Exploring Blue- and White-Collar Employees’ Well-Being at Work System: Differences in Indicators of Physical and Psychosocial Conditions of Occupational Groups

Seppo Tapio Väyrynen, University of Oulu, Oulu, Finland
Heli Katariina Kiema-Junes, University of Oulu, Oulu, Finland

ABSTRACT

The aim of this study was to examine occupational group-related differences in well-being at work (WBW) indicators ranging from real accidents, absences and retirement to experienced pleasure at work. Occupational group included two categories: blue- and white-collar employees. The study is based on analysing national statistics or ones of various industrial sectors (Study 1), or bases on findings of questionnaires in Finnish case companies (N=7) (Studies 2 and 3). WBW questionnaires answered by 3500 employees. Analysis utilised data that employees of two occupational groups, or company and national statistics revealed about WBW. Analysis was based on factors related to employee, task, tool, organisation and work environment (traditional work system (WS)), psychosocial factors, and information and communication within WS. The biggest and statistically significant differences were emphasised in results and discussion. Although two groups’ roles and tasks provide reasons for many differences, the ones should be measured, thoroughly discussed and consciously managed.

KEYWORDS

Absence, Accident, Communication, Experience, Information, Organisation, Outcomes, Participation, People, Retirement, Social Skills, System, Task, Tool, Work Environment

INTRODUCTION

General Background

People in various roles, as well as their tools (e.g., technology), are the core elements of the jobs carried out within a work system. A fluent interplay of all system elements is necessary for successful work. The work system (WS) is a holistic concept that addresses all the relevant elements (employee, task, tool, organisation and work environment) and aspects of working (ISO, 2004). Organisations tailor WSs to fit various industries and services and to act as enablers of businesses; for example, they may be used as well for describing how to achieve desired outcomes for employees and patients in contemporary healthcare (see Hignett, Carayon, Buckle & Catchpole, 2013). The relevant elements provide a framework for a system’s outcomes and functioning including, in our version, psychosocial interaction, social skills, information, knowledge and communication (Figure 1). As Hatch & Cunliffe (2013) concluded, differences and changes in organisations, including technologies and management, affect social relationships, attitudes and feelings at work. This conclusion is an important basis for our approach.

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Both the empowering and defending characteristics must be included in current and future WSs. The former function is broadly related to desired outcomes (Figure 1), i.e., high performance of employees, including happiness as part of well-being at work. The latter function addresses undesired outcomes, i.e., various types of ill-being, including complaints, diseases, accidents, injuries, absences, early retirement, losses, errors, non-conformities, deviations concerning quality and risks in general.

We use the following definition of well-being at work: “WBW means safe, healthy, and productive work in a well-led organisation by competent workers and work communities who see their job as meaningful and rewarding, and see work as a factor that supports their life management” (Anttonen & Räsänen, 2009, p. 17). This definition is primarily limited to the context of WSs in our study, i.e., home and leisure contexts and living conditions are excluded.

The scope of this study involves a diverse range of employee positions and roles as subjects and objects within WSs and organisations. We examine employees’ experiences of their WS conditions, as well emphasising psychosocial factors and employees’ skills, information and communication. On the other hand, based on statistical facts, employees’ accidents at work, absences and early retirement are dealt with.

Figure 1. Model of the work system with outcomes, modified to represent a general systemic structure and the enablers and processes behind desired and undesired outcomes at work. Psychosocial factors, social skills, information, knowledge, and communication, contribute and play an essential role (Carayon & smit, 200; Carayon et al., 2014; ISO, 2004; Smith & Carayon, 1995; Smith & Sainfort, 1989; Vayrynen, Roning & Alakarppa, 2006; Vayrynen & Nevala, 2010; Vayrynen, Jounila, Latva-Ranta, Pikkarainen & von Weissenberg, 2016)
Diverse individuals in a WS can be divided into two occupational groups, categories: blue- and white-collar employees. The European Union’s (EU’s) general classification of occupations, which we utilise in this study, makes the following divisions: (1) managers; (2) professionals; (3) technicians and associate professionals (including science, engineering, health, business, administration, legal, social, cultural, information and communication professionals); (4) clerical support workers; (5) service and sales workers; (6) skilled agricultural, forestry and fishery workers; (7) craft and related trades workers (including building, metal, machinery, handicraft, printing, electrical, food processing and wood working); (8) plant and machine operators and assemblers (including drivers); and (9) elementary occupations (including cleaners, helpers, agricultural, forestry and fishery, mining, construction, manufacturing and transport labourers) (Statistics Finland, 2016). Categories 1 to 4 are considered white-collar occupations by us, whereas blue-collar occupations comprise those in categories 5 to 9.

**Balanced and Optimal: Characteristics of WSs and WBW**

Well-being at work can be identified by job demands and job resources in the following theoretical models. The job strain model defines WBW as the balance between job decision latitude and job demands (Karasek & Theorell, 1990). The “job resources and demands” model (Bakker & Schaufeli, 2004; Demerouti, Bakker, Nachreiner & Schaufeli, 2001) classifies WBW by the balance between job demands (physical or mental) and job resources (physical or mental). Effort-reward balance theory defines WBW as the balance between intrinsic and extrinsic effort and rewards (Siegrist, 1996). Main resources are linking mainly to job conditions, leadership and management, the balance between work and family, the social capital and social interaction at the workplace, the work itself and for example personal characters (Hobfoll, 2002) and that they are correlating with work engagement (Bakker, Hakanen, Demerouti & Xanthopoulou, 2007; Xanthopoulou, Bakker, Demerouti & Schaufeli, 2009).

WBW is associated with better work ability, better work quality and fewer absences or leaves due to disease (Karasek & Theorell, 1990). An essential resource for WBW is social capital which reflects reciprocity, trust and societal values; employees also need to see rules and activity toward shared goals within the work community and desired outcomes of its business (see Figure 1) (Carayon, 2009; Chen, Wei, Wang & Pen, 2016; Luthans, Youssef & Avolio 2007). WBW is influenced by factors including work conditions, organisational position, communication between co-workers, individual physical and mental resources, positive interventions, recuperation from work stress and work-life balance (Demerouti et al., 2001). WBW can be associated with WS balance theory, i.e., if an acceptable holistic balance situation is not achievable by minimising the negative aspects of an element of WS, the desired WS balance should be improved by enhancing the positive contributions of the other elements to WS (Smith & Carayon, 2000) as can be seen in Figure 1, and according to Karasek & Theorell’s (1990) model of job strain. Social support was considered a psychosocial factor in Karasek & Theorell’s model; this can be an important dimension for enhancing WBW (Carayon, 2009; Karasek & Theorell, 1990).

Differences of experienced WBW among blue- and white-collar employees is further explained by the work challenges and features. White-collar jobs characteristically involve more autonomy and positively challenging tasks than blue-collar jobs which are essential features for WBW (Toppinen-Tanner, Kalimo & Mutanen, 2002). Role problems, interpersonal conflicts, cognitive and psychosocial workloads are the main reasons for work stress in white-collar jobs whereas high monotony and low control and autonomy are the main factors creating job strain and stress (Toppinen-Tanner et al. 2002).

A work system can generate both desired and undesired outcomes (see Figure 1). Therefore, it is important to analyse how WSs and their elements should be designed, balanced and managed optimally so that work is satisfactory for desired outcomes, employees in the focus, in the role of a subject or an object (Carayon & Smith, 2000). The interactive combination of the elements of a WS should be as productive, safe and high-quality as possible (cf. ISO, 2004; Väyrynen & Nevala, 2010). Absences from work or early retirement, which may result from injury or occupational diseases, cause considerable losses to employees, organisations and society. According to the principles of occupational
risk prevention, employees must be protected within the whole entity. Empowerment, which can be used as a mechanism for desired outcomes of WBW, must occur within and throughout the system. The control of undesired losses in the WS is linked to concepts such as safety culture and climate, human factors and ergonomics, as well as to a more concrete approach to safety management, including daily actions in every employee’s own part of the WS (e.g., Eeckelaert, Starren, van Scheppingen, Fox & Brück, 2011; Väyrynen et al., 2016). “Own part” includes, e.g., the role of autonomous learning (cf., Noe & Ellingson, 2017). One example of improving WBW could involve applying ergonomics knowledge the design of tools and workstations to improve usability. Whether tangible or intangible, WBW outcomes should be measurable for better information, control and management.

Psychosocial Factors and Social Skills

Work system modelling (Figure 1) is an optimal way to illustrate tangible physical or physiological issues at work, although intangible ones must also be included and evaluated. Intangible issues can predominantly be presented under the umbrella of psychosocial factors and social skills. Wilson & Haines (2000) identified the following driver to activate social and technical skills for desired outcomes at work: employees’ participation that build and enable motivation, competence and confidence.

Social skills play a central role in the workplace (Orgambidez-Ramos & Almeida, 2017), as well as within specific WSs. Social support from colleagues or supervisor is one important implication of well-functioning psychosocial interaction within WS (Orgambidez-Ramos & Almeida, 2017; Carayon, 2009). Open and fluent interactions increase functionality at work and enhance employee engagement and commitment (Harris & Sherblom, 1999; Kiema, Mäenpää, Leinonen & Soini, 2014; King, 2005). The quality of the supervisor-subordinate relationship has been shown to have a great impact on employee job satisfaction and well-being, reduced staff turnover and employee innovativeness (Graen & Uhl-Bien, 1995; Erdogan & Enders, 2007; Loi, Chan & Lam, 2013).

Research Focus and Objectives

We assume that higher numbers of the key indicators of some undesired features in blue-collar employees, such as sick leaves and accidental injuries, may be obvious due to the differences in many organisations between blue- and white-collar employees. In a way, an extreme part of “bad” WBW comprises physical and mechanical accidents, as well as diseases, that may be considered by many people as events encountered predominantly by blue-collar employees within their WSs, which have tangible risks. These circumstances often cause easily observable periods of absence. On contrary, accidents at home, like those during leisure and commuting, may happen among employees of all occupational groups.

The above mentioned real situation may also be one reason behind probable differences in the employees’ experiences of intangible indicators. For instance, the experienced-safety climate scores differed between blue- and white-collar employees of two chemical manufacturing plants within the same company (Bergh, 2011; Bergh, Shahriari & Kines, 2013). Safety climate is a useful concept for this study; it uses a psychological approach to safety culture (Eeckelaert et al., 2011). Safety is here seen as a fundamental prerequisite of WBW in the holistic approach (Anttonen & Räsänen, 2009) we presented in the Introduction. The Nordic Occupational Safety Climate Questionnaire (NOSACQ-50, 2012), consisting of 50 Likert-style statements related to respondent’s attitudes and experiences of the workplace, was used to evaluate the safety climate in that chemical manufacturing organisation. Eeckelaert et al. (2011) defined safety culture as the deeper, implicit convictions that are shared amongst the members of a group, and which are expressed through the safety climate, i.e., the shared experiences of workers regarding safety and their working environment (cf. Huang et al., 2015). The NOSACQ-50 (2012) has been used by various industries in many countries, including this case from the Swedish chemical process industry. The main differences observed in the safety climate of this Swedish chemical process industry site were the following: First, shift workers chose significantly lower Likert-scores on the NOSACQ-scales, indicating worse safety climate, than
daytime-only workers. The proximity of production lines, while shift-workers are obliged to work in their areas of the whole WS, was seen as another reason for the differences in experienced lower level of safety. Second, blue-collar employees had significantly lower ratings (p < .01) for many safety management dimensions than managers and supervisors (who represented typical white-collar staff). For the current study, we wanted to see whether one’s occupational group (blue- versus white-collar employees within the same enterprise), one’s role in the WS and in the organisation were related to differences in WBW, based on our indicators and WBW studies that emphasise safety climate and communication. We also wanted to check whether the phenomenon discussed in the section above is present (and if so, to what extent) in our own results, as well as in the statistics-based resources we gathered. So, the research questions were:

1. Do statistics about absence from work, accidents and retirement reveal possible differences, and their reasons, related to occupational group?
2. Are there differences in experienced indicators of WBW between blue- and white-collar employees in the workplaces of our study material, and if so, which differences are the biggest?
3. What kinds of indications about the differences are presented in the literature?

MATERIALS AND METHODS

First, we collected and reviewed quantitative statistical data from various literature sources, registers and records (see Study 1). We had access to official nationwide data of interest, or studies based on that, from Finland and Sweden, as well as EU data (mainly statistics regarding accidents, absence from work and retirement). Additionally, we used detailed data from large companies, including a metal processing company (Finland), and energy sector company (France).

Our study’s following materials were gathered from the case companies (N = 7) in the fields of manufacturing (of metal components or vehicles), mechanical engineering and various other services (telecommunication, industrial planning and construction, energy, transport). We used survey-style questionnaires as our data collection method, which were answered by approximately 3500 employees of all occupational categories. In the Studies 1 and 2 the respondents assessed their own WBW, based on their experiences of their own jobs. For the core material each respondent was asked to give his or her opinion (the degree of agreement) with presented statements (opinion or description) of a given WS or WBW condition. The choices ranged from 1 (strongly disagree) to 5 (strongly agree) (a five-point Likert scale to measure satisfaction (Allen & Seaman, 2007)). The field data were gathered during 2013 and 2014. The analysis took into account the WS’s characteristics and psychosocial conditions within. The six-case study (see Study 2) examined companies situated in northern Finland. Study 3 focused on one large company operating in all parts of Finland. Some results related Studies 1, 2 and 3 have been presented already in the earlier reports, but predominantly we analysed and discussed all here in a new way and for a new purpose (cf., Filippa, 2014; Kiema et al., 2014).

We used a large, diverse set of WBW indicators available for studying the aimed differences between blue- and white-collar employees, and presented it generally in the Introduction chapter and in details in Results chapter and in the Appendixes, comprising more than 100 single variables related to our multi-factorial approach to WBW. Approximately 10% of these factors were considered in Study 1; the allocations for Studies 2 and 3 were 20% and 70%, respectively. The close analysis and results presentation focused on occupational group-based differences in each of the three studies.

Study 1

For this study, we searched and used literature and published nationwide data from Finland and Sweden, as well as EU-wide data; this data concerned occupational accidents, especially causes and circumstances of the ones, absence from work and retirement (European Commission, 2009; TVK, 2016; Sysi-Aho, 2016; Laaksonen, Rantala, Järnefelt & Kannisto, 2016; Falkstedt, Backhans,
Lundin, Allebeck & Hemmingsson, 2014; Mänty et al., 2016; FIOH, 2017). We needed sources that described the occupational group of employees who had encountered accidents, too. Many sources lack this variable.

Further, the following aspect was an essential one for Study 1: Normally, like the above EU-wide analysis (European Commission, 2009), only accidents at work are dealt with, while our own study (Yrjämä-Huikuri & Väyrynen, 2015) and a French one we found (Verrier & Chevalier, 2007), takes into account the whole daily life of employees. So, not only accidents at workplace but as well all those ones from which both the employees and employers suffer need the consideration. Accidents at home, leisure accidents, and commuting accidents to and from workplace are important undesired outcomes though not directly related to WS causes but affecting WS and WBW indirectly. The corresponding total analysis of employees’ accidents is not so common, at least as what we as authors know.

**Study 2**

The study of which Study 2 is a part composed of many different empirical activities (Filppa, 2014; Kiema et al., 2014). First in the study, a survey within six companies was conducted to establish all employees’ experiences of features of their company’s WBW and WSs (N(statements) = 22, see Appendix A). Study 2 is predominantly based on this questionnaire survey. The questionnaire form consisted of questions about respondents’ background and included space for them to write their views or short descriptions about current situation at work and possible needs for developments of it. The answers of the blue- and white-collar employees were analysed to reveal how they separately felt about their WS, and specifically the communication and psychosocial factors related to WS and WBW.

The survey was conducted using a web-based form, but some respondents who did not have access to the Internet were given a paper form. The questionnaires were distributed to employees at different levels of the participating companies. Of the potential respondents (N = 658), 431 (66%) ones returned the form (364 blue- and 67 white-collars).

**Study 3**

Our third case study, Study 3, is based on studying empirically and extensively occupational safety (OS) and background and related issues of WS and WBW in Finnish rail transport and multiple of its cargo, service, construction, support, engineering, etc. activities. The goal of the project was to generate knowledge about OS, and attitudes related to it, of the workers and their superiors, and experts and upper management in a corporation, the dominating transportation operator in Finland. Key focuses included safety management, OS culture and climate, professional interactions and communication, holistic WBW and total quality management. The survey questionnaire for this study was distributed to the entire staff of the corporation, and approximately one-third (N = 3042) of staff members answered to it. Both blue- and white-collar employees participated in the study, so it was possible to examine the differences between them revealed by the survey. The questionnaire was available whether as printed form and via the Internet. In addition to the core OS issues (71 Likert-style questions, mainly statements about experienced OS and attitudes), the questionnaire also contained questions about respondents’ backgrounds, as well as questions concerning key matters of the corporation’s transport and other operations.

As members of the original research team, the authors further processed the data of survey questionnaire, specifically were analysed its key findings and their statistical significance, for the purposes of the current new study; i.e., to reveal the differences between blue- and white-collar employees in answers and opinions about OS culture, and WBW and WS in general.
RESULTS

Study 1

In Finland from 2005 to 2014, employees with a primary or secondary education spent more time on a disability pension than did people with a tertiary education in all disease categories that reduce ability to work (Laaksonen et al., 2016). Predominantly, blue-collar employees have only a primary or secondary education, without any further higher education, and typically their roles in WSs and organisations are linked to manual, operational tasks. Retirement statistics in Finland show that socioeconomic status, education level, occupational group and WS all influence retirement (Laaksonen et al., 2016). Frequent retirement due to disability pension is linked to more strenuous physical workload or occupational hazards (Laaksonen et al., 2016; Mänty et al., 2016). Regarding the neighbouring country of Sweden, Falkstedt et al. (2014) concluded that “…working conditions seem to partly explain the increased rate of disability pension among men and women with lower education even though this association does reflect considerable selection effects based on factors already present in late childhood.” High physical strain at work and low job control also both contributed to explaining the associations between low education and disability pensions in multivariable models (Falkstedt et al., 2014). The following factors may encapsulate sources of physical strain: (1) daily heavy lifts; (2) repetitive and one-sided work movements; (3) awkward work postures; (4) heavy shaking or vibrations; (5) daily perspiration from physical exertion; (6) contact with dirt; (7) deafening noise; (8) risk of exposure to accidents.

With regard to work absences and accidents vs. occupational group within organisation, we found the following report: The average number of work absences in Finnish municipalities for white-collar workers is around half the average for blue-collar workers who perform physical tasks (FIOH, 2017). The average annual days of absence from work in various occupations within Finnish municipalities, employing hundreds of thousands of individuals, are as follows:

- 11 days for managers and professionals;
- 16 days for office clerks or corresponding assisting professions;
- 23 days for labourers of physical tasks or employees carrying out direct provision of services.

Occupations and WSs that are typically blue-collar are clearly linked to a higher incidence of injuries from accidents, as shown in EU-wide analysis (European Commission, 2009), in Finnish studies (Yrjämä-Huikuri & Väyrynen, 2015; Sysi-Aho, 2016; TVK, 2016) and in a French company case study description (Verrier & Chevalier, 2007).

European Commission (2009) reports the following:

For example, construction companies do not only employ building workers, but also engineers and office clerks. Occupation therefore provides a more accurate reflection of potential risks at work. For both fatal and non-fatal accidents at work, the highest incidence rates were observed for industrial and agricultural workers. Around 75% of fatal accidents and 68% of non-fatal accidents occurred among ‘craft and related trades workers’, ‘machine operators’ or workers employed in an ‘elementary occupation’. At a more detailed level of classification, the incidence rate for non-fatal accidents at work was highest among ‘labourers in mining, construction, manufacturing and transport’, ‘stationary and mobile-plant operators’ and ‘extraction and building trade workers’. (p. 26)

The incidence rate for the employees classified according to the last lines of the above quote typically reaches values up to 2.5 times as high as the amount for all occupations on average (around 2700 accidents with more than three days of absence per 100,000 employees). Sysi-Aho (2016) has concluded that almost equal occupations or branches of business show the highest numbers in Finland, alike to the EU numbers above.

Regarding the home and leisure injuries of people employed by the large energy sector company in France (47,681 employees), Verrier & Chevalier (2007) reported that the risk of injuries was higher among men than women (RR = 1.3, (a relative risk estimate)); among men, the risk was
five times higher among operating employees (i.e., blue-collar workers) than managers (i.e., white-collar workers). The difference in risk was similar for the company’s employees during work hours (Verrier & Chevalier, 2007), regarding the control of accidents the authors conclude: “… analysis of the behavioural factors of injuries led us to propose programs aimed at changing the risk behaviours related to do-it-yourself, stairs falls and gardening.”

Quite similarly, Yrjämä-Huikuri & Väyrynen (2015) analysed all accidents at the large Finnish metal processing company (years 2009-2013). In their study, an accident constituted one or more day’s absence from work. The analyses showed that accident risk was statistically significantly lower during time at the workplace than during time spent commuting, or during home and leisure time. Accident rates among staff, production workers (i.e., blue-collar workers) and supervisors, including experts (i.e., white-collar workers), were compared based on the RR statistic (Yrjämä-Huikuri & Väyrynen, 2015): The estimated RR statistic (metal processing company, year 2012, N(employees) = 3119) shows that the incidence of injurious home and leisure accidents was relatively higher for blue-collar employees than for white-collar employees (3.7). The corresponding relative risk RR statistic for accidents at work was 9.2.

The statistics and studies show endless amount of details of accidents and injuries. In Finland, most fatal accidents are specially investigated utilising a research-like, so-called TOT investigation procedure (TVK, 2017): Finnish Workers’ Compensation Center’s (TVK) TOT reports show the dominance of the blue-collars, while including 50 last cases between 2010-2018(early), only 3 of them concerned white-collar employees (managers or entrepreneurs) as victims. TVK’s research as well describes the following: ”In the oldest age groups (over 60 years) accident frequency was higher than among middle-aged employees. Employees older than the pension age (63 years) had a higher accident frequency; 36% higher than that of the 50–55 year age group, which had the lowest accident frequency. The accidents of the oldest age group were also more often serious.” (Salminen, Heinonen, & Sysi-Aho, 2016. In addition to the variable age, the variable gender causes differences: workplace accidents happen most often to men (62%) whereas accidents related commuting to and from workplace are predominantly a problem of women (68%) (TVK, 2018). The same source describes the final injuring mechanisms that comprise, in order of frequency (5 of them): horizontal or vertical impact with or against a stationery object (the victim is in motion); physical or mental stress; contact with sharp, pointed, rough, coarse material agent; trapped, crushed, etc.; struck by object in motion, collision with. The authors did not have opportunities, based on the published general sources, to clarify how the occupational group affects the distribution of the most ones of the above listed important variables.

Study 2

Appendix A shows the individual items of the questionnaire, with the means and standard deviations for each item, listed separately for blue- and white-collar employees. As a whole, white-collar respondents gave higher assessments, i.e., agreed more, on the Likert scale 1…5 than blue-collar respondents. The means were 3.8 and 3.4, respectively.

Table 1 shows the distribution of the scores of the experience-based five-point Likert scale assessments for each of 11 statements given by each blue-collar (N=364) and white-collar (N=67) employee (N(total) = 431) from each of the six companies in the case study. The more in-depth analysis was of 22 statements in which the difference (measured as mean) was the biggest between the two analysed employee categories (compare with Appendix A). The Chi-square statistic, calculated from cell frequencies of the Table 1, shows a statistically significant difference between the assessments of blue- and white-collar employees.

Figure 2 shows the mean Likert scores (y-axis) from experience-based assessments of 22 statements for blue-collar (N=364) and white-collar (N=67) employees (N(total) = 431) in the six different companies of the case study (x-axis). Analysis of variance for revealing the effect of employee category (blue- or white-collar) and company was carried out (Table 2). The employee
category had a significant statistical effect on Likert scale scoring; i.e. white-collar employees chose higher scores \((p<0.05)\) than blue-collar employees, although the small number of respondents from Company 3 did not show any difference at all. The company has effect but not enough to reach the level of statistical significance.

The five biggest differences between blue- and white-collar employees, in order of magnitude, were the following (cf. Appendix A, in all these five comparisons white-collars gave higher scores than blue-collars). The differences in parentheses show the difference in the mean scores between blue- and white-collar employees.

Statement 20: I get enough opportunities to participate in the training needed. \((0.9)\)
Statement 16: I get enough opportunities to take part in the development of workplace issues. \((0.8)\)
Statement 22: I am active in communication about my workplace. \((0.6)\)
Statement 5: Interaction with customers works well. \((0.6)\)
Statement 19: I can put forward ideas that aim to improve the product or working methods. \((0.5)\)
Overall, blue-collar employees seem to be less active in contributing to developmental activities: they may feel that they need a better knowledge base, a more active role and more opportunities in order to give ideas for improvements. On the other hand, only a small difference was found between blue- and white-collar employee responses regarding the straightforward contacts and communication between colleagues, the role of enabling meetings and management, and job conditions provided by the company (cf. Appendix A).

Study 3

Appendix B shows the WBW-related items of the questionnaire that revealed the biggest differences between blue- and white-collar employees, as well as the mean values for each item. The items are categorised into two groups: (1) those with the biggest difference in mean values, ranging from 0.8 to 0.2; and (2) the employee category (blue- or white-collar) that gave higher responses (higher Likert scores on the scale 1...5).

Figure 3 is an illustration based on Appendix B, and shows the statements with the biggest differences between blue- and white-collar employees. Examples of the statements of this figure included: The problems are not stuck to until something happens; I am an active actor in the development of my work and workplace; The frequency of accidents in my job is too high; Rushing my tasks affects occupational safety; Safety is a part of general quality in our activities; Accidents and disturbances are actually totally useless events.

DISCUSSION

Safety Performance and Other Statistics-Based Findings

According to Study 1, more frequent early retirement due to disability to work pension is linked to more strenuous physical workload or more occupational environmental hazards, and both of these risks are typical in blue-collar employees. In the same way, Study 1 showed that incidences of accidents at work and absences from work were clearly more common in blue-collars than white-collars within work organisations. Our examples from literature present evidence that the above phenomena can be alleviated, and many means for that are theoretically very near to the issues we see important for
optimal WS with more minimal amount of the causes for real undesired features related to decreased WBW. The Introduction emphasises especially the following issues linked with achieving good results in prevention of the phenomena listed: knowing in detailed way the WS in question, enhancing information and communication processes, and involving all in organisation for developments in risk management. More and more often all shall include supplying companies’ employees and HSEQ enablers for them (e.g., Väyrynen et al., 2016).

For progress, the importance of a lot of knowledge within organisation and its management is seen as a general key by Knardahl et al. (2017), Leino, Elfving & Ballard (2010) and McKinnon (2016), too. In detailed views, e.g., observation of factors related to safety and other WS factors by all employees, and discussion-based (e.g., “tool box” meetings), and further improving WS to prevent or alleviate risks is emphasised (Levitt & Samelson, 1993; Van der Schaaf, 1991). Actually, this can be called one of concrete core features of safety culture (NSC, 2013; Reason, 1991). Construction sector is a concrete example of positive culture change cases within industries though blue-collar jobs and demanding WSs traditionally define the whole sector. For instance, between 2005 and 2009, one of the biggest construction companies in Finland, with 2900 employees, improved its safety performance dramatically, and its accident rate decreased from 57 to 9 accidents per million work hours (Leino et al., 2010).

We propose that many kinds of different new analyses or discussions related to accidents vs. occupational group should as well be carried out: for instance, the ones that are dealing with
• Strategy, financial effects (cf., Reiman, Räisänen, Väyrynen, & Autio, 2018; FIOH, 2018)
• Type of boss (cf., Mellish, 2017)
• Autonomous learning as an approach for safety promotion instead of just attending formal training, courses, development events, and programmes (cf., Noe & Ellingson, 2017)
• Just culture (cf., Dekker, 2007)
• Participatory, psychosocial intervention was not always “a straight way” to successful results only (cf. Gupta, Wählin-Jacobsen, Abildgaard, Henriksen, Nielsen, & Holtermann, 2018)

Information and communication (IC) as general topics are closely linked with the above safety knowledge, but as well, e.g., competence, wisdom, social and technical skills, discussion, interaction, feedback, various concrete means of instruction and communication, IC technology, motivation, and creating and maintaining confidence comprise essential ones (Crawford, Davis, Walker, Cowie & Ritchie, 2017; Glendon, Clarke & McKenna, 2006; Kath, Magley & Marmet, 2010).

The last-mentioned confidence is a key to success in utilising participation (Wilson & Haines, 2000). Employee participation, psychosocial and organisational mechanism, is generally recommended and results of it presented (Rajala & Väyrynen, 2013; Vinodkumar & Bhasi, 2010).

Findings-Based Experiences

The biggest differences in the indicators of WBW experienced by the blue- vs. white-collar employees in manufacturing and engineering companies were associated with the following themes: participation in training and development within the organisation, professional communication in the workplace, the ability to put forward ideas, and level of interaction with customers.

In a large rail transport corporation with many divisions and a wide spectrum of occupations, employees experienced that improvement occurs only after something undesired happens. Our results also revealed that blue-collar employees considered their collaboration with superiors weaker than white-collar employees did. White-collar employees found their own role in WBW more important than blue-collar employees did. Blue-collar workers considered WBW part of the organisational strategy, whereas white-collar workers considered WBW a component of self-management. Blue-collar employees considered active participation in the organisation more important than white-collar employees did.

The findings show that the biggest differences between blue- and white-collar employees relate to involvement in organisational activities and management, decision-making and developmental action within the WS (cf., “I am an active actor in the development of work and workplace”). The differences between blue-collar and white-collar employees seem, on the other hand, to be revealed by increased work absences, accidents and early retirement, related to occupational and organisational features. These features are predominantly due to physical strenuousness within a WS that is typical of certain sectors’ jobs. However, due to a wide variety of nuances related to WBW, the study of effective solutions should be careful and well considered.

Further Key Arguments

We analysed the results to determine the reasons, which were found to be as well psychosocial, behind these observed differences. We wanted to see whether and how management is able to enhance WBW as we know how management has clear impact on WPW (Proudfoot, Corr, Guest & Dunn, 2009). A growing body of research indicates that a large number of problems in work settings are related to job stress and burnout (Harnois & Gabriel, 2000; Rousseau, Aube, Chiocchio, Boudrias & Morin, 2008) which are resulting from social interaction (Schaufeli & Peeters, 2000). Social and communication skills are associated with two indicators of psychological well-being as part of WBW: reduced symptoms of depression and increased life satisfaction (Segrin & Rynes, 2009). Current research has also shown that fluent internal communication is associated with commitment, discretionary effort and meaningful work, which can all be seen as factors of work engagement (Hayase, 2009;
Schaufeli & Bakker, 2004). Juvani et al. (2016) emphasised the importance of organisational justice in the workplace. Organisational justice is similar to confidence or trust (cf. Wilson & Haines, 2000). Juvani et al. (2016) found that “supervisors’ fair treatment of employees and fair decision-making in the organisations are associated with a decreased risk of disability pensioning from all causes, depression and musculoskeletal diseases.”

As pioneers of the concept of WS within a scientific context, Smith & Carayon (2000) stated that when an acceptable balance is not achievable, able to be compensated, through minimising negative aspects within a WS, the whole system should be improved by enhancing the positive aspects. This suggestion could be realised more frequently in solutions, by utilising the standards of good practices at work organisations (ISO, 2011; ISO, 2016a). Blue-collar jobs do not inevitably mean worse work conditions and experiences of work that are more negative than those of white-collar employees – a lot of means for improvements exist. Our definition of WS with added functional enablers provides the essential elements and variables for comprehensive analysis.

We have found many links between WS modelling and especially the following: holistic thinking, considering both the body and mind, potential enablers for both success and risks, undesired over- or under-load, excess stress and strain, sustainability, responsibility, and stakeholders (cf., Edwards & Jensen, 2014; ISO, 2016b; Marras & Hancock, 2014; Rocha, Mollo & Daniellou, 2015; Zeilstra & van der Weide, 2013; Zink & Fischer, 2013; Sparer Catalano, Herrick & Dennerlein, 2016; Väyrynen et al., 2016). Regarding company stakeholders, we propose that both blue- and white-collar employees will be remembered in a way that enables progress in their specific areas we think we were able to reveal. How can the in our study presented situation be seen by other stakeholders like the state, municipalities, and various institutions within insurance sector?

The differences between blue- and white-collars’ experiences, and in real undesired outcomes related to WBW and WSs, should and can be diminished. Early retirement, occupational diseases and injuries cause not only human suffering and losses but as well high costs to the other stakeholders than the employers and employees in question.

We propose that experienced WBW for different employee groups should be measured using multi-criteria factors, such as the Likert scales used in this study. In addition to the statistics of the organisation, national statistics can be a useful source in studying the differences between occupational groups, blue- and white-collar employees. Actions should be taken within the WS to comprehensively improve work conditions, and to improve leadership as it relates to psychosocial conditions and culture of all.
REFERENCES


APPENDIX A. GRAPH FOR STATEMENT QUESTIONNAIRE IN STUDY 2

Figure 4. Mean scores and standard deviations for the statement questionnaire in Study 2 (N = 431). Mean scores are based on the experience-based five-point Likert scale responses to 22 statements for blue-collar (blue line, N=364) and white-collar (red line, N=67) employees (N(total) = 431) in all companies in the case study.
### APPENDIX B. ATTITUDES ON WBW, ESPECIALLY SAFETY

**Figure 5. Attitudes on WBW, especially safety (study 3)**

<table>
<thead>
<tr>
<th>The biggest differences in the means of Likert-scale assessments</th>
<th>The Likert-scored value bigger in the employee category</th>
</tr>
</thead>
<tbody>
<tr>
<td>N(blue-collar) = 1840 (60.5%); N(white-collar) = 1202 (39.5%); N(total) = 3042</td>
<td></td>
</tr>
<tr>
<td>x̄ mean is mean (total), i.e. calculated for all respondents (N = 3042)</td>
<td></td>
</tr>
<tr>
<td>The difference in Likert distribution in all of these statements is statistically significant (Chi-square test, p &lt; 0.05, despite nos 32 and 42)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0.8</th>
<th>0.7</th>
<th>0.6</th>
<th>0.5</th>
<th>0.4</th>
<th>0.3</th>
<th>0.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Problems are not stuck to until something happens (x̄ mean = 2.9)</td>
<td>66 While working I meet unfair treatment (2.6)</td>
<td>20 Emphasising quality is not an issue in the actual work (2.1)</td>
<td>16 Accidents and disturbances are actually totally useless events (2.7)</td>
<td>13 I think the public image of our safety is negative (2.2)</td>
<td>4 Guidelines and principles of work are clear at my work place (3.7)</td>
<td>2 I think our work climate overemphasises safety (2.6)</td>
</tr>
<tr>
<td>10 Managers' and foremen's example related to safety is powerful (3.8)</td>
<td>Blue-collar</td>
<td>White-collar</td>
<td>Blue-collar</td>
<td>Blue-collar</td>
<td>White-collar</td>
<td>Blue-collar</td>
</tr>
<tr>
<td>23 Rushing my tasks affects occupational safety (3.6)</td>
<td>Blue-collar</td>
<td>Blue-collar</td>
<td>Blue-collar</td>
<td>Blue-collar</td>
<td>White-collar</td>
<td>Blue-collar</td>
</tr>
<tr>
<td>65 Violence or the threat of it is often a risk factor in our job (2.1)</td>
<td>Blue-collar</td>
<td></td>
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<tr>
<td>8. Problems are not stuck to until something happens (x̄ mean = 2.9)</td>
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<td>2 I think our work climate overemphasises safety (2.6)</td>
</tr>
<tr>
<td>22 Due to rushing I neglect safety (3.3)</td>
<td>22 Due to rushing I neglect safety (3.3)</td>
<td>32 Improving tools means effective accident prevention (4.6)</td>
<td>34 I think prevention of accidents is an essential part of my professional skills (4.3)</td>
<td>35 I find that decreasing of carelessness is needed, and by intervening risk taking (4.5)</td>
<td>42 I think safety promotion is more successful throughout recompensing than punishing (4.5)</td>
<td>45 My safety actions are based on skills I have learned, and routines (4.1)</td>
</tr>
<tr>
<td>23 Rushing my tasks affects occupational safety (3.6)</td>
<td>Blue-collar</td>
<td>Blue-collar</td>
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</table>

The results are presented in a Likert scale format, where higher scores indicate a stronger belief in the statement. The differences in mean scores are statistically significant, highlighting the varying attitudes towards workplace safety among blue-collar and white-collar workers.
Seppo Väyrynen is a Professor of Work Science at the University of Oulu, Oulu. His other former employers comprise the Finnish Institute of Occupational Health, for 12 years, and the Academy of Finland. He has master’s and doctor’s degrees in Engineering, the theses for which were addressed innovative working environment and ergonomics development, being linked to engineering design and management. In addition to heading a group of researchers and teachers connected with Industrial Engineering and Management, and supervising doctoral students, he has taught various courses of ergonomics, human factors, usability and safety at the Faculty of Technology. His main research interests include user-centred design, participatory approaches to design and management, organisational development, safety-conscious design, safety management, integrated management systems (HSEQ), corporate social responsibility and quality of working life. He has published around 400 scientific or professional articles and book chapters.

Heli Kiema-Junes works as a University Teacher at the Research Unit of Psychology at the faculty of Education/University of Oulu since 2011. Previously she has worked as workplace coach/developer in a small company in Oulu. She has graduated 2010 in educational psychology with master thesis “human resource management – implementing the tacit signal method in organisation performance” and is now finishing the doctoral thesis with subject “counselling and communication skills in psychological well-being”. Her research is dealing with well-being at work and in higher education and the role of social skills in increasing engagement and decreasing burnout. She teaches courses in general psychology and in education psychology especially developmental and organisational psychology.