesia. Due to endogenous opioids (endorphins) in some instances of placebo analgesia. Mediated by emotional change (depression & anxiety).	Cannot account for local versus generalised placebo or simultaneous positive versus negative placebo outcomes.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Stewart-Williams, S. (2004). The Placebo Puzzle: Putting Together the Pieces. <i>Health Psychology</i> , 23, pp 198-206	Critical	Generic	Conscious expectations - behaviour changes & secondary gains: Expectation of reward may enhance placebo effect.	Cannot account for local versus generalised placebo or simultaneous positive versus negative placebo outcomes
Stewart-Williams, S. (2004). The Placebo Puzzle: Putting Together the Pieces. <i>Health Psychology</i> , 23, pp 198-206	Critical	Generic	Conscious expectations - attentional refocusing: (a) on placebo effects ie. notice and recall any information consistent with schema (b) interpret ambiguous information in a manner consistent with placebo and (c) overlook mildly inconsistent behaviour.	Conceptual argument.
Smith, J.M., Karsh, B., Carayon, P & Conway, F.T. (2003). Controlling Occupational Safety and Health Hazards. In J.Campbell Quick & L.E Terrick,. <i>Handbook of Occupational Health Psychology</i> , American Psychological Association: Washington D.C., USA	Descriptive	Generic	Biopsychosocial risk factors for chemical-induced occupational health conditions: Lists intellectual capabilities, aptitudes, perceptual motor abilities, physical capabilities, health status, susceptibility to diseases, personality, hazard recognition abilities, aptitude for training in hazard prevention as important biopsychosocial contributors to occupational diseases.	Expert opinion. Does not cite supporting evidence.
Von Korff, M. (2005). Fear and depression as remedial causes of disability in common medical conditions in primary care. In P. Halligan, & M. Aylward, .(editors) <i>The Power of Belief: Psychosocial Influences on Illness, Disability and Medicine</i> (pp 1117-132)	Critical	Generic	Depression may cause/aggravate disability	Cites supporting evidence.

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Von Korff, M. (2005). Fear and depression as remedial causes of disability in common medical conditions in primary care. In P. Halligan, & M. Aylward, (editors) <i>The Power of Belief: Psychosocial Influences on Illness, Disability and Medicine</i> (pp. 1117-132)	Critical	Generic	Physical disability may induce or exacerbate depression and anxiety	Cites supporting evidence.
Von Korff, M. (2005). Fear and depression as remedial causes of disability in common medical conditions in primary care. In P. Halligan, & M. Aylward, (editors) <i>The Power of Belief: Psychosocial Influences on Illness, Disability and Medicine</i> pp. 1117-132	Critical	Generic	Fear may cause disability. Mediated by fear-avoidant beliefs and catastrophic thinking.	Cites studies. Graded fear exposure interventions are more effective than graded exercise.
Waddell, G. (2004). Predicting long-term incapacity for work. The case of low back pain.	Critical	MSD	Psychological predictors of long term incapacity: age, pain intensity/functional disability, poor perception of general health, psychological distress depression, fear avoidance, catastrophizing, pain behaviour, job dissatisfaction, duration of sickness absence/incapacity, occupational status and expectations about RTW. These are the yellow flags.	Strong. Cites findings of a systematic review (Waddell et al, 2003). Claims that demographic, psychosocial & clinical predictors are equally accurate predictors of disability. Combination has 80% sensitivity (accurate predication of long-term incapacity) and 70% specificity (accurate prediction of those who don't develop long term disability).

Article Name	Review Type	Condition	Description of Pathway	Evidence Base (Comment)
Waddell, G. (2004). Predicting long-term incapacity for work. The case of low back pain.	Systematic	MSD	Socio-demographic predictors: Gender, Age, Marital/family status, health condition, social class/occupation/educational level, time since last worked, occupational status, lost unemployment rate	Strong predictors.
Waddell, G. (2004). Predicting long-term incapacity for work. The case of low back pain.	Systematic	MSD	Clinical predictors: Previous back problems previous medical consultations, attribution of blame, severity of current pain, physical demands of work, getting on with co-workers, expectations of whether he/she will be able to work in six weeks or six months.	Strongest clinical predictors
Wade, W. (2006). Belief in rehabilitation, the hidden power of change. In P.Halligan, & M. Aylward (editors) <i>The Power of Belief: Psychosocial Influences on Illness, Disability and Medicine</i> , (pp 87-98)	Narrative-descriptive	Generic	Treatment efficacy beliefs: Beliefs in the effectiveness of interventions can strongly affect health outcomes.	Cites supportive evidence.

13.2 APPENDIX 2: ARTICLES SUMMARY - WELL-BEING ANTECEDENTS

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
<p>Andrea, H., Beurskens, A.J.H.M., Metsemakers, L.G.P.M., Van Amelsvoort, P.A., Van Den Brandt, P and Van Schayck, C.P. (2003) Health Problems and psychosocial work environment as predictors of long term sickness absence in employees who visited the occupational physician and/or general practitioner in relation to work: a prospective study; <i>Occupational and Environmental Medicine</i> 2003, 60, pp 295-300</p>	<p>Prospective cohort study</p>	<p>Psychosocial work environment</p>	<p>Moderate</p>	<p>Prospective cohort study of 45 European companies. Assessed the relationship between self-reported indicators of health status and psychosocial I work environment characteristics. After adjusting for demographics and other predictors of sickness absence, low levels of job control were the strongest predictors of sickness absence at one month.</p>
<p>Andres, A. R. (2004).; determinants of self-reported mental health using the British Household Panel Survey; <i>Journal of Mental Health Policy and Economics</i>, pp 99 - 106</p>	<p>Longitudinal study</p>	<p>Jjob status, age, marital status</p>	<p>Weak</p>	<p>Uses BHP survey to investigate determinants of self reported mental health - concluded MH related to job status, age, self-assessed health status</p>

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
<p>Arthaud-Day, M and Near, J. The wealth of nations and the happiness of nations: why accounting matters. <i>Social Indicators Research</i>, 2005, 74, pp 511-548)</p>	<p>Meta-analysis</p>	<p>Income levels</p>	<p>Moderate</p>	<p>Identifies many complex relationships exist between income and well-being. Measures happiness as the dependent variable. Different findings exist for within countries and between countries. Absolute income higher predictor across countries.</p>
<p>Beasley, M., Thompson, T. & Davidson, J. (2003)., Resilience in response to life stress: the effects of coping style and cognitive hardiness., <i>Personality and Individual Differences</i>, 34, pp 77-95</p>	<p>Cross sectional study</p>	<p>Cognitive hardiness</p>	<p>Weak due to small sample of 187 students.</p>	<p>Analysed relationships between cognitive hardiness (belief in ability to control events; commitment to values, goals and priorities in life; view changes as challenge rather than threat) and coping for health and psychological functioning. Found cognitive hardiness to moderate the effects of emotional coping (rumination, emotional reaction) and stress.</p>

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Bough, P. & Pears, J. (2004). Evaluating the influence of the type of social support on job satisfaction and work related psychological well-being.; <i>International Journal of Organisational Behaviour</i> , 8 (2), pp 472 - 485	Cross sectional - positive relationship	Social support	Weak	Study examining impact of both practical and emotional support on job satisfaction. Found practical support from supervisors had greater positive impact on job satisfaction (JS) levels compared to supervisor emotional support. Perceived supervisor support had greater impact on JS than did perceived colleague support.
Burns, G.W. (2005). ;Chapter 16: Naturally happy, naturally healthy: the role of the natural environment in well-being. In F.A. Huppert, F.A., N., Baylis, N., and B. Keverne, B. (2005), <i>The Science of Well-being</i> Oxford University Press: New York	Critical literature review	The natural environment	No consistent empirical findings	Discusses potential impact of the natural environment upon well-being.
Carsten, K, DeDreu, C,, Dirk van Dierendonk D. ,& Dijkstra, M. T. M .(2005).; Conflict at work and individual well-being; <i>International Journal of Conflict Management</i> , Vol 15, 1, pp 6 - 26	Narrative/descriptive	Conflict	Weak	Argues lowered levels of well-being can trigger conflict at work - relationship not simple with potential for relationships to work in contra direction.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Costa, et al. (2004). Flexible working hours and well-being in Europe; Some considerations from a SALTSA Project.; <i>Chronobiology International</i> Vol 21, No 6, pp 831 - 844	Critical	Flexible work hours	Moderate	Concerned with and high variability in work patterns links between nature of working patterns and health/well-being. Data from EU survey on working conditions. Longer and irregular work patterns link to lower levels of health and well-being. Specifically, lower levels of health and well-being link with low individual flexibility
Costa, G. (2003); Factors influencing health of workers and tolerance to shift work: <i>Theoretical Issues in Ergonomics</i> 4, 4-4, pp 263 - 288	Narrative/descriptive	Exposure to shift and night work	Weak	Review paper examining evidence linking health to shift and night work. Concludes tolerance to shift work is multifaceted with high inter-individual variability. Shift work can act as a trigger/stress factor for common psychosomatic disorders. Mediating factors include personal characteristics, coping strategies, family/social conditions and working situations.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Cotton, P. & Hart, P.M. (2002). Occupational well-being and performance: A review of organisation health research; <i>The Australian Psychologist</i> 38 (2) pp 118 -127	Critical review	Positive and negative work experiences, organisational climate, emotionality, coping styles, and personality.	Moderate	Review of literature concerning occupational well-being, distinguishes between distress and morale indicating both are independent and have different determinants. Concludes that personality is the strongest determinant of distress and, organisational climate is the strongest morale determinant. Morale is also linked to rates of sick leave.
de Castro, A., Agnew J., & Fitzgerald S. T. (2004). Emotional Labour - relevant theory for occupational health practice in post-industrial America.; <i>American Association of Occupational Health Nurses Journal</i> , 2 (3) pp 109 - 115	Theoretical review	Emotional labour	Weak	Summarises theoretical state of emotional labour (EL) research in US service economy. Links exposure to EL to negative health and well-being (factors being job satisfaction, burnout, authenticity) but at simplistic level only e.g. assumes dose-response relationship.
de Croon E.M., Sluiter, J. K., Paul, P., Kuijer, F. M., and Frings-Dresen, M. H. W. (2005).; The effect of office concepts on worker health and performance: a systematic review of the literature: <i>Ergonomics</i> , 48, 2, pp 119 - 134	Systematic	Office concepts e.g. office design/layout	Moderate	Reviews impact of office design on health and performance.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
119 - 134				
de Lange, A., Taris, T. W., Kompier A. A.J., Houtman I.L.D., & Bongers P.M. (2004); The relationships between work characteristics and mental health: examining normal, reversed and reciprocal relationships in a 4 wave study; <i>Work and Stress</i> 18, 2, pp 149 - 166	Longitudinal	Job demands, job control, social support	Weak	Provides evidence to support a 2 way possible causal link between certain work characteristics (job demands, job control, supervisor/social support) and strain/well-being -
DeJoy, D. & Wilson, M. G.(2003),,; organizational Health: Broadening the horizon of workplace health promotion;. <i>American Journal of Health Promotion</i> , 17, 5 pp 337 - 341	Narrative/descriptive	Organisational Climate	Weak	Considers links between health promotion and health and well-being of employees. Offers up a model of health organisations, but does not directly address well-being drivers. Builds on other work linking similar organisational factors and well-being.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Delle Fave, A. and & Massimini, F.; (2005). The relevance of subjective well-being to social policies: optimal experience and tailored intervention. In F.A. Huppert, N. Baylis, and B. Keverne, B. (2005) <i>The Science of Well-being</i> , Oxford University Press: New York	Critical literature review	Social change	Good combination of findings from a number of sources.	Good combination of findings from a number of sources, Informed article exploring social change. Does have an impact on w/b although here no stats are specified
Diener, E., Oishi, S. and Lucas, R.E. (2003). Personality, culture and subjective well-being: emotional and cognitive evaluations of life. <i>Annual Review of Psychology</i> 54, pp 403 - 425	Critical review	Personality, wealth, cultural factors	Weak	Examines the cultural and personality correlates of subjective well-being. Subjective well-being related to self-esteem and dispositional optimism.
Doest, L., Maes, S. abd & Gebhardt, W. (2006). Personal goal facilitation through work: implications for employee satisfaction and well-being.; <i>Applied Psychology</i> 55(2): pp 192-219, April 2006.	Cross sectional - positive relationship	Personal goal facilitation	Weak	Established positive link between personal goal facilitation and job attitudes/well-being

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Frank, R. (2005). Does money buy happiness? In: F.A Huppert, F.A., N. Baylis, N., and B. Keverne, B. (2005) <i>The Science of Well-being</i> , Oxford University Press: New York, pp 461-475	Critical lit review	Income, adaptation, spending categories	Good empirical findings, well supported by theoretical underpinnings, although more research is needed. This is acknowledged by author.	Satisfaction provided by conspicuous forms of consumption (e.g. house, bigger car) is more context dependent than inconspicuous forms of consumption (vacation, time with friends or family).
Furham, A. & Petrides, K.V. (2003). Trait emotional intelligence and happiness. <i>Social Behaviour and Personality</i> , 31,pp 815-824	Cross sectional study	Emotional Intelligence	Weak due to small sample of 88	Trait emotional intelligence (intelligence (ability to regulate emotions according to the context) explained 50% of the variance in happiness in 88 participants.
Gasper, D.es (2005).; Ssubjective and objective Well-being in Relation to Economic Inputs; puzzles and responses.; <i>Review of Social Economy</i> 63, 2 pp 177 - 206	Critical review	Assesses and rejects claim the well-being is related to income.	Weak/non-existent	Rejects assertion that income level is correlated with subjective well-being.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
<p>Gilbreath, B. & Benson, P.G. (2004). The contribution of supervisor behaviour to employee psychological well-being. <i>Work & Stress, 18</i>, pp 255-266</p>	<p>Cross sectional study</p>	<p>Positive supervisor behaviour</p>	<p>Weak to moderate Small sample (N=167)</p>	<p>Supervisor behaviour was a statistically significant predictor of psychiatric disturbance. Concludes that employees engaging in positive behaviours (e.g. flexibility in how objectives are accomplished, make me feel valuable, encourages me to ask questions, shows appreciation of a job well done) have better psychological health.</p>
<p>Godin, I. & Kittel, F. (2004). Differential economic stability and psychosocial stress at work: associations with psychosomatic complaints and absenteeism.; <i>Social Science and Medicine 58</i>, pp 1543 - 1553</p>	<p>Cross sectional study</p>	<p>Work control, social support, work over commitment and imbalance</p>	<p>Weak</p>	<p>Investigated relationship between stress, working conditions and absenteeism and self reported health and psychosomatic complaints. Poor health outcomes linked with low control, low social support, over commitment and high imbalance.</p>
<p>Grebner, S., Semmer, N.K. & Elfering, A. (2005). Working conditions and three types of well-being; a longitudinal study with self report and rating data. <i>Journal of Occupational Health Psychology, 10</i> (1) pp 31 - 43</p>	<p>Longitudinal</p>	<p>Job control</p>	<p>Weak due to small sample of 52</p>	<p>Job control predicted general well-being.</p>

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
<p>Grebner, S., Semmer, N.K., Faso, L.L., Gut, S., Kalin, W & Elfering, A. (2003). Working conditions, well-being and job related attitudes among call centre agents; <i>European Journal of Work and Organisational Psychology</i>, 12,4, pp 341 - 365</p>	<p>Cross sectional - negative relationship</p>	<p>Job/task design</p>	<p>Weak</p>	<p>Cross sectional comparative study investigating links between working conditions (job design, task stressors) and well-being in a sample of call centre agents and a sample of other occupational demands, including emotional dissonance. Concludes strong division of labour in call centre jobs is related to lower levels of well-being compared to people in comparison jobs (needs clarification).</p>

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Hagger, M. S. & Orbell, S. (2003). A Meta-Analytic Review Of The Common-Sense Model Of Illness Representations. <i>Psychology and Health</i> , 2003, Vol. 18, No. 2, pp. 141-184.	Meta-analysis	Illness identity, perceived controllability of symptoms, time line, curability, controllability.	Consequences (moderate to strong effect sizes with illness outcomes), Control/cure (small to moderate effect size with some illness outcomes), Identity (moderate to strong effect sizes with illness outcomes), Timeline (Small to moderate effect sizes with illness outcomes).	Meta-analysis of 45 studies investigating illness-representations. Perceptions of a strong illness identity were positively related to the use of coping strategies of avoidance and emotion expression. Perceived controllability of the illness was associated with cognitive reappraisal, expressing emotions and problem-focused coping strategies. Perceptions of the illness as highly symptomatic, having a chronic timeline and serious consequences was correlated with avoidance and expressing emotions coping strategies. Perceptions that the illness was curable/controllable was positively related to the adaptive outcomes of psychological well-being, social functioning and vitality and negatively related to psychological distress and disease state.
Harter, J.K., Schmidt F.L., Keyes (2002), C.L.M., (2002). Well-being in the workplace and its relationships to business outcomes; in C.L. Keys and J. Haidt (eds) <i>Flourishing: The Positive Person and the Good Life</i> pp 205 - 224	Meta-analysis	Individual performance, supervisor opinion about work quality, positive workplace perceptions	Moderate	Uses meta analysis techniques to link well-being to business outcomes.
Hauck, K. K. & Rice, N. A longitudinal analysis of mental health mobility in Britain. <i>Health Economics</i> (2004), 13: 981-1001		Socio-economic factors including income, education and social class	Fairly strong relationships.	Large-scale survey of mental health mobility in the UK using the General Health Questionnaire. Concludes that disadvantaged socio-demographic groups suffer poorer mental health and experience more periods of illness than higher socio-demographic groups.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Head, J., Kivimaki, M., Martikainen, P., Vahtera, J., Ferrie, J.E., Marmot, M, G. (2006). Influence of change in psychosocial work characteristics on sickness absence: the Whitehall II study. <i>Journal of Epidemiology and Community Health</i> 2006;60:pp 55-61	Prospective cohort study	Self-perceived psychosocial characteristics.	Strong - reviewed and grouped a number of studies.	Concludes that poorly managed change harms health.
Helliwell, J.F. and Putnam, R.D. (2005). The social context of well-being, in: F.A Huppert, F.A.,N. Baylis, N., andB. Keverne, B. (2005). <i>The Science of Well-being</i> , Oxford University Press: New York	Surveying influences	Social networks, social capital	Builds up a clear picture of how factors interact with one another.	Emerging evidence is demonstrating the extent of social networks to be positively related to well-being, providing trust prevails within the network.
Houkes, I., Janssen, P.M., de Jonge, J. & Bakker, A. (2003).; Personality, work characteristics and employee well-being: a longitudinal analysis of additive and moderating effects; . <i>Journal of Occupational Health Psychology</i> , 8, (1) pp 20 - 38	Longitudinal	Intrinsic work motivation.	Weak to moderate	Tests the influence of personality factors (growth need, negative affectivity and upward striving) on 3 outcomes - work motivation, emotional exhaustion and turnover intention. Negative affect showed direct and additive relationships with emotional exhaustion and also moderates relationship between workload and emotional exhaustion.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Huppert, F. (2004);. A population approach to positive psychology: the potential for population interventions to promote well-being and prevent disorder in <i>Positive Psychology in Practice</i> by Martin E. P. Seligman (Foreword), P. Alex Linley (Editor), Stephen Joseph (Editor), Wiley (2004)	Narrative/descriptive	Social support, stress.	Weak	Agues the case for taking a population level approach in efforts to increase levels of well-being. Suggests social relationships influence well-being more than demographic factors or income - social relationships an important determinant of well-being.
Huppert, F. & Whittington, J.E. (2003). Evidence for the independence of positive and negative well-being: Implications for quality of life assessment; <i>British Journal of Health Psychology</i> , 8, 107-122	Cross sectional study	Article distinguishes between positive and negative well-being. - Paid employment is an important determinant of positive well-being. Disability and lack of social roles is associated with negative well-being but not in a work context.	Weak - based on cross sectional study albeit with large sample size	Summarises empirical research concerning the independence of positive and negative states of well-being. Identifies possible constructs and determining factors of positive well-being

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Ihlebrack, C. and Eriksen, H.; Occupational and Social Variation in subjective health complaints. . (2003),. <i>Occupational Medicine</i> , 53: pp 270-278	Cross sectional	Gender, education, lifestyle, work related factors, perceived stress, coping strategies	Weak.	Factors explained very little of the variance for subjective well-being, no effect of occupational group.
Kenny, D. & McIntyre, D. (2005). Construction of occupational stress: nuisances, nuances of novelties. In A. Stamatios, C. Antoniou, C. Cooper <i>Research Companion to Organisational Health Psychology</i> Cheltenham, UK: Edward Elgar pp 59-69.	Critical Review	Coping style	Moderate-strong	Cites a strong corpus of evidence demonstrates that organisational climate (recognition, co-worker interaction, goal congruency, development opportunities, participative decision making, role clarify and supportive relationship) mediates coping and occupational well-being.
Kivimaki, M., Elovainio, M. Vahtera, J & Ferrie, J.; Organisational justice and health of employees: a prospective cohort study. , <i>J. Occupational Environmental Medicine</i> , 2003; 60, pp 27-34	Longitudinal	Justice of decision making procedures	Some evidence. More research needed	This prospective cohort study investigated the justice of interpersonal treatment by supervisors (the relational component of organisational justice) as a predictor of health. The sample comprised 10, 308 civil servants. The study concluded that the extent to which people are treated with justice in workplaces seems to predict their health independently of established stressors at work.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
<p>Kompier, A.J. & Taris, T.W. (2005). Psychosocial risk factors and work-related stress: state of the art and issues for future research. In A. Stamatios, G. Antoniou, G. & Cooper, C.L. <i>Research Companion to Organisational Health Psychology</i>, Cheltenham, UK: Edward Elgar pp 59-69.</p>	Critical	Psychosocial risk factors for stress	Major risk factors	Reviews the status quo in stress research. Highlights methodological shortcomings.
<p>Kuper, H. & Marmot, M. (2003).; Job strain, job demands, decision latitude and risk of coronary heart disease within the Whitehall II study; <i>Journal of Epidemiology and Community Health</i>, , 57, pp 147 - 153</p>	Longitudinal	Decision latitude, job demands	Moderate	Uses Whitehall II data to investigate association between job strain and coronary heart disease. Concludes job strain, high demands and low decision latitude are associated with increased risk of coronary heart disease

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
<p>LeFevre, M., Matheny, J. and Kolt, G. (2003). Eustress, distress and interpretation in occupational stress; <i>Journal of managerial Psychology</i>, 18, 7 pp 726 - 744</p>	<p>Critical review</p>	<p>Any environmental stimulus that results in distress - looks at Selye's perspective.</p>	<p>Conceptual</p>	<p>Discusses concept of eustress in context of occupational stress theories i.e. PE person-environment fit, Cybernetic and Control. Argues that only latter theory is adequate to accommodate eustress concept and goes on to develop a model of occupational stress based on this. Authors reject Yerkes- Dodson Law and associated presumption in management literature that a reasonable amount of stress/distress is necessary for performance at work.</p>

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Lightsey, O.R. (2006). Resilience, Meaning and Well-Being. <i>The Counselling Psychologist</i> . 34, 2006	Narrative/descriptive	Resilience & Meaning	Conceptual - unproven	Theoretically based descriptions of resilience and meaning.: Describes resilience as generalized self-efficacy, and meaning as the process of augmenting self-efficacy expectations, outcome expectancies and would in turn increase situational and global life satisfaction. Concludes that a deficit (stress model) has limited value in encouraging resilience (i.e. acquired by stress tolerance) but that it should be encouraged thought motivation and growth.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
<p>Lorretto, W., Popham, F., Platt, S., Pavis, S., Hardy, G., MacCleod, L. and Gibbs, J. (2005). Assessing psychological well-being: A holistic investigation of NHS employees; <i>International Review of Psychiatry</i>, Oct , 17 (5) pp 329 - 336</p>	<p>Longitudinal</p>	<p>Various including work demands, co-worker support, job demands, managerial support and work-life conflict.</p>	<p>Moderate</p>	<p>Used questionnaire data to probe links between well-being (measured by GHQ) and known predictors of stress at work. Findings agreed with usual patterns. Additionally, found that effects of work life balance were independent of effects of organisational change on well-being. No interactions/moderating effects found, suggesting these well-being factors are independent.</p>
<p>Lowe, G.S., Schellenberg, G. & Shannon, H.S. (2003). Correlates of employees perceptions of a healthy workplace; <i>American Journal of Health Promotion</i>, 17, 6, pp 390 - 399</p>	<p>Cross sectional study</p>	<p>Good communication, social support</p>	<p>Weak</p>	<p>Analysed correlates of workers perceptions of extent to which their work environment is healthy and how these perceptions influence job satisfaction, employee commitment, morale, absenteeism and intention to quit. Strongest correlate of healthy work environment is food communication and social support followed by job demands.</p>

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Lynn, M. & Steel, P. (2006).; National differences in subjective well-being; the interactive effects of extraversion and neuroticism; <i>Journal of Happiness Studies</i> . 7, pp 155 - 165	Cross sectional study	Personality - extraversion and neuroticism	Weak to moderate	Concludes that interaction of extraversion and neuroticism is a strong predictor of satisfaction with life, affect and happiness.
Makinkangas, A. & Kinnunen, U. (2003). Psychosocial work stressors and well being: self-esteem and optimism as moderators in a one year longitudinal sample.; <i>Personality and Individual Differences</i> , 35, pp 537b - 557	Longitudinal	Self-esteem and optimism	Weak to moderate	Longitudinal study investigating the roles of self-esteem (SE) and optimism between psychosocial work stressors and well-being. SE moderated relationship between poor organisational climate and emotional exhaustion and mental distress in males. Optimism moderated between time pressures, job insecurity and poor organisational climate on mental distress. Concludes SE and Optimism are important resources which have main and moderator effects on well-being.

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Malka, A. & Chatman, J.A (2003);. Intrinsic and extrinsic work orientations as moderators of the effect of annual income on subjective well-being; a longitudinal study; <i>Personality and Social Psychology Bulletin</i> . 29 (6) pp 737 - 746	Longitudinal	Income, extrinsic orientation (value work as a route to money)/intrinsic orientation (value work as a means to intellectual fulfilment).	Weak	Found individuals high in extrinsic orientation had higher levels of subjective well-being and job satisfaction, whereas those high in intrinsic orientation had lower subjective well-being at higher income levels.
Marmot, M. (2005).; Remediable or preventative social factors in the aetiology and prognosis of medical disorders, In: P. White, P(2005) <i>Biopsychosocial Medicine: an integrated approach to understanding illness</i> . Oxford University Press: New York	Critical lit review	Social gradients, work related stressors	Social environment has a crucial impact on health - backed up by consistent epidemiological findings.	Expert review of Whitehall II findings. Concludes that social gradient affects morbidity and mortality independently of other confounders. Health risk behaviours mediate this relationship, but work stressors also have an independent effect.
Martikainen, P., Adda, J., Ferrie, J.E., Davey Smith, G. & Marmot, M.(2003). Effects of income and wealth on GHQ depression and poor self rated health in white-collar women and men in the Whitehall II study. <i>Journal Epidemiology and Community Health</i> , 57, PP 718 - 723	Longitudinal	Income, wealth	Moderate. Needs further explication.	Shows association between current personal income/wealth and General Health Questionnaire depression/poor self rated health.

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McCalister K. et al (2006). Hardiness and support at work as predictors of work stress and job satisfaction. <i>Stress Management</i> 20 (3) pp 183 - 191	Cross sectional - negative relationship	Hardiness and support at work	Weak	Cross sectional study investigating links between hardiness and stress/job satisfaction. Concludes hardiness functions in a protective way with regard to the former issues and suggests these are possible areas for intervention e.g. hardiness training (need to define hardiness).

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<p>Michie, S. & Williams S. (2003). Reducing work related psychological ill health and sickness absence - a systematic literature review. <i>Occupational and Environmental Medicine</i> , 60, pp 3 - 9</p>	<p>Systematic</p>	<p>Long working hours, lack of control over work, lack pf of participation in decision making/problem solving and unclear management and work role</p>	<p>Sstrong</p>	<p>Reviews key work factors associated with psychological ill health and sickness absence. Key determinants were long hours, work overload/pressure, poor social support, ambiguous work role and management input. Successful interventions to improve psychological ill health and sickness absence used training and organisational approaches to increase participation in decision making and problem solving, increase support/feedback and improve communication. Key message is that these issues are amenable to change.</p>
<p>Neidhammer, I., Chtstag, J., David, S., Barouhile, L. & Barrandon, M.D. (2006). Psychosocial Work Environment and Mental Health: Job-strain and Effort Reward Imbalance in a Context of Major Organizational Changes. <i>International Journal of Occupational and Environmental Health</i>, 12, pp 111-119</p>	<p>Cross sectional study</p>	<p>Social Support</p>	<p>Moderate</p>	<p>Social support reduced depression in a cross sectional sample of 680 employees from a French publication distribution company.</p>

Article Details	Article type	Factor Name(s) IV Determinants	Evidence Base (Comment)	Article Summary
Nezlek, J.B. & Allen, M.R.(2006).; Social support as a moderator of day to day relationships between daily negative events and daily psychological well-being. <i>European Journal of Personality</i> , 20, pp 53 - 68	Cross sectional study	Social support	Weak	Study examined whether social support acts as a moderator between negative events and psychological well-being. Daily well-being positively related to number of positive events and negatively related to number of negative events. Small sample size.
Nielson, M.L., Rugulies, R., Christensen K.B., Smith-Hanson, L., Bjorner, J.B. & Kristensen, T.S (2004). Impact of the psychosocial work environment registered absence from work: a two year longitudinal study using the IPAQ cohort; <i>Work and Stress</i> 18 (4) pp 323 - 335	Longitudinal	Decision authority, skill discretion, predictability (of work).	Weak to moderate	Longitudinal study testing the impact of psychosocial factors on absence rates from work. High levels of decision authority, supervisor support and skill discretion predict lower absence rates in both genders. High predictability levels (jobs that are less predictable) link to lower absence rates in men.
Park, C. and Adler, N. (2003).; Coping style as a predictor of health and well-being across the first year of medical school.; <i>Health Psychology</i> , 22: pp 627-631	Longitudinal	Coping style	Non-found	Investigated potential association between coping style and well-being - coping style did not predict change in well-being levels. Healthy population.

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Pavot, W. & Diener, E. (2004). Findings on Subjective Well-being: Applications to Public Policy, Clinical Interventions, and Education. In A. Linley (Editor), S. Joseph (Editor), <i>Positive Psychology in Practice</i> Wiley (2004).	Review - narrative/descriptive	Personality/temperament	Moderate	Summarises research into determinants of subjective well-being. Cites personality traits, positive and negative affect, quality of social relationships as key determinants/influencers of subjective well-being.
Penedo, F.J. & Dahn, J.R. (2005). Exercise and well-being; a review of mental and physical health benefits associated with physical activity; <i>Current Opinion in Psychiatry</i> , 18, pp 189 - 193	Narrative/descriptive	Physical exercise	Weak	Reviews literature exploring relationship between physical exercise and physical/mental health. Concludes that participants engaging in regular exercise display more desirable health outcomes across range of physical conditions.
Peterson, J., Lowe, J., Peterson, A. and Janz, K. (2006). The relationship between active living and health related quality of life: income as a moderator. <i>Health Education Research</i> , 21 (1), pp 146-156	Narrative/descriptive	Active living	Accounts for some variance in the model.	Explores complex relationships between active living and quality of life. Concludes relationship is a complex one.

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<p>Poelmans, S., O'Driscoll, M. & Beham, B. (2005). An overview of international research on the work-family interface. In: S. Poelmans (Ed.), <i>Work and Family: An International Research Perspective</i>. Mahwah NJ: Lawrence Erlbaum Associates.</p>	Critical	Work-to-family interference (in Western Cultures)	Weak to moderate due to lack of longitudinal research and empirical testing.	Cross cultural review of the antecedents, moderators and consequences of work family-conflict. Work-to-family interference more common in western culture,culture is mediated by time demands and psychological involvement. Cites inconsistent evidence of gender, negative affectivity, social support, job support, spouse support, and hardiness as potential moderators. Coping strategies, such as redefining roles may as buffers.
<p>Propper, C., Jones, K., Bolster, A., Burgess, S., Johnston, R and Sarker, R.(2005); Local Neighbourhood and mental health: evidence from the UK. <i>Social Science and Medicine</i> (2005), 61; 2065-2083</p>	Critical	Neighbourhood	Very weak relationship between neighbourhood and well-being	Reviews relationship between neighbourhood and well-being.
<p>Radcliff, B. (2005). Class organisation and subjective well-being: A cross national analysis. <i>Social Forces</i>, 84 (1), pp 513-530</p>	Critical	Labour organisation	Strong evidence.	Highlights importance of unions in aiding happiness and also the way teams and workers are organised impacts upon well-being.

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Rydstedt, L.W., Ferrie, J. & Head, J. (2006); Is there support for curvilinear relationships between psychosocial work characteristics and mental well-being: Cross-sectional and long-term data from the Whitehall II study; <i>Work and Stress</i> , 20 (1) pp 6 - 20	Longitudinal	Social support, decision latitude	Moderate	Uses Whitehall II data to investigate possible curvilinear relationship between psychosocial work characteristics and mental well-being. Found little support for curvilinear relationship.
Sousa-Poza, A. & Sousa-Poza A.A. (2002). Well-being at work: a cross-national analysis of the levels and determinants of job satisfaction. <i>Journal of Socio-Economics</i> , Volume 29, Issue 6, Pages 517-538	Narrative/descriptive	Interesting job, good relations with management, job demands	Weak	Examines differences in levels of job satisfaction between different countries using statistical analysis. Finds JS job satisfaction differs between countries and that these differences are attributable to differences in work role inputs and outputs. Also shows that there are common determinants of JS across countries i.e. having interesting work and good relations with management.

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<p>Spector, P., Cooper, C.L., O'Driscoll, M., & Sparks, K. (2002). Locus of control of control and well-being at work; how generalisable are western findings? <i>Academy of Management Journal</i> , 45, 2 pp 453 - 466</p>	<p>Cross sectional</p>	<p>locus of control of control</p>	<p>weak</p>	<p>Study investigating whether links between locus of control of control and job satisfaction/physical well-being are culturally dependent. Relationship between locus of control of control and JS job satisfaction are generalisable across cultures. Relationship between locus of control and physical well-being is much more variable. Locus of control of control correlates negatively with job satisfaction. The more internal your ones locus of control, of control the higher your ones well-being.</p>
<p>Steenstra, I.A., Verbeek, J.H., Heymans, M.W. and Bongers, P.M. (2005). Prognostic factors for duration of sick leave in patients sick listed with acute low back pain: a systematic review of the literature; <i>Occupational and Environmental Medicine</i> 62pp 851-860.</p>	<p>Systematic</p>	<p>Low back pain, social indicators</p>	<p>Strong</p>	<p>Conducted a systematic review to evaluate the impact of prognostic factors for return to work among workers sick listed with acute lower back pain (LBP). Studies fulfilled the inclusion criteria (i.e. inception cohort studies of workers with LBP on sick leave for less than 6 weeks, absolute outcomes, relative terms, survival curve or duration of sick leave). Specific LBP, higher disability levels, older age, female gender, more social dysfunction and more social isolation, heavier work, receiving higher compensation were identified as predictors for longer duration sick leave.</p>

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Tuomi, K., Vanhala, S., Nykyri, E. & Janhonen, M. (2004).; Organisational practices, work demands and the well-being of employees: a follow up study in the metal industry and retail trade; <i>Occupational Medicine</i> , 54, 2 pp 115 - 121	Longitudinal	Organisation practices, work demands and individual factors	Weak	Mental well-being increased most with increases in development opportunities and promotion of employee well-being. Organisational practices strongly associated with employee well-being.
Vaananen, A., Pahkin, K., Huuhtanen, P., Kivimaki, M., Vahtera, J., Theorell, T & Kalimo, R.((2005); Are intrinsic motivational factors of work associated with functional incapacity similarly regardless of the country? <i>Journal of Epidemiological Community Health</i> , 59, pp 858-863	Critical	Intrinsic motivational factors	Moderate	Job autonomy most related to functional incapacity. - Relationships statistically significant
van Horn et al.(2004) ; The structure of occupational well-being: A study among Dutch teachers; <i>Journal of Occupational and Organisational Psychology</i> , 77 pp 365 - 375	Cross sectional negative	Positive affect	Weak	Examination of possible factor structure/correlates of well-being. Concludes that affect is a central dimension of well-being.
Van Mierlo, H., Rutte, C., Kompier, M.A.J. & Doorewaard, H.C.M.(2005). Self-managing teamwork and psychosocial well-being: review of multilevel research domain; <i>Group and Organisational Management</i> . 302, pp 211 - 235	Systematic	Self-managing teamwork	Moderate	Review of 28 studies of self-managing teamwork. Demonstrates that higher levels of job satisfaction are consistently associated with self-managing teamwork.

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Wegge, J., Van Dick, R., Fisher, G.K., Wecking, C. & Motlzen, K. (2006). Work motivation, organization identification, and well-being in call centre work. <i>Work & Stress</i> , 20, pp 60-83	Cross sectional study	Organisational Identification	Weak to moderate	Analysed relationships between objective working conditions, subjective measures of the motivating potential of work, organisational identification (question e.g. being a member of the organisation is a reflection of who I am) and well-being in 211 & 161 German call centre workers. Highly identified call centre workers reported more motivation and well-being.
Weich, S., Twigg, L. Holt, G., Lewis, G. and Jones, K. (2003).; Contextual risk factors for the common mental disorders in Britain: A multilevel investigation of the effects of place. <i>Journal of Epidemiological Community Health</i> . 57, pp 616-621		Area level exposure, where people live	No relationship established	No relationship established. How people live their lives rather than where they live appears to be the more important factor.

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Wilson, M. G., DeJoy, D.M., Vandenburg, R.J., Richardson, H.A. & McGrath, A. (2004) Work characteristics and employee health and well-being; Test of a model of healthy work organisation.; <i>Journal of Occupational and Organisational Psychology</i> 7, pp 565 - 588	Cross sectional negative	Org climate	Weak	Paper tests a model of healthy work organisation using various self-report measures of health and well-being. Concludes employee's perceptions of organisational climate impacts ultimately on well-being. Small sample size.
Zammuner, V. L. & Galli, C.(2005).; Well-being: causes and consequences of emotion regulation in work settings; <i>International Review of Psychiatry</i> , Oct 2005, 17 (5) pp 355 - 364	Cross sectional - positive relationship	Emotional labour	Weak - based on cross sectional study albeit with large sample size	Found strong association between burnout and Emotional labour.
Zapf, D.(2002). Emotion work and psychological well-being. A review of the literature and some conceptual considerations. <i>Human Resource Management Review</i> 12, pp 237 - 268	Narrative/descriptive	Emotion work - control and support	Weak	Emotion work leads to positive and negative effects on health/well-being. But effect is indeterminate. Emotional dissonance (gap between felt and expressed emotion) appears to be a key concept. Control/social support moderates the link between emotion work variables and job satisfaction/burnout.

