

The Impact of Occupational Stress on Employees' Somatic Symptoms, Job Anxiety and Employee's Turnover Intention—An Empirical Study

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The aim of this study is to analyse the reliability and validity of job factors in relation to the impact of occupational stress on employees' somatic symptoms, job anxiety and turnover intention through a two time cross-sectional study of the Water and Power Development Authority (WAPDA). The method employed consisted of two times self-reported cross-sectional surveys that covered 420 respondents at T1 and 388 respondents at T2. Results: Appropriate internal consistencies of the seven scales i.e. demands, control, job stress, social supports, employees' somatic symptoms, job anxiety and turnover intention were obtained. Zero-order correlation and linear and multiple regressions analysis replicated the theoretically assumed structure of the job factors and employees' somatic symptoms, job anxiety and turnover intention construct in men and women collectively. Evidence of criterion validity was obtained from cross-correlations of the scales and from their linear and multiple regression analysis. Finally, all seven measures were associated with a highly significant ratio of job stress, and the effect was strongest for the job stress ratio as predicted by the fundamental theory of Karasek. Conclusion: We examine how users, who are assimilating job factors into their work, experience the level of work related demands in their jobs, the level of autonomy/control they have over their work, and how these relate to outcomes, such as employees' somatic symptoms, job anxiety and turnover intention. Based on the results of this study the seven-version scale is considered reliable and serves as a valid instrument for measuring psychosocial pressure in work environment. These outcomes and measures are applicable to all services and manufacturing industries.

Keywords: Work Overload, Work Control, Organisational Support, Job Stress, Somatic Symptoms, Job Anxiety, and Employees Turnover Intention (ETI)

INTRODUCTION

Occupational stress has been documented as one of the most significant workplace hazards for employees in Water and Power Development Authority (WAPDA) of Pakistan. WAPDA is one of the largest commercial organisation with the sole authority to distribute power nation wide and employs a work force of 146625 employees—i.e. 134632 in Power. 9207 in Water wing 9207 and 2786 in common services (*Source:* Manpower Statistics, 2007-8). WAPDA has three power sources: hydro- power with production capacity of 6500 MW; WAPDA's own thermal power generation with

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production capacity 5000 MW; and the Independent Power Producers (IPP) with production capacity of 6000 MW in the private sector. The power wing is the largest part of WAPDA comprising 92 percent of total manpower engaged in multifarious tasks to provide electricity to commercial and domestic consumers. After preliminary investigation, literature review, and pilot study we conclude that the main internal problems of the Power wing of WAPDA that contribute to occupational stress are:

- (1) Line losses ranging from 24 percent to 25 percent of Distribution Companies (DISCOs) due to weak control over work environment and lack of motivation among employees;
- (2) Work environment, work control, job description, salaries structure, promotion policies, routine managerial policies, customer relationship; and
- (3) Lack of training in advanced computer courses to staff at WAPDA Staff College, Islamabad and WAPDA Engineering Academy, Faisalabad to meet the requirements of advanced technology and re-engineering of the work environment (*Source: Standing Operating Procedure, 2005*).

It is necessary to investigate job demands and job control of employees to find the root causes of stressors i.e. which specific demands and which specific controls contribute more to job stress.

Cartwright and Cooper (1997) and Bradley (2004) have pointed out that in the short term stress can lead to emotional distress, stomach disorders, headaches, somatic problems, sleeplessness, and loss of energy and, in the long term, it can contribute to serious illness and even premature death, particularly from some cardiovascular disease. Moreover, occupational stress has become endemic to the modern workplace, as national surveys (in the US) have shown that a large proportion of workers report feeling highly stressed at work [see Sauter, *et al.* (1999)]. There are a number of job factors, called *job stressors*, that make work environment stressful. Some stressors are associated with the nature of work environment. Other stressors are perceived through interpersonal relationships at workplace, such as conflicts with colleagues and conflicts with supervisors.

Several types of outcomes may result from the situations represented by the two diagonals. For example exhaustion, and psychosomatic complaints relating to strain area, and work motivation, learning, and job satisfaction in the case of the active learning area of the above diagram [de Jonge, *et al.* (1995)]. Unfortunately, cross-sectional as well as longitudinal studies on the JDCA model have not been unanimous in their results. Researches on the Karasek's original JDC model, the predicted results are obtained particularly with cardiovascular disease [Johnson (1986); Astrand, Hanson, and Isacson (1989); Johnson and Hall (1988); Johnson, *et al.* (1989)], whereas for somatic complaints and psychological strain, the results are contradictory. Andries, *et al.* (1996) claimed to support the JDCA model; they merely compared different *combinations* of the three variables and did not specifically test the 3-way multiplicative *interaction* relationship. On the other side of the picture, the results of the study by Parkes, *et al.* (1994) were mixed; the models 'worked' for somatic symptoms but not for job satisfaction or

improved productivity. Past researches on JDCA model have identified many antecedents and correlates of stress, and have confirmed that the experience of stress over prolonged periods of time is associated with a range of adverse consequences, including physical upsets, psychological pressure, interpersonal conflicts, performance deficits, absenteeism and turnover of employees [Kahn and Byosiere (1992); Travers (2001)].

The independent effects of job demands have been verified using a wide range of strain measures including job stress/anxiety/dissatisfaction [Kalimo and Vuori (1991); Landsbergis, *et al.* (1992); Parker and Sprigg (1998); Tattersall and Farmer (1995); Wall, *et al.* (1996); Williams and Alliger (1994); Vermeulen and Mustard (2000)], emotional exhaustion and/or burnout [de Rijk, Le Blanc, and Schaufeli (1998); Karasek (1979); Pomaki and Anagnostopoulou (2001); Rafferty, Friend and Landsbergis (2001)], general psychological health [Tyler and Cushway (1998); Beehr, *et al.* (2001); Morrison, Payne, and Wall (2001)], and somatic complaints/ physical illnesses [Wall, *et al.* (1996); de Croon, Van Der Beek, Blonk, and Frings-Dresen (2000)].

Most of the researchers suggest that the availability of job control can have moderate effects upon levels of job satisfaction and morale, as well as somewhat weaker effects upon work withdrawal behaviours, self-reported somatic health and psychological well-being of employees [Hart, Wearing, and Conn (1995); Spector (1986); Kasl (1989); Parkes (1989); Clegg and Jackson (1990); Landy (1992) and Pearson (1992)].

The effects of job control may also vary with a range of personality variables: for example, Hurrell and Lindstrom (1992) found that job control predicted somatic complaints differentially according to participants' age and locus of job control. One job strain researcher, Repetti (1993) noted that (a) supervisor support is more strongly and more consistently related to both job strain and anxiety than is collegial support, (b) both supervisor and collegial support are correlated, but not consistently or strongly, with somatic disorders and coronary heart disease risk factors, and (c) many of these relationships become non-significant when other stressors (e.g., work job demands, uncertain career future) are job controlled by organisation.

Payne and Fletcher (1983) pointed out five measures of job strain (depression, anxiety, obsession, somatic complaints and cognitive failures) and found the main effect for job demands on anxiety, and main effects for job control on all four factors of the other strain outcomes. Similarly, Fletcher and Jones (1993) establish job demands-support additive effects on anxiety and depression for both males and females, but, when job satisfaction was the criterion, the additive effect was obtained for females only. Likewise, Landsbergis, *et al.* (1992) established that job demands and support jointly predicted anxiety, depressive symptoms and job dissatisfaction, but only support predicted psychological outcomes. For example, in a study of strain amongst nurses, McIntosh (1990) entered both job control (autonomy) and supervisor support in standard regression analyses, and found that both job factors predicted job satisfaction, but only level job control predicted anxiety. On the other hand, Landsbergis, *et al.* (1992) suggested that job control and support contributed jointly to the prediction of job satisfaction, but only support predicted level of anxiety and only job control predicted job involvement.

Parkes, *et al.* (1994) pointed out an additive effect on job satisfaction, but not on somatic symptoms, in a sample of health-care workers. Whereas, Moyle (1998) reported, in a longitudinal study, that support predicted job satisfaction contemporaneously and prospectively, whereas job control predicted this outcome contemporaneously. The factors of strain assessed in past research over the period of fifty years, fall into three categories: emotional/psychological (e.g., tension, frustration, anger, hostility, anxiety, job dissatisfaction, reductions in morale and general well-being, burnout, emotional exhaustion, disturbed cognitive functioning and lack of motivation), behavioural (e.g., absenteeism, sleep disturbances, smoking, alcohol consumption, medication consumption, other substance abuse, reductions in work performance, accidents, medical visits, and turnover), and somatic symptoms (e.g., immune functioning, cardiovascular functions, illness symptoms, physical health risk factors, and physical exhaustion). [Bradley (2004)].

In another view, Sauter, *et al.* (1983) suggested that both job control and support contributed significantly to the prediction of job dissatisfaction, at the same time as only support predicted ill-health symptoms and somatic complaints. Karasek and Theorell (1990) noted that three job factors, job demands, job control and social support, jointly establish worker strain. Both Warr (1990) and Wall, *et al.* (1996) found the impact of job demands and job control upon levels of anxiety, depression and job satisfaction in separate samples of over 1000 British workers. Conversely, LaRocco, *et al.* (1980) suggested that the buffering role of social support varies with the type of outcome: social support buffers the relationship between stressors and such indicators of strain as stress, depression, somatic complaints, but it does not have a significant buffering effect on stressor-job satisfaction relationships. However, Karasek proposed that accumulated anxiety, as being similar to negative affectivity, was a potential outcome of work environment. Watson and Pennebaker's (1989) claimed that correlations between stressors and criterion variables (e.g., somatic complaints) are overstated because NA acts as an (antecedent) influence on both sets of variables.

HYPOTHESES

According to the objectives of our study we predicted the following six hypotheses:

- H1-Job demands are positively associated with Somatic Symptoms, Job Anxiety and Turnover Intention.
- H2-Job control is negatively associated with Somatic Symptoms, Job Anxiety and Turnover Intention.
- H3-Social support is negatively related to Somatic Symptoms, Job Anxiety and Turnover Intention.
- H4-Job control and social supports moderate the relationship between demands and Somatic Symptoms, Job Anxiety and Turnover Intention.
- H5-The additive effects of job demands and job control predict levels of Somatic Symptoms, Job Anxiety and Turnover Intention better than does the main effect alone.
- H6-The additive effects of job demands and social support predict levels of Somatic Symptoms, Job Anxiety and Turnover Intention better than does the main effect alone.

H7- The additive effect of job demands, job control and job social supports predict levels of Somatic Symptoms, Job Anxiety and Turnover Intention better than does the main effect alone.

RESEARCH METHOD

Participants and Procedure

This two time cross-sectional study is based on data obtained from two random samples consisting of nine distribution companies (DISCOs) of WAPDA working in all parts of Pakistan, except the Karachi region. The Employees' Statistical Reckoning (2007–08) personnel records were used to select a simple random sample of 1000 working as regular employees in DISCOs. The target population was all those having graduate and post-graduate qualifications working on various positions from BPS-9 to BPS-17. Because the number of employees between these two ends of the basic pay scales are 80 percent of the total they have a significant role in WAPDA performance. In selecting an appropriate interval between data collection points, it was important to ensure that the time lag was long enough (9 months) to permit an effect to occur without being so long as to lose touch with a large proportion of Time 1 respondents. Several factors were considered in selecting an appropriate time lag. First the intervals used in previous cross-sectional research were identified. The patterns of change observed and attrition rates reported in this past research were examined. There was also a need to ensure that the second wave also coincided with events because less number of employees have been transferred or have resigned or retired from service. On the basis of the information received, the decision was taken to dispatch the Time 2 questionnaires at any time, and thus use an interval of approximately nine months between the two phases of data collection. This time lag provided ample opportunity for the respondents' job conditions to have an impact. It ensured that both questionnaires were completed in the months of the two years that were similar in environment, and avoided the large attrition problems likely to be associated with a change of seasonal climate in the country, particularly June to August. It also follows the practice employed in several past occupational stress studies [e.g., Dormann and Zapf (1999); Schonfeld (1992, 2000); Bradley (2004)].

Finally, it is noted that there was no structured, planned intervention in both studies. No natural and minor organisational changes took place, which had to do with some organisational renewal and personnel changes between the two waves. The 1000 selected employees were delivered personally a copy of the research materials both at T1 and T2. Questionnaires were returned by 401 at T1 and 388 at T2 of these employees with nine month time gap, and all of these were usable. The response rate was 40 percent at T1 and 38 percent at T2. Demographics at T1 showed that 95 percent of the sample was male, and mean age was 26.0 years ($SD = 7.1$, range 24–45). The mean working time in the current organisation was 10 years ($SD = 8.33$). The demographic characteristics of the respondents in the second study showed that the ages ranged from 25–48 years ($M = 29$, $SD = 10.8$). Most of the respondents were male: 98 percent, and the mean working time was 11 years ($SD = 6$).

MEASUREMENT OF JOB FACTORS

The items measuring demands, control and social support developed for use in study 1 and study 2 were subjected to correlation and regression analyses. On the basis of

these analyses, 16 of the original total demands, total control, job stress and 8 of social support items, measuring four different job factor domains were selected for use in Study 1 and 2.

Job Demands

Job demands were measured by using a sub-dimension of Karasek, *et al.* (1985), Job Content Survey and Bradley (2004). This dimension consists of 16 items scored on a 5-point Likert scale. Respondents are asked to rate their present job on a 5-point Likert scale ranging from 1= completely false to 5= completely true. The reliability and validity of the measure are available elsewhere [Karasek, *et al.* (1985)]. Internal reliability for this scale with the current sample was $\alpha = 0.81$ [Daryl B. O'Connor, *et al.* (2000)]. Cammann, *et al.* (1983) reported the coefficient of reliability at 0.65, and Bradley (2004) reported a reliability of 0.746 and weighted reliability of 0.939. The reliability coefficients produced by this research for total job demands subscales consisted of $[\alpha] T1 = 0.94$ and $T2 = 0.90$.

Job Control

We used Ganster's (1989) validated measure of job control. Ganster's original scale had 22 items, each asking the subject how much control they possessed over the various facets of their work. We reduced the scale to 16 items, removing those items that were not applicable to the employees in our sample; these included questions about control over job demands. The control-scale consisted of two dimensions; skills discretion and decision authority. *Skills discretion* was measured by four items ("keep learning new things", "job requires skill", "job requires creativity", "repetitive work", control over the physical conditions of one's work station, or control over the ability to decorate or personalise the work area. *Decision authority* was measured by some items ("have freedom to make decisions", "can choose how to perform work"), with Cronbach's alpha of .70. Scores on the items were averaged to provide an aggregate index of the amount of control perceived they had over their job, a high score indicates greater perceived control. All the items were scaled on a five-point Likert scale, ranging from 1 = have virtually no control to 5 = have complete control. Ganster (1989) reported internal reliability for this scale of also 0.85 and Bradley (2004) reported a reliability of 0.824 and weighted reliability of 0.947. The reliability coefficients produced by this research for total job control subscales consisted of $[\alpha] T1 = 0.95$ and $T2 = 0.94$.

Social Support

Social support was measured using Bradley, (2004), Caplan, Cobb, French, Van Harrison, and Pinneau's (1975) Social Support Scale and revised social support scale. This measure includes two subscales: social support from supervisor and social support from work colleagues. The measure asks the respondents to identify the extent to which four items of support are received from each of these two sources. Example items include: How much do your department administration staffs go out of their way to make life easier for you? And how much do your colleagues go out of their way to make easier for you? The participants responded on a five-point Likert scale where 1 = not at all to 5 = very much. High scores indicate high levels of social support. The measures' internal consistency was tested with Cronbach's alpha statistic. The reliability coefficients

produced by this research for the two social support subscales consisted of $[\alpha] = T1$ 0.89 and $T2$ 0.88 (supervisor) and $[\alpha] = T1$ 0.93 and $T2$ 0.92 (colleagues). The Cronbach estimate of reliability for the non-commissioned officers support scale was 0.87 whereas Bradley (2004) reported reliability of 0.887 (supervisor) and 0.903 (colleague). Caplan, *et al.* report reliability coefficients of 0.83 for the supervisor support and 0.73 for the colleague support scales. Internal consistency reported by subsequent researchers is typically in excess of 0.70, and often approximates to 0.90.

Occupational Stress

Subjective stress was measured by a four-item scale developed by Motowidlo, Packard, and Manning (1986) as adopted by Bradley (2004). An illustrative item is "I feel a great deal of stress because of my job". Responses were on a five-point scale from 1 (strongly disagree) to 5 (strongly agree). Motowidlo, *et al.* reported a coefficient alpha of 0.83 for this scale. Bradley reported a coefficient alpha of 0.898 for this scale. The reliability coefficients produced by this research for job stress subscales consisted of $[\alpha]$ $T1 = 0.92$ and $T2 = 0.91$.

Job Anxiety

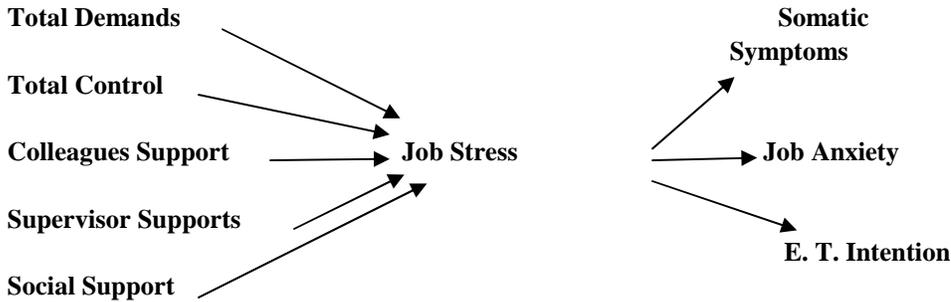
Job anxiety was measured using Spielberger, Gurush, Lusterne, Vagg, and Jacobs's (1983), Cox, Russell, and Robb (1998, 1999) State Anxiety Scale. Instructions were modified as suggested by Spector (1987) to focus respondents' attention on the work environment. To minimise respondent burden, and in line with several previous studies [e.g., Bradley (2004); Beehr, *et al.* (2000); Dollard and Winefield (1995); Spector and O'Connell (1994)], a 10-item version of the scale was used. Responses were on a five-point scale from 1 = not at all to 5 = extremely. Use of the scale is supported by extensive reliability and validity data reported in the test manual [Spielberger, *et al.* (1983)]. Past researchers who have used the scale [e.g., Bradley (2004); Elsass and Veiga (1997); Jex and Spector (1996); Jimmieson and Terry (1993); Landsbergis, *et al.* (1992); McIntosh (1990); Spector (1987a); Spector, *et al.* (1988); Steptoe, *et al.* (1993)] report reliability coefficients ranging from approximately 0.80 to in excess of 0.90. Beehr, *et al.* Dollard and Winefield, and Spector and O'Connell all reported an alpha coefficient of 0.89 for shortened versions of the scale. Bradley (2004) reported an alpha coefficient of 0.965 for this scale. The reliability coefficients produced by this research for total tension anxiety scales consisted of $[\alpha]$ $T1 = 0.72$ and $T2 = 0.58$.

Somatic Symptoms

A physical health checklist (see Appendix E-3 from E1 to E10) was developed based on similar scales used by Motowidlo, *et al.* (1986), Pierce and Molloy (1990), Spector (1987), University of Melbourne (1990), Daryl B. O'Connor, *et al.* (2000), Checklist 90-R (SCL-90-R, Derogatis, *et al.* (1973) and Bradley (2004). In selecting the scale, distributions of participants' responses in past research were examined to identify items that have strong floor effects. To limit the length of the current scale, ten items were selected. These ten-item versions of the scale were included in the quantitative pilot study at the beginning of the first research study. Employees reported the frequency with which they experienced each symptom using a five-point scale, ranging from 1 (not at

all) to 5 (once a week). Some of the items were shown to be non- discriminating and were deleted from the list. Reliability and validity data is reported by Derogatis, *et al.* (1973). Internal reliability for this scale with this sample was a =0.88. Bradley (2004) reported a reliability coefficient of .886. The reliability coefficients produced by this research for somatic symptoms scales consisted of [alpha] T1 =0.92 and T2= 0.86.

Research Design



Tests of Job Stress Hypotheses

Correlation Analyses

Table 1 shows the zero-order correlations between the total job factors and job stress outcomes. The three job factors variables were highly correlated (see tables) with Job Stress. Job demands and its sub-scales, were high positively and significantly related to the expected job factors and job stress, whilst job control and social supports emphasis were also negatively (and slightly less significant) related to job demands and job stress. Furthermore, the relative magnitude of these bi-variate correlations was consistent with original predictions. High levels of all job stress variables were associated with social supports, although the correlation between employees demands at T2 and job factors emphasis was slightly less significant.

Table 1

Correlation Matrix (N=402 and 388)

S. No.	Job Factors	Time Variables																		
		Time 1									Time 2									
		1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9	
1.	Total Demands	1									1									
2.	Total Control	-.77	1								-.71	1								
3.	Colleagues Support	-.83	.73	1							-.78	.70	1							
4.	Supervisor Support	-.80	.71	.88	1						-.56	.50	.62	1						
5.	Social Supports	-.83	.74	.96	.98	1					-.62	.46	.77	.65	1					
6.	Job Stress	.83	-.75	-.84	-.85	-.87	1				.82	-.74	-.84	-.69	-.66	1				
7.	Somatic Symptom	.69	-.63	-.74	-.70	-.70	.76	1			.70	-.64	-.72	-.56	-.57	.77	1			
8.	Job Anxiety	.74	-.64	-.69	-.72	-.77	.75	.68	1		.69	-.61	-.77	-.54	-.59	.73	.66	1		
9.	E.T. Intention	.82	-.75	-.84	-.81	-.84	.82	.72	.77	1	.82	-.73	-.84	-.66	-.68	.86	.78	.79	1	

Linear and Multiple Regression Analyses

Tables 2 show that, at T1, and T2 the job factors explained significant amount of the variance in Job Stress. These variances were analysed as under:

Table 2
*Hierarchical Regression Analyses of Job Factors Scales upon
Job Predictors of Model and their Interactions*

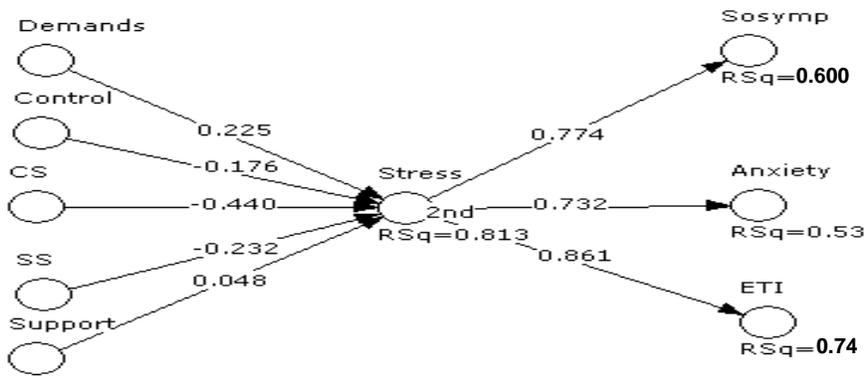
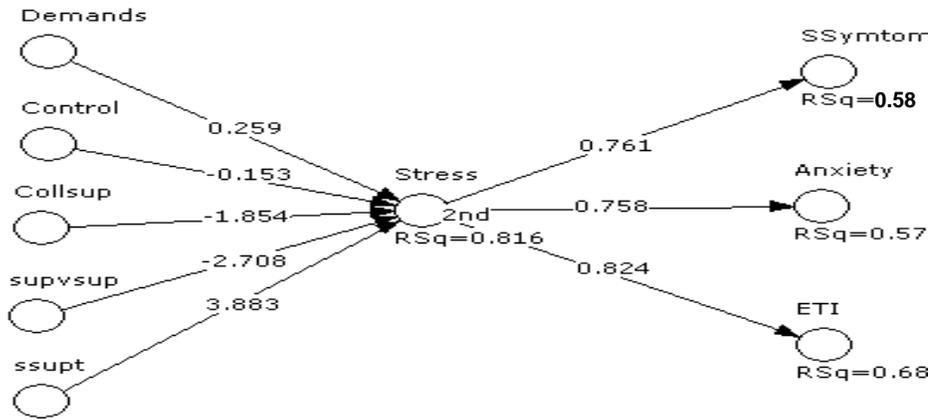
Independent	Dependent	Time 1 (N = 401)					Time 2 (N = 388)						
		β	SE β	Beta	t-Values	R ² (Adjusted)	F-Values	β	SE β	Beta	t-Values	R ² (Adjusted)	F-Values
Total Demands	Somatic Symptoms	.66	.034	.70**	19.55	.48	382.17**	.82	.03	.73	21.01	.53	441.41
Total Control	Somatic Symptoms	-.52	.032	-.63**	-16.42	.40	268.57**	-.56	.03	-.64	-16.46	.41	270.94
Social Support	Somatic Symptoms	-.56	.025	-.74***	-22.41	.55	501.90**	-.63	.04	-.58	-13.96	.33	195.06
Total Demands	Job Anxiety	.46	.02	.75**	22.56	.56	509.08**	.55	.02	.73	21.14	.54	447.02
Total Control	Job Anxiety	-.35	.020	-.65**	-16.97	.42	288.16***	-.36	.02	-.62	-15.39	.38	236.91
Social Support	Job Anxiety	-.38	.016	-.78**	-24.59	.60	604.36***	-.44	.03	-.60	-14.72	.36	216.89
Total Demands	E.T. Intention	1.07	.037	.83***	29.19	.68	842.09***	1.30	.04	.84	31.43	.72	988.03
Total Control	E.T. Intention	-.83	.039	-.72***	-20.78	.52	431.78***	-.88	.04	-.73	-21.47	.54	461.03
Social Support	E.T. Intention	-.87	.027	-.85**	-31.95	.72	1021.16**	-1.02	.05	-.68	-18.71	.47	350.11
Demands	Somatic Symptoms	.18	.06	.19	2.94			.49	.06	.43	7.59		
Control		-.09	.04	-.11	-2.15			-.19	.04	-.22	-4.42		
Support	Job Anxiety	-.37	.04	-.50	-8.03	.58	182.83	-.21	.04	-.19	-4.50	.57	174.01
Demands		.18	.03	.30	4.97			.35	.04	.46	8.09		
Control	E.T. Intention	-.03	.02	-.05	-1.14			-.09	.03	-.16	-3.18		
Support		-.24	.02	-.48	-8.26	.63	4.98	-.16	.03	-.22	-5.24	.57	174.59
Demands	E.T. Intention	.43	.06	.33	8.86			.77	.06	.50	12.11		
Control		-.10	.04	-.09	-2.27			-.29	.04	-.24	-6.70		
Support		-.51	.04	-.49	-10.71	.76	430.07	-.37	.04	-.25	-8.19	.78	456.87

Note: β = Unstandardised Co-efficient of Regression. SE β = Standard Errors in Beta (unstandardised). Beta = Standardised coefficients. All Beta and F values are significance at $p < .001$.

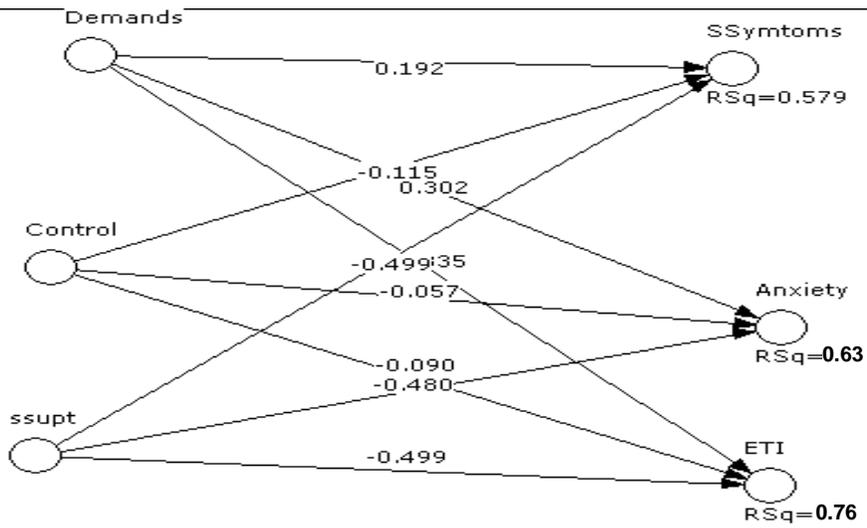
Hierarchical multiple regression analyses were performed to assess the effects of the various job factors on job stress. Main, quadratic and interaction effects were explored separately each for job demands, job control and social supports. This was done because each variable has separate entity and requisites. All these analyses used the T1 and T2 data to develop the relationship between job factors and job stress variables. Table 2 summarises findings from the main and additive analyses. These regression models explained significant and consistent variances in various sub-group domain analyses, but slightly smaller proportions of the variances in employees' Job Stress. The Job Stress dimensions were associated with significant ($p < .001$) R² adjusted values when entered together as a block in predicting each of the job factors. Job Stress predicted all job factors particularly supervisor support ($p < .01$), but smaller prediction in qualitative demands. Social supports (colleagues + supervisor) were also emphasised by the entire job factors especially additive effects of job factors. These findings are consistent with the above developed hypothesis' main effect of job factors on job stress.

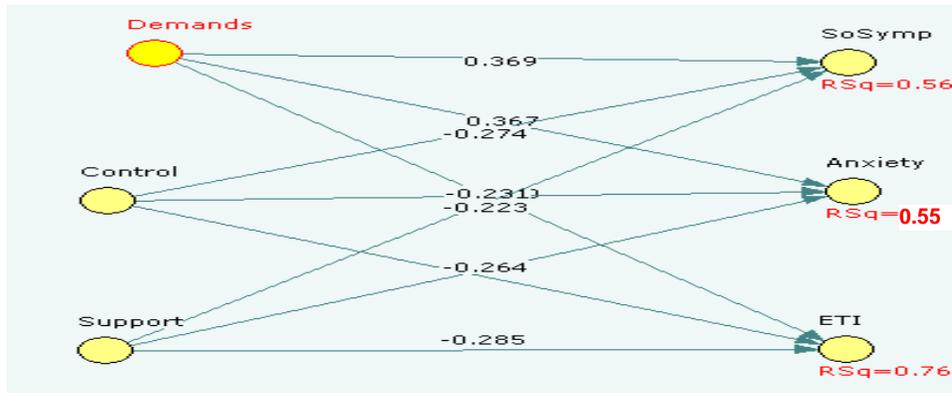
Modelling Analyses

Two principal models were tested using PLS (partial least square). All models assumed that job demands and control co-varied or demands, control and social supports co-varied and that there was significant interaction term with AP variables. The models also included covariance paths between the residuals in all endogenous variables specified at the same step in the hypothesised sequence.



Time-1 and 2





Time-1 and 2

Model 1 and 2: Modified Karasek's (1979) Core Model (Time-1 and 2)

Summary of Findings

This study summarises findings relevant to the immediate indices of occupational stress hypotheses.

Hypothesis 1: Main Effects of Demands on Somatic Symptoms, Job Anxiety and Employees Turnover Intention

Findings from total demands and specific factors domains provide impressive support for the predicted effect of job demands on Somatic Symptoms, Job Anxiety and Employees Turnover Intention. The effects were consistent across job domains, stress indices, and temporal frameworks of modelling. Mostly strong effects (direct and indirect) were found for (a) all demands scales on employees' turnover intention, and then on job anxiety and somatic symptoms. Furthermore, social support (particularly colleague support) for this effect was strongest when the outcomes were Somatic Symptoms, Job Anxiety and Employees Turnover Intention.

Hypothesis 2: Main Effects of Job Control on Somatic Symptoms, Job Anxiety and Employees Turnover Intention

Most findings supported the predicted effects of control on Somatic Symptoms, Job Anxiety and ETI. The slightly less significant relationships as compared to others (job somatic symptoms and job anxiety) were (a) total control on employees' turnover intention were slightly more significant, (b) total control on job anxiety slightly less significant, and (c) total control on somatic symptoms was less significant. Regression analyses (see Table 2) indicated that job control over issues in ETI was a more reliable predictor of occupational stress than was control in other job outcomes.

Hypothesis 3: Main Effects of Social Support on Somatic Symptoms, Job Anxiety and Employees Turnover Intention

There was significant support for this hypothesis from the ANOVAs and linear regression analyses. However, the ANOVAs and the regression analyses both indicated

that colleagues support explains significant amounts of unique variance in job anxiety, ETI, and somatic symptoms. On the other hand, colleagues support was also significant but considerably lower than supervisory support. The social support (supervisory support and colleagues support) remained significant on all indices of stress, particularly, on ETI.

Hypothesis 4: Additive Effects of Control and Social Support on Stress Outcomes

Findings were much clear in relation to this hypothesis. In the regression analyses, the effect of control + supervisor support, and effect of control + colleague support were confirmed, but the effect control + colleagues was slightly lower than the first one. This difference between the two studies of control + so

cial support at T1 and T2 remained nearly at the same variance. Multiple regression analyses indicated that control + supervisor support was a more reliable predictor of strain than was control + colleagues support, except in models that included stressors as a mediating variable.

Hypothesis 5: Additive Effects of Demands and Control on Occupational Stress Outcomes

This hypothesis was supported using various angles of regression analysis (tables and modeling analysis). Findings were supported through additive and interactive analysis that job demands and job control explained significant amounts of variance in most occupational stress outcomes better than the main effect alone. Furthermore, the total demands on occupational stress outcomes for this effect was strongest than that of total control.

Hypothesis 6: Additive Effects of Demands and Social Support on Stress Outcomes

The demands—support additive hypothesis (see Table 2) reported highly significant prediction and variance in ETI than to job anxiety and somatic symptoms. This hypothesis was strongly confirmed in correlational as well as multiple regression analyses. The effects of the two additive terms, involving supervisory support and colleague support, varied with the type of stress. For example, there was a consistently strong effect of demands—supervisor support on all indices of occupational stress and colleague support effect on stress—that was slightly less than that involving supervisor support.

Hypothesis 7: Additive Effects of Demands, Control and Social Support on Job Strain

This hypothesis received more support than did any of the other interaction hypotheses. Because, in the multiple regression analyses, the total demands + total control + social support interaction predicted ETI, job anxiety and somatic symptoms significantly at T1 and at T2, particularly ETI. This hypothesis received some special support from the regression analyses, and from the cross-sectional one-way ANOVAs. Support was also obtained from evidence that entry of all three job factors as predictors in study 1 and 2 multiple regression analyses yielded significant increases in explained variance at each step in several of the occupational stress indices, particularly job

dissatisfaction. Evidence of this kind was stronger for hypothesis (demands + control + supervisory support) than for hypothesis carried dual or main effect alone.

Discussion Regarding Occupational Stress Hypotheses

Consistent with the prior researches and our study 1 findings, demands, control and social support had significant effects on immediate outcomes of occupational stress. The effects were consistent across time frames, independent and dependent variables, and modes of analysis except in a few cases. Significant effects were typically associated with job demands and social support than with job control. The T1 job factors on T2 occupational stress have not been due to the greater instability and non-significance results. Significant findings were obtained for the hypothesised additive effect of demands and control, thus confirming Karasek's (1979, p. 287) reported finding that "occupational stress results not from a single aspect of the work environment, but from the joint effects" of demands and control. While similar additive effects have been reported in past researches and T1, the current findings were noteworthy for their consistency, especially given the relatively high correlations between corresponding measures of demands and control (see Table 1). The total proportion of variance in occupational stress explained by these two job factors was high enough (typically 60-80 percent). Furthermore, high or low level of correlation may be contributed through many variables potentially associated to occupational stress outcomes; it may be unrealistic to expect proportions of explained variance to be much higher than this [see Semner, *et al.* (1996); Bradley (2004)]. Karasek's original model is commonly interpreted as predicting a demands + control interaction upon strain indices. Most of the past researchers reported their findings in (a) male or mixed sex, blue-collar samples, (b) cross-sectional designs, and (c) congruent and occupation-specific self-report measures of the job characteristics. In the current study, considerable support for the interaction hypothesis was obtained. Somewhat interestingly, in the light of T1 findings, evidence of the buffering effects of control was stronger in the study 2 than in the T1 analyses. The extent to which control buffered the effects of demands was shown too consistent across job domains and occupational stress indices. The workload demands x workload control interaction term was particularly successful in predicting employees turnover intention (ETI) in those models that included stressors as a mediating variable, suggesting that interaction effects on occupational stress were stronger than other two indices. Several researchers [e.g., Burke and Greenglass (1995); Pomaki (2001); Sheffield, *et al.* (1994); Bradley (2004)] have found that social support does not correlate highly with occupational stress in samples of white collar employees. On the other hand, researchers such as Alloway and Bebbington (1987), Payne and Jones (1987) and Buunk and Peeters (1994), have concluded that significant findings occur significantly but not frequently than would be expected.

Some interesting comparisons can be made between the present study T1 and T2 and that reported by Dormann and Zapf (1999). Both studies included separate measures of supervisor and colleague support [scales of Caplan, *et al.* (1975)], both used longitudinal designs with an eight-month time lag and both tested the buffering hypothesis using continuous interaction terms within SEM models and reported significance of interaction of social support. Bradley (2004) reported in his cross-sectional correlations between social support and occupational stress in the region of $-.20$.

Despite this modest mean, their bivariate correlation, several main effects for social support were significant in the multivariate analyses. In their analysis, support from supervisors was a strong (negative) predictor of turnover intentions, whilst support from colleagues was highly predictive of ETI. Similar analyses were found in our study 1 and 2. Support from supervisors was a strong (negative) predictor of all three indices of occupational stress, whilst support from colleagues was lower in study 1, highly predictive of job outcomes in study 2. Thus, Kahn and Byosiere (1992), Mitchell, *et al.* (1982), and some others have indicated that the demands x support interaction may hold only for particular combinations of stressors and not all types of support and specific indices of occupational stress. The demands + support, and control + support, hypotheses were strongly supported by the current findings. The mean R² adjusted associated with the control x social support prediction was .81 at T1, and .71 at T2. Indeed, the findings are more consistent with an additive than with main or independent effects with the model of the effects of demands and support upon occupational stress.

Two possible exceptions to this general pattern of non-significant effects were the interactions between (a) colleagues support and employees' demands at T1, and (b) colleague support and all stressors at T2. These significant effects provided support to hypothesis but buffering effects are most pronounced when the type of support offered meets the particular needs of the person who is experiencing stress. According to this "stress-matching concept" hypothesis, well-targeted and specific types of support are of much more use to those experiencing stress than to those who are not, and hence the beneficial effects of such support vary between employees depending on their requirements and circumstances available at work environment.

Consistent with past research, the present findings suggest that control + colleague support impacted more strongly on occupational stress outcomes than on any other strain index, while control + supervisor support had strong effects on both ETI and other indices of occupational stress. Therefore, evidence is accumulating in support of the views that the two job factors of control and social support operate in supplementary, rather than substitutive, ways to counteract all or at least some kinds of strain. Whilst some studies were made for the additive effects of control and social support, the current research provides sufficient grounds to support the claim of the interactive effect of these two job factors on occupational stress. The most consistent evidence of the hypothesised synergistic relationship was in relation to the control + supervisory support effect on job anxiety and ultimately leads to *turnover* intentions of employees. Given the current findings, there may be value in future researchers examining the impact of the control + social support interaction on this criterion. If replicated, the finding may have implications for reducing levels of staff turnover in an organisation.

This study reported findings from multiple regression analyses of several versions of four principal models of the relationships between job factors and occupational stress. Findings from these analyses suggested that model choice depended upon the relative importance attached to goodness-of-fit and parsimony and also in consideration of work environment. Model 1, (both T1 and T2) which specified direct effects from all job factors to all occupational stress indices yielded the best set of fit statistics, although greater parsimony was achieved by models that included mediating variables such as stressors and/or immediate strain indices.

All models explained similar amounts of variance in the strain outcomes. The indirect effects version of models 1 and 2 tended to provide a better fit than did the corresponding hypothesised versions, a finding that is consistent with the evidence that the best compilation fit was provided by model 1 than complex model 3 and 4. However, model 1, and the indirect versions (T1 and 2) of the other models, were highly significant and typically contained a small number of non-significant paths. In comparison, the hypothesised versions of models 1 and 2 provided satisfactory fit, with greater parsimony, while model 3 and 4 provided further clarification to researchers. Models (3 and 4) that included the stressor variable more consistently yielded significant parameter estimates associated with social support and with the demands and control interaction. In contrast, the latter models more consistently yielded significant estimates associated with social support.

The regression analyses significantly confirmed the hypothesised role of job factors in mediating the relationships between the job factors and occupational stress. Mediation paths were particularly strong when supervisor support was the job factor and/or when job-anxiety or somatic symptoms was the occupational stress index (see model 1 and 2).

Finally, it was concluded that the findings from this study provide quite strong evidence of the additive effects of demands, control and social support on self-reports of strain, and more modest evidence of main effects of these three job factors. The evidence for such independent and additive effects is less significant when job control activities at T1 and total demands at T2 were used as indices of occupational stress. The terms representing the interactions between the job factors accounted for considerable variance in all seven measures of strain. Given the number of tests conducted and the significant effects generally obtained, it seems reasonable to conclude that study 2 provides qualified support to some level for Karasek's (1979), Karasek and Theorell (1990) main and additive effects models of job strain.

Recommendations for WAPDA Management

- (1) This study enables managers (of WAPDA) to understand the sources of job dissatisfaction and make decisions about how to improve the employee job satisfaction, performance and job description in consideration of our analysis of Demand Control Support Model.
- (2) These studies (T1 and T2) communicate clearly the significant effect of social support on immediate and remote outcomes of strain in the work environment of WAPDA. Supervisors must have the knowhow to provide guidance; support and to organise the level of job demands, on the worker's decision-making latitude, and on the quality of social support available from management and co-workers.
- (3) This study's reports (four subscales of each job demands, control and stress; two subscale of social support) give recommendations to organisations if the time and financial resources are invested in restructuring the recruitment policies (development of Human Resource Department), promotional policies, salaries structures, fringe benefits (in consideration of real wages) and training employees, it will pay huge dividends in reducing employees' job stress, job

dissatisfaction, increasing productivity and minimising turnover of competent and productive employees. The study also reports that those training programmes are most likely to be successful in which workers played key roles in work restructuring and work reorganisation.

- (4) The authority must allocate work environment clearly and equitably, ensure the jobs are designed in accord with ergonomic principles, develop and maintain efficient internal systems, encourage the two-way flow of information consistency, and build effective team work.
- (5) Finally, it is suggested that re-structuring and other necessary reforms at WAPDA must be designed to boost efficiency, foster good corporate governance, cut down costs, and make these entities truly commercially viable enterprises. Because the operating costs and line losses of DISCOS are too high, it was necessary to undertake a comprehensive re-structuring programme and split DISCOS into smaller companies and privatise them.

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