

## Psychosocial predictors of health status

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This prospective study examined, in a sample of male and female adults, the relationship between specific psychosocial factors and health status. Measures of stress, health habits, social support, Type A behaviour, and coping style were collected for 203 professional employees in a large aerospace organization in 1988. One year later a follow-up questionnaire assessing self-reported physical illness and job burn-out was administered resulting in a final sample of 95 employees. When adjustments for age, sex, education, and initial psychological well-being were made, perceived stress, physical exercise, and an avoidant coping style significantly contributed to predictions of physical illness in multiple regression analyses. Employees who possessed less hardy appraisals of work/life and expressed greater Type A behaviour reported significantly more fatigue and exhaustion one year later. Type A individuals also reported being significantly less sensitive and caring towards others. Finally, individuals who perceived less stress and expressed more cognitive hardiness reported significantly greater work/life satisfaction. Overall, the data supported the view that psychosocial factors may be differentially associated with diverse physical and psychological health outcomes.

*Keywords:* Limited prospective study; Stress; Health habits; Type A behaviour; Social Support; Coping; Physical health; Psychological health.

### 1. Introduction

In recent years, a great deal of research has investigated the role of individual factors in the stress-illness relationship. This research has been spurred by the recognition that the association between stress and health status has been consistent, albeit modest (Rabkin and Struening 1976). At the same time, an increasing number of studies have pointed to the importance of a wide variety of psychosocial factors in the prevalence, incidence, prognosis, and mortality rates of both infectious and non-infectious disease (cf., Mechanic 1979). Social support, lifestyle habits, adverse life events, personality, positive and negative affectivity, optimistic cognitions, coping style, and job strain have all been consistently associated with immunofunctioning and increased risk of disease in a wide variety of cross-sectional and epidemiologic studies (e.g., Folkman *et al.* 1986, Kobasa 1979, Cobb 1976, Antonovsky 1979, Taylor 1990).

Early research relating personality to well-being focused on whether personality was related to a variety of diseases (general model) or whether specific aspects of personality were related to specific diseases (specificity model). Both empirical directions can still be found in the literature today. As an example, research using meta-analytic procedure suggests that neuroticism (negative affectivity) may be associated with the development of a rather broad range of illnesses and diseases including CHD, asthma, and ulcers (Friedman and Booth-Kewley 1987). With respect to specific models of personality-illness relationships, recent studies have examined potential pathogenic components of the Type A behaviour pattern with the development of CHD (e.g., Booth-Kewley and Friedman, 1987, Matthews 1988). Some evidence supports a possible

relationship between the Impatience-Irritability dimension of the Type A behaviour pattern (anger, hostility, cynical mistrust) and increased risk of CHD (e.g., Dembroski and Costa 1987, Barefoot *et al.* 1983, Matthews 1983). Such research provides limited support for the view that Type A behaviour is a specific disease-prone personality, although the exact pathogenic components and mechanisms continue to remain elusive.

What appears increasingly clear from the diverse literature on health psychology and behavioural medicine is that a wide variety of individual difference factors may play a role in the development of both chronic and acute illness. What is not clear is whether these psychosocial factors exert an independent influence on well-being, or whether they have a common feature which links them (*cf.*, Kasl 1983). For example, some of these psychosocial predictors (e.g., negative emotional states, stressful events, or Type A behaviour) may directly produce pathogenic psychophysiological changes (e.g., Smith 1989, Dembroski and Costa 1987, Matthews 1988, Jemmott and Locke, 1984, Kiecolt-Glaser and Glaser 1987). Other factors, such as social support or coping style, may directly influence health enhancing or health damaging behaviours which result in specific psychophysiological reactions (Berkman and Syme 1979, Langlie 1977, Krantz *et al.* 1985, Mechanic 1979, Payne and Jones 1987). Of the numerous issues warranting further exploration, a major concern is whether these psychosocial factors represent common predisposing psychophysiological states, or whether they exert their impacts on well-being in interaction with each other. In general, causal pathways for each of these hypothesized psychosocial factors remains largely unclear and in need of additional investigation.

Current theory and research on the relation between stressful events and indicators of health status (e.g. psychological stress, somatic health) reflect the belief that this relation is largely mediated by coping processes (Folkman and Lazarus 1980, Pearlin and Schooler 1978, Billings and Moos 1980, Nowack 1989). It is assumed that individual coping processes are relatively stable across diverse stressful situations and over time directly affecting health status (*cf.*, Mullen and Suls 1982, Roth and Cohen 1986). However, it is not clear whether single or multiple coping styles may be most adaptive in managing at least some stressful work and life events (Taylor 1990). Hence, coping processes would appear to be both theoretically and conceptually relevant to the investigation of psychosocial factors and health status.

The importance of coping processes in the study of stress and health status has resulted in multiple definitions of the concept as well as both episodic (e.g., Folkman and Lazarus 1985, Billings and Moos 1981, Stone and Neal 1964, Cohen *et al.* 1986) and dispositional (trait) measures of the construct (e.g., Nowack 1989, Pearlin and Schooler 1978). The coping area is a good example of researchers investigating a very complex concept using extremely diverse definitions, measures, and methods (*c.f.*, Cohen 1987, Taylor 1989).

Despite the eclectic approach to the topic, recent developments in both the conceptualization and measurement of coping processes have provided a more structured framework for investigators. For example, Lazarus and his associates view the initiation of coping processes as beginning when appraisals of the environment (as harmful, threatening, or challenging) are made. In this view, individuals evaluate his/her resources, skills, and abilities to determine whether they can adequately cope with the perceived threat, harm or challenge of the event or situation (Folkman *et al.* 1986, Cohen and Lazarus, 1976).

To date, the majority of studies investigating the relationship between psychosocial factors and health status have tended to use cross-sectional designs involving measurement of a limited number of individual variables. Prospective or longitudinal designs that

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include two or more psychosocial variables provide for greater clarity about the relative contributions of psychosocial risk factors to well-being. In this study, a longitudinal approach was used to examine the contributions of various psychosocial risk factors to well-being. The purpose of the study was to investigate the relative contributions of several specific psychosocial factors to measure of physical health and psychological distress (assessed as job burn-out) in a professional sample of working adults. The psychosocial factors included in the present study (lifestyle health habits, social support, Type A behaviour, cognitive hardiness, and coping) have consistently shown to be associated with a wide variety of both infectious and non-infectious illnesses and diseases.

## 2. Method

### 2.1. Overview

A sample of professional employees attending management training workshops was administered a battery of questionnaires designed to assess specific psychosocial risk factors including stress, social support, lifestyle habits, Type A behaviour, cognitive hardiness, and coping style. One year later, these same employees were asked to complete a second set of questionnaires measuring self-reported physical illness and psychological stress (job burn-out).

### 2.2. Participants

The participants for this study included professional working adults within a large aerospace corporation in the Los Angeles area. The mean age of the final sample ( $n=95$ ) was 38.9 (SD=9.78) with ages ranging from 24 to 57 years. This sample consisted of 54.8% males and 44.2% females, was well educated (75.3% reported to have at least a two-year college degree and 55% reported having at least four years of college or more), and was racially diverse (66.3% White, 8.7% Asian, 10.9% Black, 8.7% Hispanic, and 5.4% other). The employees were working exclusively in supervisory, management, and professional positions.

### 2.3. Procedures

Participants included the full-time professional employees of a large aerospace corporation who attended a series of management development training programmes in 1987-1988. During their attendance at the training programme, a total of 203 employees were asked to complete a battery of questionnaires assessing psychosocial risk factors. The employees were informed in a covering letter that their participation was voluntary and all information would be strictly confidential and used only for research purposes. One year later, a brief follow-up questionnaire assessing physical illness and psychological distress was mailed internally to all 203 employees who had previously completed the initial battery of questionnaires.

It was determined that 32 of the original employees were no longer employed with the organization primarily due to corporate downsizing efforts during the course of the year. After follow-up letters were sent to all employees initially participating in the study, a total of 95 were returned for an effective response rate of 55.6%. To assess the nature of this possible volunteer effect, a statistical analysis was performed comparing the mean levels of stress and lifestyle habits between the group of compliers and non-compliers. No significant differences were observed between those returning the second battery of questionnaires one year later and those that did not.

## 2.4. Measures

2.4.1. *Initial psychosocial risk factors assessed at time 1:* During the management development training programme, the participants completed a battery of questionnaires assessing specific psychosocial risk factors including: (1) perceived stress; (2) lifestyle habits (exercise, eating/nutrition, rest/sleep, preventive hygiene); (3) social support; (4) type A behaviour; (5) cognitive hardiness; (6) coping style (intrusive positive talk, intrusive negative talk, avoidance, problem-focused coping); and (7) psychological well-being. A full description of the development and psychometric properties of this questionnaire battery have been described elsewhere (Nowack 1989, 1990).

1. Stress was measured using a six-item scale based on factor analysis of hassles scale (Kanner *et al.* 1981). This scale lists six categories of minor irritants of daily living including the areas of work, family, friends, the environment, practical considerations, and chance occurrences. In the present study the stress scale had a reliability (alpha) of 0.66. This scale has demonstrated adequate test re-test reliability (0.67) over a four-month period (Nowack 1990). The original hassles scale has been found to account for more variance to a variety of psychological and health outcomes than the life events approaches to stress management (Kanner *et al.* 1981, Monroe 1983).

2. Coping style was assessed by the twenty-item coping style scale which was developed to appraise four types of coping responses: intrusive positive thoughts, intrusive negative thoughts, avoidance, and problem-focused coping. In this study, coping style scale was answered on a five-point scale assessing frequency of use of particular coping behaviours (e.g., 'never', 'rarely', 'sometimes', 'often', 'always').

The coping style scales include a five-item intrusive positive thoughts scale with a coefficient alpha of 0.67; a five-item intrusive negative thoughts scale with a coefficient alpha of 0.72; a five-item avoidance scale with a coefficient alpha of 0.68; and a five-item problem-focused scale with a coefficient alpha of 0.67. Characteristic items for the coping style scale included: intrusive positive thoughts—'Say and think positive things to myself to make me feel better about it'; intrusive negative thoughts—'Blame and criticize myself for creating or causing my problem'; avoidance—'Avoid thinking about it when it crosses my mind'; and problem-focused coping—'Change something in my own behaviour or environment to minimize or alleviate my dissatisfaction'.

3. The cognitive hardiness scale assesses the possession of specific attitudes and beliefs based upon the concept of personality hardiness (Kobasa 1979). This scale has its roots in the empirical work of Lefcourt (1980), Phares (1976), and Antonovsky (1979). Recent criticisms of the original hardiness scale of Kobasa (cf. Hull *et al.* 1987, Nowack 1986) have also been considered in the development of the present scale.

The present, 30-item scale, is composed of attitudes and beliefs about work and life including: (1) involvement—commitment, as opposed to alienation, to one's work, family, self, hobbies; (2) challenge—attitudes around viewing life changes as challenges as opposed to threats; (3) control—beliefs that one has a sense of control over significant outcomes in life. Respondents are asked to rate how strongly they agree with specific statements about their beliefs on a 1–5 scale ('strongly agree', 'agree', 'neither agree nor disagree', 'disagree', 'strongly disagree'). A sample item is 'My involvement in non-work activities and hobbies provides me with a sense of meaning and purpose'. This scale demonstrated a high internal consistency reliability (alpha) of 0.83 in the present study.

The cognitive hardiness scale used in this study has shown some evidence of convergent validity with the original Kobasa hardiness scales in one unpublished study with 239 police officers (Greene 1988). The Pearson correlation coefficients for the cognitive hardiness scale with the global Kobasa hardiness scale, commitment, challenge,

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and control subscales were 0.43 ( $p < 0.01$ ), 0.40 ( $p < 0.01$ ), 0.02 ( $p > 0.05$ ), and 0.50, ( $p < 0.01$ ). In a recent unpublished three-year longitudinal study, the cognitive hardiness scale, but not the original Kobasa measure, was found to predict both objective (cumulative sick days verified from medical records) and subjective health measures (self-reported hospitalization due to injury/illness and psychological well-being) in 230 full-time employees (Greene and Nowack 1991).

4. Health related lifestyle behaviours were measured by a 25-item scale assessing the daily practice of specific behaviours hypothesized to be conducive to both physical and psychological well-being. These health habits include level of exercise, rest, sleep and relaxation, preventive hygiene practices, and nutrition/eating habits. Respondents are asked to rate how frequently they practice these specific health habits on a 1-5 scale (e.g., 'never', 'rarely', 'sometimes', 'often', 'always'). This scale is conceptually based on earlier research on preventative health behaviours including Harris and Guten (1979), Belloc and Breslow (1972), Wiley and Camacho (1980), and Pardine *et al.* (1982).

High scores on the health habits scale suggest the practice of health habits on a regular basis. In the present study, this scale demonstrated moderately high internal consistency reliability (alpha) of 0.80. A characteristic item included: 'Exercised for at least 30 min, three times a week, to enhance muscle tone, strength, or flexibility (e.g., stretching, weight lifting, calisthenics, isometrics, etc.)'

5. Social support was measured using an 18-item scale assessing the perceived use, availability, and satisfaction with five separate groups including co-workers, supervisor/boss, family, friends, and significant others. The conceptual framework for this scale was derived from Payne and Jones (1987) and Sarason *et al.* (1983). An overall social support score is calculated across all five groups for this scale. In this study, it showed a moderately high internal consistency reliability (alpha) of 0.83.

6. Type A behaviour was measured with a brief 10-item scale measuring self-perceived frequency of specific behaviours in response to work and life challenges, threats, and stressors. Items for the Type A scale were rationally derived from an extensive literature review and comparisons with available self-report instruments assessing Type A behaviour. This scale was rationally derived on the more critical subcomponents identified in recent conceptualizations of the TABP including anger/hostility, impatience, time pressure, hard-driving, and competitive behaviours (Edwards *et al.* 1990, Ganster *et al.* 1991, Edwards and Baglioni 1991).

Respondents are asked how frequently they express specific Type A behaviours on a 1 to 5 scale where 1 = none of the time to 5 = all of the time. Sample items include, 'I tend to let people know and express my anger when things annoy me (e.g., poor service, waiting in lines, interpersonal conflicts, etc.)' and 'I tend to eat, walk, talk, and do most things quickly'. In the present study, this scale showed moderately high internal consistency reliability (alpha) of 0.82. The measure of Type A behaviour used in this study has shown evidence of convergent validity with the Jenkins activity scale (JAS) and Framingham Type A scale (FTAS; Haynes *et al.* 1980) in one unpublished study with 239 police officers (Greene 1988). The Pearson correlation coefficients for the Type A scale with the Framingham Type A, global JAS Type A, speed and impatience, job involvement, and hard-driving scales were 0.65, 0.44, 0.50, 0.24, and 0.18, respectively, all  $p$ 's  $< 0.01$ . These correlations lend support to both the conceptualization and development of the anger/hostility, impatience, irritability, time pressure, and hard-driving behaviours assessed in the present Type A measure.

7. Psychological well-being was measured by a 12-item scale assessing a respondent's overall work and life satisfaction. Respondents are asked to evaluate how frequently they

tend to experience specific feelings related to enjoying life, feeling happy and satisfied with one's family, health, work, and achievements on a 1 to 5 scale where 1=never and 5=always. High scores suggest low overall somatopsychic distress and emotional negativity. Sample items include: 'Feeling positive, confident, and secure with yourself', 'Pleased with your life overall', and 'Able to relax and enjoy yourself without worry'. In the present study, this scale showed a high internal consistency reliability (alpha) of 0.93.

**2.4.2. Physical Illness and Psychological Distress Measures at Time 2:** Two separate dependent physical and psychological health outcome measures were collected one year later. In this study, physical and psychological health status was measured subjectively. Several longitudinal studies have demonstrated that self-report measures of general health are related to all-cause mortality, even when statistical adjustments have been made for the standard risk factors (e.g., Kaplan and Camacho 1983, Waldron *et al.* 1982). Additional utility of self-report ratings of health have also shown high correlations with physician's assessments (LaRue *et al.* 1979) and have been found to be a better predictor of mortality than objective measures (Mossey and Shapiro 1982). In general, self-report measures of general health or physical symptomatology are considered to be valid, albeit imprecise, measures of overall health status (cf., Repeti *et al.* 1989).

1. Physical illness was measured by a modified version of the seriousness of illness scale (Wyler *et al.* 1968, 1970). This scale contains a list of 94 physical health conditions, illnesses, and diseases ranked from least to most severe (e.g., warts, colds, flu, gallstones, ulcer, high blood pressure, heart attack, cancer, etc.). Respondents were asked to report all illnesses experienced within the last 12 months. Separate scores were calculated for illness frequency and illness severity according to the weighting scheme suggested by Wyler *et al.* (1968).

2. Psychological distress was assessed by the Maslach burn-out inventory (MBI; Maslach and Jackson 1981). The construct of burn-out has been defined and conceptually linked to the stress-illness relationship in a number of recent studies (cf., Maslach and Jackson 1981). Burn-out has been defined as being an outcome of stress characterized by self-perceptions of emotional exhaustion, cynicism, negativity, low commitment, fatigue, low morale, resistance, detachment and low productivity. The MBI assesses the three burn-out dimensions of emotional exhaustion (EE), depersonalization (DP), and personal accomplishment (PA). In the present study, estimates of internal consistency (Cronbach's Alpha) ranged from 0.90 for EE, 0.79 for DP, and 0.71 for PA. Test re-test reliabilities have ranged from 0.65-0.82 for these scales in previous studies (Maslach and Jackson 1981).

### 3. Results

Means, standard deviations, and correlations among the independent variables collected at time 1 are presented in table 1. Significant correlations were observed between scales theoretically thought to be associated with each other, such as stress and psychological well-being [ $r(95) = -0.34, p < 0.01$ ], and not when the scales were thought to be independent of each other, such as stress and social support [ $r(95) = 0.03, p > 0.05$ ].

Relevant demographic variables of interest to this study included sex, age, ethnicity, and education. No significant differences were observed by either sex or ethnicity. Higher levels of education were significantly correlated with less perceived stress [ $r(95) = -0.28, p < 0.01$ ], decreased satisfaction with social support [ $r(95) = -0.19, p < 0.05$ ], and less Type A behaviour [ $r(95) = -0.21, p < 0.05$ ]. Older employees reported significantly less Type A behaviour [ $r(95) = -0.29, p < 0.01$ ], greater optimism and cognitive hardiness

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Table 1. Means, standard deviations, and intercorrelations of the scales (n=95).

Scale	M	SD	1	2	3	4	5	6	7	8	9	10
1. Stress	15.99	3.44		-0.42*	0.03	0.36*	-0.29*	0.06	0.38*	0.08	0.19	-0.34*
2. Health habits	93.76	10.87			0.09	-0.47*	0.26*	0.06	-0.42*	0.19	0.06	0.35*
3. Social support	49.68	8.19				0.31*	0.42*	0.40*	0.07	0.07	0.36*	0.47*
4. Type A behaviour	30.31	5.09					-0.15	0.01	0.42*	-0.22*	0.17	-0.17
5. Hardiness	107.05	11.82						0.59*	-0.51*	0.48*	0.29*	0.45*
6. Intrusive thoughts (+)	16.59	3.27							-0.13	0.49*	0.40*	0.36*
7. Intrusive thoughts (-)	13.77	3.04								-0.32*	0.06	-0.49*
8. Avoidance	15.32	3.09									0.25*	0.33*
9. Problem focus coping	17.01	2.55										0.32*
10. Psychological well-being	43.76	7.24										

\*  $p < 0.01$ .

Table 2. Results of multiple regression analysis with physical illness as the dependent variables ( $n=95$ ).

Variable	Multiple R	RSQ	RSQ change	F
		Illness frequency		
Psychological well-being	0.48	0.23	0.23	4.6**
Stress	0.58	0.33	0.10	11.5**
Avoidance	0.61	0.37	0.04	5.2**
		Illness severity		
Stress	0.55	0.29	0.29	14.9**
Exercise	0.57	0.33	0.05	5.8**
Avoidance	0.59	0.35	0.04	4.25*

\*  $p < 0.05$ ; \*\*  $p < 0.01$ .

[ $r(95)=0.29$ ,  $p < 0.01$ ], less frequent use of intrusive negative self talk [ $r(95)=-0.20$ ,  $p < 0.05$ ], greater use of avoidant coping strategies [ $r(95)=0.22$ ,  $p < 0.05$ ], and greater overall reports of psychological well-being [ $r(95)=0.23$ ,  $p < 0.05$ ].

### 2.5. Predictions of physical illness after one year

Table 2 presents the results of two separate stepwise multiple regression analyses examining the contribution of the psychosocial risk factors as predictors and physical illness, frequency and severity, as the dependent variables over a period of one year. In these step-wise multiple regression analyses, stress, lifestyle habits, Type A behaviour, cognitive hardiness, social support, and coping style were entered separately as predictors of illness frequency and illness severity.

Demographic variables assessed in this study (age, sex, ethnicity, and education) were entered as a block in the first step of the regression analysis to statistically adjust for the influence these demographic variables may have on illness. Psychological well-being, assessed at time 1, was also entered in the first step to control for prior levels of somatopsychic distress. This permitted an examination of the incremental variance attributed to the major psychosocial variables to physical health status, while minimizing the possible confounds of negative affectivity (NA) on self-reported health status (cf. Watson and Clark 1984, Smith *et al.* 1989, Costa *et al.* 1989, Watson and Pennebaker 1989).

Psychological well-being entered significantly on the first step of the first regression analysis: illness frequency. Stress and the avoidant coping style also significantly contributed to predictions of physical illness frequency. In this study, employees experiencing more frequent physical illness after one year reported higher levels of initial stress and less frequent use of avoidant coping strategies. Together, these variables accounted for over 0.61 of the variance in this dependent illness variable. No other psychosocial variables significantly contributed to physical health status one year later.

Stress, level of physical activity, and the avoidant coping style significantly contributed to predictions of illness severity. Together, these variables accounted for over 0.58 of the variance in this dependent variable. Therefore, employees expressing higher levels of initial stress, less physical activity, and less frequent avoidant coping strategies also reported greater severity of physical illness at the end of a one year period. None of the statistical control variables (demographic factors or psychological well-being contributed to the prediction of the severity of physical illness in this regression analysis.

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Table 3. Results of multiple regression analysis with psychological distress (job burn-out) as the dependent variables (n=95).

Variable	Multiple R	RSQ	RSQ change	F
		Emotional exhaustion		
Type A behaviour	0.43	0.18	0.18	19.7**
Cognitive hardiness	0.49	0.25	0.06	7.4**
		Depersonalization		
Type A behaviour	0.31	0.10	0.10	9.5**
		Personal accomplishment		
Cognitive hardiness	0.41	0.17	0.17	18.5**
Stress	0.49	0.24	0.06	7.5**

\*  $p < 0.05$ ; \*\*  $p < 0.01$ .

### 2.6. Predictions of psychological distress (job burn-out) after one year

Table 3 presents the results of multiple regression analyses examining the contribution of the psychosocial risk factors as predictors of psychological distress (emotional exhaustion, depersonalization, personal accomplishment) over a period of one year. In these stepwise multiple regression analyses, stress, lifestyle habits, Type A behaviour, cognitive hardiness, social support, and coping style were entered separately as predictors of psychological distress (job burn-out). Demographic variables assessed in this study (age, sex, ethnicity, and education) were entered as a block in the first step of the regression analysis to statistically adjust for the influence these demographic variables may have on illness.

Three separate stepwise regression analyses were used to determine the predictors of the psychological distress components (emotional exhaustion, depersonalization, personal accomplishment) over a one-year period. Type A behaviour ( $R^2=0.18$ ;  $F(1,94)=19.86$ ,  $p < 0.01$ ) and cognitive hardiness ( $R^2=0.25$ ;  $F(1,94)=14.4$ ,  $p < 0.01$ ) were the only factors that significantly contributed to predictions of emotional exhaustion, accounting for approximately 0.49 of the variance in this dependent variable. Thus, employees expressing greater levels of Type A behaviour and possessing less cognitively hardy appraisals of work and life reported significantly higher emotional exhaustion over a one-year period.

Type A behaviour was the only psychosocial variable to significantly contribute to predictions of depersonalization ( $R^2=0.10$ ;  $F(1,94)=9.59$ ,  $p < 0.01$ ), accounting for all of the variance in this dependent variable. Finally, high levels of cognitive hardiness ( $R^2=0.17$ ;  $F(1,94)=18.49$ ,  $p < 0.01$ ) and stress ( $R^2=0.24$ ;  $F(1,94)=13.6$ ,  $p < 0.01$ ) significantly contributed to predictions of satisfaction with personal and professional accomplishment, accounting for approximately 0.49 of the variance in this dependent variable. In this sample, higher levels of expressed Type A behaviour appeared to be associated with cynicism, interpersonal negativity, and depersonalization. This finding provides limited construct validity for the Type A scale developed for this study given its association with the overt interpersonal expression of interpersonal distrust, negativity, and irritability conceptually underlying this particular job burn-out subscale. Additional research is obviously needed to demonstrate this psychological construct in light of current criticism of global Type A measures (cf., Edwards *et al.* 1991; Ganster *et al.* 1991).

### 3. Discussion

This prospective study examined the contribution of specific psychosocial factors to predictions of physical illness and psychological distress (job burn-out) in professional working adults. The data tend to support a positive association between stress, exercise, and an avoidant coping style with self-reported physical illness. Additional support for the association between stress, Type A behaviour, and cognitive hardiness with psychological distress was also observed. These results were obtained when statistical adjustments for relevant demographic variables (age, sex, education, ethnicity) and prior levels of psychological well-being were statistically controlled for in the regression analyses.

The results of this study must be interpreted cautiously due to the reliance on self-report measures, the highly educated and relatively small professional sample used in this research, and the lack of multiple measures of relevant independent psychosocial variables. Future research is needed using more objective indices of physical health status (e.g., health insurance claims, absenteeism, physician medical records) and multiple assessments of the various psychosocial factors assessed in this study. For example, research has repeatedly shown that questionnaire methods of assessing global Type A behaviour are poorly correlated with the preferred structured interview method (cf., Chesney *et al.* 1980, Matthews *et al.* 1982, Edwards *et al.* 1991). Use of multiple assessments should provide additional evidence for both convergent and discriminant validity of the various psychosocial constructs which appear to mediate the stress-illness relationship.

The contribution of an avoidant coping style to the prediction of physical illness is consistent with an earlier finding with a concurrent study of professional working adults using a different dependent measure of health status (Nowack 1989). In the present study, individuals who minimized the significance of harmful work and life stress (presumably by not being preoccupied and dwelling on things that can not be controlled) reported significantly less frequent and less severe physical illness one year later. This finding supports previous research suggesting that a general negative affective style is associated with health status (e.g., Friedman and Booth-Kewley 1987, Taylor 1990).

Although use of avoidance was significantly associated with a prospective measure of physical illness in this study, it was not possible to determine how this particular coping style might have an adverse effect on well-being. Previous research investigating the merit of this coping approach suggests that avoidance might be most beneficial when work and life events are beyond an individual's direct control (cf., Roth and Cohen 1986, Lazarus 1983). Clearly, additional research is required to elucidate the potential benefits and liabilities of this particular approach to coping with specific work and life stressors. Future research should also attempt to utilize multiple assessments of avoidant coping strategies (i.e., state and trait) with both chronic and infectious health outcomes. Whenever possible, these studies should be longitudinal in nature, focus on the efficacy of multiple coping style, and attempt to explore the costs associated with various coping methods (e.g., physiologic arousal, lifestyle consequences). As Folkman *et al.* (1986) point out, successful coping may depend more on a match of coping approaches to the perceived stressful event than on the relative efficacy of one strategy over another.

In this sample, perceived stress appeared to significantly contribute to predictions of both illness frequency and severity over a period of one year, even after controlling for initial levels of somatopsychic distress. As Watson and Pennebaker (1989) point out, self-reported health scales are likely to have two distinct components, one that is subjective and psychological and the other that is more objective and clearly health related. They conclude that self-report measures of stress and health complaints tap heavily into a pervasive mood disposition of negative affectivity (i.e., a stable and ubiquitous individual

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difference characterized by aversive cognitions and affect such as anxiety, neuroticism, and irritability. In a broad review of health research, negative affectivity has consistently shown to be associated with these measures, but does not consistently or strongly relate to actual, long term health status. Thus, the relationship between stress and health, particularly those assessed by self-reports, is considered to be over-estimated, if not spurious, due to the shared variance and confounded relationship between stress, negative affectivity, and self-reported symptomatology.

Watson and Pennebaker (1989) concluded that negative affectivity reflects a general trait of somatopsychic distress resulting in a dispositional tendency to perceive and experience cognitive, emotional, and somatic states negatively. This suggests that any research using a health complaint scale as its criterion for health or psychological indicator and measures of any kind of subjective stress should attempt to control for the nuisance variable of negative affectivity in some manner. Recent related findings by Skitka (1990) and Suls and Marco (1990) suggest that perceived work stress and an overall stressful lifestyle (measured by the JAS and FTAS Type A scales) explained both subjective and objective health measures, even after controlling for negative affectivity. Together, these studies suggest that self-reported stress measures may still be valid, albeit weak, predictors of health status. These findings also support Watson and Pennebaker's (1989) hypothesis that the link between subjective stress and well-being may not entirely be the result of trait-related disposition of somatopsychic distress. Additional research is obviously required to further delineate the unique contributions of negative affectivity and repressive coping styles to stress and health measures.

Physical activity and exercise level also significantly contributed to predictions of physical health over a one-year period in this study. This finding is particularly noteworthy in light of recent prospective findings suggesting that exercise is significantly related to all-cause mortality, including cancer, and that the risk of developing CHD in a sedentary population is approximately 1.9 times as great as in an active population (cf., Blair *et al.* 1989, Powell *et al.* 1987). The CHD risk attributed to inactivity is comparable to the major CHD risk factors levels of 2.1-2.5 for high systolic blood pressure, smoking, and high serum cholesterol. Furthermore, the US population at risk from inactivity (59%) far exceeds the percentage of the population at risk (10%-18%) due to smoking, hypertension, or elevated cholesterol (Powell *et al.* 1987).

Individuals in this study who engaged in greater physical activity on a regular basis (i.e., 'exercised for at least 15-20 min, several times a week, to enhance muscle tone, strength, or flexibility' or 'spent at least 15-20 minutes performing some type of vigorous physical exercise at least 2-3 times a week such as aerobics, jogging, swimming, walking briskly') reported significantly less severity of physical illness of the course of a year compared to those who had a more sedentary lifestyle. The association between level of physical activity and health status in this study provides some limited support for the potential cost-saving benefits of organizational fitness programmes in the workplace. It would appear that individuals who engage in moderate physical activity may be healthier and utilize less corporate health insurance than those who exercise to a limited extent or are completely inactive.

For example, a recent review by Indiana's Blue Cross/Blue Shield health promotion programme between 1978-1982 found that for every dollar spent on health care by exercisers, non-fitness types cost an average of \$1.73 (Sloan *et al.* 1988). In general, studies evaluating several fitness and wellness programmes have consistently shown positive changes in both employee health and health promoting behaviour (cf., Pelletier 1988, Gebhardt and Crump, 1989). Future research should continue to investigate the optimum

physical activity required to promote individual health in the workplace while maximizing organizational outcomes such as productivity, absenteeism, and quality of working life.

In this study, a different set of psychosocial predictors were found for physical versus psychological health status (measured as job burn-out). This might be attributed to the significant, albeit modest, correlations found between the physical illness and job burn-out scales (average  $r$ 's (95)=0.32, all  $p$ 's<0.01). It might be argued that the physical and psychological health outcomes assessed in this study are relatively independent of each other (the correlation between illness frequency and illness severity was 0.91,  $p$ <0.01). Type A behaviour was uniquely associated with higher levels of emotional exhaustion and depersonalization, while cognitive hardiness was uniquely associated with emotional exhaustion and personal accomplishment one year later.

With respect to the Type A measure used in this study, the ten items composing this scale were developed to measure the full range of expressed Type A responses including anger-in and anger-out, irritability, time urgency, working quickly, impatience, job involvement, achievement striving, hard-driving, and competitive behaviours in employed men and women. As such, it is possible that confound between the burn-out scale items and Type A behaviour scale may account for the significant association observed in this study. Unfortunately, this study did not include alternate measures of the Type A behaviour pattern. Future research should utilize such multiple component measures of the TABP to further elucidate the pathogenic components of this behaviour pattern with diverse psychological and physical health outcomes. Based on recent research by Edwards *et al.* (1990, 1991), it is recommended that new measures of TABP should be developed by carefully defining the components of interest, constructing items that convincingly represent the content domains, and demonstrating psychometric integrity. The use of these new measures might result in greater understanding of the effects of TABP on psychophysiological symptomatology as well as work related performance measures.

The significant association between cognitive hardiness and emotional exhaustion and personal accomplishment factors of job burn-out, but not physical illness, are consistent with the findings of an earlier study (Nowack 1986). The data support the view that a sense of commitment, control, and challenge underlying the cognitive hardiness measure used in this study are important cognitions that contribute to predictions of psychological well-being. The finding that cognitive hardiness was not related to physical illness is not consistent with prior research by Kobasa and her colleagues (*cf.*, Kobasa 1979, Kobasa *et al.* 1982, 1983, 1981) or a recent unpublished longitudinal study with 230 employees (Greene and Nowack 1991).

However, when additional regression analyses were conducted, without statistical adjustments for initial psychological well-being, stress ( $R^2=0.21$ ;  $F(1,94)=20.67$ ,  $p<0.01$ ) and cognitive hardiness ( $R^2=0.29$ ;  $F(1,94)=9.08$ ,  $p<0.01$ ) significantly contributed to predictions of physical illness frequency, accounting for over 0.55 of the variance in this dependent variable. Thus, employees who reported greater levels of stress and possessed less cognitive hardiness experienced significantly greater levels of physical illness over the period of one-year. Furthermore, cognitive hardiness and psychological well-being in this study were moderately correlated with each other ( $r(94)=0.45$ ,  $p<0.01$ ). One explanation for these apparently contradictory findings is that the covariance between the two variables accounted for the lack of an observed association between cognitive hardiness and physical illness in those regression analyses where statistical adjustments for initial levels of psychological well-being were made. It is

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possible that some confound exists between these two scales. Additional research is required to more fully delineate the psychometric properties and potential overlap between these two scales.

Overall, this prospective study provides limited criterion-related validity between various psychosocial factors and physical and psychological well-being. The data also provided support for a possible causal relationship between stress, exercise, and an avoidant coping style with physical illness. Replication of this study is necessary with diverse samples (e.g., elderly, blue-collar workers) to strengthen the generalizability of the findings. Future research should attempt to utilize longitudinal designs and incorporate both subjective and objective health outcome measures.

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