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‘Bus-ting’ a gut – the strains of an urban bus driver

John L. M. Tse*, Rhona Flin, Kathryn Mearns

The Industrial Psychology Research Centre, University of Aberdeen, UK

john.tse@abdn.ac.uk

Abstract

The profession of urban bus driving has been widely shown to be a challenging one in terms of psychosocial risk and health outcomes. This research project considers sources of occupational strain in a sample of British bus drivers. Adopting the influential models of the Job Demand/Control and Effort-Reward Imbalance, a questionnaire survey was completed by a number of drivers from several bus operating depots. The questionnaire battery consisted of measures of job strain, job specific stressors, psychological health, and physical health. High job strain bus drivers were compared to low/no strain bus drivers and significant differences were found in terms of organisational outcomes: (a) accident rates, (b) work absenteeism (c) intention to quit, (d) service level quality, as well as (e) personal health habits. Furthermore, a series of multiple regressions were conducted to examine the predictive qualities of a number of predictors on the criterion variables of psychological and physical health.

This study is the first phase of a project looking at the impact of occupational strain on performance and safety in bus drivers.

Keywords: bus drivers, occupational stress, well-being, organisational outcomes

Introduction

Occupational health is concerned with safety, health and well-being of the workforce. Since the 1950's the evidence that bus drivers are at particular risk from poor physical health became apparent beginning with UK studies by Morris and his colleagues looking at heart disease (Morris, Heady, Raffle, Roberts, & Parks, 1953a, 1953b). Over the last few decades, the world-wide research has matured to show that in terms of physical health, bus drivers are particularly susceptible to musculoskeletal disorders, cardiovascular disease and gastro-intestinal problems (G. W. Evans, 1994; Kompier & di Martino, 1995; Winkleby, Ragland, Fisher, & Syme, 1988). However, in tandem with this, there is evidence to suggest that there is poorer psychological health in bus drivers when compared to the general population (Duffy & McGoldrick, 1990). One contributory factor that has been implicated in both physical and psychological well-being is occupational stress.

Stress is defined as “*a particular relationship between the person and the environment that is appraised by the individual as taxing or exceeding his or her resources and endangering his or her well-being*” (Lazarus & Folkman, 1984, p.19). Applied to the occupational arena, it becomes clear how the job environment has the capacity to affect psychological health. In the literature on bus drivers, there have been analyses of what specific factors in the environment are construed as job stressors (events/properties of events). The variety of stressors include: a lack of decision-making authority, fatigue, fear of assault, social isolation, tight running schedules, vehicle mechanical faults, reduced rest breaks, poor cabin comfort, continually rotating shift patterns, adverse weather conditions, traffic congestion, the sedentary nature of the job, noxious air from other vehicles, pressures of ensuring

safety of passengers, and demanding passengers (Carrère, Evans, Palsane, & Rivas, 1991; Duffy & McGoldrick, 1990; Evans, & Johansson, & Rydstedt, 1999; Evans & Carrère, 1991; Evans & Johansson, 1998; Fisher & Jacoby, 1992; Greiner, Krause, Ragland, & Fisher, 1998; Kompier & di Martino, 1995; Krause, Ragland, Greiner, Syme, & Fisher, 1997; Rydstedt, Johansson, & Evans, 1998). These factors, either individually or in combination, produces occupational stress. How such perceived stressors translate into the experience of strain can elucidated by theory. Two specific models of job strain that have particular currency in the study of bus drivers can be found in the Job Demand/Control model (Karasek, 1979) and the Effort-Reward Imbalance model (Siegrist, 1996). The former predicts that job strain will occur when an individual believes that their job involves high psychological job demands coupled with low job control. The focus here is on control of the environment. Siegrist's model focuses on effort and reward in the job. Reward is seen to encapsulate money, esteem, job security and career development. In addition, this model incorporates a personality dimension, that of 'overcommitment'. This trait is defined as an exaggerated level of striving in order to gain esteem from others. Thus, job strain is said to arise where a job incurs high levels of effort but provides low levels of reward. Strain will be particularly high where overcommitment is evident. Though the two models may appear to overlap, there is research to suggest that the predictive ability of using both models in combination better forecasts coronary heart disease (Bosma, Peter, Siegrist, & Marmot, 1998), and well-being (de Jonge, Bosma, Peter, & Siegrist, 2000), than using either measure alone.

Understanding the link from occupationally induced strain to organisational outcomes is important. Since if the supposition is supported that stress does negatively impact organisational functioning and business objectives, then there must be attempts to effectively manage stress. Research on populations involved with driving does provide support for this supposition.

Accidents

There are a number of contributors to accident involvement, but human factors apparently account for 65% of all U.K. road accidents (as cited by Cartwright, Cooper, & Barron, 1996). Accidents involving buses, coaches and minibuses have resulted in 10,781 fatal and non-fatal casualties in the UK in 2002 (Department for Transport, 2003). Increases in psychosocial stressors for bus drivers, in particular time pressure, have been seen to increase accident involvement (Greiner et al., 1998). This may be linked to greater risk taking (Dorn, 2003), which is not helped by reduced quantity of rest breaks (Hamed, Jaradat, & Easa, 1998). Fatigue in general would appear to induce sub-optimal psycho-physiological states which may induce performance breakdown (Sluiter, van der Beek, & Frings-Dresen, 1999). Incorrect gear selection may occur, with such slips of action turning into mistakes impairing situational awareness (e.g., poor judgement of breaking distance at traffic lights, or when timing overtaking manoeuvres) as a result of fatigue in drivers (Brown, 1994). Detection of peripheral lights is also compromised as a result of anxiety, which may reduce central and peripheral task performance. Thus not only is the attentional field narrowed, but susceptibility to distraction is increase (Janelle, Singer, & Williams, 1999). For car drivers, direct stress has been shown to compound violations of traffic laws (Simon & Corbett, 1996). Bus drivers engaging in such violations include speeding, running red and amber traffic lights and not completely stopping at stop signs (Greiner et al., 1998; Kompier, 1996). In fact, Meijman & Kompier (1998) conducted a study that found 57% of bus drivers confessed to regularly exceeding speed limits in suburban areas, whilst 15% of drivers occasionally or regularly ignored local traffic laws.

It is also worth considering that physical health may also mediate the relationship between stress and accident occurrence. Lower back pain in bus drivers has been self-reported to negatively affect driver efficiency (Issever, Onen, Sabuncu, & Altunkaynak, 2002). In fact, traffic accident frequency is greater in hypertensive bus drivers than healthy drivers (Lalberge-Nadeau et al., 1996).

Work absenteeism

It has been established that bus drivers are susceptible to a two to three times greater work absence (both in frequency and duration) than a range of other occupations (Winkleby et al., 1988). Dutch bus drivers have been reported to have at least two times higher levels of work absence than the Dutch national average (Kompier et al., 1990; Mulders, Meijman, O'Hanlon, & Mulder, 1982).

Health and socio-economic factors appear to account for such patterns of work absence. Specifically, Long and Perry (1985) offer three explanations: a) characteristics of the work environment such as long hours and passenger conflict producing occupational stress, b) plenty of opportunities for overtime

which make the benefits of regular attendance unclear, and c) inflexibility in scheduling which may prevent legitimate reasons for taking time off.

Labour turnover

Early retirement from the bus industry has been documented where only 11% of Dutch drivers manage to reach the official retirement age (Kompier et al., 1990). This is supported by another study by Giesser-Weigl and Schmitt (1998) as reported by Göbel, Springer, and Scherff (1998), which found that only 5% of German bus drivers reached retirement in their study, and on average withdrew by the age of 50, with less than 20 years of service. Such studies point to medical disability as the cause of the premature retirement of drivers.

Service quality

Another consequence of impaired attention on-the-job could be evaluated in terms of quality of service provided to customers. It is proposed that stress induces information overload because it forces people to pay special attention. This increased attention promotes cognitive fatigue and depletes energy required for task performance (Cohen, 1980). In fact, in studies of altruism, stress has been shown to induce negative emotions, promote aggression, and reduce altruistic behaviour (Cunningham, Steinberg, & Grev, 1980; Rosenhan, Salovey, & Hargis, 1981; Rule & Nesdale, 1976). Translated into the work of bus drivers, it could be suggested that one potential approach to measuring service quality is noting the number of complaints lodged against a driver, with the notion that poorer service quality would incur a greater likelihood of encountered complaints (higher strain promoting poorer service).

Health behaviours

A personal outcome of job strain can be related to engaging in harmful health behaviours. Firstly, alcohol use has been postulated as a form of coping against job strain (Ragland, Greiner, Krause, Holman, & Fisher, 1995). Ragland's study found that bus drivers with greater service history consumed much more alcohol. In fact a positive and linear relationship was found between service history and quantities of alcohol intake. Moreover, a clear association between consumption and self-reported frequency of job stress was evident. Another study found that burnout (an extreme form of occupational stress) positively correlates with alcohol dependency amongst transit drivers (Cunradi, Greiner, Ragland, & Fisher, 2003). Secondly, there is support that smoking is higher in drivers suffering greater job strain especially in monotonous working conditions (Greiner, Ragland, Krause, & Syme, 1997).

Aims of the study

Though there has been much research on the nature of noxious job characteristics for bus drivers, there has been a largely a piecemeal attempt as looking at the direct effect of job strain on organisational outcomes. Specifically, how does job strain affect the key organisational outcomes of work absence, intention to quit the job, service quality, accidents, and health behaviours? In addition, what factors can account for physical and psychological health of bus drivers?

Method

Participants

A questionnaire was distributed to 1,087 drivers spread over 7 depots. Getting entered into a draw to win a DVD player was offered as an incentive for participation in the survey. The final number of questionnaires returned produced a sample size of 218 individuals. After removing four respondents due to inadequate completion of questions or blatant irregularities in question response, with a further individual who returned a completely blank questionnaire, a total of 213 respondents was further reduced down to 201 (after having removed those whose job status was not exclusively a 'bus driver'). Therefore, the final usable data set was based on 94% male, mean age of 42 (range 20-62), with approximately 8 years of bus driving experience (<1-40 years).

Procedure

Access was negotiated with a selection of bus depots within a transport company during the spring/summer of 2004. An attempt was made to ensure a range of depots in relation to size based on number of bus driver employees. Posters were distributed to depots to alert drivers to the forthcoming survey and to ask for their participation. Individual questionnaire packs were then delivered to the depots and depot managers were asked to distribute one pack to each of their drivers. Each pack contained a questionnaire battery and included statements of support to the research from management,

assurances of confidentiality, a raffle ticket to enter the prize draw, and a pre-paid envelope. Drivers who completed a questionnaire thus individually posted their survey directly back to the researcher. After an initial three weeks had passed since questionnaire distribution, a poster was sent out to depots to chase up non-respondents. After a further two weeks, a final response rate of 20% was achieved. This is considered low, but similar response rates for surveys conducted by the organisation have been reported.

Design

This cross-sectional study was based on self-report measures of job strain, personal health outcomes and personal performance in the job.

Equipment

Measures: A questionnaire battery was put together comprising of the following instruments:

Demographics, work patterns and health behaviours: there were a series of questions obtaining information on age, gender, marital status, education, job title, years as a bus driver, and shift work pattern. In addition, a question asked respondents to rate their weekly level of smoking and drinking (where a five point likert scale with 'none' scored as '0', through to 'everyday' scored as '4').

Job Content Questionnaire, JCQ (Karasek, 1985) - a tool that measures job strain – a dimension, according to the Job Demand/Control model, which is extrapolated from psychological job demands and decision latitude (control). In addition, there are scales that gauge social support (co-worker and supervisor), physical demands, and job insecurity. The model on which the tool is based is claimed to be one of the most influential in stress research to date (Rick, Briner, Daniels, Perryman, & Guppy, 2001). The original questionnaire, the Framingham version, was used because of its brevity over the other versions. The majority of the 27 items have responses assessed with a four point likert scale from 'strongly disagree' to 'strongly agree'. Scoring is based on various formulae. A ratio of job demands and control can be calculated to indicate whether an individual is experiencing job strain.

Effort-Reward Imbalance questionnaire, ERI (Siegrist, 1996) - 23 likert scale items measure perceived effort, perceived reward for a job and 'overcommitment'. High scores relate correspondingly to high levels on each of the dimensions. A ratio is calculated from the effort and reward score, producing a score which indicates whether there is indeed high effort and low reward, thereby suggesting job strain.

Physical Symptoms Inventory, PSI - (Spector & Jex, 1998) - measures the occurrence of physical health symptoms that are linked to psychological distress (e.g., headaches, loss of appetite, trouble sleeping). Respondents are asked to indicate on an 18 item symptom list whether they: didn't experience it, did experience it but saw no doctor, or did experience it and saw a doctor, all in the last 30 days. Three scores are thus derived consisting of: 1) total number of symptoms where no doctor was seen, 2) total number of symptoms where a doctor was seen, and 3) the sum of the previous two. A higher score therefore indicates poorer physical health.

General Health Questionnaire - 12, GHQ-12 (Goldberg, 1972) - suitable for clinical and non-clinical settings, this questionnaire provides a state measure of general psychological distress. Respondents are asked to indicate whether they have experienced certain symptoms of mental health (e.g., depression, worry) over the last few weeks. A few methods of scoring exist, but for the purposes of this study, the 'simple likert' scoring method was adopted whereby the response choices of 'not at all', 'same as usual', 'rather more than usual', and 'much more than usual' were scored 0,1,2,3 respectively. As expressed by Banks et al. (1980), this method produces a less skewed score distribution than the other methods, preferable for conducting multivariate analyses, as well as being more sensitive to the detection of 'cases' from 'normals'.

List of job specific stressors - a list of 39 work stressors were created based on a number of focus groups with bus drivers, in addition to examination of the existing literature. A likert scale response from 1 indicating 'no pressure' to 5 'extreme pressure' was provided.

Work absence - a one-item question: '*how many days have you taken off work due to illness (not including holidays or maternity/paternity leave) in the last 12 month?*'. Respondents were asked to indicate the number of days.

Intention to quit - a one-item question: ‘*How seriously have you considered quitting your job in the last 6 months?*’ was used. Responses were based on a 5-point likert scale from ‘never’ to ‘extremely often’.

Accident rate - a one-item question: ‘*How many traffic accidents (that needed to be recorded by the depot) in the last 12 months have you been involved in where you were judged to be responsible?*’. Respondents were asked to indicate the number of accidents.

Passenger complaints - a one-item question: ‘*How many times have passengers contacted your depot to complain about you in the last 12 months?*’. Respondents were asked to indicate the number of complaints lodged.

Physical violence – a one-item question: ‘*how many cases of physical assault by passengers have you experienced in the last 12 months?*’. Respondents simply had to state the frequency of times personally assaulted.

Individual depot statistics (number of: assaults, accidents, passenger complaints, and days off work) were also collected to allow for comparison with the sample to measure the level of representativeness.

Statistical analysis

Analyses were conducted using a series of independent *t*- tests on the sample, which had been split between high strain bus drivers and no/low strain bus drivers (split according to the sample’s median as described by Landsbergis, Schnall, Warren, Pickering, and Schwartz (1994). Subsequently, the two groups were compared in relation to the individual performance measures. In addition, two multiple regressions were conducted to predict physical and psychological health, entering the predictors collected from the questionnaire into the model using backward method of entry.

Results

Displayed in Table 1 is a list of means, standard deviations, and alpha coefficients for each measure. As can be seen, the reliability coefficients range from a rather low .31 for decision authority, to a maximum of .94 for supervisor support. All coefficients are acceptable except for the decision authority and job insecurity subscales of the JCQ.

Scale (no. of items in brackets)	N	M	SD	α	Possible range
Job Content Questionnaire:					
Decision latitude (9):	185	56.84	10.56	.75	24-96
Skill discretion (6)	189	28.44	5.75	.73	12-48
Decision authority (3)	194	28.49	6.37	.31	12-48
Created skill (3)	195	7.15	1.82	.74	3-12
Psychological job demands (5)	192	49.74	8.77	.58	18-72
Job insecurity (3)	199	5.46	1.70	.44	3-12
Social support (8):					
Co-worker support (4)	197	10.82	2.02	.76	4-16
Supervisor support (4)	196	10.24	3.68	.94	4-16
Physical exertion (3)	199	6.34	1.74	.65	3-12
Physical isometric load (2)	196	5.11	1.64	.86	2-8
ERI Questionnaire:					
Effort (6)	186	13.36	4.95	.81	6-30
Reward (11)	171	43.78	8.75	.85	11-55
Overcommitment (6)	193	13.69	3.86	.78	6-24
GHQ (12)	184	11.44	5.67	.88	0-36
PSI – total of (a) and (b)(18)	201	3.95	3.37	*	0-18
(a) Have symptom but no doctor seen (18)	201	3.49	3.17	*	0-18
(b) Have symptom and doctor seen (18)	201	0.46	1.06	*	0-18

Table 1: Scale means, standard deviations and Cronbach’s alpha coefficients

* Since the measure is classified as a causal indicator scale, individual items are not considered parallel forms of the same underlying construct (even though they may combine to produce the construct of ill health), thus a coefficient alpha is not a suitable index of reliability (Spector & Jex, 1998).

	High Strain Group (N=40)		No/Low Strain Group (N=135)		<i>t</i>	<i>r</i>
	Mean	SD	Mean	SD		
Work absence	11.00	19.00	4.94	9.31	-1.95*	.15
Passenger complaints	0.63	1.02	0.16	0.54	-2.84**	.21
Intention to quit	3.53	1.50	2.38	1.29	-4.76***	.34
Accidents	0.88	1.81	0.33	0.67	-1.88*	.14
Health: smoking	1.48	1.84	1.10	1.75	-1.19	.09
Health: alcohol	0.90	0.90	0.66	0.81	-1.61 ^Δ	.12

^Δ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$ (all one-tailed hypotheses)

Table 2: High strain drivers compared to no/low strain drivers on organisational/personal outcomes.

As can be seen from Table 2, when using the job strain as measured by the JCQ to split sample into the high strain group (quadrant ‘high strain’) and the rest of the sample (‘relaxed’, ‘active’ and ‘passive’ quadrants), it becomes evident that there are significant differences between them in relation to key organisational outcomes. Those experiencing high strain had greater rates of work absence, more complaints lodged by passengers, a stronger desire to quit the job, and a higher chance of accident involvement where they would be judged to be responsible. In addition, the personal outcome of alcohol use was significantly higher for those under strain. However, for smoking use, the difference was non significant. The most substantive finding based on results from Pearson’s correlation coefficient calculations of effect sizes (last column in table) is ‘intention to quit’ which has a medium effect size (as classed by Cohen, 1992). All other significant findings had a small effect size.

Models	Predictor variables	Standard Beta	<i>t</i>
Remaining predictors ^a	PSI (physical symptoms)	.36	4.87 ***
	Overcommitment	.30	3.99 ***
	Co-worker support	-.19	-2.64 **
	Skill discretion	-.17	-2.32 *
	Intention to quit	.14	1.80 ^Δ

$F(5,102) = 21.14, p < .001, R^2 = 0.51$

^aThese are the predictors left after all other predictors which are not making a significant contribution to the model are removed.

^Δ $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 3: Multiple regression of psychological health

Multiple regression was applied using backward entry with the criterion measure of psychological health (GHQ score). Predictors were subscales of the questionnaire battery. As can be seen in Table 3, a R^2 value equivalent to 51% is produced with 5 predictors. Physical health seems to be the most significant contributor to psychological health where high number of symptoms and hence poor physical well-being corresponds with poor psychological well-being. Overcommitment seems to play an important role too, where high and exaggerated levels of striving are related to poor health. Interestingly co-worker support but not supervisor support was seen to be contributing to good mental health, where low levels of support from colleagues corresponds with poor psychological health. Skill discretion appears to have a negative relationship whereby being able to develop abilities on-the-job are linked with positive psychological health. Finally, in the model, a high desire to leave the job is associated with a higher number of poor health symptoms.

Models	Predictor variables	Standard Beta	<i>t</i>
1 st Block	Age	-.16	-1.97 *
2 nd Block (remaining predictors ^a)	GHQ (psychological health)	.53	6.55 ***
	Times assaulted	.17	2.09 *

$F(3, 104) = 16.77, p < .001, R^2 = .33$

^a These are the predictors left after all other predictors which are not making a significant contribution to the model are removed.

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 4: Hierarchical multiple regression of physical symptoms

In Table 4, the results of a hierarchical multiple regression are shown for the criterion variable of physical health (where a high score indicates poor health). In the first block, age was entered in order to control for its effects. With the addition of all the other predictors entered, again, using the backward method of entry, only two variables make an additional significant contribution to the model. What is particularly interesting here is not that age does have an effect, but the direction of the relationship of this variable with physical health. Specifically, this negative relationship suggests younger drivers are apt to have poorer physical health. Also, psychological health appears to have a very significant positive relationship with physical well-being, where poor mental health coincides with poor physical health. Finally, the results show that being assaulted is connected to higher number of physical symptoms. All together, these three predictors capture 33% of the variance in physical health.

Discussion

The role of urban bus driving can be a hazardous one for psychological and physical health. A number of studies have found relationships between psychosocial stressors evident in the job, with the well-being of bus drivers and with organisational performance. This study lends further support to this statement.

The results verify the idea that occupational stress negatively impacts on personal health habits (higher levels of alcohol use), and key organisational outcomes. Drivers under strain drank marginally more than no/low strain drivers. The former also had higher level of work absence. Certainly, such drivers had a much stronger desire to leave the organisation. Whether such intention is translated into behaviour is another matter, but from an organisational viewpoint, employees who want to stay are much more desirable than employees who want to leave. Moreover, there were higher levels of passenger complaints for drivers under strain. This compromise in service levels is also critical in an industry where high levels of service quality must be maintained. Accidents were also higher for the strained bus drivers. Again, the transportation of people is a business where safety must be a priority and therefore the link between strain and accidents should warrant attention. So from this particular analysis, past research has been confirmed. However, the personal health behaviour of smoking was not seen to be different from those drivers classed as suffering job strain versus those drivers who were not under strain. With the increasing awareness that tobacco use is related to a range of adverse health outcomes such as cancer, perhaps smoking is not as prevalent today as it was in the past. In fact, the average response to the frequency of smoking the sample reported overall was 'once or twice a week'. Thus, drivers who might be under strain may be looking towards other ways of coping with job pressures, such as alcohol use, as shown in this study.

From the results of this study, with respects to physical and psychological health, it can be suggested that certain factors are important to secure a healthy workforce. Positive psychological health is related first and foremost to good physical health. In addition, low levels of overcommitment should be encouraged. This would suggest potential training for individuals identified to have excessive levels of striving in their job to allow for better coping. Promoting high levels of co-worker support appears also to be important. However, this may be difficult because as highlighted by Evans (1994), the job of bus driving does not facilitate the opportunity to spend much time with work colleagues since the job is performed alone. Next, high skill discretion where drivers are able to learn new skills and develop existing ones would be ideal. Finally, it is quite logical to see that low intention to quit the job evidently helps promote good mental health (or vice-versa).

Positive physical functioning appears to correspond to conditions where there is good psychological well-being, and no exposure to physical violence. It is relevant to note the appearance of physical assault here. Studies have demonstrated that encounters of physical assault cause the victim to have depression (Fisher & Jacoby, 1992), anxiety (Driscoll, Worthington, & Hurrell, 1995), and enduring fatigue (Hogh, Borg, & Mikkelsen, 2003). So, it can be understood how being safe at work and not being exposed to assault will have positive effects on health. Also, as the results found, a higher age seemed to benefit physical health. This would seem to challenge the mainstream idea that higher age is associated with more physical health symptoms since the body generally declines with age. So what could explain this counter-intuitive finding? The answer may be related to the so called 'healthy worker

effect'. This effect is concerned with the notion that in demanding jobs, only those workers who adapt and are able to manage the job will remain in the job. Workers who find they cannot tolerate the working conditions and their assigned role will end up suffering greater work absence and eventually, sooner or later, take leave of their job in order to seek alternative employment. Therefore, in studies of occupational health, any workforce surveyed will likely consist of individuals who generally have good health. Those unhealthy workers who do not remain in the organisation will remain untapped. The younger bus drivers may therefore be manifesting their initial adaptation to the demands of the working conditions (long shifts, shift pattern rotation, fatigue, etc), whilst older drivers (who usually have been in their role for much longer) have managed to adapt and therefore show a fewer number of poor physical health symptoms in general.

As demonstrated in the regression models, psychological and physical health have a strong bearing on each other. This would seem to support the belief that mental health affects physical health and vice-versa (Melamed, 1995). Such a conclusion thus means that by improving psychological health (via the factors witness in the regression model) will have knock on effects on physical health, thus enhancing the well-being of bus drivers. The use of training for drivers to enhance their coping of occupational strain and improving the socio-technical aspects of the job for drivers (e.g., allowing drivers proper meal and rest breaks, trying to employ fixed shift patterns, using two men crews) should be warranted. Such improvements will then likely lead to reduced operator costs in terms of lowered employee work absence and labour turnover and promote a safer, more efficient and customer orientated service for passengers.

Limitations and Future Recommendations

It should be noted that from Table 1 in the results section, the alpha coefficients for scale reliability were rather low for 'decision latitude' and for 'job security'. In revisiting the JCQ, it was observed that such a finding might be related to the fact that there are items in these subscales that have reversed questioning. This may have possibly led to inaccurate understanding by respondents and therefore their answers may have not been accurately recorded. Since statistical analyses is based on the idea of accurate measurement of attitudes and behaviours, then it could be proposed that alternative instruments that have simpler worded questions could be justifiably employed.

The response rate was lower than ideal, though it should be acknowledged that the gender proportions in the sample reflected the exact same percentages for the total bus driving workforce in the company. Moreover, given that: a) the target sample were not paid nor given official time off to complete the questionnaire, b) the length of the questionnaire and thus time needed to complete it, and c) by the nature of their job, bus drivers are not well versed to completing questionnaires, the final sample size was deemed to be of an appropriate size for the aims of this study. But generalising the results from this study should be conducted cautiously, since it cannot be precluded that only unhealthy drivers took time to complete the survey. Nor can the idea that it was only healthier drivers that decided to respond. Therefore, a future study attempting to replicate the findings herein would benefit from capturing a sample where response rates were much higher.

Due to the length of the questionnaire battery employed in this study, there were a few other measures that could not be accommodated. The use of self-report measures of job strain introduces the suggestion that negative affectivity (NA) should be measured concurrently. This construct is proposed to be a mood dispositional dimension which reflects pervasive individual differences in negative emotionality and self-concept (Watson & Clark, 1984), which is seen by some researchers to be a nuisance variable in self-report measurements of job strain, confounding the relationship between stress and well-being (Payne, 1988). Furthermore, a measure of social desirability could have been usefully employed by instruments such as the Marlowe-Crowne Social Desirability scale (Crowne & Marlowe, 1960), so as to ensure that participants were not responding in biased ways.

The reliance of self-report could be argued to give rise to unreliable reports of strain and personal performance indicators. Future research would benefit from more objective measures of job strain by perhaps adopting physiological indicators, though the intrusiveness of such measures must be weighed up in their use. More objective measures of performance are also warranted, perhaps obtaining actual records of employees as indicators rather than relying on self-reported scores. However, having collected official depot statistics (at the depot level and not at the individual level) from all but one of the seven depots, the mean value for each performance indicator could be calculated for a theoretical 100% response rate sample. Thus, the depot mean was compared to the actual mean values for

performance indicators for the actual sample obtained (minus the individuals from the seventh depot). Although this is a rather crude method to check for validity of the responses given by participants, it is a useful approach to evaluate any large inflation or suppression by respondents as a result of social desirability. In comparing the official means with the sample means, no major discrepancies existed, therefore confidence in the self-reported performance indicators is relatively high.

Another limitation is that a cross-sectional design does not scientifically explain cause and effect. Therefore, for instance is it job strain that predicts likelihood of greater accident exposure, or does accident involvement precipitate a disposition to greater strain? The use of longitudinal methods will help to clarify the interpretations made from the results of this research. However, despite the cross-sectional method employed and use of survey to measure variables, the results do largely agree with existing literature at the individual level of stress and well-being, and at the organisational level of occupational stress and performance.

Besides these, further research to evaluate whether a reduction in occupational strain will lead to performance improvements should be conducted to further the link that has been established in this study that strain negatively impacts on individual performance and thus impacts on organisational objectives.

Conclusion

This research provides further support for the negative effects of job strain on organisational outcomes. The effect of job strain on the personal health habits of drivers was not so clear however. Overall, this study points to benefits that could be accrued from reducing psychosocial strain of the job environment for urban bus drivers.

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