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Sarah E. Williams, Dawn M. Sarno, Joanna E. Lewis, Mindy K. Shoss, Mark B. Neider & Corey J. Bohil. *The psychological interaction of spam email features*. Pages: 983-994.

This study explored distinct perceptual and decisional contributions to spam email mental construal. Participants classified spam emails according to pairings of three stimulus features – presence or absence of awkward prose, abnormal message structure, and implausible premise. We examined dimensional interactions within general recognition theory (GRT; a multidimensional extension of signal detection theory). Classification accuracy was highest for categories containing either two non-normal dimension levels (e.g. awkward prose and implausible premise) or two normal dimension levels (e.g. normal prose and plausible premise). Modelling indicated both perceptual and decisional contributions to classification responding. In most cases, perceptual discriminability was higher along one dimension when stimuli contained a non-normal level of the paired dimension (e.g. prose discriminability was higher with abnormal structure). Similarly, decision criteria along one dimension were biased in favour of the non-normal response when stimuli contained a non-normal level of the paired dimension. Potential applications for training are discussed. **Practitioner summary:** We applied general recognition theory (i.e. multivariate signal detection theory) to spam email classification at low or high levels of three stimulus dimensions: premise plausibility, prose quality, and email structure. Relevant to training, this approach helped identify perceptual and decisional biases that could be leveraged to individualise training.

- **Keywords:** Spam email, spam features, spam judgment, spam attention, phishing judgment

Olga Kombeiz & Erik Dietl. *Light as a positive situational cue at work: Satisfaction with light relates to judgements of other's warmth and competence*. Pages: 995-1007.

Workplace illumination is known to impact mood, performance and decision-making. Based on the idea that positive feelings associated with light might influence social judgements in workplaces, we propose that satisfaction with light as a specific affective response to light would lead to positive judgements of other individuals. In a laboratory

experiment ($N = 164$), participants assessed their satisfaction with light and rated other person's faces on warmth and competence. Results showed that satisfaction with light positively influenced judgement of others. We replicated the positive relation between satisfaction with light and social judgements in a field study with employees ($N = 176$). These findings highlight the importance of satisfaction with light for social judgement in workplaces. We discuss theoretical contributions and practical implications concerning the design of settings involving the evaluation of other individuals. **Practitioner Summary:** The design of work settings where the evaluation of others takes place is an important topic. A laboratory experiment and a field study demonstrate that satisfaction with workplace illumination influences judgements of others. The results provide interesting possibilities for the design of work settings that involve the evaluation of others.

- **Keywords:** Light, satisfaction with light, social judgement, warmth, competence

Susanna Mixter, Svend Erik Mathiassen & David Hallman. [Alternations between physical and cognitive tasks in repetitive work – effect of cognitive task difficulty on fatigue development in women](#). Pages: 1008-1022.

In a context of job rotation, this study determined the extent to which the difficulty of a cognitive task (CT) interspersed between bouts of repetitive, low-intensity work (pipetting) influences recovery from fatigue. Fifteen participants performed three experimental sessions, each comprising 10 repeats of a 7 min + 3 min combination of pipetting and CT. The CT was easy, moderate or hard. Surface electromyography (EMG amplitude of the forearm extensor and trapezius muscles) and self-reports was used to assess fatigability. Perceived fatigue and trapezius EMG amplitude increased during sessions. CT difficulty influenced fatigue development only little, besides forearm extensor EMG increasing more in CT3 than in CT1 and CT2. During CT bouts, fatigability recovered, and to a similar extent irrespective of CT. Thus, CT difficulty influenced recovery of perceived as well as performance fatigability to a minor extent, and may not be a critical issue in job rotation comprising alternating physical and cognitive tasks. **Practitioner summary:** Alternations between physical and cognitive tasks may be an attractive option for job rotation. In this study on women, we show that the difficulty of the cognitive task influences recovery from fatigue only little and we conclude that cognitive difficulty, within reasonable limits, may be a minor issue in job rotation.

- **Keywords:** Repetitive work, fatigability, physical load, mental load, variation

Chelsea Torres & Yeonsoo Kim. *The effects of caffeine on marksmanship accuracy and reaction time: a systematic review*. Pages: 1023-1032.

Military and law enforcement personnel are required to maintain optimal marksman accuracy and reaction time during extended duty hours amidst environmental stressors. Although caffeine is commonly used to mitigate the consequences of fatigue, the effects of caffeine on marksmanship accuracy are inconclusive. The purpose of this review was to determine the effect of caffeine on marksman accuracy and reaction time. A literature search was conducted and 17 articles were selected for review based on relevance and methodological quality. Caffeine consistently improved marksman reaction time but did not improve marksmanship accuracy. However, there is some evidence that caffeine attenuates performance decrements in marksman accuracy caused by stress and fatigue if optimal dosing strategies are employed. Dosing strategies timed according to hours of wakefulness and time before testing could prevent performance deterioration. Doses of 100–200 mg every 2 hours may effectively improve accuracy during extended duty; however, further research is needed. **Practitioner Summary:** The purpose of this review was to determine the effect of caffeine on marksman accuracy and reaction time. A literature search was conducted and 17 articles were selected for review based on

relevance and methodological quality. Caffeine consistently improved marksman reaction time but did not improve marksmanship accuracy.

- **Keywords:** Marksmanship, shooting, caffeine, military performance

Daniel P. Armstrong, Kathryn E. Sinden, Jonathan Sendson, Renée S. MacPhee & Steven L. Fischer. *The Ottawa Paramedic Physical Ability Test: test-retest reliability and analysis of sex-based performance differences*. Pages: 1033-1042.

The Ottawa Paramedic Physical Ability Test (OPPAT) is a physical employment standard (PES) that candidates must pass as a pre-hire requirement and that incumbents may have to pass prior to returning to work after absence, to demonstrate their physical capabilities as required to safely meet the demands of paramedic work. Consistent with best practice guidelines for PES development, it is important to establish reliability and to investigate sex-based performance differences. Active duty paramedics completed the OPPAT twice while candidates completed the OPPAT six times. Across all participants, a median improvement of 76.0 s was observed in OPPAT performance (922.0–846.0 s) between trial 1 and trial 2. Among candidates, OPPAT performance stabilised by the fourth trial confirming reliability. Sex-based analyses revealed median differences in OPPAT performance time of 39.0 and 63.0 s between males and females during the first and second trials respectively. **Practitioner summary:** Active duty paramedics and candidates performed the Ottawa Paramedic Physical Ability Test (OPPAT) faster following familiarisation. Among candidates, performance time stabilised by the fourth trial. Performance time was slower among females, but this had less impact on females' ability to meet the OPPAT standard.

- **Keywords:** Performance standard, reliability, familiarisation, sex

Xuan Wang, Yu Hen Hu, Ming-Lun Lu & Robert G. Radwin. *The accuracy of a 2D video-based lifting monitor*. Pages: 1043-1054.

A widely used risk prediction tool, the revised NIOSH lifting equation (RNLE), provides the recommended weight limit (RWL), but is limited by analyst subjectivity, experience, and resources. This paper describes a robust, non-intrusive, straightforward approach to automatically extract spatial and temporal factors necessary for the RNLE using a single video camera in the sagittal plane. The participant's silhouette is segmented by motion information and the novel use of a ghosting effect provides accurate detection of lifting instances, and hand and feet location prediction. Laboratory tests using 6 participants, each performing 36 lifts, showed that a nominal 640 pixel × 480 pixel 2D video, in comparison to 3D motion capture, provided RWL estimations within 0.2 kg ($SD = 1.0$ kg). The linear regression between the video and 3D tracking RWL was $R^2 = 0.96$ (slope = 1.0, intercept = 0.2 kg). Since low definition video was used in order to synchronise with motion capture, better performance is anticipated using high definition video. **Practitioner's summary:** An algorithm for automatically calculating the revised NIOSH lifting equation using a single video camera was evaluated in comparison to laboratory 3D motion capture. The results indicate that this method has suitable accuracy for practical use and may be, particularly, useful when multiple lifts are evaluated.

- **Keywords:** Manual lifting, NIOSH lifting equation, video, motion monitoring, lower back pain preventio

Jennifer Anderson, Malcolm H. Granat, Anita E. Williams & Christopher Nester. *Exploring occupational standing activities using accelerometer-based activity monitoring*. Pages: 1055-1065.

Prolonged standing at work is required by an estimated 60% of the employed population and is associated with a high prevalence of musculoskeletal disorders. 'Standing' is expected to encompass a range of activities of varying intensity. This study aimed to define a range of 'standing' work-based activities; and objectively explore differences between 'standing' occupations. The following movements were defined using a triaxial accelerometer (ActivPAL) through recordings of known movements ($n = 11$): static standing, weight-shifting, shuffling, walking and sitting. Movements over a working day were defined for chefs ($n = 10$), veterinary surgeons ($n = 7$) and office workers ($n = 9$). Despite veterinary surgeons and chefs spending a similar time in an upright posture, veterinary surgeons spent 62% of this time standing statically whereas chefs split their time between all the movements. Overall, this study provides the first attempt to define 'standing' activities, allowing the differentiation of activities between occupations spending similar periods of time upright. **Practitioner Summary:** This study identified a range of work-based 'standing' activities of varying intensity. Differences in activity were recorded between two occupations spending a similar time in an upright posture (veterinary surgeons and chefs). A broader definition of standing activities could be important when considering factors related to musculoskeletal disorders at work.

- **Keywords:** Occupational standing, accelerometer, activity monitor, veterinary surgeons, chefs

Philippe-Antoine Dubé, Daniel Imbeau, Denise Dubeau & Isabelle Auger. Worker heat stress prevention and work metabolism estimation: comparing two assessment methods of the heart rate thermal component. Pages: 1066-1085.

The heart rate thermal component (Δ HRT) can increase with body heat accumulation and lead to work metabolism (WM) overestimation. We used two methods (VOGT and KAMP) to assess Δ HRT of 35 forest workers throughout their work shifts, then compared Δ HRT at work and at rest using limits of agreement (LoA). Next, for a subsample of 20 forest workers, we produced corrected WM estimates from Δ HRT and compared them to measured WM. Although both methods produced significantly different Δ HRT time-related profiles, they yielded comparable average thermal cardiac reactivity (VOGT: 24.8 bpm $^{\circ}\text{C}^{-1}$; KAMP: 24.5 bpm $^{\circ}\text{C}^{-1}$), average Δ HRT (LoA: 0.7 ± 11.2 bpm) and average WM estimates (LoA: 0.2 ± 3.4 ml O₂ kg⁻¹min⁻¹ for VOGT, and 0.0 ± 5.4 ml O₂ kg⁻¹min⁻¹ for KAMP). Both methods are suitable to assess heat stress through Δ HRT and improve WM estimation. **Practitioner summary:** We compared two methods for assessing the heart rate thermal component (Δ HRT), which is needed to produce a corrected HR profile for estimating work metabolism (WM). Both methods yielded similar Δ HRT estimates that allowed accurate estimations of heat stress and WM at the group level, but they were imprecise at the individual level.

- **Keywords:** Heart rate thermal component, work metabolism estimation, field methodology, forest work, heat stress monitoring

Guojie Ma, Danxin Li & Xiangling Zhuang. Do visual word segmentation cues improve reading performance in Chinese reading? Pages: 1086-1097.

It is controversial whether providing visual word segmentation cues can improve Chinese reading performance. This study investigated this topic by examining how visual word segmentation cues such as grey highlighting, red colour and interword spacing influence global sentence reading and local word recognition during reading Chinese text in three experiments. The results showed that interword spacing could facilitate local word recognition but could not increase reading speed. In contrast, grey highlighting and red colour could improve neither local word recognition nor global sentence reading

performance. Instead, these cues increased the number of fixations and saccades, resulting in slower reading speed. These results suggest that even red colour is not a practically visual cue for Chinese word segmentation and the corresponding mechanisms were discussed. **Practitioner Summary:** We studied how visual cues such as grey highlighting, red colour and interword spacing influenced Chinese reading performance. Our data showed that even the red colour was not an efficient cue for Chinese word segmentation. The corresponding mechanisms and future direction were discussed regarding how to improve Chinese reading performance.

- **Keywords:** Chinese word segmentation, reading performance, grey highlighting, red colour and interword spacing

Manrong She, Zhizhong Li & Liang Ma. *User-defined information sharing for team situation awareness and teamwork.* Pages: 1098-1112.

Team members have different roles in various scenarios to maintain situation awareness. A collaborative system should therefore provide appropriate information to the appropriate person at an appropriate time. Considering the mismatch between the designed and actually used information, this paper proposed that users should define what information to share with their team-mates. Thirty-six participants, who formed eighteen teams, used both the traditional and user-defined shared displays to perform failure diagnosis on the context of nuclear power plants. The user-defined shared display exhibited shorter diagnosis time without significant difference in correctness. Information quality, instead of quantity, was positively correlated with team mutual awareness. This study provides empirical evidence that user-defined information sharing is effective at improving operator's diagnosis performance, so the users should be able to tailor the information based on requirements. **Practitioner Summary:** To support team situation awareness and teamwork, the present study proposed that users should define what information to share with their team-mates. The laboratory experiment shows that user-defined information sharing shortens operator diagnosis time without degrading correctness. Information quality appears more important than information quantity in enhancing team mutual awareness.

- **Keywords:** User-defined information sharing, team situation awareness, mutual awareness, information quality, teamwork