Job Strain And Rumination About Work Issues During Leisure Time: A Diary Study

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ABSTRACT

Previous research has suggested that high job strain (high demand, low control at work) is associated with an inability to 'unwind' physiologically after work. It was speculated that one mechanism related to the 'unwinding process' is an individual's ability to 'cognitively switch-off' about work related issues after work. This hypothesis was tested in a diary study of primary and secondary school teachers who were asked to keep an hourly record of their work related thoughts over a workday evening between 17.00 hrs and 21.00 hrs. As expected both groups demonstrated a degree of unwinding and disengagement from work issues over the evening. High strain ($n = 34$) teachers however took longer to unwind and ruminated more about work related issues, relative to low job strain ($n = 35$) teachers. High job strain teachers also reported they had less personal control over what they were doing in the evening. Across the evening all individuals reported higher ruminative thoughts about work issues when alone than when with family and friends, but high strain teachers reported more ruminative cognitions when watching television and with family and friends than low strain teachers. The results could not be explained by work patterns as there was no difference in the number of hours worked in the evening between the two groups. It is argued that one reason why high job strain teachers failed to successfully unwind after work is that they ruminated more about work issues, than low job strain teachers.

INTRODUCTION

The need for recovery in relation to health and well being has been emphasised in a number of models (e.g., Hobfoll, 1998; Meijman & Mulder, 1998). Evidence suggests that speed of recovery may be more important in the aetiology of disease and illness than how reactive someone is during the period of stress (Linden, Earle, Gerin, & Christenfeld, 1997; Schuler & O'Brien, 1997). The effects of work stress on health and well being are well documented (Le Blanc, de Jonge, & Schaufeli, 2000). Accumulated stress has repeatedly been associated with physical and psychological health problems (Kuper & Marmot, 2003; Stansfeld, Fuhrer, Shipley, & Marmot 2002; Steptoe & Cropley, 2000). The effects of working in a stressful environment can 'spill-over' into non-work time, and some people in demanding jobs find it difficult to 'unwind' after work and remain physiologically aroused after work (Meijman, van Dormolen, Mulder, & Cremer, 1992; Sluiter, van der Beek, & Frings-Dresen, 1998). To date relatively little attention has been paid to the relationship between job-related stress and recovery following the cessation of work.

One of the most influential conceptualisations of job related stress is Karasek's (1979) job strain model. Karasek argues that job strain can be best understood in terms of the combination of job demands and job discretion (control over how the job is done, and the opportunity to develop new skills) (Karasek, 1979; Karasek & Theorell, 1990). In short, job strain and subsequently negative well being, is likely to be highest among those who face demanding jobs over which they have little or no discretion.

High job strain has indeed been consistently associated with a number of stress related disorders, e.g., anxiety, depression, fatigue, raised blood pressure and cardiovascular disease (Cropley, Steptoe, & Joeke, 1999; Schnall, Schwartz, Landsbergis, Warren, & Pickering, 1998). Studies using ambulatory blood pressure monitoring have shown that blood pressure levels at work are higher in individuals reporting high job strain (Schnall, Pieper, Schwartz, Karasek, Schlusell, et al., 1990). Such individuals are thus thought to be at an increased risk of developing cardiovascular disease (Schnall, et al., 1998).

Job strain has also been associated with impaired physiological recovery during non-work time, in terms of elevated evening blood pressure and heart rate (Blumenthal, Thyrum, & Siegel, 1995; Steptoe, Cropley & Joeke, 1999; Vrijkotte, van Doornen, de Geus, 2000). In one study, Steptoe et al., (1999) investigated the association between cardiovascular disease risk and job strain in a sample of primary and secondary school teachers. Blood pressure and heart rate were monitored using ambulatory apparatus over the working day and evening, and readings were accompanied with diary ratings of personal control and stress. Systolic and diastolic blood pressure did not differ between high and low strain individuals over the working day, but decreased to a greater extent in the evening in the low strain participants (Steptoe et al., 1999). These results were independent of baseline blood pressure, posture, age, gender and body mass index. The mechanism by which high job strain contributed to sustained evening arousal in this study was not clear. The authors however, speculated that high job strain individuals may perceive their lives (as well as their jobs) as being under less personal control as ratings of control were lower in the evening in the high strain group. Another possibility is that, relative to their low strain colleagues, high job strain individuals were more physiologically aroused in the evening because they failed to ‘cognitively switch-off’ after work, engaging in more preservative/ruminative thinking about work related issues.

Rumination is a term primarily used to describe unintentional preservative thoughts in the absence of obvious external cues. Such thinking has been conceptualised as 1) involving automatic and controlled processing, 2) as hindering goal attainment, and 3) for its frequency (Martin & Tesser, 1989). Research in this area has been dominated by clinical/health psychology and rumination has been associated with a number of stress related disorders including increased physical symptom reporting (Hazlett & Haynes, 1992), anxiety (Mellings & Alden, 2000) and depression (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998). However, the exact role rumination plays in the development and/or progression of these disorders is not known. It is nonetheless evident that rumination is linked to the recovery process.

Laboratory studies have revealed that individuals who demonstrate preservative thinking when stressed, show prolonged physiological arousal and delayed recovery (Roger & Jamieson, 1988). Rumination may therefore be conceptualised as a surrogate or proxy indicator of insufficient recovery. No study to our knowledge has yet examined the association between job strain and work related thoughts throughout the evening.

The preliminary aim of the present exploratory study was to investigate whether high and low job strain workers differ in ruminative thinking about work related issues during recreational time. Two methods were employed. First, school teachers were sent a pack of questionnaires concerning issues centred about work, e.g., job strain, the number of hours worked at home and demographic characteristics. A subgroup of teachers then volunteered, using diaries, to keep a record of their thoughts over a typical workday evening, monitored hourly from 17.00 hrs to 21.00 hrs. Two specific hypotheses were tested. Firstly it was predicted that relative to low strain, high job strain individuals would take longer to unwind following work and would ruminate more about work issues over the evening (Hypothesis 1). Secondly, following the findings of Steptoe et al., (1999) it was also predicted that high job strain workers would perceive that they have less personal control over what they do in their leisure time (Hypothesis 2).

METHOD

Participants

Participants were recruited from a survey of primary and secondary school teachers in Surrey, Hampshire and Shropshire, England. This survey sought information about work, stressors, and included a measure of job strain. Head teachers were initially approached by letter asking if their school would be willing to participate in the study. A total of 312 questionnaires together with an information sheet were distributed, and 220 completed questionnaires were returned, a response rate of 70.5%. All teachers were additionally asked to complete a self-report diary of their work related thoughts and behaviours over a typical workday evening. Of those who agreed to take part,

102 (52.5%) provided a useable diary. There was no significant difference in age, gender, occupational grade, years teaching or job strain, between those who did and did not elect to keep a diary. Eight diaries had to be excluded because participants had reported that they had worked all evening. The final sample consisted of 94 teachers, their age ranged from 22 - 64 years, with a mean of 39.1 (SD = 11.3 years). The majority of the sample were female (78.7%).

Measures

Job Strain

Job strain was assessed using a 10-item measure adapted from Karasek and Theorell (1990). Three items concern perceived job control (e.g., 'I have freedom to decide what I do in my job'), three items concern job demands (e.g., 'The pace of work in my job is very intense'), and four items refer to skill utilisation (e.g., 'My job involves me learning new things'). Each statement is rated along a 4-point scale ranging from 1-strongly disagree to 4-strongly agree. The job strain score is computed as $\text{job strain} = \text{job demand} / (\text{job control} + \text{skill utilisation})$. The validity of this measure has been demonstrated in a number of previous studies (e.g., Cropley et al., 1999; Steptoe et al., 1999; Evans & Steptoe, 2001; 2002). Classification of high and low job strain teachers followed Steptoe et al. (1999): high job strain above 13.3 (men) and 13.5 (women); and low job strain below 11.3 (men) and 12.4 (women). The internal consistency (Cronbach α) scores for the job demand, and autonomy (control plus skill utilisation), were 0.68, 0.61, respectively.

Diary Measures and Procedure

Participants were instructed to complete the diary on a mid-week evening, i.e., Tuesday, Wednesday, or Thursday after work. Entries to the diary were made over the course of one evening at hourly intervals between 5pm and 9pm. In order to facilitate this process, participants were issued with stopwatches which sounded on the hour and were reset by each participant.

There were three sections to complete within each time point. Section One sought information about the location of the respondent (e.g., home, work). Section Two gathered information about what the person was doing (walking, driving, relaxing, watching television and working) with ‘working’ also divided into five subsections (e.g., lesson preparation, report writing, writing appraisals, marking and other). Section Three comprised one question about personal control, and three questions about ruminative thinking.

Piloting identified a range of ruminative responses that school teachers experience. Preservative thought could involve thinking about the negative aspects of the job, for example, daily hassles, arguments with work colleagues, or the amount of work to be done. Ruminations may be future orientated, concerned with the following day’s activities, or retrospective, ruminating about what happened during today. The three rumination questions used in the present study were: 1 = ‘did you think about work in the last hour’; 2 = ‘did you think about future work, e.g., lessons tomorrow?’; 3 = ‘did you think about things that had happened today, at work or previous to today?’ Each was rated on a 7 – point scale ranging from 1 = *not at all*, to 7 = *all the time*. The internal consistency (Cronbach α) of the scale was good: 5pm = .77, 6pm = .87, 7pm = .86, 8pm = .78 and 9pm = .81. The reliability of the scale was based on the larger diary sample from which participants were drawn. The control question was in the last hour ‘how much control do you think you had in what you were doing?’ and was anchored by 1 = *no control* to 7 = *complete control*. Participants were required to indicate their choice by circling an appropriate number. Each double page entry contained information relating to one hour.

Data analysis

It was our original intention to include in the analysis only those teachers who did not work out side contractual hours. This would however have meant screening out 94% of the sample.

Therefore all teachers, regardless of whether they had worked at home (at some point) during the evening were included in the final analysis. Rumination and control variables were analysed using

a Group (high/low job strain) X Time (5pm, 6pm, 7pm, 8pm, 9pm), Repeated Measures ANOVA. Post-hoc analyses were computed using planned t-tests. Bivariate correlations between self-reported personal control and rumination over the five evening time points revealed significant negative correlations at 5pm ($r = -.30, p < .05$), and at 9pm ($r = -.35, p < .01$), but not at 6pm, ($r = -.16$), 7pm ($r = -.12$) or 8pm ($r = -.10$). Conceptually, it would seem that personal control and rumination are distinct constructs since statistically the association between the two variables is unreliable. Consequently, these variables are treated separately in the following analyses.

RESULTS

Participant characteristics and questionnaire data are summarised and presented in Table 1. There were no significant differences between the groups with respect to gender, age, occupational grade, teaching experience, or the number of hours worked at home. As expected there were more females than males in each group, entirely reflective of the gender ratio in teaching in the UK. By design there was a significant difference in job demands, job control, skill utilisation, and job strain between the high/low job strain groups.

INSERT TABLE 1 ABOUT HERE

Ruminative thought

Ratings of preservative thought over the workday evening revealed a significant main effect of Group ($F(1,67) = 4.7, p < .05$), and Time ($F(1,67) = 28.5, p < .001$), and a significant Group x Time interaction ($F(1,65) = 3.2, p < .05$). These means are shown in Figure 1. Planned comparisons showed that there was no difference in ratings of rumination between the groups at 5pm, 6pm, or 7pm ($p = .06$) (which approached significance), but there was a significant difference at 8pm ($p < 0.5$) and 9pm ($p < 0.5$), with the high job strain group reporting higher levels of ruminative thought at both time points. For the low job strain group ratings of preservative thought were

significantly lower at 6pm, 7pm, 8pm, and 9pm, relative to 5pm (all $p < .001$), and ratings were also significant lower in the high job strain group at 6pm ($p < .05$), 7pm, ($p < .01$), 8pm ($p < .001$), and 9pm ($p < .001$), relative to 5pm. Overall, these results afford strong support for Hypothesis 1.

To rule out a potential explanation in terms of differences in number of hours worked, there were no significant differences in the total mean number of hours individuals worked at home ($t(1,67) = .5$, ns.), between the high job strain (1.8hrs) and the low job strain groups (1.7 hrs). Nor was there a significant difference at any time point between them across the evening. The above analysis was repeated controlling for the number of minutes worked over the evening, but this made no difference to the overall results. To apply a more conservative test of the hypothesis, a further Repeated Measures ANOVA was performed on aggregated scores of the three ruminative responses. For this analysis the data was screened to include only the time periods when teachers reported not working. An average score for each ruminative item was calculated for each individual over the whole evening. This revealed a significant main effect of Group ($F(1,67) = 7.5$, $p < .01$), and Item ($F(1,66) = 4.8$, $p < .01$), but there was no significant Group x Item interaction ($F(1,66) = .7$, ns.). The mean differences between high and low job strain groups for the three ruminative items were as follows: ‘did you think about work in the last hour’ ($t(67) = 2.7$, $p < 0.01$) (mean 4.0 vs. 3.0), ‘did you think about future work’ ($t(67) = 2.0$, $p < 0.05$) mean 3.6 vs. 2.8), and ‘did you think about things that had happened today, at work or previous to today’ ($t(67) = 2.5$, $p < 0.01$) mean 3.6 vs. 2.7). In summary, the findings strongly support the hypothesis that high job strain teachers would ruminate more about work related issues, and that they would also perceive their home life to be under less personal control, relative to low job strain teachers.

INSERT FIGURE 1 ABOUT HERE

The relationship between activity and rumination

The number of activities pursued over the evening varied within and between people to such an extent that it was not possible in most cases to make meaningful comparisons. However average ruminative scores over the 5 time points for each individual revealed three significant findings. First irrespective of job strain, teachers reported higher ruminative scores when alone compared to being with family or friends ($t(20) = 2.1, p < 0.05$) (mean 3.9 vs. 3.0). Compared to low strain teachers, high job strain individuals reported higher levels of rumination while watching television ($t(23) = 2.2, p < 0.05$) (mean 3.6 vs. 2.6), and when being with family and friends ($t(53) = 3.4, p < 0.001$) (mean 3.6 vs. 2.3). That is, regardless of activity or company, high job strain individuals reported engaging in more ruminative thoughts about work issues relative to their low strain colleagues.

Control

Perceived ratings of control revealed a significant main effect of Group ($F(1,67) = 7.0, p < .001$), but there was no significant effect of Time ($F(1,67) = .9, ns$), nor a significant Group x Time interaction ($F(1,65) = .6, ns$). Consistent with Hypothesis 2, relative to high job strain teachers, low job strain teachers reported higher levels of personal control throughout the evening.

DISCUSSION

Unfortunately due to the nature of some jobs it may be extremely difficult to reduce the amount of stress people are exposed to whilst at work (e.g., health care workers, police, teachers). It is especially important therefore for individuals in high stress jobs to 'unwind' after work, in order to reduce wear on their physical organism and to aid recovery from daily strains. Fatigued workers have been shown to suffer a range of both physical and psychological problems (Barton, Spelten, Totterdell, Smith, Folkard, 1995; Bultmann, Kant, Van den Brandt & Kasl, 2002; Hardy, Shapiro, Borrill, 1997). The aim of this study was to compare the effects of high and low job strain on teachers' ability to wind-down after work. School teachers were chosen because it is widely

acknowledged that teaching is a stressful occupation and many teachers report high levels of distress and health problems (Cropley et al., 1999; Travers & Cooper, 1996). The inability to adequately disengage from work, especially in this occupational group may contribute to the aetiology of illness and disease. Previous work has indeed shown that high strain teachers may remain more aroused in the evening and take longer to recover physiologically after work, relative to their low strain colleagues (Steptoe et al., 1999).

We speculated that one mechanism related to the ‘unwinding process’ is an individual’s ability to ‘cognitively switch-off’ after work, and tested this hypothesis using a diary format. Three different, although related items were chosen to assess preservative thinking in the evening. Nevertheless a consistent pattern emerged: high strain school teachers found it difficult to stop thinking about work, thought more about future work related tasks and thought more often about something that had happened at work over the last few days, in comparison to low strain teachers. The interaction between job strain and rumination also revealed that the high strain teachers took longer to disengage from work related matters over the course of the evening. It is not clear why this was the case. One explanation is that high and low strain individuals differed in the types of activities they engaged in over the evening. Leisure time activities have been associated with recovery and well-being in previous research (Sonnentag, 2001). However, even when the groups were doing the same task such as watching television or being with friends and family, the high job strain, relative to the low strain teachers, still reported more ruminative thoughts, suggesting that it may not be the task itself that is important for recovery.

There are numerous ways an individual may relax or unwind after work: reading, watching television, exercising or pursuing hobbies. Research suggests that workers who actively participate in leisure activities report lower levels of burnout (Stanton-Rich & Iso-Ahola, 1998; Stearns & Moore, 1993). A Finish study reported that stressed teachers thought more about work during their leisure time, compared to those with little or no stress. The low stressed teachers reported spending more time pursuing their interests (Salo, 1995). Encouraging teachers, particularly those who

report high job strain, to engage in leisure pursuits may help them gain a sense of mastery over their non-working time. Therapeutically the crucial issue appears not to be the recreational activity itself, but the extent to which it induces “a sense of control” over that behaviour (Iso-Ahola, 1980). It is important to point out that leisure time refers to the time spent solely on activities one wishes to pursue and must be distinguished from other non-work time activities such as doing domestic chores (Parker & Smith, 1976).

Consistent with Steptoe et al's, findings (1999), high job strain teachers also reported they had less control over what they were doing in the evening. Thus, even during non-work time, high strain individuals saw their lives as being under less personal control than their low strain colleagues. The present results could not be explained by evening working patterns. There was no difference in the number of hours worked in the evening between the high and low job strain teachers. Surprisingly, 93.6% of the sample worked outside their contractual hours, and 83% worked at home at some point during the evening. The most common reported activities were marking and lesson preparation.

At a more theoretical level, the self-regulation model of ruminative thought (Martin & Tesser, 1996), offers three mechanisms to stop ruminative thinking: distraction, disengagement from the goal, and goal attainment. Goal attainment may not be possible due to the constant changing goals especially within the teaching profession, although it may be feasible to teach distraction techniques. These could be cognitive (e.g., attention switching, thought stopping), or behavioural (e.g., playing sports or gardening). It may not be possible to stop rumination completely (Martin & Tesser, 1996), nevertheless a temporary cessation from unwanted thoughts could provide health benefits. Using distraction as a coping strategy has recently been shown to aid sleep on-set latency (Ellis & Cropley, 2002; Harvey & Payne, 2002), and therefore distraction may be particularly advantageous for helping high strain individuals to relax and recuperate after work.

The cross-sectional design of the study precludes making causality claims. It is not known within the present study, whether high job strain individuals ruminated in the evening because of the nature of their work, or because of some aspect of their personality. It is likely that when stressed, a proportion of individuals (especially those reporting high job strain) engage in ruminative coping strategies. High stressed teachers have been shown to report using more maladaptive coping responses under times of stress (Griffith, Steptoe, & Cropley, 1999). It is acknowledged that stress patterns in teaching vary throughout the year (Hembling & Gilliland, 1981; Salo, 1995), and future research, using a prospective design could examine the association between variations in job strain to fluctuations in ruminative thought. It would also be of interest to examine outcome measures such as general health or sleep quality. School teachers have been shown to report a range of health problems including sleep disturbance (Cropley et al., 1999). In the present study, rumination was conceptualised as a proxy for insufficient recovery. It is possible that rumination is also a mediator between job strain and well-being.

Using the present design it was possible to obtain an hour-by-hour account of teachers thoughts and behaviours throughout an evening after school. Diary methods have a number of advantages where the aim is to measure an unobservable variable (work related thoughts) over a fixed time frame (an evening following a working day) (Breakwell & Wood, 1995). Only three ruminative responses and a single measure of personal control were assessed by the diary, and this could be considered a limitation to the present study. It was, however, considered important to keep the diary brief for two reasons. Firstly, shorter diaries are relatively easy to complete, and secondly a longer diary would interfere too much with an individual's normal behaviour thereby reducing the validity of the diary data. More information would be obtained if the length of time was extended to bedtime and the diary was completed at half hour intervals. It would also be more informative for participants to complete the diary over a number of evenings thereby allowing a more in depth analysis of the association between leisure activities, preservative thought and well-being (c.f. Sonnentag, 2001). Notwithstanding these limitations, the present study has demonstrated that

compared to low job strain teachers, teachers who reported high levels of job strain found it more difficult to switch off from work, ruminated longer about work in their evenings, and perceived they had less personal control over their non-work time. These findings have important implications for how we conceptualise and investigate stress recovery mechanisms.

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Table 1 Participants characteristics in the low and high job strain groups

	<i>Low job strain</i> (n = 35)	<i>High job strain</i> (n = 34)
Gender		
Male	5	9
Female	30	25
Age	36.2 (10.9)	41.2 (12.5)
School Type (%)		
Primary	60.0	64.7
Secondary	40.0	35.3
Occupational Grade (%)		
Class teachers	60	73.5
Promoted teachers	40	26.5
Years of teaching	11.9 (10.3)	15.9 (12.2)
Hours worked at home (per week) (%)		
1 – 5 hours	14.3	11.8
6 – 10 hours	40.0	32.4
11 – 15 hours	25.7	32.4
16 or more hours	20.0	23.5
Job Strain	10.8 (1.2)	15.6 (2.4)**
Demand	3.5 (0.4)	3.9 (0.1)**
Control	3.1 (0.3)	2.1 (0.5)**
Skill	3.4 (0.3)	3.0 (0.3)**

(standard deviation in parenthesis)

** P < .001 difference between groups

Figure 1 Rumination about work during the evening from 5pm to 9pm in high and low job strain individuals