



Measuring work-related psychosocial and physical risk factors using workplace observations: a validation study of the “Healthy Workplace Screening”



Anne Tomaschek^{a,*}, Sarah S. Lütke Lanfer^b, Marlen Melzer^c, Uwe Debitz^{a,1}, Gabriele Buruck^{a,*}

^a Department of Psychology, Technische Universität Dresden, 01062 Dresden, Germany

^b Department of Psychology, Albert-Ludwigs-Universität Freiburg, Engelbergerstraße 41, 79085 Freiburg, Germany

^c Federal Institute for Occupational Safety and Health (BAuA), 01072 Dresden, Germany

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ABSTRACT

Occupational health research has demonstrated that work-related risk factors affect employees' physical and mental health, performance and ability to work. In order to design healthy workplaces, a valid and comprehensive assessment of potential work-related risk factors is needed. Currently, observation-based methods are scarce, even though they would provide a meaningful complement to self-report instruments. The present study aimed at validating an observational interview, the “Healthy Workplace Screening” (Screening Gesundes Arbeiten, SGA), which measures work-related psychosocial and physical risk factors. We collected a sample of 641 SGA profiles representing various jobs and occupational settings to test construct and criterion validity. Results regarding construct validity showed medium-sized correlations with the stressor subscales of an established self-report job analysis instrument (SQUAW). Providing support for the criterion validity, jobs with varying risk profiles in SGA dimensions significantly differed with regard to mental health and musculoskeletal complaints. In sum, the SGA can be recommended as a valid and efficient observation-based instrument to identify critical work-related risk factors. Together with its suggestions for work design, it can serve as an easy to apply tool for workplace health promotion.

1. Introduction

According to the European Survey of Enterprises on New and Emerging Risks (ESENER- EU-OSHA, 2012), mental health complaints such as stress, depression or anxiety are the second most frequently reported work-related health problem after musculoskeletal diseases. Work-related psychosocial factors have been shown as major contributors to mental health problems (for longitudinal studies see e.g. Ahola et al., 2006; Harvey et al., 2017; Milner et al., 2017; Niedhammer et al., 2015; for recent systematic reviews see Rau and Buyken, 2015; Theorell et al., 2015). Furthermore, a majority of findings (for longitudinal studies see e.g. Campbell et al., 2013; Warren et al., 2015; for reviews/meta-analysis see Bernal et al., 2015; Harvey et al., 2017; Hauke et al., 2011; Lang et al., 2012; Nixon et al., 2011) also highlight the importance of psychosocial factors at work (e.g. job demands, job

control, feedback, social support and leadership) for the development of musculoskeletal complaints (e.g. low back pain). Consequently, the results of ESENER 2 confirm psychosocial risk factors as the biggest challenge for businesses in Europe (EU-OSHA, 2015).

To understand how those work-related risk factors – both psychosocial in addition to physical – can have an adverse impact on employees' physical and mental health the “Cinderella” – Hypothesis offers an interesting psychophysiological explanation.

1.1. “Cinderella” - Hypothesis

In the nineties, the term “Cinderella” - Hypothesis was coined by Hägg (1991) for his assumption that the development of neck/upper limb musculoskeletal disorders (MSD) is caused by prolonged physical activation of low threshold motor units. Referring to the fairy tale

* Corresponding authors at: Department of Psychology, Institute of Work, Organizational and Social Psychology, TU Dresden, 01062 Dresden, Germany.

¹ Present address: Hubrich and Roitzsch Partnership, Chemnitz Str. 119, 01187 Dresden, Germany.

character Cinderella, who had to work the whole time, those muscle fibres are recruited first at the onset of muscle activation and are firing non-stop until the muscle is completely relaxed. Consequently, sustained engagement leads to exhaustion and overload of those muscle fibres independent of the absolute level of force and contributes in the long run to degenerative processes as well as pain development. However, research showed that physical activation merely explains 33% of the development of all MSD (see for instance Kuhn, 2007). Therefore, Melin and Lundberg (1997) expanded the “Cinderella” - Hypothesis by adding psychosocial aspects of work tasks as potential risk factors for musculoskeletal complaints. Specifically, several experimental studies (e.g. Lundberg, 2002; Rissen et al., 2002; Sjøgaard et al., 2000) indicate that psychosocial factors contribute to the prolonged recruitment of the same low threshold motor units as physical activation.

Additional support for the extended “Cinderella” - Hypothesis comes from occupational health research (for longitudinal studies see e.g. Esquirol et al., 2017; Kouvonen et al., 2016; for reviews/meta-analysis see e.g. da Costa and Vieira, 2010; Nixon et al., 2011; Taylor et al., 2014; van den Berg et al., 2009) showing that both kinds of work-related risk factors (physical and psychosocial, respectively) are associated with self-reported musculoskeletal complaints as well as impaired mental health. Accordingly, a study using data provided by the German pension fund (Deutsche Rentenversicherung) demonstrated that the relative risk of early retirement increased by 67% as a result of a combination of physical and psychosocial risk factors compared to the exposure of physical risks only (Sigrist and Dragano, 2007).

Despite this evidence suggesting the importance of monitoring physical and psychosocial factors in the work environment and the corresponding policy initiatives in the EU as well as at the national level in many countries, there is still a lack of transfer into practice (EU-OSHA, 2012). This might be due to a shortage of validated and user-friendly instruments for the combined assessment of psychosocial and physical risk factors at work.

1.2. Observation-based job analysis

To date, the majority of job analysis instruments assessing work-related risk factors have been based upon self-reports rather than on workplace observations (Gebele et al., 2011; Grebner et al., 2005; Leitner and Resch, 2005). There are validated comprehensive surveys (Pejtersen et al., 2010) as well as symptom-specific questionnaires (Brom et al., 2015). However, even longitudinal designs are not able to rule out the major concern of common method bias inherent in perceptual measures (Podsakoff et al., 2003). Observation-based job analysis instruments represent one valuable alternative for measuring work-related risk factors independently of the reports of the incumbents (for other approaches see Daniels, 2006; Rugulies, 2012). As these instruments assess observable work-related risk factors, they provide a more tangible starting point for the development of job design solutions (e.g. task interruption or feedback systems, Frese and Zapf, 1999). However, such instruments are likely to suffer from low interrater-reliability due to bias resulting from observers' individual characteristics (Rugulies, 2012; Semmer et al., 2003). This can be improved by introducing a training curriculum, which trains observers to become familiar with the instrument as well as the underlying constructs.

Furthermore, observation-based and self-rated job analysis instruments examine and evaluate work-related risk factors from different perspectives (Frese and Zapf, 1999; Semmer et al., 2003). As a consequence, empirical findings comparing both kinds of measurement tools point to high associations for some psychosocial factors (e.g. task variety, participation, control) and to low associations for job demands,

responsibility, leadership, communication and conflicts (Demerouti, 1999; Nachreiner, 2008; Rau et al., 2010; Theorell and Hasselhorn, 2005; Waldenström and Harenstam, 2008).

Waldenström and Harenstam (2008) offer the explanation that “external assessments and self-reports had partly different theoretical roots, and were thus intended to measure partially different aspects of the same dimension” (p. 248). Self-reports assess work-related risk factors as they are perceived by the worker. Therefore, they are influenced by additional factors such as personal dispositions, mood, expectations and previous experiences. Whereas observation-based instruments rather measure risk factors as they can be observed. Thereby, some issues of the work environment are rather difficult to observe (e.g. role conflict, Frese and Zapf, 1999) or “unlikely to surface in the presence of an observer” (Rugulies, 2012). This might apply to the more socially transmitted risk factors (e.g. leadership, communication) where incumbents have deeper insights and knowledge. Rau et al. (2010) argue that the inconsistency between observation-based and self-report measures of job demands is due to the conceptualization of the “construct of job demand itself” (p. 90). Defined as a pressure to manage the job well, job demands refer to an outcome associated with an inherent subjective component not a work-related risk factor per se. As a consequence job demands are difficult to observe. However, conditions (e.g. task conflicts, work interruptions, multitasking, etc.) leading to high job demands are observable and might therefore be more appropriate for observation-based measurements. In consideration of the specific challenges inherent in both measurement types, simultaneous use of observation-based and self-report instruments seems a promising strategy to accurately identifying work-related risk factors (e.g. Grebner et al., 2005; Rau et al., 2010; Schuller et al., 2012; Semmer et al., 2003; Theorell and Hasselhorn, 2005). Some comprehensive (ISTA: Grebner et al., 2005; TBS: Hacker et al., 1995; VERA/RIHA: Leitner and Resch, 2005; REBA: Richter et al., 2009) as well as sector-specific (Stab et al., 2016) observation-based job analysis instruments have been developed and validated by German-speaking research groups (for an overview of some European instruments see Tabanelli et al., 2008). Those instruments provide an in-depth analysis of work-related risk factors at a very complex and detailed level of measurement. Consequently, observer ratings are based on an extended analysis period (up to one work day) and should be realized by trained work and organizational experts (ergonomists or psychologists). However, to our knowledge, effortless and time efficient observation-based instruments are still rare. Moreover, there are no observation-based instruments that sufficiently assess both psychosocial and physical risk factors at work.

Hence, the present article aims at the introduction and validation of an observer-based screening instrument which comprises both psychosocial and physical factors: The “Healthy Workplace Screening” (Screening Gesundes Arbeiten, SGA - Buruck et al., 2015; Debitz et al., 2014). The SGA represents a user-friendly, low-threshold tool for workplace risk assessment. Relying on the extended “Cinderella” Hypothesis (Melin and Lundberg, 1997), it allows a combined measurement of both psychosocial and physical risk factors. Several pilot studies (e.g., Buruck et al., 2007; Horváth et al., 2015; Keller et al., 2010) supported the validity and practicability of the SGA, a comprehensive validation study of this instrument has not been conducted yet. Therefore, the current study pursues two research goals: First, an investigation of the construct validity of the SGA instrument (correlational analysis) and second, a test of the criterion validity of the SGA instrument by analysing the relationship between the SGA dimensions and health-related outcomes (mental health, musculoskeletal complaints, and back pain).

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