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## Introduction

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**Biographical notes:** Lennart Sjöberg is Adjunct Professor of Community Psychology at the Norwegian University of Science and Technology. He has a PhD in psychology from the University of Stockholm. He was a visiting Professor at UC Berkeley and Stanford University and is a member of the Royal Swedish Academy of Engineering Sciences. He is currently Professor of Psychology at the Stockholm School of Economics and Head of its Centre for Risk Research. He is a Fellow of the Society for Risk Analysis and a member of the editorial board of the *Journal of Risk Research*, *International Journal of Risk Assessment and Management*, *Risk Analysis* and *European Psychologist*. He is currently working on perceived risks of gene technology and of pesticides in agriculture.

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Risk perception research has developed into a vast field, on the basis of its beginnings in the 1970s (Slovic, 2000). Social and behavioural research on risk communication and risk perception is important because risk is a crucial topic in current debate. Conflicts about risks abound, and decision makers often find it very hard to understand and adjust to the demands made by the public for risk regulation (Sjöberg, 2001). Technological and economic developments are the ultimate causes of the risks. I mention such topics as cellular phones, genetically modified food and global warming. This is a field of research of great interest not only to researchers but also to administrators and other decision makers. Considerable resources for social and behavioural science risk research are available, from national governments, the European Union and the US Federal Government.

Most of the work in the field is related to policy concerns (Sjöberg, 1979; Sjöberg, 2002). Work environment risks constitute a field of great interest for the risk perception approach, but thus far it has been rather seldom studied. The purpose of the present special issue of the *International Journal of Risk Assessment and Management* is to compile a set of important and interesting contributions to this field which is likely to expand in the near future.

The work environment is sometimes risky and accidents happen. How do employees perceive these risks? What are the consequences of perceived risk? Is there a relationship between perceived risk and risky behaviour – and if so, how are these constructs related? In this special issue of the *International Journal of Risk Assessment and Management*, risk perception in the work environment is dealt with in several ways and with contributors from seven countries.

Dov Zohar and Ido Erev point out that careless behaviour is common in many routine jobs and accounts for a large share of all accidents. Self-preservation is given surprisingly low priority. The question they pose is why this is so, and what can be done about it.

Zohar and Erev point to three types of behavioural biases which account for unsafe behaviour in the workplace: disregard of delayed outcomes (melioration), underweighting of small probabilities and disregard for collective outcomes at the expense of one's own short-term advantages. Thus, they propose that unsafe behaviour is carried out because of its benefits (e.g. comfort, economic gains) and because the negative consequences are fairly rare or at least delayed in time. Most of the time nothing negative happens if safety policy is ignored. People disregard low-probability negative events in their everyday behaviour, even if they over-estimate many low risks (Lichtenstein et al., 1978). Part of the problem may be caused by personal risks being confused with risks to others (Sjöberg, 2003). Moreover, free riding is common at work (Albanese and van Fleet, 1985; Petersen, 1992) when there are advantages to each individual for not living up to his or her duties, even if such behaviour hurts the collective. The authors point to promising practical approaches to risk mitigation in the work environment. Short-term improvement, i.e. less risk-taking, is produced by the use of reinforcement schedules. The problem is how it can be maintained over a long time. Improved supervisory practices provide one clue, safety climate another. However, probably the most common approach is that of education, or training, about principles of safe behaviour. This type of intervention is insufficient to counteract the behavioural biases which sustain unsafe behaviour. Behaviour is a function of knowledge *and* motivation. The common belief that education and information will lead to behaviour change is unrealistic. Zohar and Erev present impressive results; their approach seems to be effective in decreasing unsafe work behaviour.

Steven Yule, Rhona Flin and Andy Murdy studied the perceived safety climate in six UK power stations. They assumed that safety climate was an indicator of real safety performance, and that it was, in turn, generated by workforce perceptions of certain managerial practices and supervisor behaviour. Safety climate was suggested to be a leading indicator of the state of safety without the need for an accident to occur. Accidents are rare and to study them requires time series data. Using SEM modelling, they found that knowledge and training were the most important factors influencing risk-taking behaviour. In turn, knowledge and training were related both to management and supervisor attitudes, as perceived by the employees. In future work, it would be interesting to get data on the attitudes and practices of management and supervisors, not only how they are perceived. People who report that they are very cautious and follow management's and supervisors' safety rules may do so regardless of what these rules are really like. The central role of training and knowledge in accounting for risk-taking is interesting, since it has often been found, in work on risk communication, that information is not a lacking or crucial factor. People know they take risks and still do it, e.g. they go on smoking in spite of knowing about the risks. Is it also like that in the work environment?

Lorraine Hope and Kathryn Mearns investigated health management and its relation to risk identification and risk-taking behaviour, as well as its effects on the general organisational climate in an off-shore industry setting. They assumed that employees' perception that management is concerned about their health generally, and not only about workplace accidents, will have positive effects. Such effects would be more specific, health orientated and more general for the psychological work climate and such aspects as work motivation. They note that previous work has found strong relationships, across installations, between injuries and management's concern with health promotion and surveillance and health and safety auditing (Mearns, Whitaker and Flin, 2003). Their data support these findings. There were very large differences in health concerns across the

installations they studied. However, risk-taking behaviour was not related to perceived management health concern. They suggest that the relationship between management's concern about employee health and safety climate could be due to the perception of a caring atmosphere in the company. This interesting hypothesis is a topic for further research. It would also be interesting to investigate the reasons for the large variation in health concern across installations.

Hilde Iversen and Torbjørn Rundmo reviewed the field of job insecurity and health. In their own empirical study, they used a wide range of measures of antecedent and intermediate variables in constructing their models of risk behaviour and illness-causing behaviour. Their focus was job insecurity and downsizing, in an off-shore industry. Using structural equations modelling, they found that they could explain a very large share of the variance of risk behaviour, 70%. This was achieved by a model with job insecurity as antecedent, and job satisfaction as intermediate. Job insecurity had its effects on risk behaviour both indirectly, through job dissatisfaction as hypothesized, and directly – a smaller effect. Risk perception added very substantially to the power of the model, both in its affective and cognitive aspects. The higher the perceived risk, the more risk behaviour. The effects of risk perception were largely mediated through job satisfaction, a smaller part was direct. Job stress was also entered as an antecedent variable and was found to have some effect on risk behaviour. However, it was small compared to the effect of job satisfaction. It should be noted that the final model constructed and tested by Iversen and Rundmo approaches a full explanation of the variance in risk behaviour. Still, alternatives can of course be attempted. Is perceived risk driving risk behaviour or is it the other way round? One could imagine that risk behaviour, resulting in accidents or near-misses, should provide information about one's risk and hence increase perceived risk if, for any reason, more risk behaviour is carried out. Hence, perception could be a consequence rather than a cause. A similar problem exists with regard to the effects of job insecurity. People dislike an insecure job. That seems to be very natural. But why should they also take risks? One possibility, suggested by Probst and Brubaker (Probst and Brubaker, 2001), is that people work more and take risks in order to avoid losing their job. Another possibility is that job insecurity creates job dissatisfaction which in turn disengages the employee from the firm and its norm structure, including safety norms. A third possibility is that job insecurity and job dissatisfaction contribute to a negative affect which in turn makes people less capable of rational safety behaviour. Affect has been found to be a cause of a loss of long-term rationality in other research traditions such as addiction (Sjöberg, 1980).

Marit Christensen reports on a study of the effects of downsizing in a cornerstone industry in three small municipalities in mid Norway. Many negative effects were found on the employees and their families, both as to physical and psychological health. Furthermore, social and health services of the communities came under pressure from these developments and were not given the required additional resources. They also had their own problems with re-organisations that had not been adequately planned. This small but important study gives a very plausible picture of the process of downsizing in a cornerstone industry on a small community which is dependent on that industry for employment. The economic gains of the company are exchanged with the losses in the wider community. The paper can be compared with the subsequent paper by Størseth which also showed the effects of downsizing and job insecurity as related to undesirable outcomes, but was restricted to risk-taking on the job.

Fred Størseth investigated the effects of job insecurity, overtime pressure and work hazards on job risk taking. His work is based on Probst and Brubaker (2001) who argued that perceived job insecurity leads to increased risk taking because employees are eager to show that they are useful to the company, and hence work more at the expense of safety. This type of tendency is termed 'rational' by Størseth who suggested that there is also an affective factor in the perceived risk of losing one's job. Rundmo and Sjöberg (1996) had earlier shown that risk perception more generally has both a cognitive, or rational, aspect and an affective one. The affective factor should, according to Størseth's model, have an effect on risk taking. The stronger the effect, the more employees should report risk-taking behaviour. Furthermore, this increased risk-taking should be mediated by a lower level of job satisfaction and work motivation, the latter being construed as willingness to work in accordance with Sjöberg and Lind (1994), and Björklund (2001). Størseth found that there was an effect in terms of a correlation between negative affect and risk-taking behaviour, and that it was partly mediated by job satisfaction and work motivation. This is an important finding because downsizing, leading to job insecurity, is usually regarded as an economically 'rational' strategy. The type of finding that Størseth presents points to the possibility of serious drawbacks not only of the type discussed by Probst and Brubaker but also on the basis of emotional reactions of the employees.

Lorena Perez-Floriano, Jose Flores-Mora and Joan MacLean developed a scale for measuring trust in management with regard to risk policies. They applied it in five countries, *viz.* Argentina, Brazil, Mexico, the USA and Canada. It worked well from a psychometric point of view, having acceptable reliability. It was also distinct from other similar scales, such as hope, and related as expected to risk in most cases. In most cases, it was found that the higher the trust, the less risk was perceived. The relationship was weak, however, and even reversed in some cases. The latter finding was explained by the authors as having arisen in a case where management had been particularly committed to inform employees about the risks and increase job environment safety. Hence, the usually negative relationship between perceived risk and trust may be mediated by the message received from management. The trust scale was unrelated to general values as measured by the Schwartz scale, which is a common finding since general values can seldom predict more specific measures. The general thrust of the paper is that perceived risk and worry about the work environment is something one wants to avoid, and that risk communication should have the effect of reassuring workers. Risk communication obviously works better if people trust management. However, it is interesting to reflect on these matters from the standpoint of accident statistics in different contexts and countries. 'Blind trust' can lead workers to take unnecessary risks and management does not always have workers' safety as its highest priority. Be that as it may, the paper is a major effort to develop a useful trust scale and it is an interesting application with data from both South and North America.

Lennart Sjöberg studied job willingness to work and perceived risk in the work environment, and job satisfaction, as well as other related dimensions. Employees of a biotech company, 210 in all, responded to an extensive questionnaire which had been constructed on the basis of a large number of preliminary interviews and focus groups. It was found that job risk accounted for about 50% of the variance of work motivation and job satisfaction. The most important risks were the social ones, and stress. Work

motivation and job satisfaction mapped different aspects of adjustment to work, both important. Work motivation was related to performance dimensions while job satisfaction was strongly related to intention to quit or to stay on the job. Job interest was a very important dimension, as was the supervisor's decisiveness and involvement, and the feeling of having a meaningful job.

Christina Björklund investigated the relationship between perceived job risks and willingness to work in two large samples. One consisted of people working at day-care centres, the other were employees of an insurance company. Extensive data were obtained on work motivation, risk and several other variables. She found strong correlations between work motivation, measured as willingness to work, and perceived job risk. She also used the distinction suggested by Sjöberg and Lind (1994) between risk burden (a negative component) and accepted risk (a positive component). These studies are clearly supportive of the approach of using risk perception in understanding work motivation. The fact that she found similar results in two widely differing groups of employees speaks in favour of the generality of the results.

Benjamin Brook's contribution is about the dangerous job of lobster fishermen in Australia. He was especially interested in two types of decisions made by the fishermen: to fish or not on a given day, and to wear a life jacket or not during work. Few of the studied men used a life jacket at sea. The wear rate was less than one percent of the time. This is an example of letting comfort and perhaps economic benefits take priority over safety. Brook used an ethnographic approach to studying the two decisions, and came up with some suggestions for how to increase the use of life jackets. He emphasised the need for a social support for promoting the use of such jackets. The paper is interesting as an example of a different methodological approach which diverges from the other papers in the issue.

Tore J. Larsson, Erik Mather and Geoff Dell obtained information about the safety policies of a large number of Australian corporations. The market performance of the shares of these companies was followed for a number of years and related to the quality of their safety policies. It was found that corporations with the best policies also had, on the average, the best market development of their stocks. There could be several explanations for this finding, e.g. that they had the best over all management or that their concern for employees' safety had several positive effects at the individual level, such as improved work motivation, less frequent sick leave and decreased turnover. Be that as it may, the paper provides some strong evidence that safety investment also pays off, in economic terms.

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