

# **Work stress interventions and their effectiveness: a literature review**



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## **Introduction**

The field of occupational stress interventions and stress prevention in general has been rapidly expanding during the last three decades. There are many different interventions available to prevent and cure the adverse health effects associated with occupational stress. These interventions may focus on either the individual, the organisation or the individual-organisational interface. Most stress interventions however focus on changing the worker instead of the work environment (Semmer, 2003).

Interventions may also be classified as being primary, secondary or tertiary in nature, each serving different purposes (Quick, Murphy and Hurrell, 1992). In primary prevention interventions the goal is to eliminate, reduce or change job stressors. The aim of secondary prevention interventions is to prevent employees who are already showing symptoms of stress from getting sick, by altering the way they respond to job stressors. Finally, tertiary interventions focus on the treatment of employees who suffer from severe stress consequences and the rehabilitation of employees after a period of sickness absenteeism (Kompier & Kristensen, 2001).

Although the activity in the field of occupational stress interventions has greatly expanded, there is a lack of evaluation research on intervention programmes. Especially evaluations of organisation-level interventions are relatively scarce, because a methodologically sound evaluation of this type of intervention is difficult to implement (Van der Hek and Plomp, 1997). Also, in the case of evaluation research, the designs of these studies can often be criticised for their methodological and theoretical weaknesses. During recent years however, the quality of evaluation research has improved considerably and gradually more information has become available about the effectiveness of stress interventions.

The aim of the current paper is to provide a state of the art review on occupational stress interventions. We will present a description of the different types of interventions that can be used when employees experience work stress or develop mental health problems. Subsequently, the effectiveness of these interventions in the reduction of mental health complaints and rehabilitation of employees who are absent from work because of these complaints is discussed. In the appendix 63 relevant and recent interventions studies directed at work stress are summarised.

## Method

Three strategies were used to locate relevant stress intervention studies. First, a computerised search was conducted over the period 1993-2003, using the following databases:

- Medline (via PubMed: biomedical)
- PsycINFO (via PsycINFO: psychological)
- NIOSHTIC2 (via OSH-ROM: occupational health and safety)
- HSELINE (via OSH-ROM: occupational health and safety)
- CISDOC (via OSH-ROM: occupational health and safety)
- MHIDAS (via OSH-ROM: occupational health and safety)
- MEDL-OEM (via OSH-ROM: occupational health and safety)
- RILOSH (via OSH-ROM: occupational health and safety)

Three sets of key words were composed to conduct this search (Table 1). Within each group of key words we used the Boolean term OR. Subsequently search 1 and 2 were combined, using AND. Finally, search 3 was added.

**Table 1.** Key words used in the literature search

Group	Key words
1) Key words related to (psychological) health outcomes	absenteeism anxiety burnout depression job stress mental fatigue mental health occupational stress sickness absence work related stress work stress
2) Key words linked to work-relatedness	employee employees employment job labour occupational work work related work-related
3) Key words related to interventions	EAP Employee Assistance Program(me)/s health care recruitment intervention, interventions job enrichment job redesign job rotation management program(me)/s primary care psychotherapies psychotherapy

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secondary prevention  
stress inoculation training  
stress reduction  
task enrichment  
task reduction  
task rotation  
clinical protocol(s)  
counse(l)ling  
therapy  
treatment

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Second, to identify relevant publications that were missed in the database-search, we conducted a manual search using citations in publications identified in the database-search (snowball-method). Third, we also used the personal archives of the researchers.

A study had to meet two inclusion criteria to be included in the review. First, the study had to be published in a peer reviewed English journal or book chapter. Second, participants in the study had to be recruited from the working population.

We looked for both quantitative (experimental, quasi-experimental) and qualitative studies. To identify individual-oriented interventions we used key words such as treatment, counselling and "clinical protocol". However, the number of hits resulting from the use of these key words in the Medline and PsycINFO databases was very high. Therefore, we narrowed our search in these databases by adding the key words "sickness absence" or "absenteeism" separately. Also, we conducted some additional searches using the terms "(occupational) stress intervention(s)" and "sickness absence/absenteeism intervention(s)".

The number of articles and book chapters that were considered relevant to our review was 63. A tabular overview of these studies is provided in Appendix A. For each study several characteristics are described: 1) research design, 2) research subjects 3) outcomes measures, 4) type of intervention and 5) results of the study.

The research design is described in the first column. We distinguish between natural experiments, controlled trials and randomised control trials (RCT). In natural experiments the intervention is initiated by an organisation itself. Often no control group is available. A controlled trial on the other hand is initiated by the researcher. Although there is a control group, participants are not randomly assigned to this group or the intervention group. Finally, in a RCT people are randomly assigned to either the control or experimental group.

In the second column the number of subjects, their sector of employment and their occupation are described. Some studies however cover more than one sector of employment.

In the column 'health complaints or problems/occupational risks' relevant outcomes are described. In most studies outcomes were measured at an individual level. If outcomes were

measured at an organisational level the focus mostly was on absenteeism. The way organisational interventions should be designed and how effects at the organisational level should be examined is still subject to debate (Griffiths, 1999).

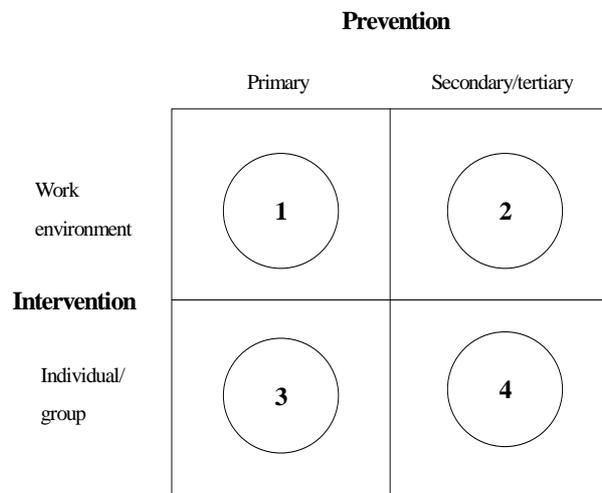
In the fourth column the interventions are characterised according to the following aspects: type of intervention, phasing, and duration of the intervention. Relevant factors that may have influenced the intervention are also described.

In the last column the results of the study are described. Obviously, these results can not be interpreted without taking into account the design of the study.

In Appendix B several recent reviews on (the effectiveness of) stress interventions are shortly summarised.

## Results

In order to create some structure in the vast amount of stress interventions, reviewers of stress intervention literature have proposed several categorizations. Unfortunately these categorizations are not identical. In this review we will attempt to offer an integrated overview. DeFrank and Cooper (1987) propose a classification which distinguishes interventions as well as targets of stress management programmes on three levels: individual, organisation, and individual-organisation interface. Most of the categorizations proposed by other authors fit in DeFrank and Cooper's classification. Some interventions within each level may be defined as preventive, whereas others are curative (Matteson, 1987). In a similar vein, some are primary -stressor reduction-, whereas others are secondary -stress management-, or tertiary -Employee Assistance Programs- (Murphy, 1988; Kompier & Kristensen, 2001). By combining the two main axes (changing work versus changing the person & prevention versus cure) the following conceptual framework can be developed (Kompier & Krsitensen, 2001).



**Figure 1.** A conceptual framework for stress prevention and intervention (taken from Kompier & Kristensen, 2001)

Newman and Beehr (in Burke, 1993) categorize interventions at the individual level in those aimed at psychological conditions, those aimed at physical or physiological conditions, those aimed at changing one's behaviour and those aimed at changing one's work-environment. Ivancevich, Matteson, Freedman and Philips (1990) define interventions at the organisational level as: '(...) any activity, programme, or opportunity initiated by an organisation, which

focuses on reducing the presence of work-related stressors or on assisting individuals to minimize the negative outcomes of exposure to these stressors'. Newman and Beehr divide organisational interventions in interventions intended for changing organisational characteristics, interventions intended for changing role characteristics and those intended for changing task characteristics.

### **Interventions aimed at the individual**

#### *Psychological relaxation/meditation*

A psychological method for achieving relaxation is described by Tsai (1993). It comprises three cognitive processes: focusing, passivity and receptivity. Focusing is the ability to identify, differentiate, maintain attention on and return attention to simple stimuli for an extended period of time. Passivity is the ability to stop unnecessary goal-directed and analytic activity. Receptivity is the ability to tolerate and accept experiences that may be uncertain, unfamiliar, or paradoxical. In the progress of relaxation, focusing, passivity, and receptivity is incorporated into the cognitive process, and the outcome of such relaxation is a calm mind and a relaxed body functioning (van der Hek & Plomp, 1997). Of course, also other techniques, such as Transcendental meditation, yoga, mantra singing, etc. can be used to induce relaxation.

According to Murphy (1996) meditation had positive effects on psychological and cognitive health outcomes and on job and organisational health outcomes. Meditation produced the most consistent results across outcome measures, but caution is called for, since only six studies were reviewed. Edwards and Burnard (2003) reported positive effects of meditation and relaxation on coping with anxiety and stress. In a meta-analysis of occupational stress-reducing interventions by Van der Klink et al. (2001) the effectiveness was determined of four intervention types: cognitive behavioural approaches, relaxation techniques, multi-modal interventions and organization-focused interventions. A small positive effect was found of both psychological and physical relaxation techniques on quality of work, psychologic responses and resources, physiology and anxiety symptoms.

#### *Cognitive behavioural approaches*

Cognitive-behavioural approaches aim at changing cognitions and subsequently reinforcing active coping skills (Van der Klink et al., 2001). Two examples of cognitive behaviourally oriented stress interventions are Rational Emotive Therapy (RET) and Stress Inoculation Training (SIT). Kushnir and Malkinson (1993) give a description of a group setting RET. The

first part of the intervention was educational: participants were provided with information on exhaustion and stress management outlining the causes of stress at work and various coping techniques. The RET workshop consisted of several units. Firstly, the ABC model is introduced. ABC stands for Activating event, Beliefs and Consequences. According to this model an event is (mis)interpreted which may lead to possibly negative consequences. Irrational and rational beliefs and their emotional and behavioural consequences are therefore identified. Subsequently the concepts of stress and burnout are elaborated and by means of the ABC model personal experiences of stress and burnout are analysed. Irrational beliefs are discussed and are changed into rational ones. The RET workshop also comprises an assertiveness training focusing on interaction with superiors. Realistic interpersonal exchanges at work are analysed in terms of RET principles. Participants receive homework assignments to facilitate insight, assimilation and cognitive change.

Stress inoculation training is a comprehensive stress training intervention based on a cognitive behavioural approach. It is designed to communicate skills to enhance resistance to stress, preparing the individual to respond more favourably to stressful events. SIT consists of three stages of training. The first phase is of an educational nature. The goal of this phase is to help the individual appreciate the nature of stress and stress effects. The second phase centres on skill acquisition and rehearsal, in order to develop and practice a repertoire of coping skills to respond effectively in the stressful situation. Finally, the third phase of SIT involves the application of coping skills in conditions that are similar to the real work-setting. To augment the transfer of training, trainees may employ imagery or role-play which offers them the opportunity to apply coping skills gradually across increasing levels of stress (Saunders, Driskell, Johnston & Salas, 1996).

In the meta-analysis by Van der Klink et al. (2001) cognitive behavioural interventions proved to be more effective than relaxation techniques, multi-modal programs and organization focused programs. Cognitive behavioural interventions especially helped to improve perceived quality of work life and psychologic responses and resources. They also significantly reduced anxiety symptoms. It is suggested that employees with high job control profit more from being provided with individual coping skills than employees working in more constrained environments, because this high job control allows them to exercise these coping skills.

Murphy (1996) remarked that the effectiveness of stress interventions varied according to the outcome measure that was used. Cognitive behavioural interventions were more effective when psychological outcomes, such as anxiety, irritability and depression, were evaluated.

### *Multi-modal interventions, goal-setting and time management*

Other cognitive strategies for stress management are multi-modal interventions, goal-setting and time management. Multi-modal interventions concentrate on the acquisition of passive and active coping skills (Van der Klink et al., 2001). Time management is about doing the same task in less time than usual and using time that one previously wasted. Goal-setting means planning ahead by setting clear and well defined attainable goals. In short, multi-modal interventions focus on altering the way people respond to stress, whereas goal-setting and time management aim at stress prevention. In the meta-analysis by Van der Klink (2001) multi-modal interventions proved to be the second most effective way of reducing occupational stress. Furthermore, only multi-modal programs were effective in decreasing depressive symptoms.

### *Employee Assistance Programmes*

Employee Assistance Programmes (EAPs) originate from the USA. The programmes are meant to improve the well-being and health of an organisation's employees (Schabracq et al., 2001). The programmes are designed to assist employees and their dependents in dealing with personal problems that diminish job functioning, pose a threat to their health, well being, and/or possibly their jobs. Typically, the employer pays for the programme and there is no cost to the employee.

### *Interventions aimed at changing one's work environment.*

An individual can change his or her own work environment by changing to a less demanding (stressful) job or less demanding (stressful) organisation. However, when the organisation tries to alter the work environment, the intervention is seen as an intervention on the organisational level.

### *Physiological/physical relaxation*

Progressive muscle relaxation is a physical way for attaining relaxation. Progressive muscle relaxation entails focusing one's attention on muscle activity, learning to identify even small amounts of tension in a muscle group, and practising releasing tension from the muscles. The underlying rationale is that, since relaxation and muscle tension are incompatible, reducing muscle tension is coupled with the reduction of autonomic activity, and consequently anxiety and stress levels. Muscle relaxation is usually realised by alternating tensing and relaxing

exercises. Systematically moving through the major muscle groups of the body enables a person to become skilled at recognizing tension in a muscle group and relieving that tension. Another way of achieving relaxation is biofeedback. Biofeedback is based on a principle of learning: people learn best when they receive feedback on their performance. In biofeedback training, a person is provided with feedback about the status of a physiological function. The intention of biofeedback is that over time a person learns to control the activity of that function (Murphy, 1996).

Muscle relaxation seems to be especially effective in decreasing blood pressure to more healthy levels. Biofeedback seemed to be the least effective technique (Murphy, 1996). As described previously Van der Klink et al. (2001) found a small positive effect of both psychological and physical relaxation techniques on quality of work, psychologic responses and resources, physiology and anxiety symptoms.

*Interventions aimed at changing one's behaviour.*

Newman and Beehr (in Burke, 1993) distinguish the category 'interventions aimed at changing one's behaviour'. As example they mention becoming less type A, taking time off for fun, or developing friendships for social support, and using the relaxation response. Perhaps this category is somewhat superfluous, since all interventions directly or indirectly aim at a behavioural change. Cognitive behavioural therapy, for instance, is not only about changing beliefs, but also about changing behaviour.

Finally, it should be mentioned that many interventions are a combination of the interventions previously described. In Table 2 the effects of the individual oriented interventions, summarized in Appendix A, are presented. We focused on three types of outcomes: well-being, absenteeism and psychological complaints such as anxiety or feelings of burnout.

**Table 2.** Effects of interventions aimed at the individual

Type of outcome	Positive	Negative	Neutral
Well-being	Less mental strain <sup>2</sup>	Decrease in job dissatisfaction <sup>5, 6</sup>	No improvements in psychological health <sup>6, 30</sup>
	Less prolactine <sup>2, 26</sup>	Increase in propensity to quit <sup>5</sup>	No improvements in stress levels <sup>6, 19, 23, 30</sup>
	Improvements in mental health <sup>3, 27</sup>	Adverse impact on the quality of life outside <sup>13</sup>	No consistent results on stress <sup>7</sup>
	Improvements in psychological strain <sup>4</sup>	Work demands <sup>13</sup>	No increase in job satisfaction <sup>15, 19</sup>
	Job satisfaction <sup>4, 14</sup>	Decrease in coping <sup>28</sup>	No reduction in role overload <sup>19</sup>
	Reduction of stress <sup>4, 12, 14, 28</sup>		No reduction in psychological distress <sup>22, 25</sup>
	Better understanding of stress management <sup>8</sup>		Work demands <sup>21</sup>
	Better coping skills <sup>8, 19, 23</sup>		Mastery <sup>22</sup>
	Sensitivity <sup>9</sup>		No increase in objective wellness <sup>27</sup>
	Reduced anger <sup>10</sup>		No decrease in psychosomatic symptoms <sup>31</sup>
	Reductions in perceived home/work stress <sup>12</sup>		
	Positive feelings about work <sup>13</sup>		
	Response to stress <sup>28</sup>		
	Self-efficacy for dealing with stress <sup>27</sup>		
	Cognitive weariness <sup>20</sup>		
	Reduction in psychological distress <sup>18, 19</sup>		
	Reduction in unassertiveness <sup>19, 20</sup>		
Reduction in irrationality <sup>20</sup>			
Equity with organisation <sup>17</sup>			
Increase in social support <sup>18, 21</sup>			
Mastery <sup>18</sup>			
Absenteeism	Decrease in absenteeism <sup>29</sup>	Increase in absenteeism <sup>5</sup>	
		Increase in absence frequency <sup>17</sup>	
		Increase in self-reported sick-leave <sup>23, 25</sup>	
Burnout/ anxiety/ depression	Decrease in anxiety levels <sup>1, 15, 16, 19, 21, 27, 28</sup>	Temporary decrease in personal accomplishment (as part of a burnout scale) <sup>17</sup>	Depersonalisation <sup>17</sup>
	Improvement in depression <sup>16</sup>		Depression <sup>21, 22</sup>
	Decrease in emotional exhaustion <sup>17, 24</sup>		Anxiety <sup>22</sup>
	Decrease in depersonalisation <sup>24</sup>		
	Increase in personal accomplishment (as part of a burnout scale) <sup>24</sup>		

<sup>1</sup>Andre, C., Lelord, F., Legeron, P., Reignier, & A., Delattre, A. 1997 (controlled trial); <sup>2</sup>Arnetz, B.B. 1996 (controlled trial); <sup>3</sup>Bond, F.W., & Bunce, D. 2000 (RCT); <sup>4</sup>Bunce, D., & West, M.A. 1996 (quasi experiment + control); <sup>5</sup>Dolan, S.L. 1994 (RCT); <sup>6</sup>Gronningsaeter, H., Hytten, K., Skauli G., Christensen, C.C., & Ursin H. 1992 (RCT); <sup>7</sup>Hek, H. van der, & Plomp, H.N. 1997 (review); <sup>8</sup>Heron, R.J., McKeown, S., Tomenson, J.A., & Teasdale, E.L. 1999 (natural experiment + control group); <sup>9</sup>Kagan, N.I., Kagan, H., & Watson, M.G. 1995 (quasi experiment); <sup>10</sup>Keyes, J.B., & Dean, S.F. 1998 (controlled trial); <sup>11</sup>Klink, J.J. van der, Blonk, R.W., Schene, A.H., & Dijk, F.J. van. 2001 (review); <sup>12</sup>Lindquist, T.L., & Cooper, C.L. 1999 (RCT); <sup>13</sup>Löck, C.T.J., & Arnetz, B.B. 2000/2002 (controlled trial); <sup>14</sup>Murphy, L.R. 1996 (review); <sup>15</sup>Thomason, J.A., & Pond, S.B. 1995 (RCT); <sup>16</sup>Whatmore, L., Cartwright, S., & Cooper, C. 1999 (RCT); <sup>17</sup>Dierendonck, D. van, Schaufeli, W.M., & Buunk, B.P. 1998 (RCT); <sup>18</sup>Freedy, J.R., & Hobfoll, S.E. 1994 (quasi experiment); <sup>19</sup>Jong, G.M. de, & Emmelkamp, P.M.G. 2000 (RCT); <sup>20</sup>Kushnir, T., & Malkinon, R. 1993 (controlled trial); <sup>21</sup>Rose, J. Jones, F., & Fletcher, B.C. 1998 (quasi experiment + control group); <sup>22</sup>Klink, J.J.L. van der, Blonk, R.W.B., Schene, A.H., & Dijk, F.J.H. van. 2003 (RCT); <sup>23</sup>Eriksen, H.R., Ihlebæk, C., Mikkelsen, A., Gronningsaeter, H., Sandal GM, & Ursin H. 2002 (RCT); <sup>24</sup>Ewers, P., Bradshaw, T., McGovern, J., & Ewers, B. 2002 (RCT); <sup>25</sup>Kawakami, N., Haratani, T., Iwata, N., Imanaka, Y., & Murata, K., Araki S. 1999 (RCT); <sup>26</sup>Löck, C.T.J., Arnetz, B.B. 1997 (RCT); <sup>27</sup>Pelletier, K.R., Rodenburg, A., Vinther, A., Chikamoto, Y., King, A., & Farquhar, J. 1999 (RCT); <sup>28</sup>Rahe, R.H., Taylor, C.B., Tolles, R.L., Newhall, L.M., Veach, T.L., & Bryson, S. 2002 (RCT); <sup>29</sup>Toivanen, H., Helin P., & Hänninen, O. 1993 (RCT); <sup>30</sup>Iwi, D., Watson, J., Barber, P., Kimber, & N., Sharman, G. 1998 (controlled trial); <sup>31</sup>Skargren, E., & Oberg, B. 1999 (cross-over).

Conclusions: mainly positive results are reported, but they mainly pertain to well being and psychological or mental health. No clear effect on absence was found. It should be noted that quite some studies did the second measurement directly after the intervention. Moreover, not all studies had a follow-up. Bunce (1996) reported no positive effects after one year, Kagan (1995) reported only a short-term effect for two of the three interventions and a long term – effect for the ‘interpersonal awareness’ programme, Whatmore (1999) also found an exclusively short-term effect for two out of three interventions and both a short- and long-term effect for a stress management programme based on ‘cognitive restructuring’. The meta-analysis by Van der Klink et al (2001) suggests that cognitive behavioural therapy is one of the most effective intervention type.

In the studies considered in this review, the sustainability of the effect of these interventions over time -if even established on the short term- is unknown. This should be indicated as a severe shortcoming.

It should also be noted that the majority of the actors in these programmes are psychologists or related professions. The physician, e.g. interventions by the general practitioner as well as the occupational health physician directed at work stress reduction are hardly found to be the professional actor in the studies. Several very recent studies from The Netherlands draw attention to this group, since it is a highly relevant professional group in the Dutch situation (e.g. Van der Klink et al. 2003; Nieuwenhuijsen et al, 2003).

### **Individual-organisation interface level**

#### *Strengthening social support at the workplace*

Interventions that focus on strengthening social support make use of co-worker support groups which primarily aim to improve the relationship between the employee and the organisation, instead of changing individual characteristics. The groups are networks of employees who occupy similar positions in the organisation and consider themselves to have common needs and goals. A group meets to solve common problems, support each other and improve their skills. The emphasis lies on sharing problems, providing one another with reassurance and support, sharing successful coping strategies and listening empathically (Van der Hek & Plomp, 1997).

Van der Hek and Plomp (1997) evaluated three studies that examined the effectiveness of social support. One study reported a significant reduction in anxiety, depression and hostility.

The other two studies had conflicting results: one reported a decrease in stress, whereas the other did not.

#### *Other interventions at the individual-organisation interface level*

Other interventions at the individual-organisation level aim at improving the job-demands person style fit, the participation preferences-practices fit and the autonomy preferences-practices fit (Ivancevich et al., 1990).

### **Organisational interventions**

#### *Interventions aimed at changing organisational characteristics*

Newman and Beehr (in Burke, 1993) mention interventions directed at changing the organisational structure; changing organisational processes, such as reward systems, selection and placement, training and development systems, job rotation policies, etc.; the development of health services; and policy on ergonomics.

#### *Interventions aimed at changing role characteristics*

Newman and Beehr (in Burke, 1993) divide interventions aimed at changing role characteristics in redefining roles, reducing role overload, increasing participation in decision making and reducing role conflict.

#### *Interventions aimed at changing task characteristics*

Task characteristics can be changed by designing jobs in the light of workers' abilities and preferences, using workers' preferences in selection and placement, providing training programmes so workers can enhance their skills and individualizing the treatment of workers. Interventions aimed at changing both role and task characteristics can be achieved by job (re)design.

An example of an intervention on the organisation level can be found in Heany, Israel, Schurman, Baker, House and Hugentobler (1993). Participative action research (PAR) is a specific model of work reorganisation employing a collaborative process that occurs between a change agent and organisation members. The collaborative relationship applies to all areas of the intervention process, that is diagnosis, the actual intervention and the evaluation. The authors' PAR intervention included changing stressful features of the work environment in an attempt to reduce the levels of stress experienced by employees, strengthening those factors that serve to buffer or alleviate the impact of stress on health (e.g. strengthening social

support and increasing perceived control through participation in decision making) and promoting employee mental and physical health, with the intention of counteracting the negative effects of stress. Another example is the job redesign reported by Griffin (1991). The intervention consisted of enhancement of responsibility, authority and accountability in a group of bank tellers. The employees learnt to do a wider range of activities and they received more autonomy over routine decisions. Feedback was also enhanced. Before the intervention employees had to wait until the end of the day, whereas after the intervention the computer gave them immediate feedback, allowing them to monitor their own work pace. Finally a closer link between the employees and the customers was established.

Van der Klink et al. (2001) reported a small and non significant effect size for the (few) organisational interventions that were studied. Organisational interventions only brought about a small improvement with regard to psychological responses and resources. According to Van der Klink et al. two factors may explain the lack of effect. First, most studies assessed outcomes and the individual level, whereas the primary outcomes of organisational interventions involve workplace aspects. Individual outcomes depend on the intermediate workplace effects. It may take time for this mediating mechanism to produce effects at an individual level. Second, organisational interventions are not tailor-made. Although programs may enhance job control, individual coping skills are needed to use this extra control.

**Table 3.** Interventions focused on job redesign, new tasks, etc.

Type of outcome	Positive	Negative	Neutral
Well-being/risk perception	Improvement mental health <sup>2,5</sup> Control <sup>3,7</sup> Opportunities for development <sup>3</sup> Satisfaction with salary and being an employee in the company <sup>3</sup> Improvement on task perceptions <sup>4</sup> Organisational commitment <sup>4</sup> Job satisfaction <sup>4</sup> Less propensity to quit <sup>4</sup> Perceived psychological demands <sup>7</sup>	Still no satisfactory mental variation <sup>1</sup> Impairment on relationship with colleagues <sup>3</sup>	No improvement on psychological distress <sup>5</sup> No improvement in social support from supervisors and colleagues <sup>7</sup> No improvement in general stress reaction-7 No improvement in life style <sup>7</sup>
Absenteeism	Reduction of sickness absence rates (4x) <sup>2,4,6,7</sup>		No effect on absenteeism <sup>5</sup>
Burnout/ anxiety/ depression	-	-	-

<sup>1</sup>Åborg, C., Fernstrom, E., & Ericson, M.O. 1998 (natural experiment); <sup>2</sup>Bond, F.W., & Bunce, D. 2001 (quasi experiment + control group); <sup>3</sup>Christmansson, M., Friden, J., & Sollerman, C. 1999 (natural experiment); <sup>4</sup>Griffin, R.W. 1991 (natural experiment + control group); <sup>5</sup>Reynolds, S. 1997 (quasi experiment + control group); <sup>6</sup>Terra, N. 1995 (natural experiment); <sup>7</sup>Maes, S., Verhoeven, C., Kittel, F., & Scholten, H. 1998 (RCT).

A qualitative evaluation of the organisational interventions described in Appendix A shows that results were mixed. Sometimes a positive effect on absenteeism, depression, or anxiety was reported, but the interventions did not systematically reduce stress levels.

Conclusion: In general the results are mixed. Most benefits were found on well-being. Absenteeism decreased in some cases. No effects were reported on burnout, depression, or anxiety. Health apparently, is not considered a highly relevant issue when studying the effects of redesign. It is striking though that no other indices, e.g. an index of productivity, are measured and reported in this literature (see also Van der Hek & Plomp, 1997; Van der Klink et al., 2001).

**Table 4.** Interventions focused on changing the organisational structure and/or processes

Type of outcome	Positive	Negative	Neutral
Well-being	Overall mental strenuousness <sup>1</sup>  Satisfaction <sup>4</sup> (limited), <sup>9</sup> Skill discretion <sup>6</sup> (limited), <sup>10</sup> Learning climate <sup>6</sup> (limited), <sup>7</sup>  Management style <sup>6</sup> (limited), <sup>7</sup> Reduced levels of stress <sup>7</sup> (limited) Job characteristics <sup>7</sup> Authority <sup>10</sup>	Job characteristics <sup>5</sup>  Competence/development <sup>8</sup>	Job characteristics <sup>5</sup>  No reduction of stress <sup>9</sup> No improved satisfaction <sup>9</sup> No improved organisational commitment <sup>9</sup>
Absenteeism	Decrease in sick-leave <sup>3,4,10</sup>		
Burnout/ anxiety/ depression	Depression <sup>2,3</sup> Anxiety <sup>6</sup>	Psychosomatic symptoms <sup>8</sup> Exhaustion <sup>8</sup>	

<sup>1</sup>Elo, A.L., Leppanen, A., & Sillanpaa, P. 1998 (natural experiment); <sup>2</sup>Heaney, C.A., Israel, B.A., Shurman, S.J., Baker, E.A., House, J.S., & Hugentobler, M. 1993 (natural experiment); <sup>3</sup>Kawakami, N., Araki, S., Kawashima, M., Masumoto, T., & Hayashi, T. 1997 (controlled trial); <sup>4</sup>Kompier, M.A., Aust, B., Berg, A.M. van den, & Siegrist, J. 2000a (review); <sup>5</sup>Landsbergis, P.A., & Vivona-Vaughan, E. 1995 (quasi experiment + control group); <sup>6</sup>Mikkelsen, A., & Saksvik, P.Ø. 1999 (controlled trial); <sup>7</sup>Mikkelsen, A., Saksvik, P.Ø., & Landsbergis, P. 2000 (quasi experiment + control group); <sup>8</sup>Pettersson, I.L., & Arnetz, B.B. 1998 (natural experiment); <sup>9</sup>Tiernan, S.D., Flood, P.C., Murphy, E.P., & Carroll, S.J. 2002 (natural experiment); <sup>10</sup>Wahlstedt, K.G.I., & Edling, C. 1997 (natural experiment).

Results on the effectiveness of the other organisational interventions (Table 4 and 5) are mixed as well. There were generally positive effects on well being and absenteeism, although the number of studies is limited. Several other studies reported no effects of the organisational interventions on risks. The latter is an assumption when studying the relationship between organisational measures and health outcomes, this has to be achieved for example by reducing demands or increasing control.

Some studies indicate that depression and anxiety are actually reduced, whereas others indicate that these health problems are negatively influenced. No conclusive findings on the effectiveness of these measures can be reported.

**Table 5.** Other organisational interventions

<b>Type of outcome</b>	<b>Positive</b>	<b>Negative</b>	<b>Neutral</b>
Well-being/risk perception	Increase in job satisfaction <sup>1,4</sup>	Decrease in supervisor satisfaction <sup>3 (limited)</sup>	No effect on job demands, control, support & relations at work <sup>6</sup>
	Decrease in job satisfaction <sup>6</sup>	Increase in inclination to turnover <sup>6</sup>	No improvement in social support from supervisors and colleagues <sup>5</sup>
	Lower uncertainty <sup>3</sup>		No reduction of stress reaction <sup>5</sup>
	Increase in commitment <sup>4</sup>		No improvement in life style <sup>5</sup>
	Decrease in perceived psychological demands <sup>5</sup>		No improvement in social support from supervisors and colleagues <sup>5</sup>
	Increase in perceived control <sup>5</sup> Lower uncertainty <sup>3</sup>		
Absenteeism	Improvement sickness absence rates <sup>5</sup>		No effect on absenteeism <sup>1,2,3,4</sup>
Burnout/ anxiety/ depression	Reduction anxiety on the short term <sup>1</sup>	Increase in emotional exhaustion <sup>6</sup>	

<sup>1</sup>Parkes, K.R. 1995 (cross-over design), <sup>2</sup>Saksvik, P.Ø., & Nytrø, K. 2001 (natural experiment + control group);

<sup>3</sup>Schaubroeck, J., Ganster, D.C., Sime, W.E., & Ditman, D. 1993 (RCT); <sup>4</sup>Schweiger, D.M., & Denisi, A.S. 1991 (controlled trial); <sup>5</sup>Maes, S., Verhoeven, C., Kittel, F., & Scholten, H. 1998 (RCT); <sup>6</sup>Houtman et al. 2003 (natural experiment in 67 organisations).

## **Overall conclusion on the effectiveness of interventions**

The aim of this paper was to provide an integrated review on the effectiveness of occupational stress interventions. First we provided a short description of the different types of interventions that are used when patients experience work stress. Next we tried to find studies providing evidence for the effectiveness of stress interventions. Therefore we conducted a literature search.

In this section we summarize the results of this literature study. Because we used a rather qualitative approach we will include several other reviews and meta-analyses focusing on the effectiveness of interventions in our discussion of the results presented above. We will conclude with some recommendations for future research and policy regarding the counselling of employees who suffer from incapacity for work because of stress related problems, and end up with some issues relevant for the next work packages of the Stress Impact project.

In this discussion the next topics will be tapped upon:

- Individual -versus- organisation directed interventions
- Conditions for an effective approach
- The process of intervention
- Participation of employees
- Gaps in the literature studies
- Recommendations for research (including Stress Impact), practice and policy

### ***Individual -versus- organisation directed interventions***

In most reviews, even the very recent ones (e.g. Semmer, 2003) it is concluded that the majority of the research on the effectiveness of work stress interventions is considering individually directed interventions, and which mainly aim at adapting individuals to their environment. Reasons mentioned why this is and has been the case are:

1. Management itself often has the opinion that work stress problems are caused by individuals, particularly their incapacity to cope with the work demands imposed upon them.
2. It is also in their interest not to change the organisation too much on behalf of the problems that resulted.

3. It is much easier to study the effect of individual interventions in an experimentally proper way than when an organisation, or even a part of it is the entity of the intervention study. Issues like randomisation, follow-up of a control group, restricting the intervention only to the experimental group, and avoiding other changes than just the experimental ones are much easier on the level of individuals than on the level of (parts of) the organisation. There even are prominent researchers who consider a randomised clinical trial an invalid testing when it concerns the complex organisational level (e.g. Griffiths, 1999).

When considering the outcomes of the studies presented in this survey, the studies focussed on individual interventions not only showed more consistent and positive results as compared to the organisational ones, they also were -in general- of better quality. Particularly the latter may be the case because it has generally been found to be too difficult to set up a well controlled randomised intervention study at the organisational level. This is well illustrated for example by the Landsbergis et al (1999) review that mentions the large number of 'grey' documentation on the effectiveness of organisational interventions. It has also become an accepted trend to present and publish well documented case studies (e.g. Karasek, 1992; Kompier & Cooper, 1999; Kompier et al, 2000a & b). By several researchers, this is even seen to be the better way (e.g. Griffiths, 1999; Kompier & Kristensen, 2001). Major arguments for not considering the 'RCT' as the golden standard for these type of interventions clearly have to do with the fact that on the organisational level it is often not a good thing to choose any organisation as a control, since those organisations that in principle do not want such an intervention differ a lot from the experimental group regarding 'motive' (and maybe other issues). With this characteristic, a lot more may be confounding differences between the (groups of) organisations.

On the other hand, many of the reviews promote the merits of organisational interventions, and use the following arguments:

1. to prevent is better than to cure;
2. long term follow-up of stress management at the organisational level in general is not well studied. Therefore it is not convincingly demonstrated that these interventions really are effective;
3. when considering primary prevention, causes can best be tackled at the organisational level. When only done at the individual level you are bound to get more problems because the individual is stigmatised... either the individual is an outcast, and both that person as well as the management have to deal with that. When, however, the

work is really stressful, the stronger ones will fail and report absent as well, it will only take more time.

4. so in the end, the approach to reduce risks at their source appears most attractive for all.

The present status still is, however, that little research on the effectiveness of organisational interventions exists, and that it is quite inconclusive. As mentioned before, the complexity of organisations is one of the reasons that intervention processes are difficult to control, and that it is difficult to withhold a really interested organisation a potential effective intervention. In the latter case, often the mode of a 'postponed intervention' with additional measurements is found to be a practical way out. This has, however, been little practiced within the area of work stress interventions.

### ***Conditions for a successful intervention at the organisational level***

The reviews mention the following conditions for a successful intervention, mainly based on the qualitative research, the case studies on work stress prevention on the organisational level (e.g. Kompier et al, 2000a & b; Kompier & Kristensen, 2001; Landsbergis et al, 1999):

1. a step wise and systematic approach: steps identified are:
  - a. identification & acknowledgement of the problem,
  - b. additional gathering of information
  - c. choice of what to do/what measures to implement
  - d. implementation
  - e. evaluation, both process and product
2. participation of employees and management (including top management)
3. the research benefits should also include organisational benefits
4. Continuing attention towards the process of intervention is essential

Hindrances for such an intervention are the problem to isolate the risk factor to such a degree that it easily leads to a risk that can be well (and easily be) managed.

### ***The process of intervention***

From the previous texts there appears to be a number of conditions that have to be met in case of a successful intervention of work stress. Many conditions are found to be difficult to be

met. Many (e.g. Nytrø et al; 2000) claim that implementing interventions is difficult. The process is in fact more important than the content of the intervention because of the motivation and enthusiasm that has to be mobilised. It is important in such a process to create a climate which allows one to learn from ones own mistakes.

Another important issue is the fact that interventions are indeed quite complex and need support from everybody in the organisation to make it a success. Therefore a culture must exist in which all working in that organisation must be aware of the culture and endorse or come to endorse that culture.

### ***Employee participation***

Employee participation in interventions is very important. It is one of the most important issues in organisational interventions. Both empirical and review studies stress this aspect over and over again (see also Landsbergis et al, 1999).

### ***Gaps in the literature studied***

There are several gaps in the literature described above as well as in the reviews. These gaps pertain to:

- The follow-up period, which is absent or quite short in many cases. The long(er) term effects of interventions are often unknown.
- Regarding the quality of treatment, this quality often is not specified.
- The actors are often psychologists, or related professions, but not physicians like the GP or OHP. In many countries, however, these physicians play an extremely important role in the rehabilitating process. Their performance should be monitored and used, even implemented somewhere.
- Most studies are on the prevention of deterioration of health complaints or absence. Only few studies looked at the effectiveness of work-resumption protocols.

### ***Recommendations***

On the basis of the findings and discussion presented above, we should recommend to the area of **research** to:

- Increase attention to the role of the physicians (particularly GP + OHP).
- Measure longer term effects.
- Map the process of intervention.
- Map moderating factors like the perceived risks, changes therein, and other relevant processes that happen.
- Diversify the outcomes: well-being, health, absence and (other) indices of productivity.
- Gender is one of the diversifying variables.

Other recommendations, directed at the level of **practice** and **policy** are related to the fact that:

- The employer should have a prominent role... but the employee as well.
- Social behavioural therapy appears to be a quite good remedy against burnout, but does not hold against a mixed intervention including amending the work demands.
- Medicalisation appears to be a risk factor. Research (e.g. Blonk et al, 2003) suggests that even an intervention of cognitive therapy is not better off than no intervention when considering those who are provided real work related options to temporarily reduce the work load.
- Communication between professional involved may be important to work resumption as well.

### **Specific issues as related to Stress Impact**

- We probably need to have some knowledge about the quality of the intervention.
- We need to relate the work related risk to the health related outcome.
- How to overcome the problem that the professional and employee have different views on what happened/was intended during contract hours.

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## Appendix

### Summary of intervention studies and reviews

article	research design	subjects	complaints/risks	intervention	results
Åborg, C., Fernstrom, E. & Ericson, M.O. 1998	natural experiment	22 data entry workers	VDU work, health complaints, psychosocial factors	During 1½ year, at first reorganisation of the data processing unit by providing it with new tasks, then close down of the unit and transfer of the employees to units with more varied tasks.	Better work-load distribution, still no satisfactory mental variation, no effects on health complaints.
Andre, C., Lelord, F., Legeron, P., Reigner, A. & Dellatre, A. 1997	controlled trial	bus drivers after aggression; 67 control, 65 treatment	impact of a traumatic event (aggression)	1-6 sessions cognitive behaviour intervention including: evocation of the aggression, relaxation, role plays, cognitive restructuring.	Decrease in anxiety levels and intrusion of the traumatic memory in the treatment group.
Arnetz, B.B. 1996	controlled trial	employees in IT company; 61 study, 50 control	stress, cardiovascular risk	Choice of 3 stress-reduction program: (1) progressive relaxation according to the method described by Benson (2) applied relaxation as described by Öst (3) tai chi combined with progressive relaxation.	Less mental strain and less prolactin (stress-sensitive hormone) in intervention group. type of programme and intensity of participation did not influence the results significantly.
Blonk, R.W.B. & Lagerveld, S.E. 2003	RCT	163 self-employed with minor psychiatric disorder, working in different occupations; 2 x 40 intervention, 42 control	degree of incapacity for work, psychological complaints (depression, anxiety, stress, burnout)	Intervention 1: psychological counselling focused on both work and the individual (combined approach) by a job-analyst/labour-expert; 5-6 sessions. Intervention 2: cognitive behavioural treatment by a psychologist (cognitive restructuring, time management); 10-12 sessions.	Significant reduction in level of incapacity and psychological complaints for all conditions after 4 months. Intervention 1 (combined approach) significantly more effective in reducing incapacity for work. No significant changes between conditions on psychological complaints. After 10 months a further reduction of level of incapacity is established. Differences between conditions remain the same. No further reduction of psychological complaints.
Bond, F.W., & Bunce, D. 2000	RCT	90 volunteers in a media-organisation, 2x30 study, 30 control	general health, depression, job motivation, job satisfaction, propensity to innovate	9h/3m - 1: acceptance and commitment therapy (ACT) 2: innovation promotion programme 3: control.	Improvements in mental health and work-related variables; in ACT changes mediated by acceptance of undesirable thoughts and feeling, in IPP by attempts to modify stressors.
Bond, F.W., &	quasi experiment with control	97 administrative	stress (occupational stress)	Participative Action Research (PAR) by	Improvement mental health,

article	research design	subjects	complaints/risks	intervention	results
Bunce, D. 2001	group; 1 year follow up	employees from a central government department	indicator, OSI), sickness absence	increasing people's job control.	sickness absence rates, self-rated performance.
Bunce, D. 1996	quasi experiment with control group; 1 year follow up	200 health care workers, 66 in 52 intervention, 84 control	job motivation/satisfaction, psychological strain, work-related stress	1 day followed by ½ day; 1: traditional stress management program, emphasizing cognitive-behavioural and arousal reduction techniques (SMP) 2: innovation promotion programme (IPP), promoting innovative responses to stressors 3: control.	SMP associated with improvements in general psychological strain and job satisfaction, IPP with work-related stress. 1 yr follow up: no gains on psychological well-being, increases in innovation.
Christmansson, M., Friden, J., & Sollerman, C. 1999	natural experiment	17 assembly workers before the redesign were compared to 12 assembly workers after the redesign	musculoskeletal pain disorders in the upper extremities, psychosocial work climate	Job redesign moving from specialised assembly tasks to work groups with enlarged and enriched tasks.	Decrease in worker efficiency, psychosocial: improvement in control, development opportunities; impairment on relationship with fellow workers, satisfaction with salary and satisfaction with being an employee in the company. Prevalence of musculoskeletal pain disorders did not improve, severity increased.
Dierendonck, D. van, Schaufeli, W.M., & Buunk, B.P. 1998	Quasi-experimental design with pre-, post- and follow-up measures (before the programme started, after 6 months, and after 12 months). One experimental group and two control groups (internal and external control group)	Data on 149 direct-care professionals working with mentally disabled individuals; 36 in the experimental group, 39 in the internal control group, and 74 in the external control group.	burnout, absenteeism, feelings of inequity resulting from a discrepancy between goals and expectations concerning recipients and organisation on the one hand and the every day reality on the other hand	Voluntary group-based cognitive behavioural burnout intervention programme, focussing directly on 3 ways in which people generally restore inequity (adjusting their actual contributions or outcomes, change their perceptions of investments and outcomes, leave the situation). 5 weekly group sessions run by a psychologist. Supervisors participated in a separate parallel workshop (3 group meetings) in which the same psychologist trained their communication skills and social skills.	Emotional exhaustion diminished in the experimental group after 6 and 12 months. After 12 months no effect on personal accomplishment or on depersonalisation. Absence duration increased in all groups. No effect for absence frequency. Equity in relationship with organisation increased in the experimental group after 6 and 12 months, especially for the people who also received social support from their supervisor. No effect for equity in the relationship with recipients. The programme decreased turnover intention when employees experienced high levels of support.

<b>article</b>	<b>research design</b>	<b>subjects</b>	<b>complaints/risks</b>	<b>intervention</b>	<b>results</b>
Dolan, S.L. 1994	RCT; hospitals randomised	30 hospitals (10 intervention 1, 10 intervention2, 10 control) intensive care units and emergency room units. 1.409 employees, response rate 84%	job dissatisfaction, propensity to quit, adverse impact on the quality of life outside, absenteeism	Intervention 1: diagnostic report based on an occupational stress questionnaire; Intervention 2: in addition short training session strategies for stress management.	The intervention made things worse (all aspects).
Elo, A.L., Leppanen, A., & Sillanpaa, P. 1998	natural experiment, no controls	118 employees of a carton-producing factory (office, machine and finishing department)	stress	Survey with the Occupational Stress Questionnaire, feedback in 1.5 h sessions resulting in: training programme for superior-subordinate discussions, permanent meeting system, improvement housekeeping and co-operation.	The variability of work increased and overall mental and physical strenuousness decreased (after 3 yrs).
Eriksen, H.R., Ihlebæk, C., Mikkelsen, A., Grønningsæter, H., Sandal, G.M., & Ursin, H. 2002	Participants were randomly assigned to the control group (N=344), the Physical Exercise group (N=189), the Integrated Health Programme group (N=165), or the Stress Management Training group. Measurements prior to intervention in order to establish baseline, measurements after the intervention and follow-up.	Post office and postal terminal employees.	subjective health problems	Physical Exercise: standardised aerobic dancing programme, with a special focus on reducing pain in the neck, back and arm/shoulder. Capability of the individual and the group were taken into account. Integrated Health Programme: physical exercise; information about stress, coping, health, and nutrition; and practical examination at the worksite. Stress Management Training: programme on improving the coping ability through a cognitive behavioural approach. Coping ability was attempt to be modified by using emotion-focused strategies and problem-focused strategies.	No significant effect of the interventions was found on subjective health complaints, job stress, or self-reported sick leave. Nevertheless, participants in the PE and IHP group reported more improvement in health and physical fitness than the controls. Participants in SMT and IHP were more likely to report an improvement in their work situation and their capability of dealing with stress than controls. Participants in PE, SMT and IHP reported more positive effect on muscle pain and knowledge on how to maintain good health than controls. IHP was the intervention with the best overall effect. Most of the effects were maintained at follow-up and no negative effects of the interventions were found.
Ewers, P., Bradshaw, T., McGovern, J., & Ewers, B. 2002	Participants were randomly assigned to the PSI intervention group (N=10) or waiting list control group (N=10). Measurements prior to	Forensic mental health nurses	burnout	The Psychosocial Intervention Training (PSI) consisted of 20 days training which aimed at equipping the staff with practical skills for reducing distress and improving functioning for people with	Participants in the experimental group improved significantly on the three subscales of the Maslach Burnout Inventory, i.e. Emotional exhaustion, Depersonalisation and

article	research design	subjects	complaints/risks	intervention	results
	intervention in order to establish baseline, measurements after the intervention.			schizophrenia. An underlying goal was to encourage staff to examine their attitudes and beliefs about psychotic illness. A more flexible and creative way of seeing patients' problems was aimed for. To complete the course both practical and theoretical components had to be passed.	Personal Achievement. The scores of participants in the control group hardly changed. Participants in the experimental group, after the intervention, had more positive attitudes towards people with serious mental illness than controls.
Freedy, J.R., & Hobfoll, S.E. 1994	Quasi experimental design and group comparison design. Assessment instruments were administered at weeks 1, 5 and 10 of the design. Dual resource intervention was implemented between week 1 and 5 and the single resource intervention between week 5 and 10.	87 nurses at six acute care hospitals in northeast Ohio.	stress	1. a dual resource intervention programme targeted at the enhancement of both social support and mastery resources, and 2. a single resource intervention programme targeted at the enhancement of only mastery resources. Both workshops were based on principles of Stress Inoculation Training and Conservation of Resources stress theory and were facilitated by a doctoral student. Five weekly, 75 minute sessions consisting of didactic material, group discussions, and weekly homework assignments.	Participants in dual resource intervention experienced enhancements in social support and mastery compared to the controls. The effect persisted through a five-week follow-up. Participants in dual resource intervention with low initial levels of social support or mastery experienced reductions in psychological distress. Participants in single resource intervention experienced a slight enhancement in mastery compared to controls.
Griffin, R.W. 1991	natural experiment with control group; follow up 6, 24 and 48 months	526 bank tellers; control 38 bank tellers	task perceptions, job satisfaction, organisational commitment, performance, absenteeism and propensity to quit	Job redesign, enhancement of responsibility, authority and accountability.	Significant improvements on all variables, performance improved after 24 and 48 months.
Grønningsaeter, H., Hytten K., Skauli G., Christensen C.C., & Ursin H. 1992	RCT	76 insurance company workers	job satisfaction, job stress	Aerobic exercise or cognitive behavioural stress management, lectures, group discussions, self-study and home assignments; 10 weeks, 3 times/week, 55 min.	Exercise group: reduced job satisfaction, no effect on stress; stress management group: no improvements in somatic or psychological health.
Heaney, C.A., Israel, B.A., Shurman S.J., Baker E.A., House J.S., & Hugentobler M. 1993	natural experiment, no controls	2 different divisions of a manufacturing plant employing about 1100 people	participation, support, depressive symptoms (CES-D)	Participatory Action Research (PAR); worksite stress reduction and employee well-being.	Increase in participation. increase in support and decrease in depression only in organisation with "adversarial" industrial relations.
Heron, R.J., McKeown, S.,	natural experiment with controls, cross-sectional design	452 employees of a pharmaceuticals	well-being (GHQ), knowledge of company guidance on the	Stress management workshop.	Controls were more likely to have a poor understanding of the

article	research design	subjects	complaints/risks	intervention	results
Tomenson J.A., & Teasdale, E.L. 1999		company	management of stress, assessment of coping strategies		principle of management of stress and to have poor coping skills (small differences between study and control).
Iwi, D., Watson, J., Barber, P, Kimber, N., & Sharman, G. 1998	controlled trial	193 employees from local Housing Departments facing organisational change	psychological morbidity, GHQ, OSI	Brief individual counselling offered to subjects in intervention group.	No evidence of treatment effects.
Jong, G.M. de., & Emmelkamp, P.M.G. 2000	Participants were randomly assigned to 1 of 2 Stress Management Training (SMT) conditions or an assessment-only control group. Participants filled out several questionnaires shortly before the SMT programme started, shortly after it had finished, and at 6 months follow-up.	130 employees working at police departments, schools, and a general hospital. Participants had to meet 3 out of 5 selection criteria (= neuroticism, inadequate coping strategies, lack of social support, distress in assertiveness, and unpleasant past life events).	trait anxiety, (psycho)somatic complaints, psychological distress, daily hassles, social support, distress in assertiveness, coping, neuroticism, unpleasant major life events, role overload, and job satisfaction	One SMT led by external clinical psychologists and one SMT led by individuals who held posts within the organisations involved. The voluntary SMT programme consists of eight 2,5-hour weekly group sessions in which a variety of active coping strategies are learned (progressive muscle relaxation , problem-solving training, assertiveness skills training, raising awareness). After every session an agenda was provided with theoretical lectures, exercises, and homework assignments.	The total experimental group improved with regard to trait anxiety, psychological distress, and unassertiveness. At 6 moth follow-up, the improvements persisted and also an increase in problem-focussed coping as well as a decrease in psychosomatic complaints were experienced. No significant effects of the SMT programme were found with regard role overload and job dissatisfaction. The SMT programme on site reduced stress levels more.
Kagan,, N.I., Kagan, H., & Watson, M.G. 1995	quasi experiment, no controls; follow up 9 and 16 months	373 employees of the emergency medical service of a Fire Department	depression, stress, burnout, anxiety, sensitivity, job performance	Psycho-educational programs based on physiological(M), coping-with-people(A) or interpersonal awareness (I) processes or combinations.	A&I and A&M most effective in short term, I most effective in the long term.
Kawakami, N., Araki, S., Kawashima, M., Masumoto, T., & Hayashi, T. 1997	controlled trial, follow up 1 and 2 years	111 workers from two blue-collar worksites in an electric company, 138 controls from other worksites	depression, blood pressure, sick leave	1-year stress reduction program, based on the work stress survey results: mechanic improvements, standardization of the production process, promotion on-the-job training, smaller work-units.	Depression scores and sick leave decreased, no effect on blood pressure or selected work stressors.
Kawakami, N., Haratani, T., Iwata, N., Imanaka, Y., Murata, K., & Araki, S. 1999	RCT, 226 Participants who were found to have psychological distress were randomly assigned to the intervention group or the control group. When inclusion criteria were met, the intervention group consisted of	Employees from a manufacturing plant.	psychological distress	Mailed advice for stress reduction under the name of an occupational physician. The individualised letter informed the participant of their stress levels and recommendations on how to improve daily habits and other behaviours to reduce stress. When necessary	There was no intervention effect on psychological distress: both the intervention and the control group showed considerable decreases in distress. No intervention effect was found for blood pressure, cholesterol levels, serum

article	research design	subjects	complaints/risks	intervention	results
	91 participants and the control group of 88. 81 participants in the intervention group and 77 participants in the control group responded to the follow up survey. Measurements prior to intervention in order to establish baseline, measurements after the intervention.			participants were advised to do more sports; to eat more vegetables; to reduce their frequency of drinking alcohol; to control their type A behaviours. A relaxation technique was briefly introduced to all participants in the intervention group.	triglycerides, leisure-time physical activity, green vegetables intake, or sick leave. The intervention was associated with an increase in eating breakfast regularly. Unexpectedly, the proportion of everyday drinkers was unchanged in the intervention group, while it decreased in the control group.
Keyes, J.B., & Dean, S.F. 1988	controlled trial	direct contact staff at care facilities for mentally retarded (50 study, 50 control)	anger (The Anger Inventory)	Study: stress inoculation training; control: lecture and discussion regarding stress and anger.	The Anger Inventory scores were significantly reduced in study group.
Klink, van der J.J.L., Blonk, R.W.B., Schene, A.H., Dijk, van F.J.H. 2003	Cluster RCT. Participants were randomly assigned to the intervention group (N=109) and the control group (N=83). Measurements prior to intervention in order to establish baseline and measurements after 3 and 12 months after the intervention.	192 postal and telecom employees.	adjustment disorder	A three stage cognitive behavioural treatment. The first stage focussed on understanding the origin and cause of the loss of control and on the undertaking of non-demanding daily activities. The second stage was about drawing up an inventory of stressors and developing problem solving stages for these causes of stress. The third stage required the implementation of the problem solving strategies and the extension of the activities to more demanding ones.	No differences in intensity of symptoms were found. In the intervention group the percentage of employees who returned to work -both partially and fully- within three months was significantly higher. At 12 months all employees had returned to work. Nonetheless, time to return to work (partially) and duration of sick leave were shorter for the intervention group. Also the recurrence rate was lower in the intervention group.
Kushnir, T., & Malkinson, R.A. 1993	Treatment group (N=22) and control group (N=18), and pre, end of, and treatment measures and 18 month follow-up measures were available (questionnaires)	40 male safety officers from several large industrial and service companies. Participation was voluntary.	assertiveness, irrational beliefs, emotional and cognitive stress symptoms (somatic complaints and cognitive weariness)	Stress management and prevention workshop using rational emotive principles (intervention programme of 5 weekly meetings aimed at improving cognitive skills and assertiveness mainly by decreasing irrational thought processes).	In the short term assertiveness improved and somatic complaints and irrationality decreased. 18 months later, cognitive weariness was also reduced, and the other improvements were still evident, but not to the same extent as short-term effects.
Landsbergis, P.A., & Vivona-Vaughan E. 1995	quasi-experiment, with controls	113 employees of a public health agency (paperwork and inspections)	job characteristics (JCQ) group process, social relationships, job satisfaction (JCM) task orientation job involvement (WES)	Participatory action research (PAR) based on Karasek's job strain model, employee problem solving committees.	Department 1: negligible or negative impact; department 2: mixed impact.
Lindquist, T.L., & Cooper, C.L. 1999	RCT	employees in a government tax	stress related symptoms	4 weekly workshops on stress and lifestyle education/stress coping skills	Reductions in perceived workplace and home/work stress.

article	research design	subjects	complaints/risks	intervention	results
		office with identified stress-related symptoms; 52 intervention, 52 control		training followed by individual counselling/personalised action plan.	
Lökk, C.T.J., & Arntez, B.B. 2000/2002	controlled trial, follow up after 10 wks	health care personnel at two geriatric wards during organisational change	psychosocial factors, anxiety, psychosomatic symptoms	psychosocial intervention programme aimed at enhancing their adaptation and ability to cope (10 sessions/20 wk).	Increase in work demands and in positive feelings about work.
Lökk, C.T.J., & Arnetz, B.B. 1997	Randomised, prospective, controlled and non-blinded intervention study. Staff from the two wards were randomly allocated to an intervention (N=14) and control (N=12) ward. Measurements prior to intervention in order to establish baseline, measurements after the intervention.	Employees from two hospital wards.	possible stress because of organisational change.	The intervention with regard to the expected stress response caused by the organisational change consisted of two parts. The educational part intended to increase knowledge about stressors and to facilitate stress management in the group. Topics like relaxation techniques and life style were also dealt with. In the second part participants were encouraged to alter reaction patterns and to improve their own work conditions and to increase self-control over work processes. The intervention took place on a group basis.	The intervention was associated with a decrease in prolactine (positive), which may be interpreted as less feelings of powerlessness. Cortisol, estradiol and DHEA levels did not change significantly between groups over time. Blood pressure, blood lipids and pulse rate were not significantly affected by the intervention.
Maes, S., Verhoeven, C., Kittel, F., & Scholten, H. 1998	RCT Three sites participated. The smallest site was to be a control group; the other two sites were randomly assigned to the intervention and control conditions. Measurements prior to intervention in order to establish baseline, measurements after the intervention, after 1, 2 and 3 years respectively. At the time of the third post-test the number of intervention group participants was 134 and the number of controls 130.	Employees of a manufacturer of household goods.	wellness risks due to life style and the content and organisation of work.	The intervention consisted of physical exercise; health education; participation in groups oriented around smoking, head aches or back pain; social skills and leadership. At the organisational level measures, such as a smoking policy, were introduced in order to give support to the interventions at the individual level. The second type of intervention was at the organisational and environmental level. Based on the results of Wellness at Work Interviews, proposals for modifying specific functions were developed and implemented.	When pre-test scores, age, gender and educational level were taken into account, no significant differences in general stress reactions between the intervention group and the control groups were found.
Mikkelsen, A., & Saksvik P.Ø. 1999	controlled trial, follow up 1 year	150 employees from 4 post offices in 2 cities (front-office	stress, subj. health, anxiety, organisational commitment, job satisfaction, JCQ, social support,	12wk participatory organisational intervention; actions based on local theories.	city 1: no positive results; city 2: decrease in anxiety, increase in skill discretion, learning climate,

article	research design	subjects	complaints/risks	intervention	results
		staff and clerical personnel)	learning climate, leadership		management style; no effects on stress.
Mikkelsen, A., Saksvik, P.O., & Landsbergis, P. 2000	quasi-experiment with control group	64 employees in 2 health care institutions; control 71 employees in other health care institutions	psychosocial job characteristics, stress, subjective health, job satisfaction	Participatory organisational intervention, actions were based on the employees' perceptions.	Limited but positive effect on stress, job characteristics, learning climate and management style after 12-week intervention.
Parkes, K.R. 1995	cross-over design, follow up after 5 years	133 driving examiners	cognitive performance, mental health, job satisfaction, sickness absence, heart rate recordings	Workload reduction. two experimental schedules for 12 weeks each.	Reduction in anxiety, increase in job satisfaction and performance; after 5 years no anxiety reduction.
Pelletier, K.R., Rodenburg, A., Vinther, A., Chikamoto, Y., King, A.C., & Farquhar, J.W. 1999	Employees with high demand and low autonomy were randomly assigned to the complete intervention group (N= 45), the partial intervention group, (N= 46), or the control group (N=45). Measurements prior to intervention in order to establish baseline, measurements after the intervention, after 6 months and 12 months.	Bank employees	job strain	In the complete intervention group participants received both mail and telephone calls; in the partial intervention group they only received mail. The mail intervention consisted of behavioural strategies aimed at increasing self-efficacy and finally behavioural change. The 5 phone calls gave participants the opportunity to clarify questions and to get assistance in skills development.	The complete intervention group showed the largest improvement in the subjective ratings of mental health status, followed by the partial intervention group, with the control group showing the least. However there were no differences in the objective wellness scores for the three groups. Self-efficacy beliefs with respect to dealing with stress increased, both after 6 months and one year, for the complete intervention group. Scores for the other two groups decreased. The complete intervention group showed a significant decrease in somatization and anxiety, whereas the other groups showed an increase. Differences between groups ceased to exist at the 1 year follow up. No significant differences among groups were found in changes of any scales in the Karasek's Job Content Questionnaire.
Pettersson, I.L., & Arnetz, B.B. 1998	natural experiment	2000 employees of a regional hospital	psychosocial work quality, support self-reported health and well-being	Structured organisational and staff intervention based on questionnaire at baseline.	Due to staff reduction overall worsening in most measures; manager-rated impact, positive staff attitude and involvement important for more favourable

article	research design	subjects	complaints/risks	intervention	results
					changes.
Rahe, R.H., Taylor, C.B., Tolles, R.L., Newhall, L.M., Veach, T. L., & Bryson, S. 2002	Participants were randomly assigned to the complete intervention group (N=171), the partial intervention group, (N=166 ), or the waiting list control group (N= 164). Stress, anxiety and coping measures prior to intervention in order to establish baseline and after 6 and 12 months. Health reports were completed before the intervention and after 3,6, 9 and 12 months.	Employees of a manufacturer of computer equipment and employees of the local city government.	stress, anxiety and coping	The complete intervention consisted of assessment, personalised self-study feedback, a wellness seminar and six face-to-face small-group sessions on wellness goals; stress and stress response; and coping with stress. The partial intervention consisted of a self-help group that received assessment and personalised feedback by mail.	All groups showed significant decreases in coping, stress and anxiety measures over time. Only for participants in the computer industry the intervention made a difference for a more robust improvement in negative responses to stress. The complete intervention group showed the highest decrease, followed by the partial intervention group and the control group showing the least decrease.
Reynolds, S. 1997	controlled trial/ quasi experiment; follow up 1 yr	33, 76 and 43 employees from a city council department (blue collar, white collar and management)	psychological and physical distress, absenteeism	1: individual counselling (3 sessions); 2: organisational change (increasing participation and control; training events, meetings) 3: control.	Counselling has clear benefits for employees' psychological well-being, whereas the organisational intervention has not.
Rose, J., Jones, F., & Fletcher, B.C. 1998	2 intervention groups (N=15) and 3 control groups (N=23) measurements prior to interventions and 4-5 months later at reassessment and observations (only in intervention group) also prior to and after the intervention	Direct care staff in group homes for people with learning disabilities	anxiety, depression, levels of demands, supports and constraints at work	Stress management programme (1. workshop: basic concept of stress, consideration of demands, supports, constraints model, discussion of assessment results, personal stress management, problem solving, goal setting; 2. review progress toward goals, changing goals and strategies as necessary (8-10 weeks after workshop); 3. review of goals, examination of team functioning, personal stress management, setting goals for the future (8-10 weeks after 2).	Anxiety significantly reduced in the intervention group. No similar effect was found for depression. Support increased significantly over time in the intervention group, but not in the control group. The level of support after the intervention was still lower than the support in the control group. No similar significant changes were reported for demands.
Saksvik P.Ø., & Nytrø, K. 2001	natural experiment with controls	employees from the health care sector; 165 study, 100 control	subjective health, personal work ethics, commitment, responsibility and absenteeism	Employees were allowed to take up to five days of self-administered sick leave with full financial compensation up to 4 times a year.	Slight improvements in musculoskeletal problems and in cold/influenza.
Schaubroeck, J., Ganster, D.C., Sime, W.E., & Ditman, D. 1993	RCT	50 supervisors of the business service division of a university	role conflict/clarity, supervisor satisfaction, somatic symptoms, absence	Role clarification intervention of supervisory roles.	Increase in role clarity, decrease in supervisor satisfaction (both weak).
Schweiger, D.M.,	controlled trial, follow up 3	150 employees from	uncertainty, stress, job	Communication programme to provide	Lower uncertainty, higher job

article	research design	subjects	complaints/risks	intervention	results
& Denisi, A.S. 1991	months	two plants in light manufacturing affected by a merger	satisfaction, organisational commitment, intention to remain with the organisation, performance, absenteeism and turnover	information about the merger	satisfaction, commitment.
Skargren, E., & Oberg, B. 1999	cross-over	86 nurses/nursing aides from geriatric wards	psychosomatic symptoms/ organisational/psychosocial or physical work conditions	Weekly exercise programme.	No effect, except for a negative effect on "work planning".
Shulman, K.R. 1996	quasi experiment with controls	employees of the Finance and R&D functions at a manufacturing organisation, 18 study, 15 control	anxiety (STAI)	chair massage therapy program, 1/week, 15min for 6 weeks, controls 15-m break	significant reduction of anxiety level in control group
Terra, N. 1995	natural experiment, no controls; follow up 2 year	430 employees in the metal can industry	sickness absence, productivity	PAR approach; work design based on completeness, autonomy and contact opportunities.	Absenteeism decreased, productivity increased.
Thomason, J.A., & Pond, S.B. 1995	RCT	custody staff of a prison (N=148; 54 completed the entire study)	physiological (blood pressure), somatic (SCL-90-R) and psychological (STAI for anxiety JIG for job satisfaction) symptoms of stress	1: training on stress management skills and self-management skills (SMTSM); 2: training on stress management skills only (SMT); 3: training on personal development skills (PD; placebo); 4: control (NTC).	Reduced blood pressure, decrease in somatic symptoms and anxiety level in group 1. No effects on job satisfaction.
Tiernan, S.D., Flood, P.C., Murphy E.P., & Carroll, S.J. 2002	natural experiment, post test only	aircraft maintenance industry	job satisfaction, psychosocial factors	Structural and cultural reform, introduction of an organic integrative structure and culture to a previously bureaucratically based organisation.	Improvement in intrinsic job satisfaction; no improvement in extrinsic satisfaction and organisational commitment.
Toivanen, H., Helin, P., & Hanninen, O. 1993	RCT; 6 months follow up	50 hospital cleaners	EMG levels (neck-shoulder tension), absenteeism, depression	15 minute relaxation program.	diminished neck-shoulder tension.
Wahlstedt, K.G.I., & Edling, C. 1997	natural experiment; follow up after 8 and 12 months	100 postal workers at a postal sorting terminal	psychosocial factors, sick leave, health effects as sleep difficulties and gastrointestinal complaints	Clearer role of management and production goals, decrease in number of supervisors and senior postmen, increase in work force, improvement of information system, change in shift system, food vending machine.	Increase in skill discretion and authority, reduction in difficulties with sleep and gastrointestinal complaints, reduction in sick leave.
Whatmore, L., Cartwright, S., & Cooper, C. 1999	RCT, follow up after 6 months	25.000 employees in the public sector	mental and physical health, depression, anxiety, commitment, job satisfaction, absenteeism	3 months: individual stress management based on 1. education and awareness or 2. exercise or 3. cognitive restructuring.	1. improvement health and depression after 3 months. 2. improvement health, depression and anxiety after 3 months; after 6 months still improvement on

article	research design	subjects	complaints/risks	intervention	results
					physical health and somatic anxiety.

review	subjects	complaints/risks	intervention	results	remarks
Edwards, D., & Burnard, P. 2003	mental health nurses	stress	Organisational interventions	Training in behavioural techniques improved work satisfaction and levels of sickness and reduced strain. Personal management relaxation techniques, significantly improved ability to cope with anxiety and stress. Stress management workshops were effective in reducing levels of burnout. Social support-based programmes offered no significant advantage over feedback only. A therapeutic skills training was effective in decreasing levels of psychological distress and burnout. A psychosocial interventions training had a significantly positive effect on levels of burnout	
Hek, H. van der, & Plomp, H.N. 1997	working population	stress	Occupational stress management programmes.	No consistent overall picture.	
Klink, J.J.L. van der., Blonk, R.W., Schene, A.H., & van Dijk, F.J. 2001	working population	stress	Cognitive-behavioural interventions, relaxation techniques, multimodal programs and organisation-focused interventions.	Moderate effect for cognitive behavioural and multimodal interventions, small effect for relaxation techniques, no significant effect of organisation-focused interventions.	studies with experimental or quasi-experimental design
Kompier M.A, Aust B., van den Berg, A.M., & Siegrist J. 2000a	bus drivers from 13 companies	occupational stress and sickness absenteeism	Team-based work, training courses on stress management and conflict solving, communication improvement, lifestyle; in most cases a combination of work-directed and person-directed interventions.	Decrease in sickness absenteeism, positive effects on workers' health, well-being and satisfaction (but most studies had methodological shortcomings).	studies were natural experiments
Kompier, M.A.J., Cooper, C.L., & Geurts, S. 2000b	working population	work stress	Work-directed and worker-directed approaches.	Most cases appeared to be successful, but unclear whether positive effects may be attributed to the interventions	multiple case studies
Matheny, K.B., Brack, G.L., McCarthy, C.J., & Penick, J.M. 1996	both working and non-working population	psycho physiological disorders, depression, anxiety and work strain	Cognitively-based approaches in treating stress-related symptoms.	There is considerable evidence for the effectiveness of the cognitive approaches for the three symptom categories. Cognitively-based treatments yield roughly similar effect sizes to those obtained for psychotherapy in general: treated patients usually end up better than roughly 70-80% of untreated patients. Some advantages however of cognitively based therapies are: they address stress-related problems more frequently; they are more structured and shorter in duration; their results seem to hold up well.	review of both individual studies and meta-analytic reviews
Michie, S., & Williams, S. 2003	work setting	psychological ill health and sickness absence	Training programmes (5) and organisational intervention (1).	Two studies showed a reduction in sickness absence duration and the third a reduction in depression. The most successful interventions used training and organisational approaches to increase participation in decision making and problem solving, increase support and	

				feedback, and improve communication.	
Mimura, C., & Griffiths, P. 2000	nurses	stress	Stress management programmes	The techniques are that sorted positive results were: cognitive techniques; exercise; music training; relaxation training; and social support education. It seems that there is more evidence for the effectiveness of personal support than environmental management for reducing workplace stress in the nursing profession. Nonetheless, no definitive conclusions are justified.	
Murphy, L.R. 1996	work settings	stress symptoms, job satisfaction, absenteeism	1: muscle relaxation, 2: biofeedback, 3: meditation, 4: cognitive behavioural skills, 5: combinations.	1: nearly only effects on physiologic outcomes 2: only physiologic changes 3: significant improvements on all outcome measures 4: most consistent effects on psychological outcomes 5: most effective is 1+4.	
Saunders, T., Driskell, J.E., Johnston, J.H., & Salas, E. 1996	work and non-work setting	stress	Stress Inoculation Training (SIT), three stages: education; skill acquisition and rehearsal; application of coping skills in realistic conditions.	The overall effect of stress inoculation training on reducing performance anxiety was of strong magnitude. The overall effect on reducing state anxiety and enhancing performance was of moderate magnitude. No moderator effects.	