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New Zealand Managers and Job Stress: Testing the Stimulation-Strain Theory

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This paper reports on a study of 461 managers from throughout New Zealand, testing the theory that job stress causes not only strain but also stimulation. The data supports the concept that job stress is a source of stimulation as well as strain, and indicates that many managers desire a high level of stress.

The topic of job stress in general, and managerial stress in particular, has not received much attention in the literature in New Zealand. There has been some work done, primarily on job stress in the teaching profession (Pankhurst, 1982; Galloway, Pankhurst, Boswell, Boswell & Green, 1984), and a cross-occupational study by Dewe (1985). Indeed this latter work included reference to a study on supervisors and administrators — but the sample was from the North of England. However, there is an increasing number of courses being offered by consultants, and the New Zealand Institute of Management, on management stress, which suggests that interest in the topic is growing. Certainly, if overseas experience is anything to go by, there will soon be a rapidly growing literature on the subject. Nearly ten years ago, Selye (1979) reported that he personally had over 120,000 publications on the (admittedly more general) topic of stress.

The tendency in the literature on job stress is to concentrate on the possible harmful effects of stress, and to ignore, or to pay lip-service only, to the possible beneficial effects. In general, articles either define the subject as necessarily harmful, or they give the subject a neutral definition, but then concentrate on statistics of death, disease or loss to society. Thus stress has been variously defined as a demand with "noxious characteristics" (Gupta & Beehr, 1979, p.374) or a demand that results in unbearable unpleasantness (Welford, 1974). Less extreme perhaps, but also leaving no doubt that stress should only be regarded as "bad', are the definitions that refer only to "strain" (Dewe, 1985), or "negative environmental factors" (Cooper & Marshall, 1976). The second approach is illustrated by those who simply blame absenteeism and turnover on stress (Cooper & Arbose, 1984) or who emphasise the deaths from stress (Matteson & Ivancevich, 1982) or the millions — and even billions — of dollars supposedly lost to society because of stress (Beech, Burns, & Sheffield, 1982; Cooper, 1981; Lloyd, 1981).

In amongst this gloom some papers make passing acknowledgement to the fact that stress has a good side. Unfortunately this aspect of stress is rarely given adequate treatment. Schuler (1980) is well justified in pointing out that the passing mention to the inverted-U relationship between stress and stimulation, or the fact that stress has positive aspects, is only made after the definition and discussion on stress has ensured that it has a bad name. However, a small minority actively support the contention that while stress can indeed result in strain, it can equally well result in stimulation. Thus, under certain conditions and for certain individuals, the stress of having set oneself ambitious performance goals can result in strain (headaches, worry, sleeplessness) while for others it can result in stimulation (enthusiasm, better performance, more enjoyment of work). Indeed a close analogy can be made between the effects of job stress on individuals and the effects of training on athletes. If athletes overtrain, or train carelessly, they can suffer strain. However, if they decide to avoid the risk of strain by not subjecting themselves to the stress of a training programme they will never get the desired stimulation and improved performance. Hence this paper supports the view that stress should be defined so that its twin effects are given equal emphasis. It has been argued elsewhere (Geare 1989a), that a definition which satisfies those conditions is that stress is "the application of a perceived physical or psychological demand on a person resulting in stimulation and/or strain."

The research on which this paper is based has two broad objectives. The first is to provide basic information about perceived job stress amongst New Zealand managers, which until now has been lacking. The second is to apply additional

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tests to the stimulation-strain theory encapsulated in the above definition of stress. If, as believed, job stress provides stimulation as well as strain — or at least managers perceive that stress provides stimulation — then organisations will have to take a much more sophisticated approach than would be needed if stress was simply an evil, causing only ill-effects. If stress has only negative effects, then a rational strategy would be simply to reduce all factors which cause stress. However, if stress is recognised as causing both strain and stimulation then the correct strategy is not so obvious, or so easy. What is required is skilful fine tuning of the level of stress caused by particular factors to optimise the stimulation-strain mix.

More explicitly, the research tests two basic research hypotheses. The first reflects the work of Yerkes and Dodson (1908) and their "Inverted-U" theory of stimulation and is that: "Stress has a positive effect on stimulation up to a point, after which the effect diminishes." For the first hypothesis to be supported, managers who feel that the level of stress they work under is just right should have higher stimulation than those who consider their stress to be too low or too high. Should this hypothesis not receive support, a weaker version will be considered that: "Stress is associated with high levels of stimulation".

The second hypothesis is that: "Stress has a positive effect on strain." That is, that the greater the stress, the greater the strain. Those who feel their stress is "just right" would not necessarily have the lowest *strain* — because the benefit of stimulation will counteract some of the detrimental effects of the strain. Indeed, *if* in fact those who consider their stress is "just right" have higher levels of strain than those who think the stress is "too low" — then this would suggest there is in fact stimulation counteracting the strain. (Otherwise, the most favourable attitude should be from those who feel stress is "too low" rather than "just right").

Method

The study replicates a recently published Australian study (Geare 1989b). Based on reports received from some 280 Western Australian managers, the Australian study provided support for the stimulation-strain theory, with evidence for both the "Inverted-U" with regards stimulation, and increasing strain with higher levels of stress.

Subjects

The New Zealand replication involved sending a multi-faceted questionnaire to 995 managers throughout New Zealand. The managers had been selected by name and position from the *New Zealand Business Who's Who*. Systematic sampling was used to give a spread of position, seniority and organisation size (minimum of 20 employees), and to ensure that only managers (as opposed to non-executive directors), were selected. A total of 506 responses were obtained, of which 461 (46.3 percent of the total) were usable. This response rate is appreciably better than that achieved in the Australian study (30.6 percent), which in turn was marginally better than that achieved by England (1975) in his well-known mail survey of managers. None-the-less, such a response rate is far from ideal. However, the survey does provide information from a comparatively large sample of managers at different points on the hierarchical scale, from a variety of industries, and geographical locations.

Measures

It should be noted that the information obtained by the survey is of course subjective. It gives the managers' *perceptions* of stress levels and their self-reported problems with strain. Content validity was determined by the method described by Sax (1968, p.232) in which "a group of 'experts' . . . rate the extent to which each item on a questionnaire appears to measure some universe of opinion, attitude or belief." In this case nine academics from Australia and the United Kingdom assessed the questionnaire, to ensure content validity was high.

In this part of the study, respondents answered a bank of questions indicating the extent to which some twenty seven job-related factors affected their positive and negative feelings towards their jobs, and the extent to which the factors affected the amount of stress under which they felt they were working. They were then asked some specific single item questions, to be used for this analysis. Using a seven-point Likert-type scale, they gave their views as to the actual level of job stress they worked under, and the levels they perceived as "optimal" to achieve maximum performance, and optimal to achieve maximum enjoyment. The seven point scale ranged from 1 (virtually none) to 7 (great deal). In addition, they reported, again using single-item scales, on their levels of job and life satisfaction. (Correlation between the average satisfaction score for the twenty seven job factors and the overall measure for the 461 managers was $r(460) = .76, p < .001$.)

Finally, respondents indicated the degree (again on a seven point scale) to which they suffered from what are often considered "strain-related" problems, and also indicated (on a yes-no basis) whether they had received medical treatment in the last five years for possibly strain-related, or other illnesses.

Procedure

Managers were classified as perceiving that their

actual stress levels were "just right', "too low" or "too high" depending on whether they scored their perceived *actual* level the same, higher, or lower than the perceived *optimal* level for maximum performance, and *optimal* level for maximum enjoyment. Detailed discussions of this aspect have been reported earlier (Geare, 1987). These classifications enabled statistical tests to be performed against measures for "stimulation" and "strain".

Reported levels of job satisfaction and satisfaction with life as a whole were used as proxies for stimulation. Jackson and Schuler (1985) cite over three dozen studies which have used job satisfaction measures as an index of strain. Those studies considered dissatisfaction to be a proxy for strain. This study takes job satisfaction scores in the positive sense, with high satisfaction indicating stimulation. As the great majority of the managers in this study reported high job satisfaction, this alternative method is more rational. The second proxy was life satisfaction. Although intuitively the two indices would appear to be closely related Rice, Near, and Hunt (1980) after surveying a number of studies, consider that less than 10 percent of the variance in life satisfaction can be attributed to job satisfaction. Hence the use of the two indices is worthwhile. Scores on the two scales were significantly correlated, $r(460) = .50$, $p < .0001$, in the present study.

Three sets of data were used as measures of strain. The first involved reported experiences of less severe physiological problems — problems with sleeping, digestion, short breath, high blood pressure and headaches/nervousness. All the above have frequently been assumed to indicate "stress", or in the terminology of this paper, "strain". (See, for example, Cooper & Marshall, 1978). The second set involved reported levels of smoking and alcohol consumption, since it is also popularly supposed that excessive strain leads to increased smoking and drinking. Thus Cooper and Melhuish (1983) claim that, "In general, stress does not itself cause disease; what it does is make managers live unhealthily, and it is the resultant abuses which cause disease. Increased smoking, drinking and eating are easy examples" (p.46).

The third set of data concerned the numbers who had received medical treatment for four specified illnesses (commonly considered strain related) — sleeping problems, ulcers, cardio-vascular problems, nervous complaints/headaches — or for any other serious illness. For purposes of analysis, managers were classified first according to whether or not they had had treatment for any of the four strain related complaints and secondly if they had had medical treatment for the four plus "any other serious illness".

Table 2: *Mean Satisfaction Scores for Different Stress Level Groups (n = 461)*

Perceived stress level compared to:	Perceived stress level Too low	Just right	Too high
Optimal for performance			
Job Satisfaction	5.8	5.8	5.4
Life Satisfaction	5.9	5.7	5.4
Optimal for enjoyment			
Job Satisfaction	5.8	5.8	5.5
Life Satisfaction	5.9	5.8	5.5

Table 3: *Mean Levels of Stress, Job Satisfaction and Life Satisfaction (n = 461)*

	M	SD	% scoring 5,6,7/7
Actual Job Stress	4.5	1.4	59
Job Satisfaction	5.6	1.0	88
Life Satisfaction	5.7	1.0	88

Table 1: *Percentage of subjects in each stress level group reporting job satisfaction and satisfaction with life (n = 461)*

Perceived stress level compared to that deemed optimal for performance	1	2 (Virtually None)	3	*Job satisfaction* 4	5	6 (Great Deal)	7
Just Right (n = 152)	0	1.3	1.3	9.9	23.0	38.2	26.3
Too Low (n = 153)	0	0.7	0.7	3.9	26.1	48.4	20.3
Too High (n = 156)	0	2.6	1.9	12.8	34.0	38.5	10.3
				Satisfaction with Life			
Just Right (n = 152)	0	0	1.4	10.2	25.2	39.5	23.8
Too Low (n = 153)	0	0	0	3.3	21.9	55.0	19.9
Too High (n = 156)	0	0	8.0	12.0	32.0	36.7	11.3
Perceived stress level compared to that deemed optimal for enjoyment							
				Job Satisfaction			
Just Right (n = 137)	0	1.5	2.9	9.5	15.3	51.1	19.7
Too Low (n = 124)	0	0	0.8	4.0	31.5	40.3	22.6
Too High (n = 200)	0	2.0	0.5	11.5	34.0	36.0	16.0
				Satisfaction with Life			
Just Right (n = 137)	0	0	1.5	4.4	30.1	40.4	23.5
Too Low (n = 124)	0	0	0	4.2	22.7	51.3	21.8
Too High (n = 200)	0	0	6.2	4.0	25.9	41.5	12.4

Table 4: *Percentage of Subjects Reporting Physiological Problems or Behavioural Effects (n = 461)*

	Virtually None						Great Deal
	1	2	3	4	5	6	7
Physiological problems:							
Sleeping	47.1	26.0	6.5	7.2	8.2	4.6	0.4
Digestion	53.1	23.9	10.4	4.8	5.6	0.9	1.3
Short Breath	56.6	24.1	8.9	6.7	2.4	0.4	0.9
High Blood Pressure	59.2	19.5	5.0	6.7	4.6	3.5	1.5
Headaches/Nerves	51.8	24.5	9.3	6.1	5.0	3.3	0.0
Behavioural effects:							
Smoking	67.2	6.7	4.1	5.9	8.5	6.3	1.3
Drinking (alcohol)	15.0	15.0	20.8	32.1	13.4	3.7	0.0

Results

In Table 1 the reported job satisfaction, and satisfaction with life, of the managers classified as perceiving their actual stress level to be just right, too high or too low is presented. The percentage of subjects in each group rating their satisfaction at each level on the 7-point scale is reported. For each data set, between group differences were analyzed by computing a chi-square, with columns 1 to 4 combined to ensure cells had adequate expected frequencies. Testing was performed on the frequencies data (not percentages). For the "Optimal for Performance" data, chi-square was significant for job satisfaction, $\chi^2(6) = 26.51$, $p < .0002$, and for satisfaction with life, $\chi^2(6) = 30.56$, $p < .0001$. For the "Optimal for Enjoyment" data, chi-square was significant for job satisfaction, $\chi^2(6) = 23.92$ $p < .0005$ and for satisfaction with life $\chi^2(6) = 32.9$ $p < .0001$.

The mean satisfaction scores for the different stress level groups are shown in Table 2. The difference between the scores for each row were tested for statistical significance using Duncan's Multiple Range Test. For each of the four rows, the mean satisfaction level for the group who perceived their stress as "too high", was significantly lower than for the other two groups ($p < .05$). The difference between the mean satisfaction level for the groups who perceived their stress as "too low" or "just right" was not statistically significant. Summarised mean scores for the sample as a whole are presented in Table 3.

Table 4 gives the percentages of subjects who reported the extent they suffered physiological problems or indulged in smoking or alcohol consumption on a 7-point scale. Table 5 reports on the percentage of subjects who had received medical treatment either for commonly considered strain-related illnesses, or for any other serious illness.

Table 5: *Percentage of Subjects Who Have Received Medical Treatment (n = 461)*

Those having medical treatment during last five years for:	
Sleeping Problems	9.3
Ulcers	4.6
Cardio-vascular Problems	7.1
Nervous Complaints/Headaches	15.7
Any other serious illness	7.9
Any of the four strain-related illnesses	29.3
Any of the four, or "any-other" illness	33.9

Table 6: *Percentage of Managers Reporting Strain Symptoms or Medical Treatment in Each Stress Level Group (n = 461)*

	Perceived stress level compared to that deemed: *Optimal for performance*		
Percentage of managers reporting perceived	Too Low (N=153)	Just Right (N=152)	Too High (N=156)
Physiological symptoms:	19.6	24.3	40.4
Behavioural symptoms:	25.5	25.7	25.6
Treatment for "Strain-associated" illnesses:	13.1	21.1	25.6
Treatment for "Strain-associated" *or* other illnesses:	17.0	30.3	30.1
	Optimal for enjoyment		
	(N=124)	(N=137)	(N=200)
Physiological symptom:	23.4	17.5	38.5
Behavioural symptom:	20.2	27.0	28.0
Treatment for "Strain-associated" illnesses:	16.9	14.6	25.5
Treatment for "Strain-associated" *or* other illnesses:	20.2	16.8	35.5

Table 6 gives the percentages of the managers in each stress group who reported symptoms of strain and/or reported having received medical treatment. The chi-square trend test (see Armitage, 1971) was used on the frequencies data (not percentages) to test whether there was a significant trend from too low to just right to too high. For the "optimal for performance" data, there was a signficant trend for physiological symptoms $\chi^2(1) = 16.53$ $p < .001$, and for treatment for strain related illness $\chi^2(1) = 6.62$ $p < .01$ and for strain or other illness $\chi^2(1) = 6.91$ $p < .01$. As clearly indicated in the table, there was no trend related to behavioural symptoms. For the optimal for enjoyment data, similar results eventuated. For physiological symptoms $\chi^2(1) = 11.19$ $p < .001$, strain illness $\chi^2(1) = 4.42$ $p < .05$ and for strain or other illness $\chi^2(1) = 11.67$ $p < .001$. The trend for behavioural symptoms was again not significant.

Discussion

Certain aspects of Table 1 suggest a slight measure of support for the first hypothesis. Both when job satisfaction and satisfaction with life as a whole are used as proxies for stimulation the null hypothesis that stress has no effect on stimulation can be rejected at acceptable significance levels. However, increased satisfaction for the "just right" group is clear only at the highest level (7/7) of satisfaction. Indeed, the *average* satisfaction scores are marginally, but not significantly, higher for the "too low" group, as shown in Table 2.

The results in Table 2 contrast with the Australian study, where in three of the four cases, the "just right" scores were significantly higher than the "too low" scores. Notwithstanding the statistical significance indicated by some of the Chi-squared tests, the first hypothesis and the "Inverted-U" theory cannot be deemed to be given support. Rather the average figures support the concept of an "Inverted-L".

Given that the first hypothesis is not clearly supported, the weaker version must be considered. That is, whether perceived stress can be associated with high levels of stimulation. Table 3 clearly indicates that this is the case. Although the average level of stress is high, the proxies used for stimulation are even higher.

The reported physiological and behavioural symptoms of strain are shown in Table 4. Few report any physiological problem at level 5, 6, or 7, and indeed only 79/461 reported that they drink alcohol at such levels. If managers are classified as exhibiting "few" physiological symptoms if they scored 4 or less for all five symptoms (as opposed to a score of 5, 6 or 7 for at least one symptom), then 71.8% of the total sample are classified as exhibiting few symptoms. Similar scoring used for the behavioural effects, gives 74.4% classified as exhibiting "few" symptoms. The percentages of managers reporting medical treatment during the last five years are shown in Table 5 showing that nearly two thirds of the sample had not required medical treatment for any strain related, or other serious illness in the last five years.

The impact of stress on strain is presented in Table 6. The data are again presented in two parts depending on whether the comparison between perceived actual stress is with the level deemed optimal for performance or for enjoyment. There is a clear significant difference between the three different stress groups and their reported strain — as measured by having a high level of at least one of the physiological symptoms. Managers who perceive that their stress is "too high" are clearly much more prone to report physiological symptoms of strain. When perceived stress is compared to optimal for performance there is a clear increase in the proportion reporting physiological symptoms, moving from "too low" to "just right" to "too high". However when stress is compared to optimal for enjoyment there is a U shaped relationship, and the lowest proportion are those who consider their stress level is "just right".

Interestingly, there is no statistically significant difference between stress groups with regard to the behavioural symptoms of smoking and drinking. For optimal for performance in Table 6, the percentages are virtually identical. For optimal for enjoyment there is a visible, but not statistically significant, relationship. There is thus no conclusive evidence that "stress", (or in the terminology of this paper: "strain"), results in New Zealand managers turning to tobacco and/or alcohol. This non-significant result could possibly be a function of working with self-report data, although this explanation is difficult to rationalise. Table 5 indicates that managers were reporting quite high levels of drinking. Intuitively, one would expect those with high alcohol consumption to justify their heavy drinking by claiming that they were working under excessive, or "too high", stress. The fact that they did not, suggests the self-reporting may be honest. It

should also be noted that although it may be conventional wisdom to claim that job stress causes managers to resort to nicotine and alcohol, at least one American study on alcohol considers the relationship between alcoholism and job stress to be a myth. Von Wiegand (1972) claims that:

> contrary to popular folklore on the subject, no American studies have ever revealed any evidence of a correlation between alcoholism and certain types of work, job classification, or job stresses . . . only three variables affect the prevalence of alcoholism . . . (they are) the ratio of males . . . the average age . . . the degree of permissiveness (p.18).

The group which considers it is working under "too high" a level of stress clearly claims to have received more medical treatment over the last five years than the other groups. It should be noted that the table does not prove a *causal* relationship, it merely demonstrates that there is a relationship. As with alcohol consumption, it is clearly possible that the fact that the respondents have received medical treatment encourages them to believe that they are under excessive stress.

Although the "Inverted-U" theory is not supported, the data presented in the paper provide support for the proposed definition and the idea that job stress causes both stimulation and strain. As pointed out in the introduction, a large proportion of the social science literature on job stress emphasises the strain component and either ignores or pays lip service only to the stimulation component. The results presented in this paper indicate that this selective emphasis is unwarranted and consideration should be given to *both* the stimulation effect and strain effect of job stress.

General acceptance of the twin effects of job stress have obvious implications for organisational action. If stress is simplistically taken as being an "evil" which causes strain, loss of production, breakdowns and even death, then the obvious course of action is to identify those factors that cause stress and to attempt either to reduce their impact or indeed to eliminate the factors altogether. However, once it is accepted that stress results in stimulation as well as strain, then the course of action requires much more sophistication. Organisations, and managers, need to identify factors that cause stress and examine them in the context of particular individuals to determine the extent to which the stimulation component outweighs, or is outweighed by, strain. In some situations it may be better to *reduce* stress, in others it may be better to *increase* stress.

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