



# The implementation of ergonomics advice and the stage of change approach



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## ARTICLE INFO

### Article history:

Received 9 October 2014

Received in revised form

2 April 2015

Accepted 10 June 2015

Available online 25 June 2015

### Keywords:

Stage of Change

Implementation

Ergonomics interventions

## ABSTRACT

This paper investigates the implementation of injury prevention advice tailored according to the Stage of Change (SOC) approach. The managers of 25 workgroups, drawn from medium to large companies across a wide range of occupational sectors were allocated to receive either standard ergonomics advice or ergonomics advice tailored according to the workgroup SOC. Twelve months after the advice was provided, semi-structured interviews were conducted with each manager. In a multivariate model, managers who had received tailored advice were found to have implemented significantly more of the recommended changes (IRR = 1.68, 95% CI 1.07–2.63) and more “additional” changes (IRR = 1.90, 95% CI 1.12–3.20). Qualitative analysis identified that the key barriers and facilitators to the implementation of changes were largely related to worker resistance to change and the attitudes of senior managers towards health and safety. The findings from this study suggest that the implementation of ergonomics recommendations may be improved by the tailoring of advice according to SOC principles.

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## 1. Introduction

### 1.1. The implementation of practitioner advice

In professional practice ergonomics and injury prevention advice commonly comprises a series of recommended changes to work systems, the work environment and individual work practices (Rothmore et al., 2013). However, even when actively sought, this advice may not be fully implemented or simply ignored (Trevelyan and Haslam, 2001). Compounding this is the absence of routine evaluation by ergonomics consultants of the implementation and effectiveness of the advice provided (Whysall et al., 2004).

The paucity of evaluation to explore the implementation of ergonomics advice provided by professional ergonomics consultants has been primarily related to client/company disinterest due to the associated costs, but also in part, due to the consultants' views that requests for evaluation might indicate a lack of confidence in the effectiveness of the interventions they had proposed (Whysall et al., 2004). Reasons for the lack of implementation of advice may include issues of cost, concerns over effectiveness, a lack of

understanding of company priorities on the part of the consultant engaged or simply a lack of “desire” on the part of the company to introduce change (Trevelyan and Haslam, 2001). These factors suggest the need for consultants to frame their advice in a manner which will maximise its potential adoption (Rothmore et al., 2013).

### 1.2. Behaviour change methods

Injury prevention advice typically proposes changes to the work environment, work systems and individual work practices (Rothmore et al., 2013). Such changes inevitably involve a change in behaviour.

Various methods have been proposed to improve the implementation and effectiveness of ergonomics advice according to behaviour change principles (DeJoy, 1996; Haslam, 2002; Urlings et al., 1990). The most frequently applied of the behaviour change methods in workplace settings has been Prochaska and DiClemente's Stage of Change (SOC) framework (Barrett et al., 2005; Prochaska et al., 2001; Village and Ostry, 2010; Whysall et al., 2006a, 2006b) in which readiness to change is assessed using a short series of closed questions after which they are assigned to one of five stages:

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1. Pre-contemplation (unaware or unconcerned about workplace hazards)
2. Contemplation (considering change but not yet ready to act)
3. Preparation (intend to change in the near future)
4. Action (made changes in the previous 6 months)
5. Maintenance (made changes and are working to consolidate gains and avoid relapse)

Advice is then tailored, according to the stage of change, in order to improve receptiveness. For example, while those in the more advanced stages will benefit from practical information on how to make, or maintain change, those in the earlier stages will benefit from information on the risks and hazards linked with their current behaviour and actions, which may encourage progression onto later stages.

The SOC approach has been evaluated by measuring progression through the various stages of change, post-intervention, assuming that those in more advanced stages will be more “risk aware” and therefore adopt less risky behaviour (Barrett et al., 2005; Whysall et al., 2006b). Other measures have included changes in self-reported body part discomfort or safety culture as indicators of effectiveness (Whysall et al., 2006b).

In their study of workplace interventions using the SOC approach, Whysall et al. (2006b) reported that organisations in receipt of SOC-based ergonomics advice were significantly more effective in promoting risk awareness and desired safety behaviour among their workers. Significant reductions in worker self-reported body part discomfort were also reported. These health benefits and risk awareness changes were maintained at 15 and 20 months post-intervention (Shaw et al., 2007).

Potential barriers to the implementation of advice exist not only at the consultant/client interface but also at the manager/worker level. When Whysall et al. (2006a) interviewed company managers who were responsible for implementing workplace changes designed to reduce the incidence of musculoskeletal disorders the strongest reported barriers included: resistance to change by employees; difficulties in gaining senior manager authorisation for change; and managers' attitudes to health and safety in general. While the tailoring of advice according to the SOC approach may be effective in overcoming resistance to change, empirical evidence, while encouraging, is limited.

Using a mixed methods approach the aims of this study were:

- To determine whether the rate of implementation of ergonomics and injury prevention advice provided to companies could be improved if it was tailored according stage of change principles, and
- To identify the barriers and facilitators experienced by managers in the implementation of the proposed changes

## 2. Methods

### 2.1. Sample

Purposive sampling was used to select medium-large organisations from industry groups in South Australia known to be at high risk of musculoskeletal injury according to statistical data from the State's Workers' Compensation Authority. These organisations were contacted via e-mail or telephone. Each participating organisation was asked to recruit 10 to 20 of its own employees (on a voluntary basis) who performed substantially similar tasks, were members of the same identifiable workgroup and were employed on an ongoing basis. Participating companies were classified for industry sector based on the Australian and New Zealand Industrial Classification system (Australian Bureau of Statistics, 2002).

Company size was determined based on the Australian Bureau of Statistics definitions of – medium (more than 20 but less than 200 employees), and large (more than 200 employees). Twenty-five workgroups (comprising a total of 343 workers) from a variety of industry sectors were recruited (Table 1).

### 2.2. Procedure

All members of the workgroups completed an individual, short questionnaire to identify their ‘Stage of Change’. Each of the participating companies was subsequently visited by the same ergonomist in a 2–3 h site visit. Based on direct observation, and informal discussions with employees, a report was prepared for the company managers detailing the observations made and suggested improvements/solutions.

Approximately equal numbers of workgroups were then randomly assigned to either the “standard” or “tailored” arm of the study. Randomisation was conducted by an independent researcher using a randomising function in Microsoft Excel.

At the time of the worksite visit and the development of the recommendations both the ergonomist and company managers were blind to the allocation of each workgroup. During the implementation of the intervention, however, blinding was not possible.

Those organisations in the “standard” group received a report with suggested control measures which were based on ergonomics principles. Organisations in the “tailored” group received a report with suggested control measures, also based on ergonomics principles, but prioritised according to the workgroup SOC profile. Where the SOC differed within a workgroup the recommended changes took account of the distribution of the workers' identified stage and included recommendations relevant to each stage present in the workgroup. These were discussed at the follow-up visit in the context of the SOC profile of the workgroup. The managers to whom the recommendations were provided were then responsible for the selection and implementation of the changes. This allowed for the provision of intervention advice at the workgroup level, with the additional benefit of preserving individual confidentiality.

A report template was developed and standardised for both the standard and tailored recommendations. These were submitted for peer review by an academic with expertise in the development of ergonomics recommendations and subsequently modified, based on feedback received, prior to their use. The following format was used for each report:

*Background Information* - This included the demographics of those staff who were interviewed and any other sources of information which were used in the development of the recommended changes (e.g. company job dictionaries).

*Tasks observed* - This comprised a list of tasks which were directly observed and those which were simulated.

*Observations and Recommendations* - These were subdivided into categories of known risk factors for musculoskeletal injury (Bernard, 1997) – i.e. postures, forces, repetitive movement, work organisation, the work environment and any other relevant observations.

*Recommendations* - These included both higher order (i.e. the introduction of engineering solutions to eliminate the risks observed) and lower order control measures (i.e. the introduction of administrative changes to reduce workplace exposure when elimination was not possible).

*Standard Guidance Material* – Copies of guidance material published by the State Regulatory Authority relevant to any of the recommendations made was included.

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