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Elma Mulaomerovic, Eric Min-yang Wang & Milivoj Markovic. *The influence of cultural dimensions when implementing fun in the workplace approach as a driver of creativity*. Pages: 1243-1253.

Creativity is essential for success in business, especially in the contemporary world where innovations are a cornerstone of competitive advantage. A large body of literature has examined many factors which influence creative abilities with the work environment being the factor of increasing importance. Creativity has been associated with the work environment through a number of theoretical frameworks and empirical studies. However, the relationship between the work environment and creativity in different cultures has not been explored sufficiently. This paper addresses this gap in the literature by linking the concept of a creativity-supporting work environment and culture. To that end, elements of the work environment (physical, socio-organisational, and fun in the workplace) and creative personality have been analysed on multinational samples. The results clearly point that the relationship exists between dimensions of the national culture (individualism, uncertainty avoidance, masculinity, and power distance) and specific elements of a creativity-supporting work environment. **Practitioner summary:** Companies experience high pressure for generating creative ideas. As a result, stimulating employees' creativity has become a key strategic aim. This study, through cross-cultural primary research, provides clear managerial implications and practical advice for successful implementation and quality adoption of the creativity-supporting work environment worldwide.

- **Keywords:** Work environment, creativity, cross-cultural research, fun in the workplace

Michael A. Greig, Judy Village, Shane M. Dixon, Filippo A. Salustri & W. Patrick Neumann. *Assessing human factors and ergonomics capability in organisations – the Human Factors Integration Toolset*. Pages: 1254-1272.

This paper presents the development of a tool that allows an organisation to assess its level of human factors (HF) and ergonomics integration and maturity within the organisation. The Human Factors Integration Toolset (available at:

<https://www.researchgate.net/project/Human-Factors-Integration-Toolset>) has been developed and validated through a series of workshops with 45 participants from industry and academia and through industry partnered field-testing. HF maturity is assessed across five levels in 16 organisational functions based on any of 31 discrete elements contributing to HF. Summing element scores in a function determines a percent of ideal HF for the function. Industry stakeholders engaged in field-testing found the tool helped to establish the status of HF in the organisation, plan projects to further develop HF capabilities, and initiate discussions on HF for performance and well-being. Improvement suggestions included adding an IT function, refining the language for non-HF specialists, including knowledge work and creating a digital version to improve usability. **Practitioner summary:** A tool scoring HF capability in 16 organisation functions has been developed collaboratively. Industry stakeholders expressed a need for the tool and provided validation of tool design decisions. Field-testing improved tool usability and showed that beyond scoring HF capability, the tool created opportunities for discussions of HF-related improvement possibilities.

- **Keywords:** Macroergonomics, ergonomics strategy, organisational design and management, process management, operations management

Peter E. D. Love, Pauline Teo, Jim Smith, Fran Ackermann & Ying Zhou. *The nature and severity of workplace injuries in construction: engendering operational benchmarking.* Pages: 1273-1288.

To remain competitive and manage their safety performance, many construction organisations have engaged in benchmarking themselves against lagging indicators provided by a statutory body. Aggregated metrics that are provided by statutory bodies are not useful for the purpose of operational benchmarking, as 'best practice' is unable to be identified. Access to safety statistics from leading construction organisations' projects is seldom made available for the purposes of benchmarking. In addressing this void and to engender a process of operational benchmarking, a homogeneous dataset is used to examine 26,665 workplace injuries that arose during the delivery of 562 projects over a 10-year period by a leading international Australian construction organisation. The nature and the degree of severity of the injuries that arose are statistically analysed. The findings provide invaluable insights into issues contributing to workplace injuries during construction, which can be used as a basis for operational benchmarking and a platform for engaging in continuous improvement. **Practitioner summary:** Workplace injuries are a problem in construction. Recognising that safety is a key goal for construction organisations, we analyse the nature of workplace injuries that occurred in 562 projects. Acknowledging the challenges of using lagging indicators, an operational framework for engendering best practice in workplace safety is presented.

- **Keywords:** Construction, learning, operational benchmarking, safety, workplace injuries

Kaifeng Liu, Calvin K. L. Or & Simon Y. W. Li. *Visual differentiation and recognition memory of look-alike drug names: effects of disfluent format, text enhancement and exposure time.* Pages: 1289-1300.

Three computer-based experiments were conducted to examine whether disfluent format, enhanced text, and increased exposure time improve the accuracy of visual differentiation and recognition memory of look-alike drug names. A three-way, repeated-measures look-alike drug name differentiation test assessed the visual differentiation accuracy of 30 nursing students (Experiment 1) and 15 nurses (Experiment 2). A two-way, repeated-measures recognition memory test examined the recognition memory accuracy of 15 nurses for look-alike drug names (Experiment 3). We found that making drug names disfluent did not significantly improve differentiation (Experiment 2) or memory accuracy (Experiment 3), but even impaired differentiation accuracy

(Experiment 1). Enhanced text and longer exposure time significantly improved differentiation accuracy (Experiments 1 and 2). However, the enhanced text did not improve recognition memory (Experiment 3). We suggest that making look-alike drug names disfluent is not favourable. Enhanced text and longer exposure times are effective in supporting visual differentiation of look-alike drug names. **Practitioner Summary:** Confusion arising from look-alike drug names may compromise patient safety. Three experiments examined the effects of disfluent format, text enhancement and increased exposure time on visual and memory performances. Making drug names more difficult to read did not improve performance. Enhancing text design and increasing exposure (i.e. reading) time improved visual differentiation between medications, but did not improve the recognition of medications from memory.

- **Keywords:** Look-alike drug names, disfluent format, text enhancement, exposure time, drug safety

Diana Rossi, Filippo Marciano & Paolo Cabassa. *A multi-criteria methodology for evaluating alternative ultrasound devices.* Pages: 1301-1312.

Several surveys and clinical studies report high prevalence of work-related musculoskeletal disorders (WMSDs) among sonographers and sonologists. Better performing ultrasound devices can increase the number and quality of examinations, but also reduce the user comfort and increase the risk of WMSDs. This should lead the choice of the device to buy and use. To support hospitals or diagnostic centres in selecting the best ultrasound device, this study provides a structured methodology based on a multi-criteria approach, the Analytic Hierarchy Process. It has a Goal (to optimise workers' well-being and satisfy company production objectives) and 45 evaluation elements. It was applied in an Italian hospital comparing 3 alternatives: wireless, portable, and cart-based. The latter proved to be the best in satisfying the Goal, whereas a previous study obtained that the wireless device was preferable considering only the ergonomic point of view. The case study validated the applicability of the methodology. **Practitioner summary:** This paper provides the decision-makers of hospitals or diagnostic centres with a multi-criteria methodology to select the best ultrasound device capable of optimising workers' well-being and satisfying company production objectives. The methodology can also support manufacturers of ultrasound devices in improving their products.

- **Keywords:** Sonographer, sonologist, wireless transducer, AHP, human factors

Dominique Larouche, Philippe Corbeil, Marie Bellemare, Marie Authier, Jérôme Prairie & Sandrine Hegg-Deloye. *To what extent do paramedics apply safe handling principles when transferring patients from stair chairs to stretchers?* Pages: 1313-1326.

The efficiency of training programmes in handling designed to prevent injuries has rarely been demonstrated by studies in the workplace. This study aimed to identify factors that may favour or inhibit the application of safe handling principles by paramedics performing full-body transfers of patients from a stair chair to a stretcher. In an observational field study, handling methods used in 45 patient transfers from a stair chair to stretcher were characterised. Principles concerning the physical environment seem to be applied frequently, but those applicable during the transfer are neglected. Principles taught during training may not be applied due to the physical constraints of the workplace and the underestimation of risk exposure. The results suggest that training should be enhanced, not by focussing on handling techniques but by focussing on compromise and the capacity to adapt work techniques based on the working context and the team-mate. To assess safe handling principles applied by paramedics

transferring patients from stair chairs to stretchers, an observational field study and a posteriori analysis were conducted. The results suggest that training should focus more on the ability to adapt work techniques according to the work context and the team-mate.

- **Keywords:** Prehospital emergency care, training, safe patient handling, observational study, patient transfer

Jason Bouffard, Romain Martinez, André Plamondon, Julie N. Côté & Mickaël Begon. *Sex differences in glenohumeral muscle activation and coactivation during a box lifting task.* Pages: 1327-1338.

Manual material handling is associated with shoulder musculoskeletal disorders, especially for women. Sex differences in glenohumeral muscle activity may contribute to women's higher injury risk by affecting shoulder load and stability. We assessed the effects of sex (25 women vs 26 men) and lifting load (6 kg vs 12 kg) on muscle activation during box lifting from hip to eye level. Surface and intramuscular electromyography were recorded from 10 glenohumeral muscles. Most muscles were more activated for the heavier box and for women. These effects were larger for 'prime movers' than for stabilisers and antagonists. Despite their apparently heterogeneous effects on muscle activity, sex and mass did not affect Muscle Focus, a metric of coactivation. This may be partly related to the limited sensitivity of the Muscle Focus. Nevertheless, sex differences in strength, more than in coactivation patterns, may contribute to the sex imbalance in the prevalence of musculoskeletal disorders. **Practitioner summary:** We studied sex differences in glenohumeral muscle activity in a lifting task to eye level. Women lifting a 6-kg box activated their muscles similarly to men lifting a 12-kg box, i.e. up to 48% of their maximum capacity. Interventions minimising shoulder load should be implemented, especially for women.

- **Keywords:** Shoulder, manual material handling, occupational biomechanics, electromyography, gender

Jackie D. Zehr, Liana M. Tennant & Jack P. Callaghan. *Examining endplate fatigue failure during cyclic compression loading with variable and consistent peak magnitudes using a force weighting adjustment approach: an in vitro study.* Pages: 1339-1348.

Repetitive movement is common in many occupational contexts. Therefore, cumulative load is a widely recognised risk factor for lowback injury. This study quantified the effect of force weighting factors on cumulative load estimates and injury prediction during cyclic loading. Forty-eight porcine cervical spine motion segments were assigned to experimental groups that differed by average peak compression magnitude (30%, 50% and 70% of predicted tolerance) and amplitude variation (consistent, variable). Cyclic loading was performed at a frequency of 0.5 Hz until fatigue failure occurred. Weighting factors were determined and applied instantaneously. Inclusion of weighting factors resulted in statistically similar cumulative load estimates at injury between variable and consistent loading ($p > .071$). Further, survivorship was generally greater when the peak compression magnitude was consistent compared to variable. These results emphasise the importance of weighting factors as an equalisation tool for the evaluation of cumulative low back loading exposures in occupational contexts. **Practitioner summary:** Weighting factors can equalise the risk of injury based on compression magnitude. When weighted, the cumulative compression was similar between consistent and variable cyclic loading protocols, despite being significantly different when unweighted and having similar injury rates. Therefore, assessing representative occupational exposures without evaluating task performance variability may underestimate injury risk.

- **Keywords:** Cumulative load, weighting factor, compression, endplate, loading pattern

Ben Schram, Robin Orr, Ben Hinton, Rodney Pope & Geoff Norris. *The effects of body armour on the power development and agility of police officers.* Pages: 1349-1356.

A study was conducted in which 11 police officers wore one of three different types of Individual Light Armour Vests (ILAV), or normal station wear, for an entire day while completing power and agility-based tasks including a vertical jump (VJ), agility test, 20 m sprint and counter movement jump (CMJ). Despite all three ILAVs being significantly ($p < .05$) heavier than normal station wear, there were no significant differences between any of the ILAVs in VJ, time to complete the agility test, 20 m sprint time, peak force, velocity, power and jump distance in the CMJ. There was a significantly ($p < .05$) higher mean force produced in the CMJ while wearing all three ILAVs. The ILAV's investigated do not appear to be heavy enough to significantly affect the power or agility of police officers. The utilisation of ILAVs by police officers does not appear to hinder policing tasks that involve agility or power development. **Practitioner summary:** The addition of the extra load of military-styled body armour is known to decrease performance and mobility. When compared to normal station wear, the wearing of three different ILAV types used in policing do not appear to be heavy enough to affect the power or agility of police officers.

- **Keywords:** Law enforcement, load, personal protective equipment, occupational health and safety

Monica L. H. Jones, Victor C. Le, Sheila M. Ebert, Kathleen H. Sienko, Matthew P. Reed & James R. Sayer. *Motion sickness in passenger vehicles during test track operations.* Pages: 1357-1371.

As automation transforms drivers into passengers, the deployment of automated vehicles (AVs) has the potential to greatly increase the incidence of motion sickness. A study was conducted to quantify motion sickness response of front-seat passengers performing ecologically relevant passenger activities during conditions consistent with driving on public roadways. Fifty-two adults with a large range of self-reported levels of motion sickness susceptibility and age participated in data collection on a closed test track in a passenger sedan. Motion sickness ratings increased with task vs. no-task and moderate vs. low acceleration test conditions. Increased motion sickness susceptibility was associated with higher motion sickness ratings. In comparison to older participants (age > 60), younger participants (age < 60) experienced increased motion sickness. This is the first in-vehicle study that systematically compared normative passenger activities and acceleration magnitudes typical of normative driving conditions on motion sickness response for a large, diverse sample of passengers, enabling the exploration of the effects of covariates. **Practitioner summary:** The data demonstrate that a relatively large range of motion sickness response can be expected to result from passengers performing visual tasks in passenger vehicles. Measurement and modelling efforts should seek to elucidate relationships among the factors contributing to motion sickness for the purpose of informing and prioritising future countermeasures for automated vehicles (AVs).

- **Keywords:** Motion sickness, vehicle acceleration, passenger activities, automated vehicles