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# Resilience, work engagement and stress reactivity in a middle-aged manual worker population

Julie K. Black, George M. Balanos, Anna C. Whittaker (previously Phillips) *

*School of Sport, Exercise and Rehabilitation Sciences, College of Life and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham, West Midlands, B15 2TT, UK*

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ABSTRACT

Work stress is a growing problem in Europe. Together, the negative physiological effect of stress on health, and increasing age increases the risk of developing cardiovascular disease in those aged over 50 years. Therefore, identifying older workers who may be at risk of work-related stress, and its physiological effects, is key to promoting their health and wellbeing in the workforce. The present study examined the relationship between perceived psychological resilience and work-related factors (work engagement and presenteeism) and the physiological response to acute psychological stress in older manual workers in the UK. Thirty-one participants, mean (SD) age 54.9 (3.78) years reported perceived levels of resilience, work engagement, and presenteeism using standardized questionnaires. Cardiovascular measurements (heart rate (HR) and blood pressure (BP) and salivary cortisol were used to assess their physiological response to an acute psychological stress task. Resilience was not associated with work-related factors or reactivity. However, workers with higher work engagement showed lower SBP ($p = 0.02$) and HR ($p = 0.001$) reactivity than those with lower work engagement. Further, those with higher sickness presenteeism also had higher HR reactivity ($p = 0.03$). This suggests a potential pathway by which higher work stress might contribute to the risk of future cardiovascular disease.



## 1. Introduction

Recently, perceived psychological stress has become a major occupational problem (Tripodi et al., 2012) and continues to be a growing issue in Europe (European Agency for Safety and Health at Work, 2012). In 2014/2015, the Health and Safety Executive (2015) reported that work related stress in the UK accounted for 35% of all health-related work illness and 43% of work absence. Of particular concern are older workers occupying lower status jobs such as nursing, healthcare, industry and education (Fragar and Depczynski, 2011; Jones et al., 2013; Koolhaas et al., 2012). This is because frequent, maladaptive response to work stress, is harmful to physical health and from the age of 50 years, the cardiovascular system undergoes significant changes which heighten the risk of cardiovascular disease (Lupien et al., 2009; McEniery et al., 2007).

Due to work-related sickness absence and the increasing problem of sickness presenteeism (attending work whilst not fully well), promoting the health and wellbeing of employees, is of growing interest, especially those who are termed 'older workers' (50 + years) (Department for Work and Pensions, 2011), and particularly in manual occupations (Crawford et al., 2010). Manual workers aged over 50 years experience increasing levels of stress in occupations such as construction (Arndt et al., 2005; Dong et al., 2012). Further, there is evidence to suggest that work-related stress is related to low levels of work engagement and presenteeism in workers aged ≥50 years (Callen et al., 2013; Fiabane et al., 2013; Jones et al., 2013; Leineweber et al., 2011). However, to our knowledge, there are no studies examining such work-related factors in relation to stress reactivity. Consequently, the present study will examine this.

Research into psychological stress and wellbeing has suggested that future health and wellbeing can depend on the extent of one's physiological responses to stressful situations (Obrist, 1981). Physiological reactivity to acute psychological stress is related to an increased risk of cardiovascular disease (Obrist, 1981) and predicts conditions such as hypertension (Carroll et al., 2012b; Carroll et al., 2011; Carroll et al., 2001) carotid arteriosclerosis (Everson et al., 1997) and even cardiovascular disease mortality (Carroll et al., 2012a). Additionally, elevated cortisol (a stress hormone) secretion in response to acute mental stress is associated with the development of hypertension (Hamer and Steptoe, 2012). However, negative health outcomes including depression, obesity and addiction are also related to blunted reactivity (Heaney et al., 2011; Phillips, 2011). Thus, how older manual workers respond physiologically to psychological stress is key to understanding the potential risk of damage that may later affect health and wellbeing across working life and into retirement.

* Corresponding author at: School of Sport, Exercise and Rehabilitation Sciences, College of Life and Environmental Sciences, University of Birmingham, Edgbaston, Birmingham, B15 2TT, UK.
*E-mail address:* a.c.phillips@bham.ac.uk (A.C. Whittaker (previously Phillips)).

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Recent research has begun to explore whether perceived high levels of psychological resilience might buffer against the effects of stress (de Paula Couto et al., 2011; Galatzer-Levy et al., 2014). In adults over 55 years old, high resilience was associated with good physical and mental health (Schure et al., 2013); those with low resilience had high levels of depression. Further, adults with a mean age 68 years with high levels of resilience had more positive wellbeing (de Paula Couto et al., 2011). In younger adults, policemen aged 27–32 years who were resilient displayed a significant cortisol increase (healthy) in response to acute psychological stress, while those less resilient showed a blunted (unhealthy) response (Galatzer-Levy et al., 2014). Recently, a review of 29 studies evidenced the relationship between work-related stress and elevated BP, and suggested a stronger association of increased BP and job strain in those aged 50 years and over (Landsbergis et al., 2013). Additional evidence suggests that those who experience high job strain (high demand, low control) are at risk of sustained cardiovascular dysfunction over time (Clays et al., 2007; Steptoe, 2001; Steptoe, 2004). There has been scant research into stress reactivity and the association with job-related factors in older workers. Of the available studies, one found that men aged 55–65 years with high job strain had pronounced cardiovascular responses to mental stress (Steptoe et al., 1993). A further study found cardiovascular reactivity was positively associated with job strain in a group of workers with a mean age 51.9 years, and was higher among those over 50 (Clays et al., 2007). Equally, work-related stress has also been associated with higher cortisol reactivity (Hausser et al., 2011; Karhula et al., 2016; Steptoe et al., 2000). However, current evidence suggests that the relationship between work and stress reactivity is complex (Rudolph et al., 2016) and the majority of studies have not measured or found consistent results for both cardiovascular and cortisol responses to acute stress, or have not measured resilience. Therefore, further research is needed to understand how resilience and work-related factors may relate to the stress response within older workers.

There is evidence to suggest that social support plays a role in promoting resilience to psychological stress; those who are married or cohabiting have been shown to have higher levels of resilience than those who live alone (Guinn et al., 2009). Additionally, in occupations such as the police force where there are high levels of psychological stress, employees with greater levels of support from colleagues have higher resilience (de Terte et al., 2014). Although social support can reduce reactivity to stress (Phillips et al., 2006), the impact of marital status on the response to stress is unclear (Zhao et al., 2003), and will be examined in the present study.

It is clear from the above evidence that the research into the relationships between resilience and work-related factors and physiological responses to acute psychological stress in this age group is limited. Further, those aged 45–54 years old have been found to be less resilient than those younger or older (Bonanno et al., 2007). Given that high levels of psychological stress and extremes of reactivity to acute psychological stress are a risk factor for cardiovascular pathology, and that after age 50 years, the risk of physiological health problems such as hypertension increases (McEniery et al., 2007), it is worthwhile attempting to understand the relationships between these factors among older workers if they are to remain healthy and employed for longer. Consequently, the objectives of this study were to identify the relationship between the physiological response to acute psychological stress and perceived psychological resilience to stress and work-related variables in older manual workers aged 50+ years. It was hypothesised that those who exhibited maladaptive (exaggerated or blunted) response to acute psychological stress would have low levels of perceived stress resilience, and display lower levels of positive work-related factors such as work engagement.

## 2. Methods

### 2.1. Participants and design

Participants were 200 manual workers aged 50+ years (mean = 57.1, standard deviation (SD) = 5.62 years) who were recruited in 2015 via posters displayed in 20 organisations and industries including the welfare sector i.e. health professionals, education (teachers), service (fire and rescue and police officers) from around the UK. Other industries included retail, construction and farming. A purposive sample of thirty-one participants willing to undertake further testing were invited to complete a questionnaire to measure perceived levels of resilience and work-related factors, and to attend a testing session to measure cardiovascular and cortisol reactions to an acute psychological stress task. Previous correlational reactivity studies have revealed significant associations with similar sample sizes, e.g., Almela et al. (2011), Domes et al. (2002), and Hogan et al. (2012), so we attempted to recruit a similar number. Participants were given gift vouchers for completing the stress testing session. Written informed consent was given and the University of Birmingham ethics committee approved the study.

### 2.2. Measures

#### 2.2.1. Stress Resilience Questionnaire

The ability to recover from stress was measured using the Brief Resilience Scale (Smith et al., 2008). This is a one-dimensional self-report questionnaire containing six items e.g. "I tend to bounce back after hard times" with a possible response of 1 (strongly disagree) to 5 (strongly agree). A mean of the 6 items is taken to represent level of resilience. The questionnaire has previously demonstrated high internal consistency of $\alpha = 0.80–0.91$ (Smith et al., 2008) and 0.78 in the present study.

#### 2.2.2. Sickness Presenteeism Questionnaire

The Work Limitations Questionnaire (WLQ) (Lerner et al., 2001) was used to assess sickness presenteeism. Previous research has evidenced the scale as being suitable for measuring presenteeism (Schultz and Edington, 2007). The scale includes four dimensions (Time demands e.g., work required hours, Physical demands e.g., repeat motions, Mental demands e.g., concentrate on work, and Interpersonal demands e.g., speak on the phone). The 25 item self-report instrument is a valid and reliable (internal consistency $\alpha = 0.90$) method of measuring the degree to which chronic health problems interfere with the ability to perform job roles (Lerner et al., 2001). A 4-week WLQ is considered to be cost effective and more efficient when periods of time need to be matched across other instruments within a study (Lerner et al., 2001). This study therefore asked participants to respond with regard to the past 4 weeks. The scale had an internal consistency of 0.90.

#### 2.2.3. Work Engagement Questionnaire

The Utrecht Work Engagement Scale (UWES-9) (Schaufeli et al., 2006) was used to measure work engagement. The UWES-9 is a shortened version of the original 17-item UWES self-report questionnaire and measures three dimensions of work engagement; vigour, dedication and absorption. Responses were rated on a 7-point scale (1 = Never, 7 = Always) with higher scores indicating higher levels of work engagement. Evidence of the validity and internal consistency ($\alpha = 0.92$) of the UWES-9 has been reported (Schaufeli et al., 2006). In the present study the internal consistency was 0.90.

#### 2.2.4. Health behaviours

Smoking and alcohol consumption were measured using a single item question. Responses for smoking were statements rated as 'Previously', 'Currently', 'Never'. Alcohol consumption measured as 'Often', 'Sometimes', 'Rarely' or 'Never'.

#### 2.2.5. Psychological stress task evaluation

Participants rated to what extent they found the task to be difficult, stressful, and engaging as well as how they thought they had performed. Responses were made on a 0 (not at all) to 6 (extremely) Likert-type scales.