

Human Relations

<http://hum.sagepub.com>

Stress, Type-A, Coping, and Psychological and Physical Symptoms: A Multi-Sample Test of Alternative Models

Jeffrey R. Edwards, A. J. Baglioni, Jr. and Cary L. Cooper
Human Relations 1990; 43; 919
DOI: 10.1177/001872679004301001

The online version of this article can be found at:
<http://hum.sagepub.com/cgi/content/abstract/43/10/919>

Published by:



<http://www.sagepublications.com>

On behalf of:



The Tavistock Institute

Additional services and information for *Human Relations* can be found at:

Email Alerts: <http://hum.sagepub.com/cgi/alerts>

Subscriptions: <http://hum.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.co.uk/journalsPermissions.nav>

Citations <http://hum.sagepub.com/cgi/content/refs/43/10/919>

Stress, Type-A, Coping, and Psychological and Physical Symptoms: A Multi-Sample Test of Alternative Models¹

Jeffrey R. Edwards² and A. J. Baglioni, Jr.

University of Virginia

Cary L. Cooper

University of Manchester

Theoretical and empirical organizational stress research typically focuses on some combination of stress, personality factors, coping, and symptoms of ill health. Though these factors are typically considered important, there is considerable disagreement regarding the underlying process by which they are interrelated. This article discusses and empirically evaluates seven alternative conceptual models specifying the interrelationships among stress, personality (in this case, Type-A behavior pattern), coping, and psychological and physical symptoms, using data from 1468 adults in four occupations. Results generally support three models which incorporate linear effects and fail to support four models which incorporate nonlinear, i.e., interactive, effects. Implications for research are discussed.

INTRODUCTION

A great deal of research has examined the causes and consequences of stress in organizations (Cooper & Marshall, 1980; Cooper & Payne, 1988; Cooper & Smith, 1985). This research has examined a wide variety of specif-

¹This research was supported in part by the Darden School Sponsors. The authors wish to thank Carol Steele LeMay for assistance in data base management and Mary Darnell for her administrative assistance in the preparation of this article.

²Requests for reprints should be sent to Jeffrey R. Edwards, Graduate School of Business Administration, University of Virginia, Box 6550, Charlottesville, Virginia 22906-6550.

ic person and situation variables, most of which may be grouped into one of four broad categories: (1) stressful situations and events, (2) personality factors, (3) coping, and (4) symptoms of ill health. Most researchers would agree that these variables play a central role in organizational stress research, but few would agree on the process by which they are interrelated.

The purpose of this article is to review and empirically evaluate alternative theoretical models regarding the interrelationships among stress, personality, coping, and symptoms. To represent these constructs, we will use stressful life events, Type-A behavior pattern, methods of coping, and psychological and physical symptoms. These constructs will be combined according to seven general theoretical models drawn from the stress literature. To broaden the appeal of this study, we have selected models representing general themes rather than specific approaches attributable to particular researchers. By assessing the validity of these general models, we hope to suggest an agenda for developing more detailed models regarding the interrelationships among stress, personality, coping, and symptoms.

GENERAL THEORETICAL APPROACHES

The stress literature contains a wide variety of general theoretical approaches regarding the interrelationships among stress, Type-A, coping, and symptoms. Some of these approaches have been presented as explicit theories, others may be inferred from analyses conducted in empirical studies, and others are readily derived as extensions of existing models. From these, we have selected seven approaches that represent much of the stress literature to date: (1) the direct effects model, (2) the buffered effects model, (3) the mediated effects model, (4) the mediating buffered effects model, (5) mediating mediated effects model, (6) the buffered mediated effects model, and (7) the buffered buffered effects model (see Fig. 1). In this section, we will describe these approaches and review relevant evidence, focusing primarily on field studies using occupational or normal adult populations.

Direct Effects Model

The direct effects model (Fig. 1a) posits that stress, Type-A, and coping independently influence symptoms, such that stress and Type-A both increase symptoms, whereas coping reduces symptoms. In various forms, this model underlies much early research into stress, Type-A, and coping (Coel-

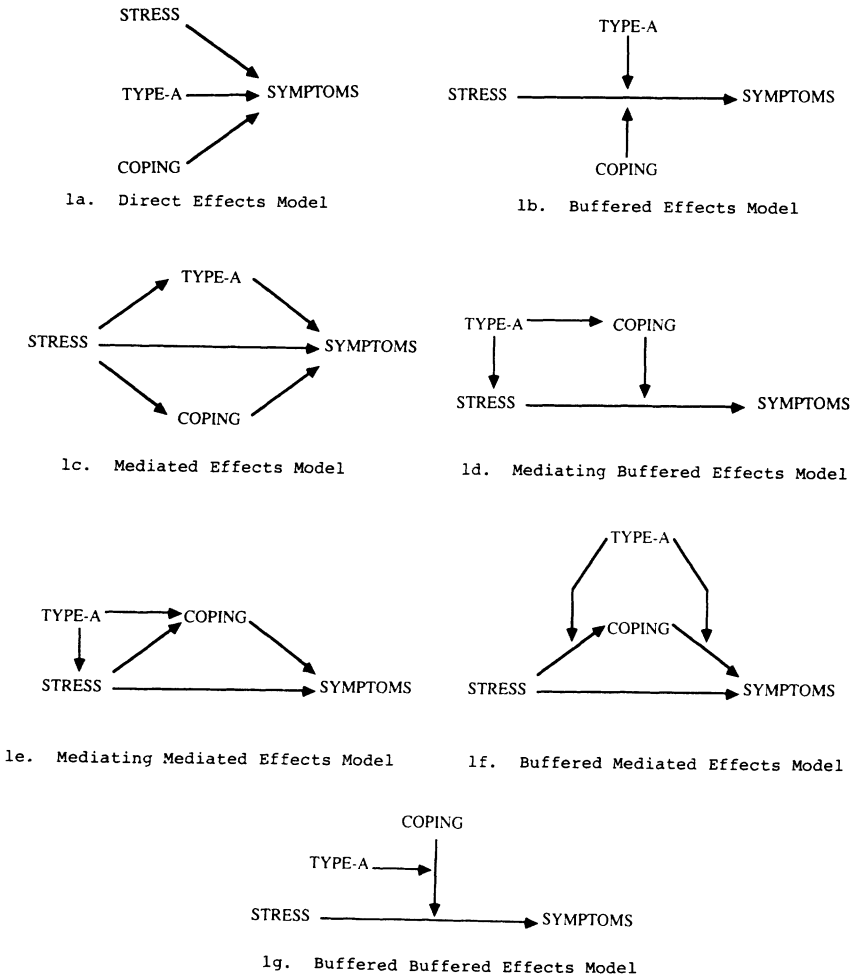


Fig. 1. Models of stress, Type-A, coping, and symptoms.

ho, Hamburg, & Adams, 1974; Jenkins, 1971; Rabkin & Struening, 1976). Overall, research pertaining to this model has been moderately supportive. For example, stressful life events have consistently demonstrated a modest positive relationship with psychological symptoms, with similar but weaker results for physical symptoms (Cooper & Marshall, 1976; Dohrenwend & Dohrenwend, 1981; Rabkin & Struening, 1976; Thoits, 1983). Type-A has

demonstrated a positive relationship with physical symptoms, particularly coronary heart disease (French-Belgian Collaborative Group, 1982; Haynes, Feinleib, & Kannel, 1980; Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975), though more recent evidence has been less conclusive (Booth-Kewley & Friedman, 1987). Evidence for the direct effects of Type-A on psychological symptoms is mixed, though several studies suggest positive relationships with nervousness, anxiety, and depression (Burke & Weir, 1980; Chesney, Black, Chadwick, & Rosenman, 1981; Dearborn & Hastings, 1987; Frew & Bruning, 1987; Matteson & Ivancevich, 1982; Somes, Garrity, & Marx, 1981).

Studies of the direct effects of coping have found either positive or negative effects, depending primarily on the particular coping strategy in question. Coping strategies directed toward altering the situation, i.e., problem-focused coping, are typically associated with reduced symptoms, whereas coping strategies directed toward regulating emotional upset, i.e., emotion-focused coping, are often positively related to symptoms (Billings & Moos, 1981; Caplan, Naidu, & Tripathi, 1984; Howard, Rechnitzer, & Cunningham, 1975; McCrae & Costa, 1986; Mitchell, Cronkite, & Moos, 1983; Newton & Keenan, 1985; Pearlin & Schooler, 1978; Shinn, Rosario, Morch, & Chestnut, 1984). Relationship between coping strategies directed toward reappraising the situation, i.e., appraisal-focused coping, and symptoms have been negative (Needle, Griffin, & Svendsen, 1981; Pearlin & Schooler, 1978), positive (Folkman, Lazarus, Gruen, & DeLongis, 1986b), and essentially zero (Pearlin, Lieberman, Menaghan, & Mullan, 1981). These differential findings may indicate that problem-focused coping is more likely to eliminate the source of stress, thereby reducing symptoms, whereas appraisal- and emotion-focused coping may actually prolong exposure to stress, thereby increasing symptoms. Alternately, symptoms may influence coping strategy selection, such that mild symptoms enable problem-focused coping, whereas extreme symptoms necessitate emotion- and appraisal-focused coping. In any case, these findings emphasize the importance of viewing coping as a multidimensional rather than a unidimensional construct. In sum, evidence regarding the direct effects model indicates modest positive effects of stress and Type-A on symptoms, whereas the effects of coping are contingent upon the coping strategy used.

Buffered Effects Model

The modest relationship between stress and symptoms has stimulated research into factors that may modify, or buffer this relationship (Fig. 1b). This research is based on the assumption that a weak relationship between

stress and symptoms may conceal a stronger relationship for certain individuals, i.e., Type-As, ineffective copers, and a weaker effect for others, i.e., Type-Bs, effective copers. Available evidence provides moderate support for the buffering effects of Type-B behavior for both psychological and physical symptoms (Cohen & Edwards, 1988; Ganster, Sime, & Mayes, 1987), though most studies have used subgrouping analysis rather than hierarchical regression to test moderating effects (Arnold, 1982), thereby limiting the conclusiveness of their findings. Studies of the buffering effects of coping suggest that problem- and appraisal-focused coping buffer the effects of stress, whereas emotion-focused coping exacerbates its effects (Caplan et al., 1984; Mitchell et al., 1983; Pearlin et al., 1981; Pearlin & Schooler, 1979), though exceptions exist (Shinn et al., 1984). Thus, available evidence suggests that Type-B behavior and problem- and appraisal-focused coping buffer the effects of stress, whereas emotion-focused coping exacerbates its effects.

Mediated Effects Model

The mediated effects model (Fig. 1c) suggests that stress not only increases symptoms, but also activates coping and Type-A behavior, which in turn influence symptoms (Ganster et al., 1987; Howard, Cunningham, & Rechnitzer, 1977; Wheaton, 1985). When the mediator is negatively related to symptoms, e.g., problem-focused coping, this results in an overall decrease in symptoms, whereas when the mediator is positively related to symptoms, e.g., Type-A behavior and emotion-focused coping, this results in an overall increase in symptoms. Though no studies have directly tested the mediating effects of coping and Type-A, indirect evidence is available. For example, stress has consistently demonstrated a positive relationship with Type-A (Burke & Weir, 1980; Howard et al., 1977; Kelly & Houston, 1985; Somes, Garrity, & Marx, 1981; Suls, Gastorf, & Wittenberg, 1979). This evidence, combined with the positive relationship typically found between Type-A and symptoms, is consistent with the mediated effects model. Stress has also demonstrated a positive relationship with emotion-focused coping, but has demonstrated a negative relationship with problem- and appraisal-focused coping (Fleishman, 1984; Mitchell et al., 1983). These results suggest that stress stimulates maladaptive, i.e., emotion-focused, coping and inhibits adaptive, i.e., problem-focused, coping, which is clearly inconsistent with the mediated effects model. Nonetheless, these results do not constitute an appropriate test of the model, which requires causal modeling or, at a minimum, hierarchical regression, with symptoms regressed first on coping, and then on both stress and coping (James & Brett, 1984). Though several studies have used hierarchical regression (Billings & Moos, 1981; Pearlin & Schooler, 1978),

they have entered coping *after* controlling for stress, thereby implicitly testing the mediating effects of stress, not coping. Thus, available evidence regarding the mediated effects model is supportive for Type-A and emotion-focused coping, but contrary to predictions for appraisal- and problem-focused coping.

Mediating Buffered Effects Model

Several explanations have been offered for the effects of Type-A on symptoms. One explanation is that, compared to Type-Bs, Type-As either select or create more stressful situations for themselves (Ganster et al., 1987). A second explanation is that Type-As are more likely to use maladaptive coping strategies (Newton & Keenan, 1985). In essence, both of these explanations suggest that Type-A influences stress and coping, which in turn influence symptoms. However, they do not specify the process by which stress and coping combine to influence symptoms. One potential process is represented by the buffered effects model (Fig. 1b). By combining the effect of Type-A on stress and coping with the buffered effects model, we obtain the mediating buffered effects model (Fig. 1d), which suggests that the buffering effect of coping mediates the effects of Type-A on symptoms.

Though no studies have directly tested the mediating buffered effects model, several studies have examined its components. For example, several studies suggest that, compared to Type-Bs, Type-As are more likely to engage in maladaptive and ineffective coping (Brunson & Matthews, 1981; Davidson & Cooper, 1980; Howard et al., 1975; Newton & Keenan, 1985). The evidence reviewed earlier indicating a positive relationship between Type-A and stress is also consistent with the model, but only Kelly and Houston (1985) specifically demonstrated that stress mediated the relationship between Type-A and symptoms. Evidence reviewed earlier also supports the moderating effects of coping posited by the model. Thus, available evidence is consistent with the mediating buffered effects model, though an explicit test of the model has not been conducted.

Mediating Mediated Effects Model

The mediating mediated effects model (Fig. 1e) is analogous to the mediating buffered effects model, in that both models pose stress and coping as mediators of the relationship between Type-A and symptoms. However, unlike the mediating buffered effects model, in which coping buffers the rela-

tionship between stress and symptoms, the mediating mediated effects model states that coping mediates the relationship between stress and symptoms. Aside from this distinction, the models are the same, with both viewing Type-A as a determinant of stress and coping. Because of this, the evidence reviewed above regarding the effects of Type-A on stress and coping is also consistent with the mediating mediated effects model. Evidence reviewed earlier regarding the mediating effects of coping also pertains to the mediating mediated effects model, though we should again note that this evidence is consistent with the model for emotion-focused coping but inconsistent for problem- and appraisal-focused coping. Despite these findings, a direct test of the mediating mediated effects model has not been conducted.

Buffered Mediated Effects Model

The buffered mediated effects model (Fig. 1f) specifies an alternative process by which Type-A may influence the effects of stress and coping on symptoms. This model contains two primary propositions. One proposition indicates that, when under stress, Type-As select less effective coping strategies, as represented by the arrow from Type-A to the arrow between stress and coping. A second proposition indicates that the beneficial effects of coping on symptoms are greater for Type-Bs than for Type-As, as represented by the arrow from Type-A to the arrow between coping and symptoms. Unfortunately, we know of no available evidence pertaining to either of these propositions.

Buffered Buffered Effects Model

Another process by which Type-A may influence coping is depicted by the buffered buffered effects model (Fig. 1g). This model states that the effects of coping on the relationship between stress and symptoms differs for Type-As and Type-Bs, such that adaptive, e.g., problem-focused, coping buffers the effects of coping only for Type-Bs, whereas maladaptive, e.g., emotion-focused, coping exacerbates the effects of stress only for Type-As. To date, we know of no studies that examined the joint effects of Type-A and coping implied by the model.

Summary of Models

Most of the seven models outlined here appear in various forms in the stress literature. By far, the direct effects model is the most common and,

in general, has received the most support. The buffered effects model has received support for Type-B behavior and problem- and appraisal-focused coping, though available evidence suggests that emotion-focused coping exacerbates the effects of stress. The mediated effects model has only received indirect attention, though available evidence is supportive for Type-A but mixed for coping. We found only one study which explicitly tested the mediating effects of stress implied by both the mediating buffered effects model and the mediating mediated effects model, and results were moderately supportive. Neither the buffered mediated effects model nor the buffered buffered effects model has been examined explicitly in the literature, though both models provide a plausible representation of the combined effects of Type-A and coping on the relationship between stress and symptoms. In this article, we will explicitly test these models to determine which ones provide a plausible representation of the interrelationship among stress, Type-A, coping, and symptoms.

METHOD

Sample

The sample consisted of 1468 employed adults drawn from the following four independent occupational groups:

1. *Accountants.* Haskins, Baglioni, and Cooper (in press) surveyed senior accountants in a U.S. Big Eight firm and public accountants at all levels in several small and medium-sized firms ($n = 271$). The accountants averaged 30.3 years of age and 5.7 years of experience. About 63% were male, and 56% were married.

2. *Dentists.* Cooper, Watts, Baglioni, and Kelly (1988) surveyed 484 U.K. dentists, comprising every seventeenth dentist on the British Dental Association register. The median age of the dentists was about 35 years. Approximately 82% were male, and 74% were married.

3. *Nurses.* Hingley and Cooper (1986) surveyed 475 female nurse managers in one U.K. National Health Service Authority. The nurses had a mean age of 43.7 and a median of 20 years experience in nursing. About 60% were married.

4. *Musicians.* Wills and Cooper (1987) surveyed 238 English professional musicians. The musicians averaged 35 years of age and 15 years of experience. About 94% were males, and 58% were married.

Measures

Stressors. An index of occupation-specific stressors was developed for each occupational group. The number of items varied by group, ranging from

40 for the dentists to 71 for the nurse managers. The items were generated through a multi-stage process, including literature reviews for each occupation, brainstorming sessions, taped interviews, interviews with experts within each occupation, and direct observations. The items reflected several common stress dimensions across the four occupations, including stress related to a particular role, i.e., being a musician or accountant, interpersonal relations, home vs. work conflicts, and functioning within organizational constraints. All items were scored on a 5-point Likert scale, ranging from 1 (no stress) to 5 (a great deal of stress).

Coping. Measures of coping varied by occupation. For the accountants, a 50-item version of the Ways of Coping Checklist (WCCL; Folkman & Lazarus, 1980) was used, based on factor analyses of the complete WCCL (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986a). For the dentists, coping was assessed using 12 questions asking how often the respondent used various strategies, e.g., avoidance, drinking, or confronting the situation, to cope with work-related stress. Musicians responded to the same 12 items plus five additional items concerning the use of illegal drugs (marijuana, LSD, amphetamines, cocaine, and heroin). The nurses completed two coping measures. The first, developed by Hingley and Cooper (1986), contained 11 items assessing symptom-focused coping, such as smoking, drinking alcohol, using relaxation techniques, and exercise. The second, adapted from Folkman and Lazarus (1980) and Cooper, Cooper, and Faragher (1986), contained 12 items assessing both problem- and appraisal-focused coping. All measures incorporated 4- or 5-point Likert scales, with low scores indicating that the coping strategy was not used and high scores indicating that the coping strategy was used a great deal.

Type-A Behavior Pattern. The Bortner (1969) Type-A scale was used for each occupational group. This scale contains 14 items consisting of bipolar adjectives, e.g., never rushed vs. always rushed, not competitive vs. very competitive, each rated on an 11-point scale. The Bortner is moderately correlated with the Structured Interview (Bortner, 1969) and the Jenkins Activity Survey (Johnston & Shaper, 1983) and has been prospectively related to coronary heart disease (French-Belgian Collaborative Group, 1982).

Psychological and Physical Symptoms. The accountants, dentists, and nurses completed the eight-item anxiety, depression, and somatic symptom subscales from the Crown-Crisp Experiential Index (CCEI; Crown & Crisp, 1966). The CCEI has been validated against clinical diagnoses (Crisp, Ralph, McGuinness, & Harris, 1978) and has demonstrated adequate reliability (Alderman, Mackay, Lucas, Spry, & Bell, 1983). Musicians completed a revised version of the 24-item Gurin scale (Gurin, Veroff, & Feld, 1960). A factor analysis by Gurin et al. (1960) suggested that this scale contains two dimensions that overlap with the CCEI, i.e., anxiety and somatic symptoms.

RESULTS

Psychometric Properties of Measures

As indicated earlier, previous research suggests that total life events and Type-A behavior are related to symptoms fairly consistently, but the relationship between coping and symptoms varies, depending on the coping strategy used. Therefore, we used single indices to represent stress and Type-A and multiple indices to represent coping. The coping indices were based on separate factor analyses of the coping measures for each sample. Each factor analysis employed maximum likelihood extraction and oblique rotation, with scree tests and factor interpretability used to determine the number of factors to retain. For the accountants, we obtained a three-factor solution, reflecting instrumental action, wishful thinking, and seeking social support. For the dentists, we obtained a three-factor solution, consisting of instrumental action, substance use, and leisure activities. For the nurses, we obtained a three-factor solution, reflecting seeking social support, denial, and wishful thinking. Finally, for the musicians, we obtained a two-factor solution, indicating relaxation and substance use. Taken together, these factors represent one form of problem-focused coping (instrumental action) and six forms of emotion-focused coping (seeking social support, wishful thinking, denial, substance use, leisure, and relaxation).²

The factor analyses described were used to derive subscales for each coping dimension. Rather than simply summing the relevant items, we computed factor scores using the regression procedure, thereby reflecting the differential contribution of each item to the overall composite (Kim & Mueller, 1985; Perloff & Persons, 1988). The reliability of the resulting scales was estimated using omega (Heise & Bohrnstedt, 1970; McDonald, 1985). Unfortunately, the reliability of several scales was well below the conventional standard of .70 (Nunnally, 1978; see Table I). Though using these measures as separate predictors would simply bias the obtained parameter estimates downward, using them simultaneously could bias these estimates downward or upward (Kenny, 1979). To determine the direction of this bias, we compared regression coefficients from models including all coping measures simultaneously against models including each coping measure separately, using symptom measures as dependent variables. Overall, these analyses indicated that the inclusion of other coping measures slightly lowered the bivariate relationships, but in no case were these relationships severely affected. Therefore, we retained the coping measures with low reliability estimates, assuming

²The seeking social support factor was considered emotion-focused coping because it involved talking with others to vent feelings rather than to solicit aid to solve or reinterpret the problem.

Table 1. Correlations and Reliabilities of Study Variables

	1	2	3	4	5	6	7	8
Accountants								
1. Stress	(.95)							
2. Type-A	.12	(.73)						
3. Instrumental action	.37 ^c	.20 ^c	(.83)					
4. Wishful thinking	.35 ^c	.09	.43 ^c	(.76)				
5. Seek social support	.10	-.06	.15 ^b	-.08	(.50)			
6. Anxiety	.34 ^c	.23 ^c	.05	.43 ^c	.13	(.74)		
7. Somatic symptoms	.25 ^c	.12 ^a	.02	.24 ^c	-.05	.44 ^c	(.39)	
8. Depression	.24 ^c	.16 ^c	-.06	.39 ^c	-.15 ^b	.54 ^c	.46 ^c	(.52)
Nurses								
1. Stress	(.95)							
2. Type-A	.17 ^c	(.74)						
3. Seek social support	.13 ^b	-.09	(.57)					
4. Denial	-.02	-.05	.02	(.41)				
5. Wishful thinking	.47 ^c	.12 ^b	.24 ^c	.08	(.52)			
6. Anxiety	.21 ^c	.10 ^a	-.06	.01	.22 ^c	(.71)		
7. Somatic symptoms	.27 ^c	.12 ^b	-.04	-.04	.35 ^c	.49 ^c	(.59)	
8. Depression	.23 ^c	.04	-.04	-.09 ^a	.29 ^c	.45 ^c	.59 ^c	(.57)
Dentists								
1. Stress	(.91)							
2. Type-A	.24 ^c	(.65)						
3. Instrumental action	.03	.04	(.35)					
4. Substance use	.17 ^c	.17 ^c	-.06	(.26)				
5. Leisure activity	.04	-.03	.46 ^c	.07	(.30)			
6. Anxiety	.42 ^c	.26 ^c	-.07	.36 ^c	-.04	(.71)		
7. Somatic symptoms	.36 ^c	.20 ^c	-.09 ^a	.30 ^c	-.10 ^a	.57 ^c	(.57)	
8. Depression	.39 ^c	.23 ^c	-.06	.22 ^c	-.10 ^a	.66 ^c	.54 ^c	(.62)
Musicians								
1. Stress	(.92)							
2. Type-A	.06	(.75)						
3. Relaxation	.11 ^a	-.15 ^b	(.42)					
4. Substance use	-.03	.01	.01	(.38)				
5. Anxiety	.25 ^c	.16 ^b	.05	.44 ^c	(.84)			
6. Somatic symptoms	.32 ^c	.20 ^b	.02	.13 ^a	.63 ^c	(.45)		

^a*p* < .05.
^b*p* < .01.
^c*p* < .001.

that relationships obtained for these measures would be weaker than those obtainable with more reliable measures. Given the exploratory nature of this study, we felt this decision was justified. Nonetheless, results regarding the affected measures should be interpreted with appropriate reservation.

Model Analyses

Multivariate multiple regression (MMR; Dwyer, 1983) was used to analyze the seven models depicted in Fig. 1. MMR is analogous to MANOVA in that it provides a joint test for the prediction of multiple dependent variables, as indexed by the multivariate U -statistic (Wilks, 1932) or, equivalently, Rao's approximate F (Rao, 1959). However, unlike MANOVA, MMR readily incorporates either categorical or continuous variables as predictors. Details regarding specific MMR analyses are presented separately for each model.

Direct Effects Model. Three separate MMR analyses were used to test the direct effects of stress, coping, and Type-A on symptoms (see Table II). For each sample, stress was significantly related to symptoms. With few exceptions, Type-A was also positively related to symptoms. Results for coping were mixed. Instrumental action was negatively related to all symptoms for the accountants but not the dentists. Seeking social support was positively related to anxiety for the accountants but was negatively related to all symptoms for the nurses. As expected, wishful thinking and substance use were positively related to all symptoms. Leisure activities were negatively related to depression and somatic symptoms for the dentists. Surprisingly, denial was negatively related to depression for the nurses. Finally, the relationship for relaxation was not significant for the musicians. Thus, the direct effects model received strong support for stress, Type-A, wishful thinking, leisure activities, and substance use, and moderate support for instrumental action. Mixed results were found for seeking social support, contrary results were found for denial, and no relationship was found for relaxation.

Buffered Effects Model. Hierarchical MMR was used to examine the buffered effects model. For these analyses, main effects were entered into each model first, followed by the relevant interaction (Cohen, 1978). The buffering effects of Type-A and coping were analyzed separately to avoid partialing their effects from one another. In general, the buffered effects model was not supported (see Table III). For Type-A, a significant interaction was found only for nurses in the prediction of depression, but this interaction was not in the expected direction, i.e., the relationship between stress and depression was stronger for Type-Bs. For coping, multivariate analyses for the dentists indicated a significant interaction for substance use and a

marginally significant interaction ($p < .10$) for instrumental action. Univariate analyses revealed that substance use exacerbated the effect of stress on somatic symptoms, whereas instrumental action buffered the effect of stress on depression. Multivariate analyses for the musicians suggested an interaction for substance use. Univariate analyses revealed a buffering effect for substance use in the relationship between stress and somatic symptoms, but this effect was only marginally significant ($p < .10$). Thus, these analyses indicate that, with few exceptions, Type-A and coping did not buffer the relationship between stress and symptoms.

Mediated Effects Model. Three sets of MMR analyses were performed to examine the mediated effects model. The first set tested the direct effects of the mediator variable, i.e., Type-A or coping, on symptoms (see Table II). The second set added stress to determine whether it explained additional variance in symptoms after controlling for the mediator variable. The third set regressed the mediator variable on stress to determine whether a relationship between stress and the mediator variable was present (see Table IV). Significant effects in the first and third analyses, combined with a nonsignificant effect in the second analysis, was interpreted as consistent with a mediating effect (James & Brett, 1984). As with the buffered effects model, the mediating effects of Type-A and coping were analyzed separately to avoid partialing their mediating effects from one another. Overall, results provided moderate support for the mediated effects model. First, consider the mediating effects of Type-A. As indicated in Table II, Type-A was significantly related to symptoms. After controlling for Type-A, however, the effects of stress remained significant for each sample. The relationship between stress and Type-A was positive, though this relationship was only marginally significant for the accountants ($p < .10$) and not significant for the musicians. Taken together, these results suggest a partial mediating effect for Type-A for the accountants, dentists, and nurses, such that stress influences symptoms both directly and by increasing Type-A behavior which, in turn, increases symptoms (James & Brett, 1984).

Results regarding the mediating effects of coping followed a similar pattern. As indicated in Table II, most coping variables exhibited direct effects on symptoms. After controlling for coping, however, the relationship between stress and symptoms again remained significant for each sample. Significant multivariate relationships between stress and coping were found for the accountants, dentists, and nurses. Univariate analyses revealed positive relationships between stress and both instrumental action and wishful thinking for the accountants, substance use for the dentists, and both seek social support and wishful thinking for the nurses. Combining these results with those presented in Table II indicates that the mediating effects of instrumental action and seek social support ultimately dampen symptoms,

Table II. Direct Effects Model^a

Accountants		U		F		Anxiety		β		ΔR ²		F	
All symptoms													
Stress		.87	11.21 ^d					.34	.12				39.28 ^d
Type-A		.95	4.40 ^c					.23	.05				12.74 ^d
All coping													
Instrumental-action		.66	11.24 ^d					-.21	.03				24.45 ^d
Wishful thinking		.93	5.91 ^d					.54	.23				67.67 ^d
Seek social support		.73	28.05 ^d					.21	.04				12.53 ^d
Somatic symptoms		β		F		ΔR ²							
Stress		.25	14.57 ^d					.24	.06				13.53 ^d
Type-A		.12	3.12					.16	.03				6.24 ^b
All coping													
Instrumental-action		.06	5.13 ^d					-.26	.05				20.34 ^d
Wishful thinking		.01	1.88					.49	.19				54.67 ^d
Seek social support		.28	14.70 ^d					-.07	.00				1.18
Nurses		U		F		Anxiety		β		ΔR ²		F	
All symptoms													
Stress		.92	14.58 ^d					.21	.04				20.90 ^d
Type-A		.98	3.09 ^b					.10	.01				4.59 ^b
All coping													
Seek social support		.83	10.18 ^d					.06	.06				10.07 ^d
Denial		.98	3.99 ^c					-.03	.00				6.91 ^c
Wishful thinking		.98	2.74 ^b					-.01	.00				0.04
Somatic symptoms		β		F		ΔR ²							
Stress		.27	36.68 ^d					.23	.05				27.02 ^d
Type-A		.12	6.96 ^c					.04	.00				0.67
All coping													
Seek social support		.15	26.99 ^d					.11	.11				19.23 ^d
Denial		-.13	9.10 ^c					-.12	.01				6.90 ^c
Wishful thinking		-.07	2.82					-.12	.01				6.98 ^c
Somatic symptoms		β		F		ΔR ²							
Stress		.39	78.99 ^d					.33	.10				52.45 ^d

Dentists		<i>U</i>	<i>F</i>	Anxiety		β	ΔR^2	<i>F</i>
All symptoms		.79	43.04 ^d	Stress	.42	.17	101.68 ^d	
		.93	12.95 ^d	Type-A	.26	.07	34.40 ^d	
All coping		.84	9.85 ^d	All coping		.13	24.59 ^d	
Instrumental-action		.99	0.40	Instrumental-action	-.03	.00	0.36	
Substance use		.86	27.03 ^d	Substance use	.36	.13	70.97 ^d	
Leisure activities		.98	2.60 ^b	Leisure activities	-.05	.00	0.98	
Somatic symptoms	β	ΔR^2	<i>F</i>	Depression	B	ΔR^2	<i>F</i>	
Stress	.36	.13	72.43 ^d	Stress	.39	.15	87.93 ^d	
Type-A	.20	.04	20.10 ^c	Type-A	.23	.05	26.60 ^d	
All coping	.10		18.07 ^d	All coping		.06	10.16 ^d	
Instrumental-action	-.03	.00	0.32	Instrumental-action	.01	.00	0.04	
Substance use	.30	.09	47.89 ^d	Substance use	.22	.05	25.33 ^d	
Leisure activities	-.10	.01	4.36 ^b	Leisure activities	-.12	.01	5.72 ^b	
Musicians								
All symptoms	<i>U</i>	<i>F</i>		Anxiety	β	ΔR^2	<i>F</i>	
Stress	.92	13.65 ^d		Stress	.25	.06	20.90 ^d	
Type-A	.96	4.88 ^c		Type-A	.16	.03	4.59 ^b	
All coping	.77	16.01 ^d		All coping		.06	27.89 ^d	
Relaxation	.99	0.30		Relaxation	.05	.00	0.58	
Substance use	.78	33.82 ^d		Substance use	.44	.19	55.06 ^d	
Somatic symptoms	β	ΔR^2	<i>F</i>					
Stress	.32	.10	26.68 ^d					
Type-A	.20	.04	9.33 ^c					
All coping	.02		2.05					
Relaxation	.02	.00	0.12					
Substance use	.13	.02	3.97 ^b					

^aDashed lines indicate that the predictors were analyzed separately.

^b*p* < .05.

^c*p* < .01.

^d*p* < .001.

Table III. Buffered Effects Model^a

Accountants		Anxiety		F	
All symptoms	U	Stress × type-A	β	ΔR ²	F
Stress × type-A	.99	Stress × type-A	.05	.00	0.66
Stress × all coping	.98	Stress × all coping		.00	0.19
Stress × IA	.99	Stress × IA	.01	.00	0.01
Stress × WI	.99	Stress × WT	-.02	.00	0.06
Stress × SSS	.99	Stress × SSS	-.04	.00	0.52
Somatic symptoms	ΔR ²	Depression	β	ΔR ²	F
Stress × type-A	-.01	Stress × type-A	-.05	.00	0.67
Stress × all coping	.00	Stress × all coping		.00	0.70
Stress × IA	.00	Stress × IA	-.07	.00	1.08
Stress × WT	.05	Stress × WT	-.21	.00	0.09
Stress × SSS	-.02	Stress × SSS	-.00	.00	0.00
Nurses					
All symptoms	U	Anxiety	β	ΔR ²	F
Stress × type-A	.98	Stress × type-A	.04	.00	0.94
Stress × all coping	.99	Stress × all coping		.01	1.30
Stress × SSS	.99	Stress × SSS	-.01	.00	0.36
Stress × DN	.99	Stress × DN	-.00	.00	0.01
Stress × WT	.99	Stress × WT	.09	.01	3.73
Somatic symptoms	ΔR ²	Depression	β	ΔR ²	F
Stress × type-A	.01	Stress × type-A	-.09	.01	4.20 ^b
Stress × all coping	.00	Stress × all coping		.00	0.31
Stress × SSS	.04	Stress × SSS	.03	.00	0.39
Stress × DN	.01	Stress × DN	.02	.00	0.22
Stress × WT	-.00	Stress × WT	.02	.00	0.24

Dentists		U		F	
All symptoms					
Stress × type-A		.99	1.56		

Stress × all coping		.95	2.57 ^c		
Stress × IA		.99	2.19		
Stress × SU		.98	2.94 ^b		
Stress × LA		.99	0.42		
Somatic symptoms		β	ΔR ²	F	
Stress × type-A		.07	.01	2.82	

Stress × all coping		.02	3.04 ^b		
Stress × IA		-.06	1.74		
Stress × SU		.10	5.97 ^b		
Stress × LA		.01	0.05		
Musicians					
All symptoms		U	F		
Stress × type-A		.99	1.07		

Stress × all coping		.95	2.96 ^b		
Stress × RL		.96	1.65		
Stress × SU		.99	4.41 ^b		
Somatic symptoms		β	ΔR ²	F	
Stress × type-A		.09	.01	2.00	

Stress × all coping		.02	2.47		
Stress × RL		-.10	2.48		
Stress × SU		-.10	2.56		

Anxiety		β	ΔR ²	F	
Stress × type-A		-.01	.00	0.06	

Stress × all coping		.07	.07	1.51	
Stress × IA		-.07	.00	2.18	
Stress × SU		-.01	.00	0.09	
Stress × LA		-.03	.00	0.37	
Depression		β	ΔR ²	F	
Stress × type-A		.32	.00	0.59	

Stress × all coping		.02	4.56 ^c		
Stress × IA		-.12	.01	6.53 ^c	
Stress × SU		.04	.00	0.91	
Stress × LA		-.04	.00	0.76	
Anxiety		β	ΔR ²	F	
Stress × type-A		.07	.01	1.28	

Stress × all coping		.00	0.55		
Stress × RL		.06	.00	0.06	
Stress × SU		-.01	.00	1.02	

^aAll regressions controlled for stress and the moderator variable(s) of interest. Dashed lines indicate that the predictors were analyzed separately. IA-instrumental action, WT-wishful thinking, SSS-seek social support, SU-substance use, LA-leisure activities, DN-denial, and RL-relaxation.

^b*p* < .05.
^c*p* < .01.
^d*p* < .001.

Table IV. Mediated Effects Model^a

Accountants									
Analyses for the mediating effects of type-A									
All symptoms	U	F	Anxiety	β	ΔR^2	F	Stress	β	ΔR^2
Stress	.88	10.11 ^d	Stress	.32	.10	27.06 ^d	Stress	.32	.10
Somatic symptoms	β	F	Depression	β	ΔR^2	F	Depression	β	ΔR^2
Stress	.24	13.23 ^d	Stress	.22	.05	11.78 ^d	Stress	.22	.05
Type-A	β	F							
Stress	.12	3.15							
Analyses for the mediating effects of coping									
All symptoms	U	F	Anxiety	β	ΔR^2	F	Stress	β	ΔR^2
Stress	.99	7.57 ^d	Stress	.26	.06	17.94 ^d	Stress	.26	.06
Somatic symptoms	β	F	Depression	β	ΔR^2	F	Depression	β	ΔR^2
Stress	.23	10.81 ^a	Stress	.21	.04	10.43 ^d	Stress	.21	.04
All coping	U	F	Instrumental-action	β	ΔR^2	F	Instrumental-action	β	ΔR^2
Stress	.81	17.55 ^d	Stress	.37	.14	36.54 ^d	Stress	.37	.14
Wishful thinking	β	F	Seek social support	β	ΔR^2	F	Seek social support	β	ΔR^2
Stress	.35	31.43 ^d	Stress	.10	.01	2.47	Stress	.10	.01
Nurses									
Analyses for the mediating effects of type-A									
All symptoms	U	F	Anxiety	β	ΔR^2	F	Stress	β	ΔR^2
Stress	.92	13.21 ^d	Stress	.20	.04	18.25 ^d	Stress	.20	.04
Somatic symptoms	β	F	Depression	β	ΔR^2	F	Depression	β	ΔR^2
Stress	.26	32.41 ^d	Stress	.23	.05	26.26 ^d	Stress	.23	.05
Type-A	β	F							
Stress	.17	13.70 ^d							

Analyses for the mediating effects of coping

All symptoms	<i>U</i>	<i>F</i>	Anxiety	β	ΔR^2	<i>F</i>
Stress	.98	3.74 ^b	Stress	.14	.02	7.51 ^c
Somatic symptoms	β	<i>F</i>	Depression	β	ΔR^2	<i>F</i>
Stress	.13	7.55 ^c	Stress	.12	.01	6.15 ^b
All coping	<i>U</i>	<i>F</i>	Seek social support	β	ΔR^2	<i>F</i>
Stress	.78	44.42 ^d	Stress	.13	.02	8.53 ^c
Dental	β	<i>F</i>	Wishful thinking	β	ΔR^2	<i>F</i>
Stress	-.02	0.10	Stress	.47	.22	131.30 ^d
Dentists						
Analyses for the mediating effects of type-A						
All symptoms	<i>U</i>	<i>F</i>	Anxiety	β	ΔR^2	<i>F</i>
Stress	.82	10.11 ^d	Stress	.38	.14	81.14 ^d
Somatic symptoms	β	<i>F</i>	Depression	β	ΔR^2	<i>F</i>
Stress	.33	58.86 ^d	Stress	.36	.12	70.86 ^d
Type-A	β	<i>F</i>				
Stress	.24	28.11 ^d				
Analyses for the mediating effects of coping						
All symptoms	<i>U</i>	<i>F</i>	Anxiety	β	ΔR^2	<i>F</i>
Stress	.81	38.46 ^d	Stress	.37	.13	86.53 ^d
Somatic symptoms	β	<i>F</i>	Depression	β	ΔR^2	<i>F</i>
Stress	.33	61.54 ^d	Stress	.37	.13	78.90 ^d
All coping	<i>U</i>	<i>F</i>	Instrumental-action	β	ΔR^2	<i>F</i>
Stress	.97	5.13 ^c	Stress	.03	.14	0.45
Substance use	β	<i>F</i>	Leisure activities	β	ΔR^2	<i>F</i>
Stress	.17	14.55 ^d	Stress	.04	.00	0.81

Table IV. Continued

Musicians		Analyses for the mediating effects of type-A					
		<i>U</i>	<i>F</i>	Anxiety	β	ΔR^2	<i>F</i>
All symptoms		.90	13.22 ^d	Stress	.24	.06	15.08 ^d
Stress							
Somatic symptoms		β	<i>F</i>				
Stress		.31	25.21 ^d				
Type-A		β	ΔR^2				
Stress		.06	.00				0.71
				Analyses for the mediating effects of coping			
		<i>U</i>	<i>F</i>	Anxiety	β	ΔR^2	<i>F</i>
All symptoms		.88	16.19 ^d	Stress	.28	.08	23.64 ^d
Stress							
Somatic symptoms		β	<i>F</i>				
Stress		.33	28.10 ^d				
All coping		<i>U</i>	<i>F</i>	Relaxation	β	ΔR^2	<i>F</i>
Stress		.99	1.64	Stress	-.11	.01	3.03
Substance use		β	<i>F</i>				
Stress		-.03	.00				0.27

^aAll regressions of symptoms on stress controlled for the mediating variable(s) of interest.

^b $p < .05$.

^c $p < .01$.

^d $p < .001$.

whereas the mediating effects of wishful thinking and substance use ultimately increase symptoms. In sum, these results suggest a partial mediating effect for coping for the accountants, dentists, and nurses, such that stress affects symptoms both directly and by increasing certain forms of coping, which in turn influence symptoms.

Mediating Buffered Effects Model. The mediating buffered effects model was tested by combining the results concerning the buffering effects of coping with three additional sets of MMR analyses. The first set tested whether Type-A explained additional variance in symptoms after controlling for stress, coping, and their interaction. The second set regressed stress on Type-A, and the third set regressed coping on Type-A. Overall, these results provide only weak support for the mediating buffered effects model (see Table V). Recall the results presented in Table III, which provided limited support for the buffering effects of coping among the dentists and musicians. After controlling for stress, coping, and their interaction, multivariate relationships between Type-A and symptoms remained significant for both groups. Type-A was also positively related to stress and one form of coping, i.e., substance use, for the dentists.³ These results provide limited support for the mediating buffered effects model for the dentists, such that Type-A influences symptoms both directly and through stress and substance use, which interact to intensify symptoms.

Mediating Mediated Effects Model. The mediating mediated effects model was tested by combining the results regarding the mediating effects of coping with three additional sets of MMR analyses. The first set tested whether Type-A explained additional variance in symptoms after controlling for stress and coping (see Table VI). The second set regressed stress on Type-A (see Table V), and the third set regressed coping on Type-A after controlling for stress to determine whether the effect of Type-A on coping was mediated by stress, as depicted in Fig. 1e (see Table VI). In general, the mediating mediated effects model received moderate support. As indicated in Table IV, results for the accountants, dentists, and nurses indicated that stress was related to symptoms directly as well as indirectly through coping. After controlling for stress and coping, the relationship between Type-A and symptoms remained significant for the accountants and dentists (see Table VI). As indicated in Table V, Type-A was positively related to stress for the dentists and nurses and marginally related to stress for the accountants ($p < .10$). Finally, after controlling for stress, the relationship between Type-A and coping followed basically the same pattern as when stress was not controlled (see Table V), though these relationships were generally weaker.

³Relationships between Type-A and coping were also evident for the accountants and nurses, but because no buffering effect for coping was found for these samples (as assumed by the mediating buffered effects model), these results are not discussed.

Table V. Mediating Buffered Effects Model^a

Accountants		<i>U</i>	<i>F</i>	Anxiety		β	ΔR^2	<i>F</i>
All symptoms		.91	7.11 ^d	Type-A	.25	.06	19.03 ^d	
Somatic symptoms		β	<i>F</i>	Depression	β	ΔR^2	<i>F</i>	
Type-A	.10	.01	2.26	Type-A	.18	.03	9.55 ^c	
Stress		β	<i>F</i>	Instrumental action		β	ΔR^2	<i>F</i>
Type-A	.12	.01	3.15	Type-A	.20	.04	9.29 ^c	
All coping		<i>U</i>	<i>F</i>	Seek social support	β	ΔR^2	<i>F</i>	
Type-A	.95	3.74 ^b		Type-A	-.06	.00	0.83	
Wishful thinking		β	<i>F</i>	Anxiety		β	ΔR^2	<i>F</i>
Type-A	.09	.01	2.00	Type-A	.05	.00	1.02	
Nurses		<i>U</i>	<i>F</i>	Depression	β	ΔR^2	<i>F</i>	
All symptoms		.99	1.51	Type-A	-.04	.00	0.63	
Somatic symptoms		β	<i>F</i>	Seek social support	β	ΔR^2	<i>F</i>	
Type-A	.05	.00	1.07	Type-A	-.09	.01	3.95 ^b	
Stress		β	<i>F</i>	Wishful thinking	β	ΔR^2	<i>F</i>	
Type-A	.17	.03	13.70 ^d	Type-A	.12	.01	6.34 ^b	
All coping		<i>U</i>	<i>F</i>					
Type-A	.97	5.23 ^d						
Dental		β	<i>F</i>					
Type-A	-.05	.00	1.40					

Dentists			
All symptoms	<i>U</i>	<i>F</i>	
Type-A	.97	4.13 ^c	
Somatic symptoms	β	ΔR^2	<i>F</i>
Type-A	.10	.01	5.67 ^b
Stress	β	ΔR^2	<i>F</i>
Type-A	.24	.06	28.11 ^d
All coping	<i>U</i>	<i>F</i>	
Type-A	.96	5.92 ^d	
Substance use	β	ΔR^2	<i>F</i>
Type-A	.17	.03	13.86 ^d
Musicians			
All symptoms	<i>U</i>	<i>F</i>	
Type-A	.95	5.52 ^c	
Somatic symptoms	β	ΔR^2	<i>F</i>
Type-A	.19	.04	10.10 ^c
Stress	β	ΔR^2	<i>F</i>
Type-A	.06	.00	0.71
All coping	<i>U</i>	<i>F</i>	
Type-A	.98	2.61	
Substance use	β	ΔR^2	<i>F</i>
Type-A	.01	.00	0.04
Anxiety			
Type-A	β	ΔR^2	<i>F</i>
Type-A	.13	.02	10.07 ^c
Depression			
Type-A	β	ΔR^2	<i>F</i>
Type-A	.12	.01	8.08 ^c
Instrumental action			
Type-A	β	ΔR^2	<i>F</i>
Type-A	.04	.00	0.80
Leisure activities			
Type-A	β	ΔR^2	<i>F</i>
Type-A	-.03	.00	0.41
Anxiety			
Type-A	β	ΔR^2	<i>F</i>
Type-A	.15	.02	7.28 ^c
Relaxation			
Type-A	β	ΔR^2	<i>F</i>
Type-A	-.15	.02	5.19 ^b

^aAll regressions of symptoms on Type A controlled for stress, coping, and their interaction.

^b $p < .05$.

^c $p < .01$.

^d $p < .001$.

Table VI. Mediating Mediated Effects Model^a

Accountants		U		F		Anxiety		β		ΔR ²		F	
All symptoms		.92	ΔR ²	6.42 ^d	F	.23	β	.05	ΔR ²	17.91 ^d	F		
Type-A													
Somatic symptoms		.10	U	2.58 ^c	F	.16	β	.03	ΔR ²	7.72 ^c	F		
Type-A													
All coping		.96	ΔR ²	2.89 ^c	F	.16	β	.02	ΔR ²	6.56 ^c	F		
Type-A													
Wishful thinking		.05	U	0.73	F	-.07	β	.01	ΔR ²	1.22	F		
Type-A													
Nurses													
All symptoms		.99	ΔF ²	1.45	F	.05	β	.00	ΔR ²	0.96	F		
Type-A													
Somatic symptoms		.05	U	1.17	F	-.03	β	.00	ΔR ²	0.53	F		
Type-A													
All coping		.98	ΔR ²	3.39 ^b	F	-.12	β	.01	ΔR ²	6.44 ^b	F		
Type-A													
Denial		-.05	U	1.31	F	.04	β	.00	ΔR ²	0.84	F		
Type-A													

Dentists									
All symptoms		<i>U</i>	<i>F</i>						
Type-A		.98	4.12 ^c						
Somatic symptoms		β	<i>F</i>						
Type-A		.09	4.34 ^b						
All coping		<i>U</i>	<i>F</i>						
Type-A		.98	4.15 ^c						
Substance use		β	<i>F</i>						
Type-A		.13	8.61 ^c						
Musicians									
All symptoms		<i>U</i>	<i>F</i>						
Type-A		.96	5.34 ^c						
Somatic symptoms		β	<i>F</i>						
Type-A		.19	9.60 ^c						
All coping		<i>U</i>	<i>F</i>						
Type-A		.98	2.43						
Substance use		β	<i>F</i>						
Type-A		.02	0.05						
Anxiety									
Type-A		.13	.02	10.72 ^d					
Depression		β	ΔR^2	<i>F</i>					
Type-A		.12	.01	8.12 ^c					
Instrumental-action		β	ΔR^2	<i>F</i>					
Type-A		.04	.00	0.57					
Leisure activities		β	ΔR^2	<i>F</i>					
Type-A		-.04	.00	0.76					
Anxiety									
Type-A		.15	.02	7.16 ^d					
Relaxation		β	ΔR^2	<i>F</i>					
Type-A		-.14	.02	4.81 ^b					

^aAll regressions of Type-A on symptoms controlled for stress and coping, and all regressions of coping on Type-A controlled for stress. IA-instrumental action, WT-withful thinking, SSS-seek social support, SU-substance use, LA-leisure activities, DN-dental, and RL-relaxation.

^b*p* < .05.

^c*p* < .01.

^d*p* < .001.

The only exception involved the relationship between Type-A and wishful thinking for the nurses, which was no longer significant after controlling for stress. Taken together, these results support the mediating mediated effects model for seek social support for the nurses, such that Type-A heightens symptoms by increasing stress and inhibiting the seeking of social support. A similar pattern was found for wishful thinking for the nurses, though the relationship between Type-A and wishful thinking was completely mediated by stress. Results for wishful thinking for the accountants were essentially the same as those obtained for the nurses, except that Type-A also exhibited a direct effect on symptoms. Partial mediation was also evident for instrumental action for the accountants, such that Type-A increased symptoms as well as stress and instrumental action, with the latter ultimately reducing symptoms. The pattern for substance use for the dentists was identical, except that substance use ultimately increased symptoms.

Buffered Mediated Effects Model. The buffered mediated effects model was assessed using two sets of hierarchical MMR analyses. The first analysis used symptoms as a multivariate dependent variable and entered the product of Type-A and coping after controlling for both variables, thereby testing whether Type-A moderated the effect of coping on symptoms. The second analysis used coping as a multivariate dependent variable and entered the product of stress and Type-A after controlling for both variables, thereby testing whether Type-A moderated the effect of stress on coping. Overall, these results provided only weak support for the buffered mediated effects model (see Table VII). None of the interactions between Type-A and coping was significant. However, a significant interaction was found between stress and Type-A in the prediction of coping for the dentists. Univariate analyses revealed that the relationship between stress and leisure activities was positive for Type-Bs and negative for Type-As. Univariate analyses also revealed a marginally significant interaction in the prediction of substance use ($p < .10$), suggesting that the relationship between stress and substance use was stronger for Type-As. Thus, results for the buffered mediated effects model did not support a buffering effect for Type-A in the relationship between coping and symptoms, but provided limited support for a buffering effect for Type-A in the relationship between stress and coping.

Buffered Buffered Effects Model. The buffered buffered effects model was analyzed using hierarchical MMR analysis, in which product terms representing the three-way interaction between stress, Type-A, and each coping variable were entered as a set, after controlling for each variable separately and all two-way interactions. Overall, these results provide weak support for the buffered buffered effects model (see Table VIII). For the accountants, multivariate analyses indicated a significant interaction between stress, Type-A, and seeking social support. Univariate analyses revealed that this inter-

Table VII. Buffered Mediated Effects^a

Accountants		Nurses	
All symptoms	All symptoms	All symptoms	All symptoms
<i>U</i>	<i>U</i>	<i>U</i>	<i>U</i>
<i>F</i>	<i>F</i>	<i>E</i>	<i>E</i>
β	β	β	β
ΔR^2	ΔR^2	ΔR^2	ΔR^2
<i>F</i>	<i>F</i>	<i>F</i>	<i>F</i>
Type-A × all coping	Type-A × all coping	Type-A × all coping	Type-A × all coping
Type-A × IA	Type-A × IA	Type-A × SSS	Type-A × all coping
Type-A × WI	Type-A × WI	Type-A × DN	Type-A × SSS
Type-A × SSS	Type-A × SSS	Type-A × WT	Type-A × DN
Somatic symptoms	Somatic symptoms	Somatic symptoms	Type-A × WT
Type-A × all coping	Type-A × all coping	Type-A × all coping	Type-A × all coping
Type-A × IA	Type-A × IA	Type-A × SSS	Type-A × SSS
Type-A × WI	Type-A × WI	Type-A × DN	Type-A × DN
Type-A × SSS	Type-A × SSS	Type-A × WT	Type-A × WT
All coping	All coping	All coping	All coping
Type-A × stress	Type-A × stress	Type-A × stress	Type-A × stress
Substance use	Substance use	Substance use	Substance use
Type-A × stress	Type-A × stress	Type-A × stress	Type-A × stress
Anxiety	Anxiety	Anxiety	Anxiety
Type-A × all coping	Type-A × all coping	Type-A × all coping	Type-A × all coping
Type-A × IA	Type-A × IA	Type-A × SSS	Type-A × SSS
Type-A × WT	Type-A × WT	Type-A × DN	Type-A × DN
Type-A × SSS	Type-A × SSS	Type-A × WT	Type-A × WT
Depression	Depression	Depression	Depression
Type-A × all coping	Type-A × all coping	Type-A × all coping	Type-A × all coping
Type-A × IA	Type-A × IA	Type-A × SSS	Type-A × SSS
Type-A × WT	Type-A × WT	Type-A × DN	Type-A × DN
Type-A × SSS	Type-A × SSS	Type-A × WT	Type-A × WT
Instrumental-action	Instrumental-action	Instrumental-action	Instrumental-action
Type-A × stress	Type-A × stress	Type-A × stress	Type-A × stress
Leisure activities	Leisure activities	Leisure activities	Leisure activities
Type-A × stress	Type-A × stress	Type-A × stress	Type-A × stress

Table VII. Continued

All coping	<i>U</i>	<i>F</i>	Seek social support	β	ΔR^2	<i>F</i>
Type-A \times Stress	.99	0.96	Type-A \times stress	.07	.00	2.50
Denial	β	<i>F</i>	Wishful thinking	β	ΔR^2	<i>F</i>
Type-A \times stress	.03	0.40	Type-A \times stress	.02	.00	0.22
Dentists	<i>U</i>	<i>F</i>	Anxiety	β	ΔR^2	<i>F</i>
All symptoms	<i>U</i>	<i>F</i>	Type-A \times all coping			
Type-A \times all coping	.98	1.15	Type-A \times IA	.02	.00	1.15
Type-A \times IA	.99	0.53	Type-A \times SU	-.04	.00	1.21
Type-A \times SU	.99	0.71	Type-A \times LA	-.07	.00	1.12
Type-A \times LA	.99	1.19	Depression	β	ΔR^2	<i>F</i>
Somatic symptoms	β	<i>F</i>	Type-A \times all coping			
Type-A \times all coping	.00	0.48	Type-A + IA	-.04	.00	2.26
Type-A \times IA	-.01	0.03	Type-A \times SU	.09	.01	0.51
Type-A \times SU	-.04	0.98	Type-A \times LA	.09	.01	0.00
Type-A \times LA	-.03	0.27	Instrumental-action	β	ΔR^2	<i>F</i>
All coping	<i>U</i>	<i>F</i>	Type-A \times stress	.02	.00	0.11
Type-A \times stress	.98	3.78 ^a	Leisure activities	β	ΔR^2	<i>F</i>
Substance use	β	<i>F</i>	Type-A \times stress	-.11	.01	6.24 ^a
Type-A \times stress	-.09	3.35				

Musicians		Anxiety	
All symptoms		β	ΔR^2
Type-A × all coping	<i>U</i>		
Type-A × RL	.99		0.36
Type-A × SU	.99	.04	0.39
	.99	-.02	0.33
Somatic symptoms	β		<i>F</i>
	ΔR^2		
Type-A × all coping	.00		0.37
Type-A × RL	.05		0.65
Type-A × SU	.02		0.10
All coping	<i>U</i>		<i>F</i>
Stress × type-A	.99	.03	0.31
Substance use	β		<i>F</i>
	ΔR^2		
Stress × type-A	-.04		0.38

Relaxation		Stress × type-A	
		β	ΔR^2
Type-A × all coping			
Type-A × RL			0.00
Type-A × SU			0.23

^aAll regressions controlled for stress and the moderator variable(s) of interest. IA-instrumental action, WT-wishful thinking, SSS-seek social support, SU-substance use, LA-leisure activities, DN-denial, and RL-relaxation.

^b*p* < .05.

^c*p* < .01.

^d*p* < .001.

action represented a buffering effect for Type-Bs who sought social support, such that the relationship between stress and both somatic symptoms and depression was essentially zero for these individuals, but was positive for Type-As and for Type-Bs who did not seek social support. For the musicians, multivariate analyses indicated a significant interaction between stress, Type-A, and substance use. Univariate analyses suggested an exacerbating effect for Type-As who used substances, such that the relationship between stress and anxiety was positive and strong for these individuals, but was positive and weak for Type-Bs and for Type-As who did not use substances. Finally, for the dentists, a significant interaction was found between stress, Type-A, and leisure activities in the prediction of anxiety, such that leisure buffered the effects of stress for Type-Bs and exacerbated the effects of stress for Type-As. However, because this interaction was not significant at the multivariate level, it should be interpreted with caution. In sum, results provided weak support for the buffered buffered effects model, with certain forms of coping, i.e., seeking social support, buffering the effects of stress only for Type-Bs, and other forms of coping, i.e., substance use, exacerbating the effects of stress only for Type-As.

DISCUSSION

Summary of Results

The purpose of this study was to empirically evaluate seven models specifying the relationship between stress, Type-A, coping, and symptoms. Of these, the direct effects model, the mediated effects model, and the mediating mediated effects model received the most support across samples and measures. The common support for these models is not surprising, given that each incorporates direct linear effects of stress, coping, and Type-A on symptoms. The primary difference between these models is that, unlike the direct effects model, the mediated effects model includes relationships between stress and both Type-A and coping, and the mediating mediated effects model includes relationships among all three variables. Because the latter two models incorporate these additional relationships, they provide more complete representations of the underlying process than that provided by the direct effects model. These models also provide a conceptual basis for analyzing causal relationships among stress, Type-A, and coping, and for assessing the indirect effects of these variables on symptoms (Duncan, 1975). Since the relationships among stress, Type-A, and coping in the present study were, for the most part, significant, the mediated effects model and the mediating mediated effects model should be preferred over the direct effects model. Furthermore, since several significant relationships between Type-A and cop-

Table VIII. Buffered Buffered Effects^a

	<i>U</i>	<i>F</i>		β	ΔR^2	<i>F</i>
Accountants						
All symptoms			Anxiety			
Stress \times type-A \times all coping	.93	2.00 ^b	Stress \times type-A \times all coping		.00	1.32
Stress \times type-A \times IA	.99	0.27	Stress \times type-A \times IA	-.03	.00	0.14
Stress \times type-A \times WT	.99	0.59	Stress \times type-A \times WT	.08	.00	0.91
Stress \times type-A \times SSS	.95	4.13 ^c	Stress \times type-A \times SSS	.07	.00	1.41
Somatic symptoms	β	<i>F</i>	Depression			
Stress \times type-A \times all coping	.03	2.46	Stress \times type-A \times all coping		.03	4.21 ^b
Stress \times type-A \times IA	.00	0.16	Stress \times type-A \times IA	-.07	.00	0.79
Stress \times type-A \times WT	.06	0.37	Stress \times type-A \times WT	-.05	.00	0.34
Stress \times type-A \times SSS	.17	7.12 ^c	Stress \times type-A \times SSS	.18	.03	9.54 ^c
Nurses						
All symptoms	<i>U</i>	<i>F</i>	Anxiety			
Stress \times type-A \times all coping	.99	0.61	Stress \times type-A \times all coping		.00	0.64
Stress \times type-A \times SSS	.99	0.75	Stress \times type-A \times SSS	-.07	.00	1.56
Stress \times type-A \times DN	.99	0.19	Stress \times type-A \times DN	-.04	.00	0.44
Stress \times type-A \times WT	.99	1.03	Stress \times type-A \times WT	-.01	.00	0.06
Somatic symptoms	β	<i>F</i>	Depression			
Stress \times type-A \times all coping	.0	0.56	Stress \times type-A \times all coping		.00	0.62
Stress \times type-A \times SSS	-.06	1.53	Stress \times type-A \times SSS	-.03	.00	0.31
Stress \times type-A \times DN	.02	0.15	Stress \times type-A \times DN	-.00	.00	0.00
Stress \times type-A \times WT	.03	0.21	Stress \times type-A \times WT	.07	.00	1.42

Table VIII. Continued

Dentists		U		F		Anxiety		β		ΔR ²		F	
All symptoms													
Stress × type-A × all coping	.98	1.30				Stress × type-A × all coping				.01		1.63	
Stress × type-A × IA	.99	0.44				Stress × type-A × IA			-.05	.00		1.65	
Stress × type-A × SU	.99	1.83				Stress × type-A × SU			-.01	.00		0.04	
Stress × type-A × LA	.99	1.85				Stress × type-A × LA			.11	.01		4.89 ^b	
Somatic symptoms		β		ΔR ²		Depression		β		ΔR ²		F	
Stress × type-A × all coping	.01	1.55				Stress × type-A × all coping				.00		0.83	
Stress × type-A × IA	.02	0.00				Stress × type-A × IA			-.02	.00		0.18	
Stress × type-A × SU	-.09	3.49				Stress × type-A × SU			-.07	.00		2.24	
Stress × type-A × LA	.05	1.03				Stress × type-A × LA			.03	.00		0.33	
Musicians		U		F		Anxiety		β		ΔR ²		F	
All symptoms													
Stress × type-A × all coping	.97	1.97				Stress × type-A × all coping			.02	.02		3.58 ^b	
Stress × type-A × RL	.99	0.25				Stress × type-A × RL			.02	.00		0.09	
Stress × type-A × SU	.97	3.77 ^b				Stress × type-A × SU			.16	.02		6.92 ^c	
Somatic symptoms		β		ΔR ²		F							
Stress × type-A × all coping	.00	0.62											
Stress × type-A × RL	-.03	0.11											
Stress × type-A × SU	.06	0.84											

^aAll regressions controlled for stress, Type-A all coping, and all two-way interactions. IA-instrumental action, WT-wishful thinking, SSS-seek social support, SU-substance use, LA-leisure activities, DN-denial, and RL-relaxation.

^b*p* < .05.

^c*p* < .01.

ing were found, the mediating mediated effects model should probably be preferred over the mediated effects model.

Four models examined in this study that received only modest support were the buffered effects model, the mediating buffered effects model, the buffered mediating effects model, and the buffered buffered effects model. The modest support for these models was reflected in the limited number of significant interactions corresponding to their associated buffering effects. One possible methodological explanation for these findings is that, when predictors are not highly correlated (as in the present study), the reliability of their product is generally lower than the reliability of either predictor taken separately (Bohrstedt & Marwell, 1977). As a result, the coefficient associated with a product term is more susceptible to attenuation than coefficients associated with either of its constituents (Dunlap & Kemery, 1988). Of course, this does not rule out the substantive explanation that, in fact, models incorporating buffering effects are simply less accurate representations of the interrelationship between stress, Type-A, coping, and symptoms than models that simply incorporate linear effects.

In many respects, the results of this study are consistent with previous research. For example, the positive relationships between symptoms and stress, Type-A, and emotion-focused coping, i.e., wishful thinking and substance use, replicate findings from numerous previous studies. In addition, a negative relationship between problem-focused coping, i.e., instrumental action, and symptoms was found for the accountants, thereby replicating previous research. Though the analogous relationship was not evident for the dentists, the reliability of the instrumental action measure for this sample was quite low, thereby suggesting that attenuation had occurred. The present study also replicated the positive relationships among stress, Type-A, and emotion-focused coping, i.e., substance use and wishful thinking, though these results varied across samples.

Despite these consistencies, the results of this study departed from previous research in several respects. For example, the expected positive relationships between symptoms and certain forms of emotion-focused coping, i.e., seek social support and denial, were not found. In addition, the buffering effects for Type-A and coping found in previous research were absent in the present study, with the exception of an exacerbating effect for substance use for the dentists. Finally, the present study indicated that both stress and Type-A were positively related to instrumental action, which is contrary to previous research. Certainly, much additional research is needed to replicate these findings and resolve these inconsistencies.

Limitations and Directions for Future Research

The present study constitutes the first empirical evaluation of the seven conceptual models depicted in Fig. 1. Nonetheless, several aspects

of the present study limit the conclusiveness of its findings. First, though the samples used were diverse in many respects, they were restricted to white-collar occupations. This disproportionate emphasis on white-collar occupations is symptomatic of stress research in general, and it is unclear whether much of our present knowledge regarding stress, coping, Type-A, and symptoms can be generalized to blue-collar occupations (Copper & Smith, 1985). Certainly, the models involved in the present study must be evaluated using samples of blue-collar workers before such generalizations are justified. Second, all data were cross-sectional, thereby restricting conclusions regarding causality. This is particularly problematic in the present study, in that the seven models posited different causal orderings for certain variables, particularly Type-A. Hence, our results should not be interpreted as providing conclusive evidence regarding the models tested, but instead as suggesting which models are consistent with observed relationships among the variables included in the study. Further choices among these models, as well as confirmation of the results of the present study, require additional research using longitudinal designs. Third, several measurement problems should be noted. For example, though our measures were similar across samples, they were not identical. Therefore, differences in findings across samples may be attributable to variation in the measures used rather than characteristics of the samples themselves. In addition, all measures were self-report, thereby introducing the possibility of a methods effect. Finally, the reliability of several measures, particularly those associated with coping, was quite low. Because of this, our findings regarding these measures should be viewed as tentative, subject to the development of more reliable and valid measures. Due to these limitations, the results of this study should not be viewed as conclusive, but instead as providing a starting point for future research comparing various models of the interrelationship among stress, Type-A, coping, and symptoms.

The results of this study raise several issues regarding research into stress, Type-A, coping, and symptoms. First, the fact that seven conceptual models were derived using the same four constructs emphasizes the importance of clearly stating the conceptual model (or models) of interest prior to data analysis. It is clearly inappropriate to develop models *post hoc* in order to account for the observed relationships among a set of variables, given the likelihood that, with sufficient imagination, a seemingly adequate model will eventually be derived. Second, the viability of models incorporating mediating effects indicates that these models should be given greater emphasis in stress research. This is in contrast with the current focus on the direct effects and, to a lesser extent, buffering effects of Type-A and coping. Finally, of the seven models examined here, the direct effects model has by far received the most empirical attention. Though this focus on simple effects was cer-

tainly appropriate in the earlier stages of stress research, theoretical and methodological advancements now allow for the development and evaluation of more complex and, we believe, more accurate models. We hope that the present study will encourage other researchers to develop and test a variety of models depicting the interrelationships among stress, coping, Type-A, and symptoms.

REFERENCES

- ALDERMAN, K. J., MACKAY, C. J., LUCAS, E. G., SPRY, W. B., & BELL, B. Factor analysis and reliability of the Crown-Crisp Experiential Index (CCEI). *British Journal of Medical Psychology*, 1983, *56*, 329-345.
- ARNOLD, H. J. Moderator variables: A clarification of conceptual, analytic, and psychometric issues. *Organizational Behavior and Human Performance*, 1982, *29*, 143-174.
- BILLINGS, A. G., & MOOS, R. H. The role of coping responses and social resources in attenuating the stress of life events. *Journal of Behavioral Medicine*, 1981, *4*, 139-157.
- BOHRNSTEDT, G. W., & MARWELL, G. The reliability of products of two random variables. In K. F. Schuessler (Ed.), *Sociological methodology 1978*. San Francisco: Jossey-Bass, 1977.
- BOOTH-KEWLEY, S., & FRIEDMAN, H. S. Psychological predictors of heart disease: A quantitative review. *Psychological Bulletin*, 1987, *101*, 343-362.
- BORTNER, R. W. A short rating scale as a potential measure of pattern A behavior. *Journal of Chronic Diseases*, 1969, *22*, 87-91.
- BRUNSON, B. I., & MATTHEWS, K. A. The Type-A coronary-prone behavior pattern and reactions to uncontrollable events: An analysis of learned helplessness. *Journal of Personality and Social Psychology*, 1981, *40*, 906-918.
- BURKE, R. J., & WEIR, T. The Type-A experience: Occupational and life demands, satisfaction, and well-being. *Journal of Human Stress*, 1980, *6*(4), 28-38.
- CAPLAN, R. D., NAIDU, R. K., & TRIPATHI, R. C. Coping and defense: Constellations vs. components. *Journal of Health and Social Behavior*, 1984, *25*, 303-320.
- CHESNEY, J. A., BLACK, G. W., CHADWICK, J. H., & ROSENMAN, R. H. Psychological correlates of the Type-A behavior pattern. *Journal of Behavioral Medicine*, 1981, *4*, 217-229.
- COELHO, G. V., HAMBURG, D. A., & ADAMS, J. E. (Eds.). *Coping and adaptation*. New York: Basic Books, 1974.
- COHEN, J. Partialled products are interactions: Partialled powers are curve components. *Psychological Bulletin*, 1978, *85*, 858-866.
- COHEN, S., & EDWARDS, J. R. Personality characteristics as moderators of the relationship between stress and disorder. In W. J. Neufeld (Ed.), *Advances in the investigation of psychological stress*. New York: Wiley, 1988.
- COOPER, C. L., & MARSHALL, J. Occupational sources of stress: Review of literature relating to coronary heart disease and mental ill health. *Journal of Occupational Psychology*, 1976, *49*, 11-28.
- COOPER, C. L., & MARSHALL, J. *White-collar and professional stress*. New York: Wiley, 1980.
- COOPER, C. L., & PAYNE, R. (Eds.). *Causes, coping, and consequences of stress at work*. New York: Wiley, 1988.
- COOPER, C. L., & SMITH, M. J. (Eds.). *Job stress and blue-collar work*. New York: Wiley, 1985.
- COOPER, C. L., COOPER, R. F. D., & FARAGHER, E. B. A prospective study of the relationship between breast cancer and life events, Type-A behaviour, social support, and coping skills. *Stress Medicine*, 1986, *2*, 271-277.

- COOPER, C. L., WATTS, J., BAGLIONI, A. J., Jr., & KELLY, M. Occupational stress among general practice dentists. *Journal of Occupational Psychology*, 1988, *61*, 163-174.
- CRISP, A. H., RALPH, P. C., McGUINNESS, B., & HARRIS, G. Psychoneurotic profiles in the adult population. *British Journal of Medical Psychology*, 1978, *51*, 293-301.
- CROWN, S., & CRISP, A. H. A short clinical diagnostic self-rating scale for psychoneurotic patients. *British Journal of Psychiatry*, 1966, *112*, 917-923.
- DAVIDSON, M. J., & COOPER, C. L. Type-A coronary-prone behavior in the work environment. *Journal of Occupational Medicine*, 1980, *22*, 375-383.
- DEARBORN, J. J., & HASTINGS, J. E. Type-A personality as a mediator of stress and strain in employed women. *Journal of Human Stress*, 1987, *13*(2), 53-60.
- DOHRENWEND, B. S., & DOHRENWEND, B. P. *Stressful life events and their contexts*. New York: Neale Watson, 1981.
- DUNCAN, O. D. *Introduction to structural equation models*. New York: Academic Press, 1975.
- DUNLAP, W. P., & KEMERY, E. R. Effects of predictor intercorrelations and reliabilities on moderated multiple regression. *Organizational Behavior and Human Decision Process*, 1988, *41*, 248-258.
- DWYER, J. H. *Statistical models for the social and behavioral sciences*. New York: Oxford University Press, 1983.
- FLEISHMAN, J. A. Personality characteristics and coping patterns. *Journal of Health and Social Behavior*, 1984, *25*, 229-244.
- FOLKMAN, S., & LAZARUS, R. S. An analysis of coping in a middle-aged community sample. *Journal of Health and Social Behavior*, 1980, *21*, 219-239.
- FOLKMAN, S., LAZARUS, R. S., DUNKEL-SCHETTER, C., DeLONGIS, A., & GRUEN, R. J. Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology*, 1986, *50*, 992-1003. (a)
- FOLKMAN, S., LAZARUS, R. S., GRUEN, R. J., & DeLONGIS, A. Appraisal, coping, health status, and psychological symptoms. *Journal of Personality and Social Psychology*, 1986, *50*, 571-579. (b)
- FRENCH-BELGIAN COLLABORATIVE GROUP. Ischemic heart disease and psychological patterns. *Advances in Cardiology*, 1982, *29*, 25-31.
- FREW, D. R., & BRUNING, N. S. Perceived organizational characteristics and personality measures as predictors of stress/strain in the work place. *Journal of Management*, 1987, *13*, 633-646.
- GANSTER, D. C., SIME, W. E., & MAYES, B. T. Type-A behavior in the work setting: A review and some new data. In A. W. Siegman and T. M. Dembroski (Eds.), *In search of coronary-prone behavior: Beyond Type-A*. Hillsdale, New Jersey: Erlbaum, 1987, pp. 169-194.
- GURIN, G., VEROFF, J., & FELD, S. *Americans view their mental health*. New York: Arno, 1960.
- HASKINS, M., BAGLIONI, A. J., Jr., & COOPER, C. L. An investigation of the sources, moderators, and psychological symptoms of stress among audit seniors. *Contemporary Accounting Review*. In press.
- HAYNES, S. G., FEINLEIB, M., & KANNEL, W. B. The relationship of psychosocial factors to coronary heart disease in the Framingham study: III. Eight-year incidence of coronary heart disease. *American Journal of Epidemiology*, 1980, *111*(1), 37-58.
- HEISE, D. R., & BOHRNSTEDT, G. W. Validity, invalidity, and reliability. In E. F. Borgatta and G. W. Bohrnstedt (Eds.), *Sociological methodology*. San Francisco: Jossey-Bass, 1970, pp. 104-129.
- HINGLEY, P., & COOPER, C. L. *Stress and the nurse manager*. New York: Wiley, 1986.
- HOWARD, J. H., RECHNITZER, P. A., & CUNNINGHAM, D. A. Coping with job tension: Effective and ineffective methods. *Public Personnel Management*, 1975, *4*, 317-326.
- HOWARD, J. H., CUNNINGHAM, D. A., & RECHNITZER, P. A. Work patterns associated with Type-A behavior: A managerial population. *Human Relations*, 1977, *30*, 825-836.
- JAMES, L. R., & BRETT, J. M. Mediators, moderators, and tests for mediation. *Journal of Applied Psychology*, 1984, *69*, 307-321.

- JENKINS, C. D. Psychological and social precursors of coronary disease. *New England Journal of Medicine*, 1971, *284*, 244-255, 307-317.
- JOHNSTON, D. W., & SHAPER, A. G. Type-A behavior in British men: Reliability and intercorrelation of two measures. *Journal of Chronic Diseases*, 1983, *36*, 203-207.
- KELLY, K. E., & HOUSTON, B. K. Type-A behavior in employed women: Relation to work, marital, and leisure variables, social support, stress, tension, and health. *Journal of Personality and Social Psychology*, 1985, *48*, 1067-1079.
- KENNY, D. A. *Correlation and causality*. New York: Wiley, 1979.
- KIM, J. O., & MUELLER, C. W. *Factor analysis*. Beverly Hills: Sage, 1985.
- MATTESON, M. T., & IVANCEVICH, J. M. Type-A and -B behavior patterns and self-reported health symptoms and stress: Examining individual and organizational fit. *Journal of Occupational Medicine*, 1982, *24*, 585-589.
- MCCRAE, R. R., & COSTA, P. T., Jr. Personality, coping, and coping effectiveness in an adult sample. *Journal of Personality*, 1986, *54*, 385-405.
- MCDONALD, R. P. *Factor analysis and related methods*. Hillsdale, New Jersey: Erlbaum, 1985.
- MITCHELL, R. E., CRONKITE, R. C., & MOOS, R. H. Stress, coping, and depression among married couples. *Journal of Abnormal Psychology*, 1983, *92*, 433-448.
- NEEDLE, R., GRIFFIN, T., & SVENDSEN, R. Occupational stress: Coping and health problems of teachers. *Journal of School Health*, 1981, *51*, 175-181.
- NEWTON, T. J., & KEENAN, A. Coping with work-related stress. *Human Relations*, 1985, *38*, 107-126.
- NUNNALLY, J. C. *Psychometric theory*. New York: McGraw-Hill Book Company, 1978.
- PEARLIN, L. I., & SCHOOLER, C. The structure of coping. *Journal of Health and Social Behavior*, 1978, *19*, 2-21.
- PEARLIN, L. I., & SCHOOLER, C. Some extensions of "the structure of coping." *Journal of Health and Social Behavior*, 1979, *20*, 202-205.
- PEARLIN, L. I., LIEBERMAN, M. A., MENAGHAN, E. G., & MULLAN, J. T. The stress process. *Journal of Health and Social Behavior*, 1981, *22*, 337-356.
- PERLOFF, J. M., & PERSONS, J. B. Biases resulting from the use of indexes: An application to attributional style and depression. *Psychological Bulletin*, 1988, *103*, 95-104.
- RABKIN, J. G., & STRUENING, E. L. Life events, stress, and illness. *Science*, 1976, *194*, 1013-1020.
- RAO, C. R. Some problems involving linear hypotheses in multivariate analysis. *Biometrika*, 1959, *46*, 49-58.
- ROSENMAN, R. H., BRAND, R. J., JENKINS, C. D., FRIEDMAN, M., STRAUS, R., & WURM, M. Coronary heart disease in the Western Collaborative Group Study: Final follow-up experience of 8½ years. *Journal of the American Medical Association*, 1975, *233*, 872-877.
- SHINN, M., ROSARIO, M., MORCH, H., & CHESTNUT, D. E. Coping with job stress and burnout in the human services. *Journal of Personality and Social Psychology*, 1984, *46*, 864-876.
- SOMES, G. W., GARRITY, T. F., & MARX, M. B. The relationship of coronary-prone behavior pattern to the health of college students at varying levels of recent life change. *Journal of Psychosomatic Research*, 1981, *25*, 565-572.
- SULS, J., GASTORF, J. W., & WITENBERG, S. H. Life events, psychological distress and the Type-A coronary-prone behavior pattern. *Journal of Psychosomatic Research*, 1979, *23*, 315-319.
- THOITS, P. A. Dimensions of life events that influence psychological distress: An evaluation and synthesis of the literature. In H. B. Kaplan (Ed.), *Psychological stress: Trends in theory and research*. New York: Academic Press, 1983, pp. 33-103.
- WHEATON, B. Models for the stress-buffering functions of coping resources. *Journal of Health and Social Behavior*, 1985, *26*, 352-364.
- WILKS, S. S. Certain generalizations in the analysis of variance. *Biometrika*, 1932, *24*, 471-494.
- WILLS, G., & COOPER, C. L. Stress and professional popular musicians. *Stress Medicine*, 1987, *3*, 267-274.

BIOGRAPHICAL NOTES

JEFFREY R. EDWARDS (PhD, Graduate School of Industrial Administration, Carnegie Mellon University) is Assistant Professor of Business Administration at the Darden Graduate School of Business Administration at the University of Virginia. He has published articles on stress, coping, and well-being in organizations, person-job fit, and Type-A behavior pattern.

A. J. BAGLIONI, Jr. (PhD, Department of Psychology, University of Virginia) is Business Research Associate at the Darden Graduate School of Business Administration at the University of Virginia. His work focuses on gerontology as well as research methodology, including psychometrics and structural modeling.

CARY L. COOPER (PhD, University of Leeds) is Professor of Organizational Psychology at the Manchester School of Management, University of Manchester Institute of Science and Technology. He is editor of the international quarterly, the *Journal of Organizational Behavior*, President of the British Academy of Management, and author of over 40 books.