

The Relative Role of Safety and Productivity in Canadian Ergonomists' Professional Practices

La place relative de la sécurité et de la productivité dans les pratiques professionnelles des ergonomes canadiens

El rol relativo de la seguridad y la productividad en las prácticas profesionales de los ergonomistas canadienses

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Résumé de l'article

Les définitions de l'ergonomie renvoient à des applications visant tant le bien-être des personnes que de la productivité. Les discussions dans la littérature en ergonomie font état d'une correspondance entre ces objectifs dans la pratique et argumentent en faveur d'une solide conception qui met de l'avant à la fois la sécurité et la productivité, contrairement au point de vue dominant qui veut que l'ergonomie soit d'abord préoccupée par la sécurité.

Cet article examine la pratique professionnelle telle que révélée par un échantillon de 21 ergonomes à travers le Canada totalisant une expérience professionnelle de 296 années. L'analyse vise à comprendre le lien entre sécurité et productivité dans le travail de l'ergonome et les conditions plus large qui structurent cette médiation.

Les résultats démontrent que l'ergonomie est en premier lieu associée avec la sécurité. Cela est évident au vue de la position structurelle de l'ergonomie au sein des services de santé et sécurité dans les milieux de travail et selon les ergonomes eux-mêmes pour qui la sécurité au travail demeure la principale préoccupation. Une minorité de participants ont indiqué s'intéresser aux questions de productivité dans leur travail, comme résultats recherchés principaux ou encore secondaires. Malgré cela, les efforts pour mettre en valeur la contribution de l'ergonomie à l'amélioration de la production ne modifient pas de manière significative la perception dominante orientée vers la sécurité comme champ d'intervention. En fait, les considérations financières se sont avérées être les déterminants les plus importants pour l'acceptation et l'implantation des recommandations des ergonomes dans leur pratique.

L'argument en faveur de la vision dominante de l'ergonomie avancée dans la profession reflète un certain effort pour dépasser la division organisationnelle entre sécurité et productivité en soutenant que, dans la pratique, sécurité et productivité se retrouvent interreliées dans le processus de production et que les ergonomes ont un rôle à jouer dans l'avancement des deux éléments. La présente analyse permet d'identifier les défis qui se posent au soutien de cette position. L'ironie dans la position dominante des ergonomes orientés vers la sécurité est qu'elle fournit la base principale pour sa présence croissante dans les milieux de travail, tout en limitant ses possibilités d'applications.

The Relative Role of Safety and Productivity in Canadian Ergonomists' Professional Practices

Nancy Theberge and W. Patrick Neumann

This article examines the professional practices of a sample of 21 Canadian ergonomists from across Canada, focussing on the manner in which they report negotiating the intersection of safety and productivity in their work. Results indicate that ergonomic practice is directed primarily to safety concerns. A minority of study participants addressed productivity concerns, either as secondary or primary outcomes of ergonomic applications. In either instance, efforts to highlight the contribution of ergonomics to production did not significantly disrupt the dominant safety oriented perception of the field. Financial considerations were major determinants of whether recommendations were implemented. An irony of the dominant understanding of ergonomics as oriented to safety, with little reference to performance aspects, is that this provides the main basis for its growing presence in workplaces but also limits its applications.

KEYWORDS: workplace hazards, worker well-being, ergonomics applications

Introduction

Occupational health and safety (OHS) is one of the enduring, and most complex aspects of industrial relations. As Storey writes (2009: 389), "there is little doubt that some forms of work have always been dangerous and unhealthy." A systematic account of the relation between occupational hazards and injury and illness was provided by the Italian physician Bernardo Ramazzini in the early eighteenth century. Ramazzini (1983, originally published 1713) identified the health hazards associated with particular occupations, including "certain morbid affections . . . [associated with] some particular posture of the limbs or unnatural movements of the body" (as cited in Franco, 1999: 859). While the risks of injury arising from work are longstanding, it is generally recognized that work

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became more dangerous with the onset of industrial capitalism and the introduction of machinery to speed up and subdivide labour, to increase the pace of production, and to draw out the length of the working day (Storey, 2009: 388). These rationalization efforts can result in increasing repetitiveness for workers and increased duration of exposure to workplace hazards, both of which imply an increase in occupational injury risk (Westgaard and Winkel, 2011; National Research Council, 2001).

The complexity of occupational health and safety derives from its relation to capital accumulation. In one formulation, capital's interests are served by maximizing worker output, and investments in workers' well-being, including their health and safety, detract from the accumulation of surplus value (Navarro, 1982; Nichols, 1997; Barnetson, 2010). Yet, as Nichols (1997: 104) argues in an analysis of industrial injuries, there are circumstances when attention to worker safety may go hand in hand with an increase in profit. Instances of this include when the threat of major accidents poses unacceptably high costs, and where injuries are so common as to threaten productivity. These aspects become an effective organizing issue for labour or invite state regulation. Nichols (1997: 104) notes further that in all these instances safety is a price related priority, in which judgments about safety expenditures figure into considerations of labour costs. In light of the need to attend to health and safety, Novek (1993) has proposed that the historical understanding of industrial relations as directed to the exchange of wages for labour is more adequately conceptualized as a wage/effort/health bargain, to reflect the importance of health concerns in the workplace.

The risks to workers' health that accompanied the transformation of the labour process in the nineteenth century were the basis for the emergence of a set of institutional responses to address these outcomes. Dwyer (1991) has termed these the "accident prevention and compensation institutions." The initial locus of responses was the state, which addressed the continuing threats to public safety posed by workplace accidents through regulatory mechanisms and the implementation of compensation programs to provide for injured workers and their families. The persistence of accidents laid the groundwork for the emergence of the second form of "accident prevention and compensation institutions," occupations whose practice involved interventions in the design and organization of work in order to reduce the incidence and severity of injuries. In the course of the twentieth century, three workplace safety professions emerged: safety engineering, industrial psychology and, the most recent entry and the subject of the present analysis, ergonomics, which is known in some jurisdictions as human factors (Dwyer, 1991). As will be indicated below, the conceptualization of ergonomics as a "safety profession" is the subject of discussion within the field.

Scientific Knowledge, Professions and the Negotiation of Health and Safety

In its simplest conception, ergonomics is “the scientific study of human work” (Pheasant, 1991: 3). More extended definitions speak to the application of ergonomics to the twin concerns of productivity and well-being. The International Ergonomics Association (IEA), the federation of national ergonomics societies around the world, provides the following definition:

Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.

While the work of ergonomists encompasses a range of activities, the following description by Dwyer (1991: 4) will help to illustrate the content of professional practice. “A diverse range of practical demands may be presented to the ergonomist: distribution of tasks between worker and machine, detailed job descriptions of complex work routines, design of monitoring or process control systems, or redesign of work stations and machines for given tasks.”

Ergonomics, as a distinct discipline, emerged in the period following World War II (Waterson, 2011). In both Britain and North America, the initial impetus was the needs of the military to better understand the human factors associated with the operation of sophisticated equipment. From its origins in defence related work, the field grew to wider civilian applications and the British Ergonomic Research Society was founded in 1949, followed by the International Ergonomics Association in 1959. In Canada, the formal organization of professional ergonomists began with the establishment in 1968 of the Human Factors Association of Canada, which, in 1999, was renamed the Association of Canadian Ergonomists/Association canadienne d'ergonomie (ACE) (Buck, 2001). Ergonomics has gained increasing presence globally and the IEA has 47 federated societies on a worldwide basis (IEA).

Ergonomics and the Negotiation of Competing Concerns

As indicated above, definitions of ergonomics refer to its application to both productivity and well-being. Discussions in the ergonomics literature include a growing consideration of the correspondence between these goals. Pheasant (1991: 4) indicates that productivity and health and safety, along with user comfort and ease, “generally go together or at least that the goals and objectives are compatible.” While noting that “inefficient working systems are often unsafe and conversely that unsafe working practices are often uneconomic,” he acknowledges there are doubtless exceptions to this principle, in that working

practices that are efficient may have deleterious long-term effects on health (Pheasant, 1991: 4). Pheasant (1991: 4) further indicates that when conflicts between the goals of safety and productivity arise in practice, the resolution is “more of a political (and ethical) question than a scientific one.” Commenting further on the political dimension of ergonomics, he writes that “If safe working practices were always cost-effective, there would be little or no need to legislate against unsafe ones and the widespread presence of health and safety legislation in industrial economies suggests that in matters of health and safety, conflicts of interest between the individual workers and employers are not uncommon” (Pheasant, 1991: 22).

The place of health and safety and productivity, and the correspondence between these goals in ergonomics practice has been taken up more recently by authors from within the field working from different vantage points. Ahasan and Imbeau (2003) present a discussion of the “evolving practice of ergonomics” and its status as a profession. They indicate that ergonomics has focused largely on health and safety, due to increasing legislation and regulation and the pressing need to attend to protecting workers from injury. They suggest that this focus limits the “effective work” done by ergonomists in domains related to productivity and profit and “it is now time for the profession to promote the practice of ergonomics in terms of both its economic contribution and its social benefit” (2003: 127).

A position piece written by a representative of the International Labour Organization (ILO) indicates that ergonomic principles are “equally significant to both employers and workers” (Niu, 2010: 748). Niu (2010) indicates that benefits to workers from the application of ergonomics arise from reduced health care costs and lost work time along with diminished pain and suffering. His account of the benefits to employers is presented as the costs of ignoring ergonomics principles, including increased absenteeism, adverse effect on labour relations, and increased probability of accidents and errors. This conception of benefits to employers is consistent with that provided by Nichols (1997) for the broader concern of health and safety, where investments in safety are justified on the basis of their contribution to reduced labour costs.

Evidence on the relation between the health and productivity outcome of ergonomics practices is provided in a systematic review by Neumann and Dul (2010). These authors indicate that the literatures on human factors and business practices tend to be separate, and, related to this, human factors is typically seen as a health and safety tool, with little connection in work organizations to production and management units (Perrow, 1983). In light of this distinction, Neumann and Dul’s (2010) intention was to investigate the evidence for a correspondence between the “human and system effects” of one form of ergonomic

activity, the design and redesign of production systems within the manufacturing sector. Human effects considered in the analysis included employee health, physical workload, and "quality of working life." System effects included quality, productivity, performance of new technologies, and improved communication and cooperation. Results of the review provide support for the correspondence between well-being and productivity outcomes in that a high proportion (95%) of studies examined showed a positive correspondence in these two outcomes. The authors conclude that the application of human factors in design can support improvement in both employee well-being and system performance in a number of manufacturing domains (Neumann and Dul, 2010; see also Pot and Koningveld, 2009). Similar to Ahasan and Imbeau (2003), Neumann and Dul (2010) argue for greater attention to the productivity gains of ergonomics applications and, following from this, broader recognition of the more robust conception of ergonomics as oriented to both health and productivity. These authors also acknowledge the restriction of the analysis to the manufacturing sector and a need for further examination of the correspondence of health and productivity goals to other types of work settings.

Discussions by Ahasan and Imbeau (2003), Niu (2010) and Neumann and Dul (2010) consider the correspondence of the applications of ergonomics from different vantage points: one commenting on the professional status of ergonomics, another on the contributions of ergonomics to the interests of labour, and a third on its benefits to productivity (conceived as "operations systems") in the manufacturing sector. Notwithstanding these varying objectives, all three make the case for the robust conception of the field as advancing the twin agendas of safety and productivity and two specifically argue for the need to counter the dominant understanding that ergonomics is primarily concerned with issues of health and safety. Still another reason for adoption of the more robust version of ergonomics might be to enhance the employment prospects of ergonomists, wherein a profiling of their contributions to both productivity and health and safety agendas might provide gains in both status and employability (Dul *et al.*, 2012).

While there is a growing literature on conceptions of ergonomic practice (e.g., Wilson, 2000; Lamonde and Beaufort, 2000; Lamonde and Montreuil, 1995; Dul and Neumann, 2009; Theberge and Neumann, 2010; St-Vincent *et al.*, 2010, Denis *et al.*, 2008) to date there has been little analysis of how these conceptions are realized in the work of practising ergonomists. In an effort to explore this issue this article examines the professional practices of a sample of Canadian ergonomists and the manner in which they report the negotiation of the intersection of safety and productivity in their work and the broader conditions that structure this negotiation.

Data and Methodology

The analysis presented here is taken from interviews with 21 ergonomists from five Canadian provinces and territories: Alberta, British Columbia, Northwest Territories, Ontario, and Quebec. In light of our interest to obtain a sample with representation from different regions and different sectors of the economy, we employed a purposive recruitment strategy. Participants were recruited in several ways: through an invitation to participate in the study circulated by the Association of Canadian Ergonomists, additional contacts through well-networked individuals and a snowballing technique whereby participants suggested names of colleagues who might be approached to participate in the research.

The sample includes 12 men and 9 women, with an average age of 40.4 years. On average, the participants had 14.1 years of experience as practising ergonomists and thus the sample has a combined experience of 296 years. The sample includes ergonomists who work as “in house” employees and as independent consultants. In some cases, “in house” ergonomists worked in settings where they consulted for a number of worksites within a particular organization and, in this sense, like independent consultants, they practised in a variety of locations. Sectors of the economy in which participants worked include manufacturing, health care, transportation, natural resources and energy, and the public sector. Some participants who were employed as consultants worked in multiple sectors.

The analysis is taken from a study of the professional practices of ergonomists and industrial engineers. In the larger study we were interested to understand how these two professions influence health and safety agendas in work organizations and the tools and strategies they employ to accomplish these ends (Theberge and Neumann, 2010; Wells *et al.*, 2012; Berlin *et al.*, in press). In the present analysis we focus on the data from interviews with ergonomists to examine the negotiation of health and safety and productivity agendas. The interviews were semi-structured, typically took an hour to complete, and covered a range of topics related to participants’ professional practice, including descriptions of their roles as ergonomists, the types of projects in which they are engaged, their relationships with workplace parties, tools and methods they employ, challenges and opportunities they face in their professional practice and the strategies they pursue to meet both opportunities and challenges.

Interviews were audio tape recorded, transcribed and entered into a qualitative data management software tool (QSR NVIVO, 2002). The transcribed interview was sent to the participant for correction of major errors and to address any confidentiality concerns. The analysis approach followed the “General Inductive Method” of Thomas (2006). A preliminary coding scheme of major themes was devised by several members of our research team and then revised on the basis

of a reading of the transcripts by the whole team. The coding scheme was then applied to the transcriptions. A thematic analysis was employed (Thomas, 2006). To develop the analysis presented here, sections of interviews based on the codes were extracted and examined by the first author who then reviewed and revised the results with the second author. The present analysis draws in particular on interview material dealing with study participants' structural location in work organizations, their relations with other workplace parties, their conceptions of their roles, particularly with regard to performance and health and safety, and factors that influence the acceptance of ergonomic recommendations.

Results

Organizational Location and Responsibilities

One of the relevant features of ergonomists' practice is their location within organizational structures. All but two of the participants in our research were formally located within the health and safety unit of the organizations where they work (in the case of consultants, typically they were hired by and reported to health and safety units). The exceptions are one who works primarily in the design phase of projects and another who reported initially working in health and safety and more recently moving to the engineering unit of the company where s/he is employed.

Consistent with their organizational locations, all of our study participants indicated that the primary focus of their professional practice was health and safety. The following account by a participant of how projects s/he works on are initiated identifies several pathways, all of which are directed to addressing safety concerns associated with aspects of the labour process.

Someone identifies that there is a concern with the job. So, that may happen as a result of an injury, it may happen as a result of a proposed change that they want to have reviewed before it becomes an issue. It may happen as a result of a worker complaint or a work refusal or a safety concern. Or it may even be that we've done a physical demands description, a summary of job demands and the ergonomist or someone on the plant floor has said, "You know what, I have issues with this." So, at that point, we would say "You know what, we need an ergonomic assessment or a risk evaluation of that concern or job."

Another participant described the ergonomics unit in his/her work place as a "supporting group" and then said "we have some of our own initiatives, but, probably, 75% of the work we do is on other people's projects." S/he then elaborated by contrasting the roles of the ergonomic and engineering units, in a comment that highlights the separation in responsibility for safety and performance, here referred to as "technical" concerns.

Operations tells us what they would like to do, what their goals are—you know, “we want to [depiction of work process] on time 99% of the time or whatever it may be and this is how we would like to do it, what do you think?” So the Industrial Engineering group will often come up with a technical solution and then we are there to vet it from a health and safety side.

The location of ergonomists in organizational structures and the focus of their activities on injury risk and prevention reflect the understanding that ergonomics is primarily identified with health and safety. While this understanding may speak favourably to the ability of ergonomists to advance the agenda of worker well-being, as the discussion below will show, the structural alignment of ergonomics with health and safety is also the basis for some of the major challenges posed in its effective application to this interest.

Balancing the Agendas

While health and safety was the dominant focus of the professional practice of all our study participants, a minority of our participants also engaged with production concerns in the course of their work. This occurred in two ways. One participant indicated that s/he referenced productivity gains as a sales point when making the case for implementation of ergonomic initiatives to management.

We [the ergonomics unit in the workplace] also get a better sell if we . . . When I look at a piece of equipment, I'll look at it from an ergonomic standpoint: is it within acceptable parameters, but I'll go the extra step and say, “listen, you know what, that position there is going to increase their walking amount, which is not going to be an ergonomic issue per se, but we can reduce our cycle time by doing that setup.” I do take [productivity] into consideration. I think it's not so much the organization pushing it; it's basically me pushing it. Because it sells, right, it sells.

The reference to the ergonomic perspective as addressing “acceptable parameters” speaks to the understanding that ergonomics is about health and safety and efficiency gains, such as reduced cycle time, while outside the scope of ergonomics as it is conceptualized in this setting, are also of interest. Also notable here is the participant's indication that, to the extent s/he goes beyond this restricted understanding of ergonomics to make the case for initiatives, it is s/he and not the organization that is “pushing” to take this “extra step,” highlighting the separation of the two concerns in the organizational structure.

Two other ergonomists discussed their efforts to foreground productivity in their work so that it stood alongside, rather than subordinate to safety concerns. In both cases, they encountered challenges arising from the separation of safety and productivity in work organizations. One participant, who works as an independent consultant, indicated that when s/he is retained “most of it has to do with injury prevention.” The ergonomist provided an example of addressing safety issues in a

setting where s/he consults (not here described so as to preserve anonymity) and added "But what I've been able to do in the past is to look at productivity and efficiency." S/he then discussed how clients responded to the referencing of both safety and productivity: "If you can demonstrate early in the design process there may be some gains in either, both arguments are listened to. They're listened to by different people, but they're listened to." S/he expanded on this point:

I can sometimes see where I believe there are going to be productivity gains. But, in a lot of cases, unless I have a Productions Manager or an Operations Manager involved in the project, if it's Health and Safety, they're saying "Yeah, yeah, yeah, that's nice but, I don't have any control over that. Tell me what I can do with injuries." I would say for the productivity side of things, the majority of times it's coming up tends to be in the design projects and that tends to be in terms of looking at work flow, process flow, those kinds of efficiencies. The majority of the workplace ergo that I'm asked to do is safety related and the productivity tends to be a sideline.

The participant then provided an illustration of how the separation of responsibilities in work organizations functions to limit the application of the robust vision of ergonomics. Commenting on how clients respond to information about productivity gains, s/he said:

They're open to hearing it, but in a lot of cases, [for] the safety people, it's not a language they tend to speak. It's not a metric they measure, it's not something that they're tracked on, so they're less interested in that than "what can you do about my first aids and my lost time injuries."

Another ergonomist spoke to the challenges of making the case for the dual contributions of ergonomics to different audiences, in this case management and labour. The following comments capture the complexity of the place of health and safety in industrial relations. The participant began by indicating that "one of the things I'm really focusing on is the productivity side of it and the quality side of it. It's partly as a professional endeavour for me." In the latter point, the participant is referring to that fact that, at the time of the interview, s/he was completing requirements for professional certification. S/he continued with a comment on how safety and productivity benefits appeal to different audiences.

But also because there is the audience out there in the workplace, which is often the workers who are often super excited about any safety benefits and the safety personnel are excited about the safety benefits; and then there's the part of the supervisory management team who is really happy about any quality or productivity benefit. So I'm definitely paying attention to that stuff, I'm definitely measuring it, if not quantitatively, then qualitatively, getting feedback about that, and incorporating that [into my work].

The participant provided further commentary on the challenges to advancing the dual agendas of ergonomics to organized labour and management.

Now some organizations are a bit tricky about that because, interestingly enough, some organizations don't want to mix business and safety—if that makes sense. And it's because of the sort of cynical view that the union has that, "Oh sure, you guys say that this is about safety, but we know it's really about getting rid of jobs; or reducing your liability for injuries; or it's about some business process that you're trying to speed things up" or whatever the case may be. So they almost prefer that you advertise "Look at how much safer this is" and never mention the business process. The company I work for most of the time, it's clear to me that the employees are starting to buy into the fact that this industry is in major trouble and if there is a productivity success out there and they still all keep their jobs, then that's an awesome effort. If it's a productivity improvement that people start to lose their jobs, well then that's a bit of a worry and obviously I have to be real strict about being involved in that stuff because the union is not going to want me around too often . . . But they're starting to understand that you got to improve to survive. So, I definitely try to incorporate that as best I can.

The "tricky" aspect of attempting to align business and safety arises from the understanding that workers and capital have different investments in the applications of ergonomics to safety and productivity. In commenting on workers "buying into the fact" that productivity is essential, the participant indicates the pressures on labour to acknowledge their own interest in the application of ergonomics toward this outcome.

The preceding discussion indicates the subordination of productivity to safety within the professional practice of ergonomists. In some cases, ergonomists reference productivity gains as value added, or selling points to make the case for ergonomic initiatives that are directed primarily to safety issues. In these instances, the understanding that ergonomics is mainly about safety remains uncontested. Two participants who attempted to put into practice the robust vision of ergonomics by aligning safety and productivity in their agendas encountered challenges arising from the organizational separation of these concerns. In one case, where the relevant audience is different units of management, the problem is that the messages about one or another of the benefits fall on deaf ears and the dominant definition of ergonomics as directed to safety prevails. Where the relevant audiences are labour and management, it is suggested that efforts to realize the more robust vision of ergonomics may reinforce the divide between labour and capital within the work organization.

The Looming Influence of Production and Profit

Ergonomic consultations typically involve two distinct but related components: an assessment, where problems or possibilities for improvement are identified (whether in regard to OHS hazards or production issues) and formulation of "solutions" to the issue that has been identified (Wells *et al.*, 2012). A difference

between these two stages is that while the ergonomist controls the assessment, which is based on his/her professional expertise, implementation of a recommended solution is dependent on the support of other workplace parties. This support, in turn, is contingent on a fit with organizational agendas.

Our interviews contained extended discussions of the implementation process and the factors that influence whether ergonomic recommendations are adopted by work organizations. These discussions highlighted the importance of financial considerations on the implementation process. These considerations include both the implications for production but also the costs and return on investment in ergonomics.

One respondent spoke pointedly about how production concerns play a role in decisions about implementation:

When we describe the work [i.e., the proposed ergonomic changes], of course we will talk about the production because of course they've got to keep on with the production. So it's very important to be careful with that because otherwise we will be very quickly out of the plant. So we've got to deal with that, but that will be more when we develop the solutions to show that it won't be a problem with the production.

Discussions of decisions around implementation typically cited a number of factors, with production and cost considerations figuring prominently. One participant indicated that the final report that s/he provides balances the cost of current practices against those of proposed changes. The following account details a number of considerations that are addressed.

So, we look for opportunities, we look for production stoppages or bottlenecks, we look for injuries, we look for discomfort, morale, turnover, absenteeism. Those kinds of quality issues so if there is a lot of scrap on the job and we think the ergonomic change would affect that then we would try to capture some of that data. We also, on the other side, gather up the information on the cost associated with making the change that we want to make, including the operator's time for training, the engineer's time for example to make the changes, any kind of on-going maintenance that's going to be required if we bring new equipment in, and the actual cost of the physical hardware that's needed. We then balance those against each other.

Other accounts of influences on the acceptance and implementation of recommendations that referenced cost and production concerns are the following:

Certainly cost, feasibility, priorities and production concerns sometimes. How practical the changes are, the acceptance by the workers.

Time and money, those would be the obvious ones, but besides those, the amount of floor space. [The last item refers to the fact that the availability and layout of space in the plant site is a critical element of the production process that may constrain the implementation of health and safety initiatives.]

It depends on the facility. In some facilities, if it's doable it's pretty much always done. If it's more difficult, capital intensive, then there's a bit of an issue and it depends on the management team in that facility. Some management teams will say, "You know what, this is the right thing to do, this is the way we're going to go about doing it, okay. We know it's going to cost us more long-term, let's fix it now." In other facilities, they will let it sit there.

Two participants indicated that the calculation of costs includes investment in the ergonomic consultation. In the following excerpt, the participant indicates that, while the investment in ergonomics creates a space for intervention, the nature of that intervention is limited by cost considerations.

I think most of the clients expect that if they're going to pay for consultation, they want something to come out of it. It's not necessarily always what I hoped would come out of it, particularly if I've laid out "Here are the low-cost solutions and you'll probably get low benefit; and here are the higher cost and you're going to get a really great benefit from it and it'll pay back within a year kind of a thing" and then see the client just going for the low-cost hits because they want to be seen as doing something. And, they never get to the higher cost [solutions]. I find that frustrating because I can see that the benefit's there, the potential's there, they should be doing it, but it doesn't happen.

Similarly if somewhat more positively, the following respondent, when asked if recommendations get adopted, said:

They've spent money to hire me. I won't say 100%, but in 90-95% of cases, it results in change. Sometimes, I tell the worker that the worst that can happen is to change nothing. Nothing at all, we stay like this. If we don't make any changes, it'll be worse. So, in 90-95% of the time, there's something. Sometimes, we just provide amelioration; sometimes everything changes for the better but sometimes, just small changes.

Another participant who referenced production in the discussion of responses suggested that having an established relationship with clients facilitated the acceptance of recommendations.

At first, they're extremely positive for the [project]. We rarely have negative feedback at first. But we always have challenging feedback. They will say things like "Are you sure this is the first thing we should do? Are you sure this is the only aspect we can have?" With companies like [names of clients] they have confidence in our recommendation since it's not the first project. But in new companies, it's at the recommendation point [that] the relation can be a little bit more challenging. But it's never negative, it's just like that sometimes the changes we want them to make are going to affect production. So, they want to make sure it's the right choice. They want to make sure it's the right recommendation and that we've considered the production or the efficiency.

In contrast to the subordination of production issues to safety in the formal agendas and working practices of ergonomists, productivity and profit are

a looming influence on the implementation process. Cost figured particularly prominently in accounts of this process, with a number of ergonomists citing a preference in work organizations for implementing low-cost, and low-yield solutions. In some instances, the cost benefit analysis incorporates the costs of hiring ergonomists in the calculation, which is viewed as an investment in safety.

Discussion

The significance of worker well-being to industrial relations was the basis for the emergence of a set of institutional responses, including the rise of “accident prevention professions.” The most recent entry into the constellation of safety professions is ergonomics. The emergence of ergonomics is particularly relevant to industrial relations because of its potential to advance the agendas of both productivity and worker well-being. Dominant understandings of ergonomics emphasize its contributions to safety, while increasingly, observers from within the field advance a more robust conception that recognizes its contributions to both agendas, and, crucially, that these advances can occur simultaneously in a given ergonomic application (Neumann and Dul, 2010). This is in contrast to a less ambitious conception of ergonomics that sees a given initiative as benefiting either productivity or worker well-being. The ends to which ergonomics is applied thus becomes an important determinant of its positioning within industrial relations.

The analysis presented here has examined the manner in which debates about the content and application of ergonomics are realized in the professional practices of a sample of Canadian ergonomists. The experiences of study participants provide strong support for the view that ergonomics is primarily associated with health and safety. This is evident in the structural location of ergonomics within health and safety units of workplaces and its corresponding separation from production units and in ergonomists' reports that the main focus of their work is safety concerns. A minority of study participants indicated that they addressed productivity issues in their work, either by presenting these as added value to the main contribution of ergonomics to safety, or by endeavouring to align arguments about productivity gains alongside those of safety benefits. Whether presented as secondary or primary outcomes, efforts by study participants to highlight the contribution of ergonomics to production did not significantly disrupt the dominant safety-oriented perception of ergonomics and the corresponding notion that production and safety are separate concerns within work organizations, with ergonomics firmly located in the latter. While ergonomists are limited in their ability to address production concerns in the assessment of ergonomic problems and solution development, financial considerations were important determinants of whether recommendations were accepted and implemented.

These considerations include both the implications of ergonomic initiatives for the production process and the cost of proposed solutions.

Arguments for the robust vision of ergonomics discussed at the outset of this article identified two rationales for the adoption of this conception. The first, presented by Niu (2010) and Neumann and Dul (2010), speaks to the enhanced outcomes, whereby the dual agendas of safety and productivity are realized and both labour and management benefit from these applications. Neumann and Dul (2010) suggest that one of the main reasons for the lack of appreciation of the complementary relationship is the organizational separation of safety and productivity and the alignment of the former with employee well-being in corporate strategies (Perrow, 1983). The present analysis confirms this observation and shows how the organizational separation of safety and productivity is realized in the working relationships of ergonomists and workplace parties. The observation of one participant, that arguments about the contributions of ergonomics to safety on the one hand and productivity on the other are “listened to” but by “different people” captures one of the main challenges to realizing the robust vision of ergonomics – that no one stakeholder is interested in the full range of benefits ergonomics claims to represent. Variability in management support for ergonomics was shown in an analysis by Dixon, Theberge and Cole (2009) of participatory ergonomics programs, a variant of ergonomic practice. Dixon, Theberge and Cole (2009) showed that management commitment to these programs varied on the basis of managerial level (senior and middle) as well as responsibility (production, health and safety).

The challenge of advancing the dual agendas of ergonomics may be heightened when the audience for this message is organized labour. The account of one participant of the resistance of organized labour to the association of ergonomics with productivity, based on the view that this masks a hidden agenda that is counter to workers’ interests, reflects the view that health and safety and productivity are not only distinct but in opposition. This ergonomist’s characterization of labour’s position as “cynical” suggests a gap in this workplace between the views of labour and that of the professional ergonomist on the correspondence between the safety and productivity agendas.

The participant’s indication that employees at the workplace under discussion nonetheless have started to “buy into” the need to address productivity, in light of the fact that the industry is “in trouble” and jobs are at risk points to another element of the landscape for professional practice in ergonomics: that commitments to ergonomics evolve over time in response to changing circumstances. A similar process was observed by Dixon, Theberge and Cole (2009) in their analysis of participatory ergonomics programs which showed that management commitment evolved in response to changing conditions within the workplace. These

accounts of shifting support for ergonomics highlights the manner in which ergonomists must 'navigate' organizations in order to achieve their goals (Broberg and Hermund, 2004). A more developed account from the present research of this navigational process is provided in Theberge and Neumann (2010).

The preceding reference to the position of organized labour relative to the application of ergonomics to productivity points to one of the main limitations of the present analysis: the absence of a sustained examination of the impact of unionization on the professional practices of ergonomists, beyond a specific reference by one participant. This feature of the analysis derives from the composition of our sample, which includes ergonomists who work as independent consultants and, in this capacity, are employed by a number of workplaces, both unionized and non-unionized, which precluded a comparison of the practices of ergonomists who work in unionized and non unionized settings. This limitation to the present discussion highlights the need for a fuller consideration of the influence of organized labour on ergonomic practice. Research by Adler, Goldoftas and Levine (1997) in a US car manufacturing plant indicated that effective employee involvement succeeded in improving the incorporation of ergonomics into production systems. This research, while important for documenting the role of organized labour in advancing the ergonomics agenda in workplaces does not address the debate over the applications of ergonomics, which is the focus of the current analysis.

The second rationale for the adoption of the robust vision of ergonomics is Ahasan and Imbeau's (2003) observation that demonstration of its value to different constituencies would enhance the status of the profession, a view developed more recently by Dul *et al.* (2012). Findings from the present research indicate the growing status of the ergonomics profession. This is suggested indirectly in the accounts of respondents who indicate that clients who have hired them expect to make changes, offering an implicit endorsement of the value of ergonomics. More direct evidence reported elsewhere (Theberge and Neumann, 2010) lies in the observations of a number of our study participants of a shift they had witnessed over the course of their careers in the increased legitimacy accorded to ergonomics. Crucially, however, this legitimacy and the corresponding enhanced status are grounded in the contributions of ergonomics to safety agendas, not those of production.

While the persistence of work related injuries, and the associated workers' compensation costs, have exerted significant pressures on work organizations to address safety concerns and are main factors behind the rising appreciation of ergonomics, it should be noted that some of our participants spoke of management support of health and safety because it is the "right thing to do." Economic pressures arising from health hazards, supported in some contexts by corporate

responsibility for employee well-being, provide a context in which to advance the profession while at the same time serving to solidify the understanding that ergonomics is “about safety.” Productivity and profit currently figure in ergonomists’ work largely as a constraint, or, as suggested here a “looming presence,” rather than as a primary target for the application of their professional expertise.

The findings presented here highlight the challenges to advancing health and safety that may arise from the adoption of the more robust vision of ergonomics. The understanding that ergonomics is about safety, and in some cases justified on ethical grounds as “the right thing to do,” indicates that ergonomics, as currently conceptualized, constitutes a space where health and safety is addressed as a legal and moral concern. These concerns, however, are largely subordinated to cost considerations. One might be concerned that, were the robust understanding of ergonomics to be adopted, a more stringent application of a cost benefit analysis may be applied to ergonomic applications, yielding even greater constraints on the capacity of ergonomics to advance worker well-being. The counter-side of this argument is that incorporating productivity and quality benefits in ergonomics improvements efforts supplements but does not negate the ethical obligations for, and financial benefits from, improving workers’ OHS. On the contrary, increasing recognition of the “double-win” of ergonomics (Neumann and Dul, 2010; Pot and Koningveld, 2009) will increase its application even in cases where the health hazards are not critical or affect “well-being” more than safety, since the cost-benefit scale will be tipped ever more in favour of a human-centric solution. Under these circumstances we see increased adoption of ergonomics already into design stages where the costs are lower than in conventional health-focussed retrofitting projects (Miles and Swift, 1998).

Support for ergonomics because it is the right thing to do illustrates Pheasant’s (1991) argument that balancing the goals of ergonomics is an ethical and political issue. While beyond the scope of the present analysis, it is relevant to note that the political struggle over ergonomics occurs at societal levels in the form of debate over legislated ergonomics regulations. The political struggle over ergonomics has been especially well documented in the American case, where Mogensen (2006) has recounted the implementation and subsequent repeal of ergonomics standards within the Occupational Safety and Health Act (OSHA) over a ten year period beginning in the early 1990s. Organized labour, concerned about rising rates of work injuries, mounted a vigorous campaign for imposition of the standards, while corporate interests countered with a similarly vigorous argument against the inclusion of ergonomics regulations in OSHA. The initial success in gaining recognition for ergonomics regulations in 1992 occurred in a political and economic climate that was relatively favourable to state intervention in support of workers’ well-being. Over the

course of the following decade that climate changed and corporate interests, supported by a more sympathetic President and Congress, succeeded in making the case for the repeal of the standards and an emphasis on voluntary compliance (Mogensen, 2006). It is of course the case that this struggle over ergonomics regulations was grounded entirely in the understanding of ergonomics as a safety profession.

While the major trends reported here are robust, this does not preclude individual ergonomists or managers, working in different jurisdictions or with different backgrounds, from having different experiences than those presented by our sample. It has been suggested, for example, that French speaking ergonomists may have different training in ergonomics and hence different approaches to professional practice than other ergonomists (e.g., Daniellou, 2005). Similarly ergonomists in Sweden are often trained physiotherapists with a strong rehabilitation focus who refer often to their clients as "patients" (Laring *et al.*, 2007). These differences in training notwithstanding, the consistency of our findings that ergonomics is associated with health and safety and is therefore seen to conflict with productivity among our study participants is consistent with dominant understandings of ergonomics practice as discussed in the introduction. This suggests that this prioritization applies across different practice contexts. Moreover, we have no reason to believe that these findings are likely to vary across jurisdictions. Given the homogenization of business practices in a globalizing economy, we would suggest that differences on the basis of training and jurisdiction are unlikely to have a substantial effect on the manner in which work organizations consider the relative contributions of ergonomics to health and safety and productivity agendas.

Conclusion

The argument for the more robust vision of ergonomics advanced within the profession reflects an effort to overcome the organizational divide between safety and productivity by stressing that in effective ergonomics applications, safety and productivity are joined in the production process and ergonomists have a main role to play in advancing both agendas. The analysis provided here has identified significant challenges to the adoption of this position. Ergonomists are hired to address safety issues and both their organizational locations and interactions with workplace parties reinforce this understanding of their work. An irony of the dominant understanding of ergonomics as oriented to safety is that this provides the main basis for its growing presence in workplaces but also limits its applications.

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SUMMARY

The Relative Role of Safety and Productivity in Canadian Ergonomists' Professional Practices

Definitions of ergonomics reference its application to both productivity and well-being. Discussions in the ergonomics literature consider the correspondence between these goals in ergonomic practice and make the case for a robust conception that advances the twin agendas of safety and productivity, contrary to the dominant understanding that ergonomics is primarily concerned with safety.

This article examines the professional practices as reported from a sample of 21 ergonomists from across Canada with a combined experience of 296 years. The analysis aims to understand the reported intersection of safety and productivity in the ergonomists' work and the broader conditions that structure this negotiation.

Results provide strong support for the view that ergonomics is primarily associated with safety. This is evident in the structural location of ergonomics within health and safety units of workplaces and in ergonomists' reports that the main focus of their work is safety concerns. A minority of study participants indicated that they addressed productivity concerns in their work, either as secondary or primary outcomes of ergonomic applications. In either instance, efforts to highlight the contribution of ergonomics to production did not significantly disrupt the dominant safety-oriented perception of the field. Financial considerations were major determinants of whether recommendations were accepted and implemented.

The argument for the more robust vision of ergonomics advanced within the profession reflects an effort to overcome the organizational divide between safety and productivity by stressing that, in effective ergonomics applications, safety and productivity are joined in the production process and ergonomists have a main role to play in advancing both agendas. The analysis provided here has identified significant challenges to the adoption of this position. An irony of the dominant understanding of ergonomics as oriented to safety is that this provides the main basis for its growing presence in workplaces but also limits its applications.

KEYWORDS: workplace hazards, worker well-being, ergonomics applications

RÉSUMÉ

La place relative de la sécurité et de la productivité dans les pratiques professionnelles des ergonomes canadiens

Les définitions de l'ergonomie renvoient à des applications visant tant le bien-être des personnes que de la productivité. Les discussions dans la littérature en ergonomie font état d'une correspondance entre ces objectifs dans la pratique et argumentent en faveur d'une solide conception qui met de l'avant à la fois la sécurité et la productivité, contrairement au point de vue dominant qui veut que l'ergonomie soit d'abord préoccupée par la sécurité.

Cet article examine la pratique professionnelle telle que révélée par un échantillon de 21 ergonomes à travers le Canada totalisant une expérience professionnelle de 296 années. L'analyse vise à comprendre le lien entre sécurité et productivité dans le travail de l'ergonome et les conditions plus large qui structurent cette médiation.

Les résultats démontrent que l'ergonomie est en premier lieu associée avec la sécurité. Cela est évident au vue de la position structurelle de l'ergonomie au sein des services de santé et sécurité dans les milieux de travail et selon les ergonomes eux-mêmes pour qui la sécurité au travail demeure la principale préoccupation. Une minorité de participants ont indiqué s'intéresser aux questions de productivité dans leur travail, comme résultats recherchés principaux ou encore secondaires. Malgré cela, les efforts pour mettre en valeur la contribution de l'ergonomie à l'amélioration de la production ne modifient pas de manière significative la perception dominante orientée vers la sécurité comme champ d'intervention. En fait, les considérations financières se sont avérées être les déterminants les plus importants pour l'acceptation et l'implantation des recommandations des ergonomes dans leur pratique.

L'argument en faveur de la vision dominante de l'ergonomie avancée dans la profession reflète un certain effort pour dépasser la division organisationnelle entre sécurité et productivité en soutenant que, dans la pratique, sécurité et productivité se retrouvent interreliées dans le processus de production et que les ergonomes ont un rôle à jouer dans l'avancement des deux éléments. La présente analyse permet d'identifier les défis qui se posent au soutien de cette position. L'ironie dans la position dominante des ergonomes orientés vers la sécurité est qu'elle fournit la base principale pour sa présence croissante dans les milieux de travail, tout en limitant ses possibilités d'applications.

MOTS-CLÉS : risques à la santé et à la sécurité au travail, bien-être du travailleur, applications ergonomiques

RESUMEN

El rol relativo de la seguridad y la productividad en las prácticas profesionales de los ergonomistas canadienses

Las definiciones de ergonomía refieren sus aplicaciones a la productividad y al bienestar. Las discusiones en la literatura ergonómica consideran la correspondencia entre estos objetivos en la práctica ergonómica y argumentan a favor de una concepción robusta basada en estrecha relación de la seguridad y la productividad, en oposición a la comprensión dominante de la ergonomía cuya principal preocupación es la seguridad.

Este artículo examina las prácticas profesionales tal que reportadas por una muestra de 21 ergónomos de Canadá con una experiencia acumulada de 296 años. El análisis busca comprender la intersección reportada entre seguridad y productividad en el trabajo de los ergónomos y las principales condiciones que estructuran esta negociación.

Los resultados aportan un fuerte apoyo a la idea que la ergonomía estaría principalmente asociada a la seguridad. Esto es evidente en la ubicación estructural de la ergonomía dentro de las unidades de salud y seguridad ocupacional en los centros de trabajo y en los informes de ergonomía cuyo enfoque principal son los problemas de seguridad. Una minoría de los participantes indicaron que su trabajo se orienta hacia las preocupaciones de productividad, ya sea como resultado secundario o principal de las aplicaciones ergonómicas. En ambos casos, los esfuerzos para destacar la contribución de la ergonomía a la producción no alteran de manera significativa la percepción dominante del campo orientado hacia la seguridad. Las consideraciones financieras fueron los determinantes principales de la aceptación o del rechazo de las recomendaciones y de su aplicación.

El argumento a favor de una visión más robusta de la ergonomía, avanzado dentro de la profesión, refleja un esfuerzo por superar la división organizativa entre la seguridad y la productividad haciendo hincapié en que en las aplicaciones ergonómicas, en la práctica, la seguridad y la productividad se unen en el proceso de producción y que los ergónomos tienen un rol principal en el avance de ambas agendas. El análisis presentado aquí ha identificado retos significativos para la adopción de esta posición. Una ironía de la comprensión dominante de la ergonomía como orientada a la seguridad es que ésta es la base principal de su creciente presencia en los lugares de trabajo, pero al mismo tiempo ello limita sus aplicaciones.

PALABRAS CLAVES: riesgos ocupacionales, bienestar del trabajador, aplicaciones ergonómicas