
Stress and mental strain in hospital work: Exploring the relationship beyond personality

ANDRÉ ARSENAULT

Institut de cardiologie de Montréal, Canada

AND

SHIMON L. DOLAN* and MARIE REINE VAN AMERINGEN

Ecole de relations industrielles, Université de Montréal, Canada

Summary

This study focuses on the relationship between job stressors and mental strain in hospital work, adjusting for differences in personality traits. Questionnaires were obtained from 760 full-time employees. Fourteen scales of job stressors were clustered into four factors: professional latitude, clinical demands, workload problems and role difficulties. A mental strain index was derived from the addition of three sub-scales: depression, anxiety and irritation. Two personality traits were measured: Locus of Control (Rotter) and Striver-Achiever (Sales). The four job demand factors were dichotomized into high-low grouping variables. A 2⁴ factorial analysis of covariance was conducted, using the two personality traits as covariates, in order to test and adjust for trait-related strain.

Results show that Locus of Control adjusted differences in mental strain appear significantly related to work stressors. A direct relationship was found with role difficulties, professional latitude and workload problems. Moreover, high levels of role difficulties and low levels of professional latitude interact significantly with adjusted levels of mental strain. The Striver-Achiever trait, however, appears most strongly correlated with workload problems but not with mental strain. We believe that this exploratory analysis suggests that the stressor-strain relationship might be best conceived as a combination of direct and complex pathways, relating facets of both job demands and of personality with outcomes, under a cognitive and conditional paradigm.

Introduction

It is generally acknowledged that our contemporary active and 'stressful' way of life contributes in part to our society's illnesses. Given the psychological efforts involved in coping with life in general and occupational demands in particular, it is not surprising to find considerable research attention devoted to the study of potentially deleterious consequences of chronic occupational stress on psychological well-being (French, Caplan and Van Harrison, 1982; Hockey 1983; Lefcourt, 1983a; Ivancevich and Ganster, 1987; Mackay and Cooper, 1987).

Occupational stress models have focused on several categories of job stressors, among which we find role problems (conflicts and ambiguities), job content demands (workload and responsibility), work organization (lack of participation, number of hours worked), professional perspectives (career ambiguities, skill underutilization) and physical environment (noise, temperature,

*Requests for reprints: P.O. Box 6128'A', Montreal, QC #3C3J7, Canada

safety) (Caplan, Cobb, French, Harrison and Pinneau, 1975; Cooper and Marshall, 1976; Beehr and Newman, 1978, Ivancevich and Matteson, 1980; Arsenault and Dolan, 1983a).

Also, research focusing on the relationships between job stressors and psychological well-being rely heavily on self-report measures for both the job conditions and the affective reactions to it (Spector, Dwyer and Jex, 1988). The self-report measures could be improved by taking into account the personality-dependent interpretation of the affective meaning of the job environment (Payne, Jabri and Pearson, 1988). This is also true of the measures of psychological strain that cannot easily be isolated from personal characteristics. Yet, some researchers assume that environmental conditions are the prime cause of psychological strain. For example, relationships have been reported between qualitative and quantitative overload and anxiety, depression (Cooper and Roden, 1985) as well as lack of self-esteem (French *et al.*, 1982). Others have reported dissatisfaction and lack of motivation associated with unchallenging and repetitive work (Davidson and Cooper, 1983; Keenan and Newton, 1984). Some studies have reported associations between role ambiguities and conflicts (Jackson, 1983; Glowinkowski and Cooper, 1987), or quantitative and qualitative overload (Karasek, Gardell and Lindell, 1987) and psychological strain. In all of these studies the confounding effect of individual traits was not explicitly controlled for.

Without doubt, in examining psychological manifestations of occupational stress, the literature supports the role of personality as a key mediator between stimulus and response (Cooper and Marshall, 1976; French *et al.*, 1982; Sandler and Lakey, 1982; Ivancevich and Matteson, 1984; Ivancevich and Ganster, 1987). The reason for these suggestions, stems from both conceptual and methodological issues.

For one, most studies on occupational stress use an underlying assumption about cognitive appraisal of the job demands by the individual worker, which become stressful only when perceived as threatening (Lazarus and Folkman, 1984; Payne *et al.*, 1988). Secondly the outcome, in the form of affective mental strain, can also be considered from both a trait or state perspective (see for example, Sarason and Sarason, 1987). From a methodological point of view, if both the independent (demands) and the dependent (strain) variables are correlated with personality traits, one cannot adjust the observed differences in strain for differences in personality trait without falling outside the limitations of covariance analysis. But what if, from a theoretical standpoint, certain dimensions of personality uniquely correlate with strain and others with demands?

This paper explores the relationship between self-report measures of job demands and mental strain. It is postulated that the measured level of mental strain can be partially accounted for by certain personality traits while other facets of personality correlate mostly with job demands but marginally with strain symptoms. Consequently, one can stay within the limitations of covariance analysis and still study the direct and interactive influence of job demands on mental strain, taking into account certain facets of personality. The conceptual model underlying the relationships between personality traits, stressors and strain symptoms is schematically presented in Figure 1.

Methods

A comprehensive study of the relationships between job demands, personality traits and a variety of both individual and organizational outcomes in a hospital environment has been in progress since 1978 (Arsenault and Dolan, 1983a). It involved the development and testing of a contingency model of occupational stress. A number of segments of this broader study

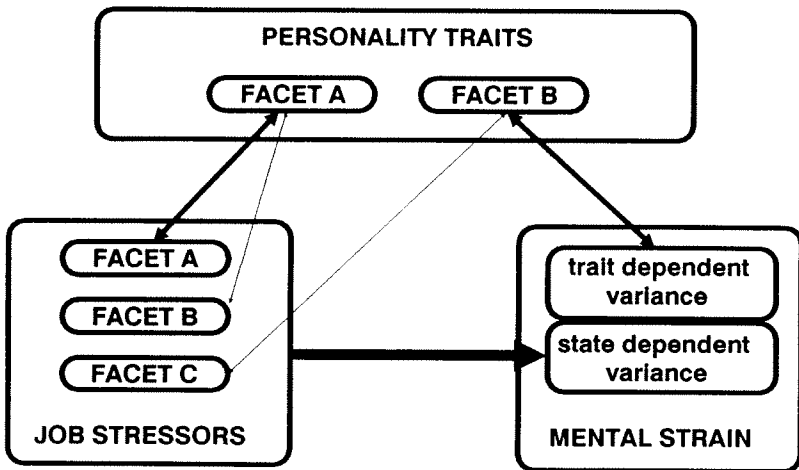


Figure 1. Conceptual relationships between personality, job stressors and mental strain

have already been published (Arsenault and Dolan 1983b; Dolan and Arsenault 1984; Dolan and Balkin, 1987; van Ameringen, Arsenault and Dolan, 1988). For this study we retained 14 scales of job demands, a mental strain index and two personality traits: Locus of Control (Rotter, 1966) and Striver–Achiever (Sales, 1969).

Sample and procedures

Union and management support was obtained in eight hospitals and solicitation was made on a voluntary basis. The hospitals supported the project by providing space where volunteers were invited to meet with the researchers and individually fill the questionnaires in a quiet environment during working hours. Every worker was invited to participate. A sample size of 1200 participants was reached with a varied representation of status and job categories. As a control measure, part-time employees and those with less than six months tenure in a given job were eliminated. This reduced the sample size to 760. The distribution across job categories was as follows: 24 per cent supervisors, mainly head nurses, 18 per cent nurses, 19 per cent nurses-aids and 39 per cent secretaries and technicians. Thus, close to two-thirds of the volunteers (61 per cent) were directly involved in patient care. Breakdown by gender showed a typical predominance of female workers (80 per cent).

The questionnaire contained 14 scales related to perceived job demands, two personality trait measures, as well as three psychological strain self-assessment scales. The job demands scales were mostly taken or adapted from those used by Caplan *et al.* (1975) and French *et al.* (1982).

Job stressors

Fourteen Likert-type scales of job demands were retained on the basis of direct relevance to hospital work organization. Of these, five were obtained from the literature and eight constructed

or reworded to reflect hospital work. One was directly related to working language pressure, more specific to Quebec. All measures were subjected to a validation study, in both languages, fully described elsewhere (Arsenault and Dolan, 1983a,b; Dolan and Arsenault, 1984; Dolan and Balkin 1987). Internal reliability coefficients for all scales ranged between 0.67 and 0.85. Table 1 presents the mean, standard deviation and observed range of all scales. Except for language pressure which was not retained, departures from normality for all other independent variables was mostly due to a few outliers which had limited impact on skewness.

Table 1. Descriptive statistics of perceived stressor scales

Stressor scale	Mean	S.D.	Min.	Max.
Career ambiguity	8.32	2.83	3	15
Role ambiguity	7.21	3.24	4	20
Quantitative workload	14.94	3.59	4	20
Language pressure	3.91	1.97	3	15
Contacts with patients	7.31	3.76	3	15
Instability of workload	8.79	2.24	3	12
Responsibility	16.72	5.09	5	25
Threatening tasks	3.45	1.55	2	8
Physical risks	3.81	1.90	2	8
Urgent decisions	4.93	1.93	2	8
Role conflict	4.99	1.93	3	12
Job participation	9.06	3.20	3	15
Restricted autonomy	6.98	2.85	3	12
Skills underutilization	6.79	3.36	3	15

Factorial analysis of the 14 scales of job stressors, using varimax rotation, yielded four independent factors comprising 10 of the above scales. Table 2 presents the sorted rotated factor loadings. In the absence of strict statistical criteria for selecting items, only those which loaded 0.5 or more on a given factor were retained, a rather conservative criterion. Subsequently, linear addition of scales within each factor yielded four new stressor indices (see Table 2): (1) restricted autonomy and skill underutilization have been inverted and added to job participation to designate *professional latitude*; (2) contacts with very sick patients, risks of contamination and frequency of urgent decisions (which also involve patient care) have been termed *clinical demands*; (3) quantitative workload and instability of workload has been named *workload problems* and finally, (4) role conflict and role ambiguities were labelled *role difficulties*. Among the remaining four scales, threatening tasks, showing a loading very close to 0.5 (0.499), was specifically excluded because the wording of the items made reference to a perceived threat. Thus, it was considered lacking face validity as an independent predictor of strain. Career ambiguity, language pressure and responsibility did not meet the loading criterion of 0.5 and were omitted from further analysis.

Covariates: Measures of personality trait

Two personality constructs were retained in order to account for the trait-related strain: Locus of Control and a Type A related scale. Both are commonly cited by researchers to denote predisposition for affective reactions (Lefcourt, 1983b; Ivancevich and Ganster, 1987). The original version of Rotter's Locus of Control scale (1966) was used. The observed range was from

Table 2. Sorted varimax rotated factor loadings*

Stressor scales	Factor 1	Factor 2	Factor 3	Factor 4
Job participation	-0.75	-	-	-
Restricted autonomy	0.72	-	-	-
Skills underutilization	0.70	-	-	0.29
Contacts with patients	-	0.81	-	-
Risks of contamination	-	0.76	-	-
Urgent decisions	-	0.65	-	-
Quantitative workload	-	-	0.79	-
Instability of workload	-	-	0.68	-
Role ambiguity	-	-	-	0.82
Role conflict	-	-	0.27	0.62
Threatening tasks	-	-	-	0.50
Career ambiguity	0.45	-	-	0.43
Language pressure	-	-	0.48	-
Responsibility	-0.44	0.26	0.27	-

* Loadings greater than 0.50 appear first.
Loadings less than 0.25 have been replaced by -.

1 to 23. A nine item-scale, the Striver-Achiever (S-A) trait, developed by Caplan *et al.* (1975) and French *et al.* (1982) from an original measure by Sales (1969) was used as an approximate measure of Type A trait and had a range of 10 to 63. The two trait measures were considered orthogonal, the empirical common variance being small ($R^2 = 0.02$).

Outcome: Mental strain

Mental strain was measured using three standard scales: depression (Cobb, 1970), anxiety (Spielberger, Gorsuch and Lushene, 1970; modified by Caplan *et al.*, 1975), and irritation (Cobb, 1970). These mental strain indicators, individually or in combination, are the most commonly cited in organizational stress literature (Cooper and Roden, 1985; Ivancevich and Ganster, 1987). Internal reliability coefficients were 0.88, 0.73 and 0.64 respectively. The wording of these scales measured the 'state' emotional reaction as opposed to 'trait' (Sarason and Sarason, 1987).

We propose an index of mental strain defined as the linear addition of the above three scales. Conceptually, given the emphasis on state strain and the multi-colinearity of the measures (0.65, 0.50, 0.49) one can suggest that the index represents three dimensions of the same mental strain construct. In fact, this concept is empirically supported by the relative homogeneity of the index ($\alpha = 0.79$). Table 3 provides descriptive statistics for all scales and indices retained for analysis.

Statistical procedure

The mental strain index was defined as the dependent variable in a factorial analysis of variance and covariance. Locus of Control and Striver-Achiever scales were used as covariates so that all the comparisons made between group means on the strain index were adjusted for individual trait differences. The four stress factors were dichotomized into high and low grouping variables

Table 3. Descriptive statistics of variables in the analysis

	Mean	S.D.	Min.	Max.
Stress factors				
Professional latitude	28.30	7.27	9	42
Clinical demands	16.05	5.93	7	31
Workload problems	23.72	5.00	7	32
Role difficulties	12.20	4.21	7	31
Personality traits				
Rotter's locus of control	10.56	3.94	1	21
Striver-achiever scale	43.24	9.46	10	63
Outcome variable				
Mental strain index	32.56	7.96	9	70

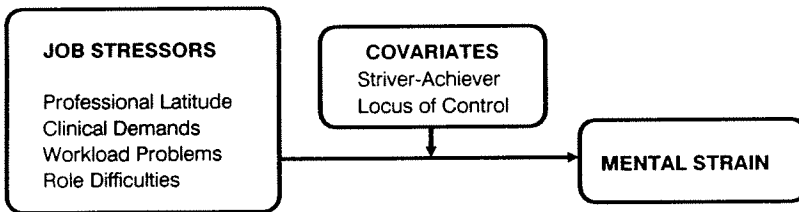


Figure 2. Operational model

using the median as a boundary. A full factorial analysis, including all interactions was conducted. A schematic presentation of the underlying operational model appears in Figure 2.

Results

Table 4 lists the correlation matrix for all the factors in the analysis. Among the trait variables, Locus of Control shows a positive correlation with the strain scale, but not the Striver-Achiever (S-A) trait. However, the S-A trait is quite strongly correlated with workload problems (0.42). This empirical result is explained by the fact that the S-A scale contains five (out of nine) items which may be directly related to workload problems. There are also weaker correlations between professional latitude and both S-A (0.22) and Locus of Control (-0.25).

The analysis of variance and covariance (Table 5) reveals that Locus of Control is a strong correlate of mental strain ($F = 45.7, p < 0.0000$) while the S-A trait is a negligible one ($F = 2.0, p = 0.15$). Three of the four stress factors show a significant association with levels of adjusted mean strain (Table 6). Strain is higher under high levels of role difficulties ($F = 31.6, p < 0.0000$) and, to a lesser degree, with higher workload problems ($F = 4.5, p < 0.04$). On the other hand, strain is significantly lower with high professional latitude ($F = 12.7, p < 0.0004$). In addition, role difficulties interact with professional latitude: strain levels are higher under the combination of high role difficulties and low professional latitude ($F = 7.3, p < 0.007$) than predicted by addition of direct effects.

Table 4. Correlation matrix of variables in the analysis

	1	2	3	4	5	6	
Mental strain scale	1						
Striver-Achiever scale	2	0.04					
Rotter's Locus of Control	3	0.27	-0.14				
Professional latitude	4	-0.17	0.22	-0.25			
Clinical demands	5	0.01	0.06	0.06	0.00		
Workload problems	6	0.14	0.42	0.04	0.11	0.21	
Role difficulties	7	0.28	0.12	0.12	-0.16	0.06	0.10

Table 5. Analysis of variance of mental strain index with dichotomized stressor scales as factors and individual traits as covariates

	SSQ	df	MSQ	F	p
Source of variation					
Role difficulties (RoleDiff)	1722.33	1	1722.33	31.58	0.0000
Professional latitude ProfLat)	693.82	1	693.82	12.72	0.0004
Workload problems (Workload)	243.03	1	243.03	4.46	0.0351
Clinical demands (ClinDmnd)	38.07	1	38.07	0.70	0.4037
(RoleDiff) × (ProfLat)	399.80	1	399.80	7.33	0.0069
(ProfLat) × (Workload)	100.01	1	100.01	1.83	0.1761
(ClinDmnd) × (Workload)	98.43	1	98.43	1.80	0.1795
(ClinDmnd) × (RoleDiff)	8.89	1	8.89	0.16	0.6865
(Workload) × (RoleDiff)	6.81	1	6.81	0.12	0.7239
(ProfLat) × (ClinDmnd)	1.35	1	1.35	0.02	0.8749
(ClinDmnd) (Workload) × (RoleDiff)	150.77	1	150.77	2.76	0.0968
(ProfLat) × ClinDmnd) × (RoleDiff)	130.90	1	130.90	2.40	0.1217
(ProfLat) × (Workload) × RoleDiff)	81.08	1	81.08	1.49	0.2231
(ProfLat) × (ClinDmnd) × (Workload)	29.63	1	29.63	0.54	0.4613
(P) × (C) × (W) × (R)	45.59	1	45.59	0.84	0.3608
All covariates	2505.88	2	1252.94	22.98	0.0000
Rotter's Locus of Control	2491.78	1	2491.78	45.69	0.0000
Striver-Achiever scale	110.55	1	110.55	2.03	0.1549
Error term	40464.25	742	54.53		

Discussion

Locus of Control is a strong positive correlate of mental strain which is in accordance with previous research (Lefcourt, 1983a). Consequently, if one wants to understand the relationship between job stress and mental strain, adjustment for Locus of Control needs to be undertaken. Externals have been reported to express more negative moods, including anxiety (Manuck, Hinrichsen and Ross, 1975) and depression (Johnson and Sarason, 1978; Lefcourt, 1983b), when faced with stressful life events, as well as general low satisfaction with life even in the absence of recent disturbing events (Lefcourt, Miller, Ware and Sherk 1981). Internals, on the other hand, perceive less stress (Anderson, 1977), manifest less strain and have better apparent coping skills (Parkes, 1984). A covariate should, however, be independent from the predictors. There

Table 6. Raw and adjusted means of mental strain

	Raw		Adjusted	
	Low	High	Low	High
<i>Main effects</i>				
Role difficulties (RollDiff)	30.72	34.46	30.95	34.22
Professional latitude (ProfLat)	33.77	31.25	33.49	31.55
Workload problems (Workload)	31.76	33.24	32.01	33.03
<i>Interaction</i>				
(RoleDiff) × (ProfLat)	Lo-Lo	Hi-Lo	Lo-Hi	Hi-Hi
Raw means	31.32	35.99	30.13	32.56
Adjusted means	31.16	35.57	30.76	32.53

is evidence that this criterion is not totally met, specifically with regards to professional latitude, which is negatively correlated with Locus of Control: externals tend to perceive less professional latitude.

From a conceptual point of view, it is not surprising to find that the belief in control over reinforcements is associated with perceived professional latitude. Consequently, Locus of Control might influence state strain in two different ways: directly through the well-documented tendency of externals to express negative moods; but also indirectly through the perceived lack of control over one's professional latitude which in itself not only leads to increased strain, but interacts with role problems to further enhance the level of distress.

After adjustment for differences in personality traits a significant proportion of adjusted differences in mental strain levels appears to be effectively related to work stressors. Role difficulties (conflicts and ambiguities), come out as the strongest factor contributing to mental strain ($F = 31.5$). In the daily environment of hospital work, such conflicts and ambiguities may make reference to inconsistencies on the ward with regards to patient management and difficulties dealing with patients' families. These aspects of the work represent constraints which may contrast with otherwise stimulating clinical demands, resulting in dissonance and increased levels of mental strain (Lee, 1987).

Similar dissonances have been noted in previous research with hospital employees (Arsenault and Dolan, 1983a) and resulted not only in affective responses but equally in behavioral reactions. For example, role difficulties, as part of an index of extrinsic job stress, have been associated with a number of somatic symptoms (Dolan and Arsenault, 1984) as well as with an increase in the frequency of absence (Arsenault and Dolan, 1983b; Léonard, Dolan, Arsenault and van Ameringen, 1987). This pattern has also been referred to as 'coping by avoidance' (Dolan, Arsenault, Léonard and van Ameringen, 1988). Absence behavior may be an ersatz to socially unacceptable emotional outbursts when faced with conflicting demands from staff, patients and families.

The second job stressor found to be related to mental strain is professional latitude. The association between professional latitude and decreased levels of mental strain cannot be solely explained by the association of the latter with Locus of Control ($r = -0.25$). Even after adjustment for this personality trait, professional latitude remains significantly linked to mental strain, first in a direct manner ($F = 12.7$) and secondly, through a significant interaction with role difficulties ($F = 7.3$). The analysis does not differentiate the individual strength of each predictor in this multiplicative relationship. Yet it suggests that the concurrent necessity of dealing with conflicting demands from staff, patients and families in an atmosphere of restricted clinical

discretion (autonomy), decreased participation and low professional recognition (skill underutilization) constitutes a highly attritional 'job demands milieu' (Payne *et al.*, 1988) in terms of mental strain. The behavioral reaction to attritional demands would correspond to an increase in absence rate and turnover, such job demands reinforcing 'coping by avoidance'.

Workload problems also have some impact on mental strain. Nonetheless, the effect here can be regarded only as simply additive and unrelated to perceived control. It should also be noted that this factor is, in relative terms, the least important ($F = 4.46$). It would appear to represent a pure case of job stressor, associated with strain symptoms independent of personality traits. As mentioned earlier, its strong correlation with the S-A scale could be regarded as an artifact. It raises however the question of specificity: are perceived workload problems related to a perceptual trait and is the prediction on strain mediated by differences in S-A trait? The very low correlation between S-A trait and mental strain hardly supports such a claim.

The lack of association between clinical demands and mental strain is also interesting since it would indicate that even highly strained workers do not appear to perceive higher clinical demands and conversely, higher clinical demands is not a significant predictor of mental strain. Clinical demands contrast with the other three factors since they correspond to frequent and intense patient-oriented activities which may not, *per se*, generate cognitive dissonance. On the contrary, workers high on this scale would be expected to maintain a high degree of vigilance and alertness. Not surprisingly, clinical demands are moderately associated with workload problems. Workers high on this scale are intrinsically kept too preoccupied to ponder much over role and latitude problems. A similar lack of association has been reported in earlier studies by Arsenault and Dolan (1983a). In these studies, clinical demands, as part of an index of intrinsic job stress, have shown a consistent lack of association with a number of somatic symptoms (Dolan and Arsenault, 1984) but appear to be associated with a decrease in the frequency of absence (Arsenault and Dolan, 1983b; Léonard *et al.*, 1987) and an increase in diastolic blood pressure (van Ameringen *et al.*, 1988). This pattern has also been referred to as 'coping by involvement' (Dolan *et al.*, 1988) and might constitute a facet of the stress-strain relationship corresponding to attractional demands (Payne *et al.*, 1988). It may reflect the fact that clinically overloaded health professionals forget about the contrasting dissonant character of other stressors, show a significantly higher attendance record and might be at risk of developing hypertension.

One should, however, cautiously not exclude the possibility that high levels of mental strain could also increase the perceptions of role problems, lack of professional latitude and high workload: a reciprocal mechanism could therefore be supported (Staw, 1975; James and Jones, 1980). Moreover, given the limitations of a cross-sectional non-random sample, one cannot consider the reported relationships as representative of all hospital milieus.

To summarize, certain facets of personality, like Locus of Control, may directly influence the level of expressed mental distress while others, like Striver-Achiever, won't. Likewise, some aspects of job demands are correlated with some facets of personality, but not all demands with all facets. We provide evidence that supports our conceptual model (Figure 1): job demands and personality are multifaceted realities that cannot be reduced to a simple linear predictive equation. When one considers mental strain as a global outcome, job demands can be linear, trait independent correlates or non-linear interactive predictors that depend upon personality to a limited degree and under a specific aspect. Consequently, the relationship between stress and mental strain can be best represented by a combination of simple and complex pathways relating facets of the demands milieu with facets of personality, notwithstanding the complexity of the outcomes themselves.

Acknowledgments

This research was supported by the Conseil québécois de la recherche sociale (contract RS-1370 M-88) and the Institut de Recherche en Santé et en Sécurité du Travail du Québec (Contract RS-80-11). The authors' names have been listed in alphabetical order and they have contributed equally to this paper.

References

- Anderson, C. R. (1977). 'Locus of control, coping behaviors and performance in a stress setting: A longitudinal study', *Journal of Applied Psychology*, **62**, 446-451.
- Arsenault, A. and Dolan, S. L. (1983a). *Le stress au travail et ses effets sur l'individu et l'organisation*, Rapport de recherche I.R.S.S.T., Montréal.
- Arsenault, A. and Dolan, S. L. (1983b). 'The role of personality, occupation and organization in understanding the relationship between job stress, performance and absenteeism', *Journal of Occupational Psychology*, **56**, 227-240.
- Beehr, T. A. and Newman, J. E. (1978). 'Job stress, employee health and organizational effectiveness: A facet analysis model and literature review', *Personnel Psychology*, **31**, 665-669.
- Caplan, R. D., Cobb, S., French, J. R. P. Jr., Harrison, R. D. and Pinneau, S. R. Jr. (1975). *Job Demands and Workers Health*, NIOSH, Government Printing Office, Washington DC.
- Cobb, S. (1970). 'Class A variables form the card sort test: A study of people changing jobs', *Project Analysis Memo # 12*, Ann Harbour, The University of Michigan, Institute for Social Research.
- Cooper, C. L. and Marshall, J. (1976). 'Occupational sources of stress: A review of the literature relating to coronary heart disease and mental health', *Journal of Occupational Psychology*, **49**, 11-28.
- Cooper, C. L. and Roden, J. (1985). 'Mental health and satisfaction among tax officers', *Social Science and Medicine*, **21**, 747-751.
- Davidson, M. J. and Cooper, C. L. (1983). *Stress and the Women Manager*, Martin Robertson Publ., Oxford.
- Dolan, S. L. and Arsenault, A. (1984). 'Job demands related cognitions and psychosomatic ailments'. In: Schwarzer, R. (Ed.) *The Self in Anxiety, Stress and Depression*, Elsevier Science Publ. North-Holland, Amsterdam, pp. 265-282.
- Dolan, S. L. and Balkin, D. (1987). 'A contingency model of occupational stress', *International Journal of Management*, Sept.
- Dolan, S. L., Arsenault, A., Léonard, C. and van Ameringen, M. R. (1988). 'Avoidance vs involvement: Two strategies to cope with job stress', *Canadian Psychology*, **29**(02A), 203.
- French, J. R. P., Caplan, R. D. and Van Harrison, R. (1982). *The Mechanisms of Job Stress and Strain*, John Wiley & Sons, New York.
- Glowinkowski, S. P. and Cooper, C. L. (1987). 'Managers and professionals in business/industrial settings: The research evidence'. In: Ivancevich, J. M. and Ganster, D. C. (Eds), *Job Stress: From Theory to Suggestion*, Haworth Press, New York, pp. 177-194.
- Hockey, R. (Ed). (1983). *Stress and Fatigue in Human Performance*, John Wiley & Sons, New York, 396 pp.
- Ivancevich, J. M. and Ganster, D. C. (Eds) (1987). *Job Stress: From Theory to Suggestion*, Haworth Press, New York, pp. 177-194.
- Ivancevich, J. M. and Matteson, M. T. (1980). *Stress and Work: A Managerial Perspective*, Scott, Foresman and Co., Glenview, Ill.
- Ivancevich, J. M. and Matteson, M. T. (1984). 'A type A-B person-work environment interaction model for examining occupational stress and consequences', *Human Relations*, **37**, 491-513.
- Jackson, S. E. (1983). 'Participation in decision making as a strategy for reducing job-related strain', *Journal of Applied Psychology*, **68**, 3-19.
- James, L. R. and Jones, A. P. (1980). 'Perceived job characteristics and job satisfaction: An examination of reciprocal causation', *Personnel Psychology*, **33**, 97-135.
- Johnson, J. H. and Sarason, I. G. (1978). 'Life stress, depression and anxiety: internal-external control as a moderator variable', *Journal of Psychosomatic Research*, **22**, 205-208.

- Karasek, R., Gardell, B. and Lindell, J. (1987). 'Work and non-work correlates of illness and behavior in male and female Swedish white collar workers', *Journal of Occupational Behavior*, **8**, 187-207.
- Keenan, A. and Newton, T. J. (1984). 'Frustration in organizations: Relationships to role stress, climate and psychological strain', *Journal of Occupational Psychology*, **57**, 57-65.
- Lazarus, R. S. and Folkman, S. (1984). *Stress Appraisal and Coping*, Stringer Publishing Co., New York.
- Lee, C. (1987). 'Professionals in medical settings: The research evidence in the 1980's'. In: Ivancevich, J. M. and Ganster, D. C. (Eds), *Job Stress: From Theory to Suggestion*, Haworth Press, New York, pp. 195-214.
- Lefcourt, H. M., Miller, R. S., Ware, E. E. and Sherk, D. (1981). 'Locus of control as a modifier of the relationship between stressors and moods', *Journal of Personality and Social Psychology*, **41**, 357-369.
- Lefcourt, H. M. (Ed.) (1983a). *Research with the Locus of Control Construct*, Vol. 2, Academic Press, New York.
- Lefcourt, H. M. (1983b). 'The locus of control as a moderator variable: stress'. In: Lefcourt, H. M. (Ed.) *Research with the Locus of Control Construct*, Vol. 2, Academic Press, New York.
- Léonard, C., Dolan, S. L., Arsenault, A. and van Ameringen, M. R. (1987). 'L'absentéisme et l'assiduité au travail: Deux moyens d'adaptation au stress? *Relations Industrielles*, **42** (4), 774-789.
- Mackay, C. J. and Cooper C. L. (1987). 'Chapter 6'. In: Cooper, C. L. and Robertson I. T. (Eds) *International Review of Industrial and Organizational Psychology*, John Wiley.
- Manuck, S. B., Hinrichsen, J. J. and Ross, E. O. (1975). 'Life stress, locus of control and state and trait anxiety', *Psychological Reports*, **36**, 413-414.
- Parke, K. R. (1984). 'Locus of control, cognitive appraisal and coping in stressful episodes', *Journal of Personality and Social Psychology*, **46**, 655-668.
- Payne, R., Jabri, M. M. and Pearson, A. W. (1988). 'On the importance of knowing the affective meaning of job demands', *Journal of Organizational Behavior*, **9**, 149-158.
- Rotter, J. B. (1966). 'Generalized expectancies for internal vs. external control of reinforcement', *Psychological Monographs*, **80**, No. 609.
- Sales, S. M. (1969). 'Organizational roles as a risky factor in coronary heart disease', *Administrative science Quarterly*, **14**, 325-336.
- Sandler, I. N. and Lakey, B. (1982). 'Locus of control as a stress moderator: The role of control perceptions and social support', *American Journal of Community Psychology*, **10**, 65-80.
- Sarason, I. G. and Sarason, B. R. (1987). 'Cognitive interferences as a component of anxiety: Measurement of its state and trait aspects'. In: Schwarzer, R., Van der Ploeg, H. M. and Spielberger, C. D. (Eds) *Advances in Test Anxiety Research*, Vol. 5, Swets North America Inc., pp. 3-14.
- Spector, P. E., Dwyer, D. J. and Jex, S. M. (1988). 'Relation of job stressors to affective, health, and performance outcomes: A comparison of multiple data sources', *Journal of Applied Psychology*, **73** (1), 11-19.
- Spielberger, C. D., Gorsuch, R. L. and Lushene, R. E. (1970). *Manual for the State-Trait Anxiety Inventory*, Consulting Psychologists Press, Palo Alto.
- Staw, B. M. (1975). 'Attribution of the "causes" of performance: A new alternative interpretation of cross-sectional research on organization', *Organizational Behavior and Human Performance*, **13**, 414-432.
- van Ameringen, M. R., Arsenault, A. and Dolan, S. L. (1988). 'Intrinsic job stress and diastolic blood pressure among female hospital workers', *Journal of Occupational Medicine*, **30** (2), 92-97.

