



The stage of change approach for implementing ergonomics advice – Translating research into practice



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ABSTRACT

The Stage of Change (SOC) approach has been proposed as a method to improve the implementation of ergonomics advice. However, despite evidence for its efficacy there is little evidence to suggest it has been adopted by ergonomics consultants. This paper investigates barriers and facilitators to the implementation, monitoring and effectiveness of ergonomics advice and the adoption of the SOC approach in a series of focus groups and a subsequent survey of members of the Human Factors Societies of Australia and New Zealand. A proposed SOC assessment tool developed for use by ergonomics practitioners is presented.

Findings from this study suggest the limited application of a SOC based approach to work-related musculoskeletal injury prevention by ergonomics practitioners is due to the absence of a suitable tool in the ergonomists' repertoire, the need for training in this approach, and their limited access to relevant research findings. The final translation of the SOC assessment tool into professional ergonomics practice will require accessible demonstration of its real-world usability to practitioners and the training of ergonomics practitioners in its application.

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1. Introduction

Work-related musculoskeletal disorders (MSDs) are a major cost burden to individuals, businesses and society (National Research Council and the Institute of Medicine, 2001; Woolf and Pflieger, 2003). In the European Union MSDs are the most frequently reported health problem among workers (Eurofound, 2012). In the USA, over the preceding decade, they have accounted for more than one-third of all work-related injuries resulting in work absence (National Institute for Occupational Safety and Health, 2004). While in Australia they are one of eight nationally recognised priority occupational diseases, accounting for total costs of more than \$61.8 billion each year (Safe Work Australia, 2015).

The contribution of physical and psychosocial risk factors to the development of MSDs and the importance of implementing multi-factorial interventions in their prevention is widely acknowledged

(Silverstein and Clark, 2004; Westgaard and Winkel, 2011; Macdonald and Oakman, 2015). Although some successes in the implementation of MSD prevention strategies have been reported (Silverstein and Clark, 2004; Denis et al., 2008; Palmer et al., 2012) MSDs remain a significant workplace issue (Wells, 2009). Wells (2009) proposed that this limited success may be associated with low rates of implementation. In other words, there is a gap between the proposed interventions designed by ergonomists and those which are implemented by organisations (Rothmore et al., 2013; Oakman et al., 2016).

Issues related to implementation include the level of awareness of ergonomics issues (Whysall et al., 2004), organisational attitudes (Perrow, 1983), and political, social and contextual issues (Theberge and Neumann, 2010). While several authors have proposed methods to improve the effectiveness of ergonomics interventions in organisational settings these have been primarily researcher-driven with little consideration for the transferability of their findings into daily professional practice (Theberge and Neumann, 2010). As an example, while Broberg and Hermund (2004)

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proposed the concept of OHS consultants as “political reflective navigators” this requires the consultant to navigate complex organisational structures in order to pursue an agenda while others in the organisation pursue different agendas (Theberge and Neumann, 2010). While useful when the consultant is embedded within an organisation throughout a project it is less so for short-term, routine consulting practice where an evaluation of the implementation and effectiveness of the advice provided is scarce (Whysall et al., 2004).

Several authors have proposed the structuring of injury prevention advice according to behaviour-change principles as a means of improving the implementation and effectiveness of interventions designed to reduce the burden of musculoskeletal injuries (Haslam, 2002; Rothmore et al., 2015; Oakman et al., 2016). The most frequently applied behaviour change method in the workplace setting has been Prochaska and Di Clemente's (1982) Stage of Change (SOC) framework (Whysall et al., 2006; Village and Ostry, 2010; Rothmore et al., 2015). This was originally developed to improve the effectiveness of public health strategies such as smoking cessation (Prochaska et al., 1993) and reducing alcohol consumption (Heather et al., 2009). In such applications individual readiness to change is assessed and the intervention targeted at the individual only. However, in the workplace setting, while individual readiness to change is assessed, the intervention is aimed at the workgroup (Oakman et al., 2016). An additional layer of complexity arises with consideration of the organisational context where organisational readiness to change is reflected in the views of supervisors and managers on the nature and extent of workplace practices and changes (Haslam, 2002).

In the SOC framework, readiness to change is assessed using a short series of closed questions after which the respondent is assigned to one of five stages:

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

Once the stage of change has been determined, advice can be tailored accordingly. For example, those in the earlier stages will benefit from information on the risks and hazards associated with their current actions and behaviours in order to encourage progression to the later stages. Conversely, those in the more advanced stages will benefit from practical information on how to make, or maintain the changes already made.

Studies which have used this approach have shown benefits in the implementation (Rothmore et al., 2015) and outcomes (Whysall et al., 2006; Doda et al., 2015) of workplace interventions. In their UK study, Whysall et al. (2006) applied the SOC framework to pre-existing company plans. When evaluated four to six months after implementation they demonstrated some support for moving employees from pre-contemplation to action and reduced discomfort levels. These were maintained at 15 and 20-months follow-up (Shaw et al., 2007). In an Australian study, Rothmore et al. (2015) described the implementation of ergonomics interventions by the OHS managers of 25 workgroups who had been randomly assigned to receive either ‘standard’ ergonomics advice (i.e. advice based on ergonomics principles) or ‘tailored’ advice (i.e. advice based on ergonomics principles but prioritised according to the workgroup's SOC profile). An important difference from Whysall's study was the development of the interventions as an integrated component. This is more closely aligned with professional

practice where consultants are engaged to identify problems and develop solutions. In this study all workgroup members completed an individual questionnaire to identify their SOC. The participating companies were subsequently visited by a single ergonomist (PR) in a 2–3 h site visit. Based on direct observations and discussions with employees and managers a report was prepared for the OHS manager. The report included details of the observations undertaken and the proposed changes. The companies were then randomly assigned to receive ‘standard’ or ‘tailored’ reports. Those companies which had been randomly assigned to receive tailored reports ($n = 12$) received additional information on the SOC profile of the workgroup as justification for the tailoring of the recommendations. This was not provided to companies in the standard group ($n = 13$). Where the SOC differed within the workgroup recommendations relevant to each stage present were provided. For example, in the description of the development of a tailored intervention described by Oakman et al. (2016) the distribution was as follows: six workers in contemplation/preparation stage, two in action, and 11 in maintenance. Consequently, the recommended changes took account of all three stages present in the workgroup. At 12 months follow-up, those who had received tailored advice had implemented the recommended changes at a significantly higher rate than those who had received standard ergonomics advice. Doda et al. (2015) subsequently analysed the associated health benefits. They reported that workers in companies which had received tailored advice were 40% less likely to report lower back pain than those in companies which had received standard ergonomics advice. Where the limited success in reducing the MSD burden has been associated with a failure to implement advice (Wells, 2009) and follow-up by consultants are scarce (Whysall et al., 2004) methods to improve the uptake are important. However, evidence that this approach has been adopted by health and safety practitioners in their routine practice is limited.

Potential barriers to the adoption of such an approach include the focus of ergonomics practitioners on the domain of practice in which they are most expert – the physical environment – and the lack of an assessment tool designed for use ‘in the field.’ The adoption of a method to frame and structure ergonomics advice according to behaviour-change theory will require a paradigm-shift. The process of translating research into practice has been proposed as intrinsically linked to the practice of ergonomics (Wilson, 2000) and to the future of the profession (Caple, 2008). Despite this, evidence suggests a ‘disconnect’ between researchers and practitioners which impedes the translation of research findings into practice (Salas, 2008).

The translation of research-based findings into professional practice will require an approach which bridges the ‘research-practice gap’ by both actively engaging ergonomics practitioners in research and improving the dissemination of findings.

Taking the above factors into account, the aims of this study were to translate the evidence-base for the SOC approach into professional practice by:

1. Identifying barriers and facilitators to the implementation, monitoring and effectiveness of ergonomics advice in preventing work-related MSDs
2. Identifying barriers and facilitators to the implementation of *behaviour-based* injury prevention advice by ergonomics practitioners
3. Obtaining the perspectives of ergonomics practitioners on the development and transferability of a behaviour-based assessment tool into professional practice

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