International Journal of Psychophysiology 94 (2014) 390–398

Contents lists available at ScienceDirect

International Journal of Psychophysiology

journal homepage: www.elsevier.com/locate/ijpsycho

Regulatory focus moderates the relationship between task control and physiological and psychological markers of stress: A work simulation study

Stacey L. Parker [a,*], Kaitlan R. Laurie [a], Cameron J. Newton [b], Nerina L. Jimmieson [b]

[a] School of Psychology, The University of Queensland, St Lucia, QLD 4072, Australia
[b] School of Management, Queensland University of Technology, Brisbane, QLD 4000, Australia

ARTICLE INFO

Article history:
Received 17 December 2013
Received in revised form 14 October 2014
Accepted 15 October 2014
Available online 23 October 2014

Keywords:
Regulatory focus
Task control
Heart rate variability
Occupational stress
Work simulation
Task performance

ABSTRACT

This experiment examined whether trait regulatory focus moderates the effects of task control on stress reactions during a demanding work simulation. Regulatory focus describes two ways in which individuals self-regulate toward desired goals: promotion and prevention. As highly promotion-focused individuals are oriented toward growth and challenge, it was expected that they would show better adaptation to demanding work under high task control. In contrast, as highly prevention-focused individuals are oriented toward safety and responsibility they were expected to show better adaptation under low task control. Participants ($N = 110$) completed a measure of trait regulatory focus and then three trials of a demanding inbox activity under either low, neutral, or high task control. Heart rate variability (HRV), affective reactions (anxiety & task dissatisfaction), and task performance were measured at each trial. As predicted, highly promotion-focused individuals found high (compared to neutral) task control stress-buffering for performance. Moreover, highly prevention-focused individuals found high (compared to low) task control stress-exacerbating for dissatisfaction. In addition, highly prevention-focused individuals found low task control stress-buffering for dissatisfaction, performance, and HRV. However, these effects of low task control for highly prevention-focused individuals depended on their promotion focus.

1. Introduction

World Health Organization (2013) statistics reveal cardiovascular diseases (CVDs) are responsible for most deaths due to disease. Clearly, further research identifying risk factors for onset of CVDs, and interventions to reduce this risk, is needed. One such CVD risk factor is occupational stress (Kivimaki et al., 2006). Occupational stress is a process whereby employees experience high demands (e.g., workload) that exceed their resources to cope. Experiments demonstrate how increased task demands directly affect cardiovascular reactivity in the short-term (e.g., Flynn and James, 2009). Epidemiological studies also identify work demands as a risk factor for metabolic syndrome, a pre-condition for cardiovascular mortality (Backe et al., 2012; Ganster and Rosen, 2013). As well as these health consequences, occupational stress impairs well-being (e.g., anxiety, depression, and burnout; see Crawford et al., 2010; Häusser et al., 2010) and performance (Gilboa et al., 2008; Ortqvist and Wincent, 2006). To better inform stress management interventions and work redesign strategies, further research is needed to identify the proximal physiological and psychological processes involved in the unfolding experience of occupational stress.

Theoretical models of occupational stress (i.e., Job Demands–Control Model; JD–CM, Karasek, 1979; Job Demands–Resources Model; JD–RM, Bakker and Demerouti, 2007) include work control as a job resource that protects employees from the detrimental effects of work demands. Work control refers to control available in the work environment and employee discretion over methods and pacing of work. Research has focused on the chronic effects of high demands and low work control on physiological health (particularly CVDs) and psychological health (e.g., Chandola et al., 2006; Peter and Siegrist, 2000), with meta-analytical research on the JD–CM showing modest support for these relationships (de Lange et al., 2003; Häusser et al., 2010; van der Doef and Maes, 1998; 1999). Limited research has examined whether providing high task control facilitates better adaptation *in the moment*.

Work control might not reduce stress reactions for all employees in the same way (as proposed by van der Doef and Maes, 1999). Indeed, research has revealed that traits such as locus of control (Meier et al., 2008) and desire for control (Parker et al., 2009) moderate the stress-buffering effects of work control. Moreover, workplace interventions that increase employee control only improve mental health and performance for those high on certain traits (e.g., psychological flexibility; Bond et al., 2008, 2009). As such, we examined trait regulatory focus as a moderator of task control, using an experiment where levels of task control were manipulated during a demanding work task.

* Corresponding author. Tel.: +61 7 3365 6423; fax: +61 7 3365 4466.
E-mail address: s.parker@psy.uq.edu.au (S.L. Parker).

http://dx.doi.org/10.1016/j.ijpsycho.2014.10.009
0167-8760/

1.1. Facilitating regulatory fit by modifying work structure

Regulatory focus is a motivational process whereby individuals self-regulate behavior to achieve desired goals via *promotion* or *prevention* forms (Higgins, 1997). Experimental studies have demonstrated that highly promotion-focused individuals use approach-oriented strategies (i.e., maximizing correct hits, gaining rewards), as they are concerned with growth and opportunities that place them closer to reaching their *ideal self*. Highly prevention-focused individuals use avoidance-oriented strategies (i.e., minimizing incorrect responses, avoiding punishment), as they are concerned with safety and responsibilities that place them closer to reaching their *ought self* (Higgins, 1997; Higgins et al., 1998).

Regulatory focus has been studied as a chronic trait or induced state (e.g., through priming; Crowe and Higgins, 1997; Higgins et al., 1994). Ostensibly, trait regulatory focus could be central to determining if control is stress-buffering, as it is a motivational construct central to the process of self-regulation. Indeed, regulatory focus is the proximal mechanism through which more distal personality traits (e.g., extraversion and conscientiousness) influence work outcomes (Lanaj et al., 2012; Gorman et al., 2012). Indeed, research has shown that trait regulatory focus is a stronger predictor than state-induced regulatory focus on task performance (i.e., anagram tasks; Higgins et al., 1998). Moreover, inducing state regulatory focus in opposition to trait regulatory focus during a task (creating a goal "mismatch") can increase systolic blood pressure (Peddie et al., 2012), illustrating the importance of matching trait regulatory focus to work structures (Brockner and Higgins, 2001).

We examine this regulatory "mismatch", but also aim to identify whether facilitating regulatory-fit during a demanding task can help with adaptation. The concept of 'regulatory fit' at work (Brockner and Higgins, 2001) offers insight into why matching work systems to trait regulatory focus may reduce stress and facilitate coping. For example, regulatory fit should occur when incentive systems are aligned (e.g., reward systems for promotion versus avoidance systems for prevention). Indeed, enhancing regulatory fit can increase performance; based on findings that anagram task performance was highest when trait regulatory focus matched congruent incentives (Shah et al., 1998). While many theories posit that work demands and resources are central to occupational stress, traits (or personal resources) can also be viewed as important in determining the utility of work resources as stress buffers (Demerouti and Bakker, 2011). We propose that regulatory focus should be taken into account when considering work control as a resource for stress reduction, as work control is expected to differentially suit these two types of self-regulatory tendency.

The presence of high work control is theorized to facilitate learning and growth (Karasek, 1979). As highly promotion-focused individuals are oriented toward growth (see Lanaj et al., 2012), the presence of high work control is expected to facilitate regulatory-fit for these individuals. High work control may be stress-buffering for highly promotion-focused individuals, as they feel work demands can be met in a way that provides positive learning and growth experiences. Alternatively, highly promotion-focused individuals are expected to find low work control stress-exacerbating, as it limits personal choice and growth.

From another perspective, high work control can place greater responsibility on individuals for making decisions about methods and procedures. This increased responsibility may induce stress for individuals who view high control as threatening, as increasing the need to formulate one's own strategies increases the chance of personal error (Burger, 1989; Shapiro et al., 1996). As highly prevention-focused individuals are oriented toward safety, it is expected that high work control will be stress-exacerbating for these individuals. Concern about making personal errors could inhibit the learning and growth that high work control may otherwise afford. Low work control is expected to provide the structure and safety that highly prevention-focused individuals prefer, facilitating stress-buffering effects. Indeed, prior research demonstrates that low work control is stress-buffering for individuals' who are non-self-determined (Parker et al., 2013a) or lower on desire for control (Parker et al., 2009).

1.2. The current study

1.2.1. Our approach

Many occupational stress researchers focus on collecting correlational data in work contexts to infer associations between demand, control, and employee health (de Lange et al., 2003). Other researchers utilize experimental paradigms, which involve participants completing work simulations under manipulated levels of demand and control (e.g., Flynn and James, 2009; Häusser et al., 2011; Jimmieson and Terry, 1997, 1999; Parker et al., 2009, 2013a, 2013b). Work simulations establish temporal precedence between predictors and outcomes, offering strong causal interpretation. Laboratory settings also increase control over collection of physiological data, an additional strength.

Experiments on the effects of task control on physiological measures reveal mixed effects; for example, finding no stress-buffering effects on systolic blood pressure (Flynn and James, 2009; Hutt and Weidner, 1993), heart rate (Flynn and James, 2009; Hutt and Weidner, 1993; Perrewe and Ganster, 1989), galvanic skin conductance, or skin temperature (Flynn and James, 2009; Perrewe and Ganster, 1989). The exception was Häusser et al. (2011) who found that high control produced stress-buffering effects for cortisol. These inconsistent effects could be due to choice of (1) physiological measure, (2) task (i.e., mental subtraction vs. work simulation), and (3) little consideration of individual differences. We address many of these inconsistencies by measuring Heart Rate Variability (HRV), using a demanding work simulation, and investigating regulatory focus as a moderator of task control. Although Flynn and James (2009) found that high task demands increased heart rate and systolic blood pressure, and Häusser et al. (2011) found that high task demands increased cortisol under low task control, no task control study has examined emotion regulation as reflected in HRV.

HRV reflects variability in the beat-to-beat changes in heart rate pattern (Berntson et al., 1997). HRV is measured non-invasively by electrocardiogram (ECG) and scores can be derived from spectral power analyses (Montano et al., 2009). Research has found HRV to be a sensitive index of mental workload (i.e., physiological coping efforts; Hoover et al., 2012; Jorna, 1992). Indeed, experimental and neuroimaging studies support that HRV reflects emotion regulation processes (Appelhans and Luecken, 2006; Geisler et al., 2010; Segerstrom and Nes, 2007; Thayer et al., 2012). HRV has the potential to be a meaningful indicator of functioning in work contexts, where individuals are exposed to stressors that require daily emotion regulation (Diefendorff et al., 2008).

High frequency HRV (HRV-HF) is considered a relatively pure measure of parasympathetic cardiac control (i.e., the down-regulation of the parasympathetic nervous system (PNS) onto the sympathetic nervous system (SNS); Berntson et al., 2008; Thayer et al., 2012). As the SNS increases adrenaline and the "stress response" (increasing blood and oxygen flow to the muscles), down-regulation by the PNS suggests the organism is more successfully regulating stress and arousal. Low frequency HRV (HRV-LF) is linked to SNS activity; however, the literature remains unclear as to whether this represents a general heightened arousal (i.e., both PNS and SNS) or a lack of PNS activity (see Berntson et al., 2008). We included both HRV-HF and HRV-LF as physiological indicators of the stress experience, as this is reflective of individuals' total emotion regulation.

1.2.2. Summary

We examined whether trait regulatory focus moderates the effects of task control on physiological and psychological indicators of stress (i.e., HRV, anxiety, task dissatisfaction, and task performance). We used a work simulation involving three trials of a demanding inbox task. Task control (i.e., low, neutral, and high) was manipulated prior to trial 2 to examine changes in our dependent variables as a result of