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The psychosocial and health effects of workplace reorganisation. 2. A systematic review of task restructuring interventions

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Objective: To systematically review the health and psychosocial effects (with reference to the demand–control–support model) of changes to the work environment brought about by task structure work reorganisation, and to determine whether those effects differ for different socioeconomic groups.

Design: Systematic review (QUORUM) of experimental and quasi-experimental studies (any language) reporting health and psychosocial effects of such interventions.

Data sources: Seventeen electronic databases (medical, social science and economic), bibliographies and expert contacts.

Results: Nineteen studies were reviewed. Some task-restructuring interventions failed to alter the psychosocial work environment significantly, and so could not be expected to have a measurable effect on health. Those that increased demand and decreased control tended to have an adverse effect on health, while those that decreased demand and increased control resulted in improved health, although some effects were minimal. Increases in workplace support did not appear to mediate this relationship.

Conclusion: This systematic review suggests that task-restructuring interventions that increase demand or decrease control adversely affect the health of employees, in line with observational research. It lends support to policy initiatives such as the recently enforced EU directive on participation at work, which aims to increase job control and autonomy.

The workplace, particularly the psychosocial work environment, is increasingly being considered by policy-makers as an important intervention point at which health can be improved and health inequalities reduced.1,2 The demand–control–support model of the role of stressful psychosocial work environments on the health of employees has dominated the research literature3–4 (although it has not been without criticism, not least from advocates of the effort–reward imbalance model).3 Karasek’s initially developed a two-dimensional concept of work-related stress in which the culmination of high psychological work demands and low job task control (low level of decision authority and low level of skill utilisation) increased work-related stress, subsequently producing higher rates of psychological and physical morbidity. Support from colleagues and supervisors has been suggested as a possible mediating factor in the relationship between high work demands, low job control and work-related stress.5

Epidemiological research, especially from the Whitehall studies, has suggested a relationship between the psychosocial work environment, work-related stress and inequalities in health status.6,7 Adverse health outcomes, including increased risk of heart disease,7,8–11 musculoskeletal pain12 and poor mental health,13 and increased sickness absence,14 have been associated with high work demands and low job control. It has also been suggested that enhanced social support in the workplace may reduce these negative consequences.6–15 Although empirical research has generally confirmed the demand–control–support model’s basic assumptions, some researchers prioritise specific parts of the model (e.g. suggesting that control may have stronger associations with health than demands).16–18 Furthermore, concerns remain as to whether other factors (most notably income) may override the influence of psychosocial factors on health.19–22 Similarly, further investigation is necessary to examine the inter-relationship between demand, control and support.21 The model is therefore usually considered to be descriptive rather than prescriptive. However, the potential clearly exists for interventions that modify the psychosocial work environment (by increasing or decreasing levels of demand, control or support) to also have positive or negative impacts on employee health.

Potential intervention points centre either on the individual (e.g. enhancing personal coping mechanisms) or on the reorganisation of the workplace at the macro or micro level.23 Macro interventions change the levels of participation in decision-making,24 whilst micro-environment interventions change the structure of work tasks. Karasek identified three types of task structure interventions (box 1): job enrichment and enlargement (task variety); collective coping and decision-making (teamworking); and the use of autonomous production groups (autonomous groups).

In our companion paper,24 we found that macro-level work reorganisation interventions that increased control had positive health effects. However, Karasek suggested that macro and micro workplace interventions may have differing psychosocial, and therefore health, outcomes.23 In this paper, then, we extend our analysis of the psychosocial work environment by presenting the results of a systematic review of the health impacts of reorganisation interventions that alter the micro, task structure, environment. Based on Karasek, it is hypothesised that task-restructuring interventions will improve levels of control and support although, in line with the characteristics of more active jobs, demands may also be high.25 Interventions that improve the psychosocial work environment in this way are predicted to have a beneficial effect on health, particularly mental health, while, conversely, interventions that result in higher demand and lower control are predicted to have an adverse effect on health outcomes.
Although previous literature reviews exist in this area, these often cover only specific occupations or one type of task-restructuring intervention, and have not been conducted using the systematic review methodology. This is therefore the first systematic review of the health effects of changes to the psychosocial work environment brought about by reorganisation of the work task structure. It offers the opportunity to examine the health effects of changes to the psychosocial work environment brought about by task structure work reorganisation, and whether those effects differ for different socio-economic groups. It also facilitates contrasts with the effects of macro-level reorganisation interventions.

**METHODS**

**Inclusion and exclusion**

The review sought to identify all experimental and quasi-experimental studies that examined the effects on health of interventions which reorganised work task structures. The review included all task structure interventions that fell into one of Karasek’s three clusters: task variety, teamworking and autonomous groups. Work reorganisation interventions based on the demand–control–support model and those motivated by economic or managerial reasons were all included. Only studies that included measures of both the psychosocial work environment (demand, control or support) and health were included.
Box 2 Critical appraisal criteria for assessing study quality

- Is the study prospective?
- Is there a representative sample?
- Is there an appropriate control group?
- Is the baseline response greater than 60%?
- Is the follow-up greater than 80% in a cohort study or greater than 60% in a cross-sectional study?
- Have the authors adjusted for non-response and dropout?
- Are the authors’ conclusions substantiated by the data presented?
- Is there adjustment for confounders?
- Were the entire intervention group exposed to the intervention?
- Was there any contamination between the intervention and control groups?
- Were appropriate statistical tests used?

RESULTS

Nineteen different studies were located, the earliest dated from 1986. Thirteen studies were located from electronic databases and the other six were identified from citation follow-ups. Eight studies examined task variety,12–40 seven examined teamworking,11–47 and six examined autonomous groups.31–46 Two of the studies examined interventions that entailed both changes to task variety and increased teamworking,17–46 and many of the other studies were conducted in the context of macro-environment work reorganisations.28 Health was measured on a self-reported basis in all but two of the studies.41–42 The psychosocial outcome measures were also self-reported, with employees asked to rate their sense of demand, control or support, or other similar psychosocial characteristics (e.g. work autonomy for control). In all but six of the studies,31 32 35 37 43–45 52 the work reorganisation was motivated by economic or managerial reasons. Fourteen prospective cohorts and five repeat cross-sectional studies were found. Ten of the studies used a comparison group (workers from a different department in the same workplace or from a similar worksite) and two of the studies also had qualitative elements.40–44 Results are presented by intervention type in tables 1 to 3.

Task variety

Eight studies17–40 examined changes to task variety (table 1), four in health care settings31–36 and four in production line settings.32 37–40

Health care

Four cohort studies,31–36 one of which was motivated out of concern for employee health,35 reported on increased task variety amongst Dutch nurses. All of the studies were prospective and had comparison groups, although the quality of the comparison groups was a cause of concern. For example, in one study the comparison group became a second intervention group after 6 months.31 In contrast to the stated aims, the interventions did not significantly alter the psychosocial working environment: in three studies31 35 36 there were no changes in support (as assessed by the Boumans Questionnaire,33 de Jonge scale34 and the Maslach Burnout Inventory35), and in the Berkhourt et al. study job autonomy (control) and work demands were also unchanged.36 In the other study,36 only clarity (control) and satisfaction with management (support) were higher in the intervention group (Boumans Questionnaire). There were few health effects: in the Boumans and Landwerweerd study33 and the Berkhourt et al. study,36 reported health complaints (assessed by the Dutch VOEG scale13 and the Dirkin Questionnaire14) decreased slightly; while emotional exhaustion (Maslach Burnout Inventory) did not change significantly in either the Boumans and Berg36 or the Melchor15 studies.

Production line

Four production line studies were located,32 37–40 one of which reported on an intervention which intended to decrease, rather than increase, task variety.40 Two of the studies32 37–40 also involved teamworking (see next section). Only one intervention32 37 was designed to improve the psychosocial work environment; the others were initiated to increase productivity.16–40

In the prospective cohort study (with comparison group) of Swedish postal workers,31–37 demands decreased, job control was unchanged, and social support increased (as assessed by the Job Content Questionnaire). The study found a decrease in reports of shoulder and thoracic musculoskeletal symptoms (Nordic questionnaire on musculoskeletal complaints). Two other prospective cohort studies examined increased task variety created by computerising the production system.16–19

included in the review. Health outcomes included specific diseases as well as more general measures of physical health and psychological well-being. Impacts on health inequalities were also considered as outcomes. Studies that focused only on workplace injuries or accidents were excluded, as were those that did not report on the psychosocial work environment beyond job satisfaction measures.

Search strategy

We searched electronic databases, bibliographies and websites for documents of any type and in any language (full search strategy available from protocol at http://www.msoc-mrc.gla.ac.uk/Evidence/Research/Research_MAIN.html). We searched the following 17 databases from start date to December 2006 (hosts given in parentheses): ASSIA (CSA), Conference Papers Index (CSA), Business Source Premier, Dissertation abstracts, Econtent (Dialog), Embase (Dialog/Ovid), ERIC Firstsearch/CSA), Electronic Collections Online (OCLC firstsearch), Index to theses, Medline (Ovid/Dialog), NTIS (free version), PAIS (Dialog), Psycinfo (Dialog/Ovid), SIGLE, Sociological abstracts (CSA), Social Sciences Citation Index (MIMAS), Zetoc and various internet sources. We also manually searched bibliographies and contacted experts.

We initially located 68 737 titles and abstracts, of which 734 were retrieved for full analysis. All papers reporting the results of an empirical study of the effects on health of interventions that changed the structure of work tasks were independently assessed by two reviewers (C.B. and M.E.) for relevance and methodological quality.

Critical appraisal and data extraction

Critical appraisal criteria were adapted from previous systematic reviews of public health interventions and existing guidance for the evaluation of non-randomised studies.26–30 Two reviewers independently appraised the included studies according to these criteria (box 2). Data were abstracted by one reviewer (S.T.) and checked by a second (C.B.). We included percentages, confidence intervals (CIs), p values and effect sizes when they were reported in the original study or calculated these statistics (using final sample sizes) if sufficient information was available.
The UK study reported a significant decrease in self-reported job pressure (Warr et al. Attitudes to Work Scale) and a non-significant increase in general and job-related strain (measured with Warr Job Related Anxiety Scale and GHQ-12). The USA study reported some increases in demand (unpredictability increased), mixed effects on job control (control over input and output quality increased but control over process quality decreased) and increased social support (assessed by Majchrzak and Cotton Questionnaire). However, there were no significant changes in terms of Brett Scale measurements of psychological problems or quality of life.

A prospective cohort study of the automation of a Swedish production line was the only one in which task variety decreased (the opposite of job enrichment). In this study, job control decreased (reports of lack of influence over work as measured by Fredriksson et al. rose) but there were no

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![Table 1 Summary of evidence of the psychosocial and health effects of task variety interventions](https://www.jech.com)
Table 2 Summary of evidence of the psychosocial and health effects of team working interventions

<table>
<thead>
<tr>
<th>Study</th>
<th>Design and methods appraisal†</th>
<th>Setting and participants</th>
<th>Intervention and implementation†</th>
<th>Psychosocial outcomes (p &lt; 0.05)‡§</th>
<th>Health outcomes (p &lt; 0.05)‡§</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kawakami et al (1997)††</td>
<td>Prospective cohort with comparison group 1- and 2-year follow-ups</td>
<td>Factory floor, Japan Manual workers</td>
<td>More and smaller teams with sub-supervisors; participatory committee; more on-the-job training; ergonomic improvements</td>
<td>Work overload (D)</td>
<td>Mental health (D)</td>
</tr>
<tr>
<td></td>
<td>Final sample n = 187</td>
<td></td>
<td>Introduction to reduce stress at the intervention site had the highest levels within the company. Authors report that employers supported the intervention although one aspect (on-the-job training) was not fully implemented. Prior support from employees is not reported</td>
<td>Control (C)</td>
<td>(Zung self-rating depression score)</td>
</tr>
<tr>
<td></td>
<td>Methods appraisal: 1, 2, 3, 4, 5, 7, 6, 9, 10,</td>
<td></td>
<td></td>
<td>Co-worker problems (S)</td>
<td></td>
</tr>
<tr>
<td>Wohlandt et al (2000, 2001)††</td>
<td>Prospective cohort with comparison group 1-month follow-up</td>
<td>Postal sorting office, Sweden Manual workers and shop floor supervisors</td>
<td>Increased task variety, more teamwork, more personnel, more time to plan work, bonus scheme</td>
<td>Psychological work demands (D)</td>
<td>Shoulder and thoracic symptoms (D)</td>
</tr>
<tr>
<td></td>
<td>Final sample (n = 82)</td>
<td></td>
<td>Intervention(s) introduced by employers to improve the psychosocial work environment and to reduce sickness absence and staff turnover. Employees volunteered to be involved in the intervention</td>
<td>Skill discretion (C)</td>
<td>Musculoskeletal disorders (D)</td>
</tr>
<tr>
<td></td>
<td>Methods appraisal: 1, 2, 3, 4, 5, 7, 10</td>
<td></td>
<td></td>
<td>Social support (S)</td>
<td></td>
</tr>
<tr>
<td>Fredriksson et al (2001)††</td>
<td>Prospective cohort. Some qualitative components 9-month follow-up</td>
<td>Factory floor, Sweden Manual workers</td>
<td>Production line introduced, increased task variety, teamwork, introduction to increase productivity, reduce the need for skilled labour and reduce sick leave. Few reported details on effectiveness of implementation or commitment of employees</td>
<td>Psychological work demands (D)</td>
<td>Sick leave (D)</td>
</tr>
<tr>
<td></td>
<td>Final sample (n = 102)</td>
<td></td>
<td></td>
<td>Skill discretion (C)</td>
<td>Sleep and gastrointestinal complaints (D)</td>
</tr>
<tr>
<td></td>
<td>Methods appraisal: 1, 2, 4, 9, 10</td>
<td></td>
<td></td>
<td>Social support (S)</td>
<td>Depression (D)</td>
</tr>
<tr>
<td>Wohlandt and Edling (1994, 1997)††</td>
<td>Prospective cohort 8- and 12-month follow-ups</td>
<td>Postal sorting office, Sweden Manual workers and shop floor supervisors</td>
<td>More teamwork, more personnel, role clarification, production goals, fewer supervisors, partial change in shift system, increased feedback, new vending machine and microwave oven</td>
<td>Full interview(s) introduced by employers to improve the psychosocial work environment and to reduce sickness absence and staff turnover. Positive experience on one section of workers extended to others. Employees involved in planning the intervention</td>
<td>Psychological work demands (D)</td>
</tr>
<tr>
<td></td>
<td>Final sample (n = 100)</td>
<td></td>
<td></td>
<td>Skill discretion (C)</td>
<td></td>
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<tr>
<td></td>
<td>Methods appraisal: 1, 2, 4, 6, 7, 8, 9, 10</td>
<td></td>
<td></td>
<td>Social support (S)</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Contact with superiors (S)</td>
<td></td>
</tr>
<tr>
<td>Karunka et al (2003)††</td>
<td>Prospective cohort. Some qualitative components 2-months and 1-year follow-ups</td>
<td>Local government office, Austria Managerial, technical, administrative and customer service workers</td>
<td>More teamwork (through restructuring, team leaders with autonomous budgets), incentive system</td>
<td>Full interview implemented as part of a politically and economically motivated shift in the style of public sector management. Authors imply that implementation may have been of a &quot;poor professional quality&quot; due to &quot;rigid bureaucractic structures&quot;</td>
<td>Job control (C)</td>
</tr>
<tr>
<td></td>
<td>Final sample n = 185</td>
<td></td>
<td></td>
<td></td>
<td>(Weyer Questionnaire)</td>
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<tr>
<td></td>
<td>Methods appraisal: 1, 2, 4, 5, 7, 9</td>
<td></td>
<td></td>
<td></td>
<td>Emotional strain (D)</td>
</tr>
<tr>
<td>Sutherland and Cooper (1989, 1992)††</td>
<td>Prospective repeat cross-section 3-year follow-up</td>
<td>Health centres, UK General practitioners (doctors)</td>
<td>More teamwork, new roles Intervention(s) in the context of the introduction of a new employment contract “at the end of a period of considerable dispute and disagreement”. Few reported details on effectiveness of implementation</td>
<td>Full interview due to unrealistic expectations of others (D)</td>
<td>Free floating anxiety (D)</td>
</tr>
<tr>
<td></td>
<td>Final sample n = 917</td>
<td></td>
<td></td>
<td>Demands of job on family life (D)</td>
<td>(Crown-Crisp experimental index)</td>
</tr>
<tr>
<td></td>
<td>Methods appraisal: 1, 2, 4, 5, 9, 10</td>
<td></td>
<td></td>
<td>Demands of job on social life (D)</td>
<td>Somatic anxiety (D)</td>
</tr>
<tr>
<td>Appleton et al (1998)††</td>
<td>Retrospective cross-section 7-year follow-up</td>
<td>Health centres, UK General practitioners (doctors)</td>
<td>More teamwork, new roles Intervention(s) in the context of the introduction of a new employment contract. Few reported details on effectiveness of implementation or commitment of employees</td>
<td>Full interview due to unrealistic expectations of others (D)</td>
<td>Depression (D)</td>
</tr>
<tr>
<td></td>
<td>Final sample n = 285</td>
<td></td>
<td></td>
<td>Demands of job on family life (D)</td>
<td>(Crown-Crisp experimental index)</td>
</tr>
<tr>
<td></td>
<td>Methods appraisal: 2, 4, 7, 9, 10</td>
<td></td>
<td></td>
<td>Demands of job on social life (D)</td>
<td></td>
</tr>
</tbody>
</table>

*Methods appraisal (box 2): 1, prospective; 2, representative sample; 3, appropriate comparison group; 4, baseline response > 60%; 5, follow-up > 80% in cohort, > 60% in cross-section; 6, adjustment for non-response and drop-out; 7, conclusions substanitiated by data; 8, adjustment for confounders; 9, all intervention group exposed, non-contaminated comparison group; 10, appropriate statistical tests.

†See box 1.

‡D: demand; C: control; S: support
§↑: improvement; ↓: worsening; ↔: little change.

*Study is set in the same workplace as Wohlandt et al (2000, 2001).††
††Study uses baseline results from Sutherland and Cooper (1992) and Cooper et al (1989)."""" Little change for sample as a whole but health outcomes worsened for lower-grade employees.
significant changes in terms of demand or support. The study found that musculoskeletal disorders (measured as experience of musculoskeletal disorders in past 7 days and 12 months) of the neck, shoulder and hand increased, as did health centre visits. The qualitative element of this study found that workers experienced reduced occupational pride and felt "robotised".

### Teamworking

Table 2 summarises the results of seven studies that examined the effects of increased teamwork. Three studies were of manual employees, and four were of professional employees. In three studies, the motivation for the intervention was employee involvement in decision-making. Four studies were of professional employees, and one was of a mixed occupational workplace.
health,40 41–43 in the others, it was productivity,44–46 reducing the need for skilled labour40 and a new employment contract.45–47

**Manual employees**

Three of the four studies of mainly male manual workers12 17 40–42 were Swedish. They reported an improved work environment: demand decreased and social support increased in the prospective study with a comparison group (outlined above),32 37 whilst job control in terms of skill discretion and authority increased (measured with the Job Content Questionnaire) in a prospective cohort study by Wahlstedt and Edling,43–44 and decreased in Fredriksson and colleagues’ prospective cohort study of task variety reduction.45 Health changes were also evident: musculoskeletal symptoms decreased in one study32 37 and increased in another,46 whilst sick leave was significantly reduced in the Wahlstedt and Edling study.43–44 In contrast, the Japanese prospective cohort study with a comparison group45 found little change in psychosocial outcomes, as measured using Zung self-rating depression score, but still reported a reduction in sick leave and depression amongst men.

**Mixed-grade employees**

One Austrian prospective cohort study of work reorganisation in a local government office46 found no significant changes in self-reported job control or social support for the sample as a whole (Sainfort Perceived Job Resources Scale). Nonetheless, those in the lowest occupational grades had adverse health outcomes (measured with the Weyer Questionnaire): perceived stress, emotional strain and tiredness increased amongst customer service advisers and tiredness increased amongst administrators, but there were no significant changes in perceived stress, emotional strain or tiredness amongst managers. It is possible that this was a result of the poor implementation of the intervention by management and the broader context of organisational change in which this intervention took place (table 2).

**Professional employees**

Two related cross-sectional studies45–47 examined the increase in teamwork that resulted after a change in contract, working hours and job roles amongst UK doctors. The earlier prospective repeat cross-sectional study45–46 found increased demands, decreased control and increased social support (Warr Job Satisfaction Scale and Cooper Job Stress Questionnaire) (Table 3). In terms of self-reported health (Crown–Crisp experimental index), men and women reported an increase in anxiety, somatic anxiety and depression. The linked retrospective cross-section45 found that, 7 years on, levels of control (Warr and Cooper scales) were still lower than before the reorganisation, and that the increase in support identified in the earlier study no longer existed. Taken together, the two studies suggest that teamwork increased support only in the short term, and that support did not compensate for the adverse health effects of decreased control and increased demands.

**Autonomous groups**

Six studies were located which examined the introduction of more autonomous production groups into factory-based mass production systems (table 3). Lean production48–49 and “just in time”50–52 were production efficiency interventions, whilst the autonomous work groups51 52 were also motivated by job redesign51 or the prevalence of musculoskeletal disorders.52

**Lean production and “just in time”**

Both of the UK studies of lean production interventions48–49 found that control and autonomy deteriorated (as measured by the Jackson et al. Task Control, Skill Utilisation and Work Demands Scales). In the prospective cohort study with comparison group by Parker,48 job autonomy and skill utilisation decreased amongst all three intervention groups, and participation also decreased in two. Job anxiety and depression (Warr Job Related Anxiety Scale) increased in all three groups (table 3). In the retrospective cross-sectional study with comparison group,49 individual and collective timing control deteriorated, and problem-solving, skill utilisation and monitoring demands also worsened (i.e. increased), while social contact and trust improved. However, there was no difference in the Warr Scale measure of job-related strain. This lack of adverse effect may be linked to the reported enhanced pay of the intervention group.

The psychosocial effects of the UK prospective cohort study with comparison group49 of a “just in time” intervention were rather mixed as, for example, whilst production demand increased there were no changes in monitoring demand (measured using the Jackson et al. scales). Similarly, in the prospective repeat cross-section, monitoring demands increased but problem-solving demands did not (Wall et al. Work Demands Scale). Co-worker support and group cohesiveness did increase (Jackson Group Climate Scale).49 However, neither study found any significant effects on mental health (measured using GHQ-12). It should be noted that the “just in time” interventions generally made only minor changes to the psychosocial work environment, so would not be expected to have a sizeable impact on health.

**Autonomous work groups**

Two studies, one a UK-based prospective cohort study (initially with a comparison group but without after 18 months)41 and the other a prospective repeat cross-section from Sweden,42 contained the introduction of autonomous work groups. Autonomy and control increased in both studies, and support decreased in one42 (measured using Warr et al.32 and Rubenowicz’s Attitudes to Work Scales) (table 3). Mental health (GHQ-12) improved in the short term (after 6 months) but not in the longer term (after 30 months) in the UK study,41 suggesting that the health effects of enhanced control may only be short-lived in certain settings. Musculoskeletal health (assessed via medical history and clinical examination) deteriorated in the other study.52 This intervention increased control but health still deteriorated. This result may be due to the study designs and the influence of other factors such as psychological demands (unmeasured in the cohort study), physical workloads (not adjusted for in the repeat cross-sectional study) or the reduction in levels of social support.52

**DISCUSSION**

**Effects of the interventions**

In summary, those interventions that improved the psychosocial work environment by increasing task variety either had no effect (primary nursing) or had a limited positive effect (production line) on health. The teamwork interventions tended to improve the psychosocial work environment in most studies, although not for all workers, but the health effects were less apparent. The autonomous work groups, contrary to the stated aims of such interventions, caused deterioration in the psychosocial work environment, and, as would be predicted from the demand–control–support model, the resulting health effects were correspondingly adverse, though in some cases they were negligible. It is important to note that some interventions did not greatly alter the psychosocial work environment at all, and so could not be expected to have a measurable effect on health. This may have been due to poor implementation of the interventions or, in some cases,
because of concurrent negative changes occurring in the wider work environment (tables 1–3). It may also be simply because some of the task-restructuring interventions were not substantial enough to alter the psychosocial work environment.

Change in the level of control appeared to be a more important factor than change in support. Those interventions that did achieve alterations in levels of control tended to report significant changes in self-reported mental and physical health, in line with predictions, decreased levels of control almost invariably resulted in adverse health outcomes and, albeit to a lesser extent, increased levels of control resulted in improved health outcomes. In all but one study, interventions that increased support, whilst demands were increased and control decreased, still reported adverse health consequences. In terms of study design, in three of the seven prospective cohort studies with a comparison group and four of the nine other studies in which the intervention changed the psychosocial work environment, health outcomes also changed. When the interventions increased demand and decreased control, this negatively affected health, in keeping with the results of epidemiological research and predictions based on the demand–control–support model. Increases to workplace support had minimal mediating effects.

Some interventions failed to bring about a measurable change in the psychosocial work environment whilst others made the environment worse. The majority of the interventions that we reviewed were introduced for economic or managerial reasons rather than as attempts to apply the demand–control–support model to the workplace to improve employee health. Those studies in which the motivation was employee well-being tended to have more positive psychosocial and health effects, whilst the effects of those that were the most overtly driven by economics were negative or negligible in relation to health outcomes. Implementation may also have been a problem as we cannot be sure that the interventions actually did increase task variety, teamworking or group autonomy. It was not always clear from the reporting of the studies if employees or managers were supportive of the intervention, or involved in its delivery. Furthermore, as Karasek has suggested, micro-level restructuring may be vulnerable to the wider constraints of the macro environment. The interventions that tended to have more positive psychosocial and health effects were those in which the macro-environment was also more positive to employee control and involvement. This suggests that work reorganisation that ignores possible health impact may in fact be health damaging.

The studies provide little insight into the differing effects of task restructuring interventions by gender or socioeconomic status. Only one study differentiated by socioeconomic status. It found that the adverse health effects of the intervention were felt only by the lowest-grade employees. However, the intervention was poorly implemented and the study lacked a comparison group. In one study of a teamworking intervention, depression levels improved only in men, but in another teamworking study no differences were found between men and women in terms of anxiety or depression.

Research implications

This systematic review suggests that micro-level interventions that change the psychosocial work environment affect health in the direction predicted by the demand–control–support model. However, the evidence base is only partial and the studies we have synthesised were subject to a number of methodological limitations. Most noticeably, although several studies had a comparison group, these were often not matched or randomised, and contamination was commonplace. A sizeable number of the studies reported on the effects of concurrent interventions, thereby preventing the isolation of the influence of a particular intervention on the psychosocial work environment or health. We also had concerns about the extent to which some interventions had been implemented (as noted in tables 1–3). The measures of demand, control and support also varied from study to study, and well-validated questionnaires, such as the Karasek and Theorell Job Content Questionnaire, were seldom used. The outcome measures used in the studies were very varied, and this means that our interpretation of the overall health effects of altering demand, control or support aspects of the work environment are indicative rather than definitive. Furthermore, only three studies differentiated outcomes by gender or socioeconomic group and so little overall insight was gained into how task restructuring might affect health inequalities. Prospective, well-controlled studies of task structure interventions that examine the impacts on the psychosocial work environment, health and health inequalities, and which also assess the fidelity of implementation, are therefore needed in the future. Studies which particularly examine the effects of

What is already known on this subject

- Observational evidence from the Whitehall and other studies suggests that the psychosocial work environment can affect health and health inequalities.
- In particular, adverse health outcomes have been associated with high task demand and low control, leading to the hypothesis that interventions that modify these work characteristics may be health protective.

What this study adds

- This is the first systematic review of intervention studies of the health and psychosocial effects of changes to the work environment brought about by task structure work reorganisation.
- Change in job control, in particular, was an important factor in terms of health: where interventions increased demand or decreased control, health appeared to get worse. Very little evidence was found as to whether these effects differ for different socioeconomic groups.

Policy implications

- Task-restructuring interventions that increase control may have positive effects on health, especially if they are implemented with the demand–control–support model in mind.
- Policy interventions such as the recently enforced EU directive on participation at work – which aims to increase job control and autonomy – should remain as a priority for public health policy.

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interventions which increase control would be the most useful.34

Policy implications
Change in job control emerges as the most important, and support as the least important, aspect of the demand–control–support model in terms of health. Interventions that increase control may have positive effects on health, especially, if they are implemented with the demand–control–support model in mind.32 The psychosocial aspects of the workplace, as well as more traditional factors such as wages and hours of work, can therefore be important targets for health improvement: policy interventions, such as the recently enforced EU directive on participation at work,33 which aims to increase job control and autonomy, should therefore remain as a priority for public health policy.2

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CONTRIBUTORS
CB planned the study, collected and analysed the data, and is lead author and guarantor. ME, ST, MP and MW assisted in various aspects of the study, including writing-up.

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REFERENCES
Sniffing glue is still a public health problem in adolescence

In the early 1980s, one of the main moral panics was glue sniffing by young teenagers. This phenomenon has largely eclipsed in press reportage with the advent of heroin and various other hard drugs that appeared from the mid 1980s onwards. However, glue-sniffing is still an issue, as evidenced from this paraphernalia found in an urban churchyard on Merseyside, UK.

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Figure 1 Glue sniffing paraphernalia found in urban churchyard.