The relationship of work stressors, coping and social support to psychological symptoms among female secretarial employees

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A conceptual framework is advanced that assumes that psychological symptoms emerge within multiple contexts, such as the workplace, and are influenced by the interplay of individual and situational risk and protective factors over time. This framework was utilized to examine the impact of work and work-family role stressors, coping, and work-related social support on psychological symptoms among 239 female, secretarial employees in the USA, using both cross-sectional and longitudinal structural equation models. Work stressors and avoidance coping were viewed as risk factors, and active coping and social support as protective factors. Work stressors contributed substantially to increased symptoms, primarily through a direct pathway in the cross-sectional model, but also indirectly to both Time 1 and Time 2 symptoms (4 months later) via pathways through active and avoidance coping. In both models, avoidance coping also predicted increased symptoms. Avoidance coping also served to partially mediate the relationship between work stressors and symptoms in the cross-sectional model, but not in the longitudinal model. Active coping was related to fewer psychological symptoms in both models, thereby reducing the negative effect of work stressors on symptoms. Likewise, work-related social support served an indirect protective function by contributing to lower levels of reported work stressors and greater use of active coping. Work stressors but not active coping mediated the relationship between social support and symptoms. Implications for future research and workplace interventions are discussed.

1. Introduction

Special attention has been paid recently in both the research literature and the media to the changing nature of work; for example, the heightened complexity of work tasks, demands for greater and more technical skills, the rapidity of change and, for many, increasing hours
in the work week. Concerns have been raised about the health implications of this changing landscape. As employees engage in their work pursuits and spend substantial time in their work settings, work-related stressors, including the challenge of the work-family interface, have increasing potential to adversely affect psychological well-being. How employees cope with these demands or the level of support they receive may serve to increase or lower risk for negative health outcomes. It is particularly timely, then, to further examine how these processes influence the relationship between work stressors and psychological outcomes.

Work stressors can affect all employees, but may have unique consequences for women who are often in lower-paid jobs that carry considerable responsibility but with less status and control. They also often are faced disproportionately with the complex task of juggling multiple work and family role demands. The psychological demand-decision latitude model (Karasek & Theorell, 1990) posits that employees in jobs characterized by high psychological demands and low control are at particular risk for developing psychological symptoms and physical illness. Employees in such high-strain jobs manifest significantly higher rates of distress (Karasek, 1979; Karasek & Theorell, 1990; Theorell & Karasek, 1996). Secretarial employees frequently work under these types of high demand/low control job conditions. Studying this occupational group can enhance our knowledge of how key factors in the stress process operate to increase or decrease the likelihood of negative psychological outcomes for women and others in high-strain occupational roles.

Theories about the nature of the stress process provide explanatory models for studying the relationship between stressors and psychological symptoms. These theories help to delineate the risk and protective factors and processes that may influence the extent to which stressors lead to negative health consequences as well as the mechanisms through which these processes might unfold. The preventive stress management model articulated by Quick, Quick, Nelson, and Hurrell (1997), for example, postulates that there are a range of organizational demands and stressors that lead to a variety of behavioural, psychological, or physical health consequences by way of individual stress responses. Whether these outcomes are negative (distress) or positive (eustress) depends on the influence of various factors (e.g. social support or individual characteristics) that may modify the individual stress response. Similarly, Kahn and Byosiere (1990) advance a structural view of the construct of work stress. Their model consists of a number of key components including stressors in organizational life (such as role stressors), individual perceptions and cognitions, and responses to stressors, including psychiatric symptomatology. In their view, the nature of responses to stressors is influenced both by properties of the person (e.g. self-esteem and coping strategies) and properties of the situation (e.g. supervisor and co-worker social support). These and related models (Ivancevich, Matteson, Freedman, & Phillips, 1990; Moos & Swindle, 1990; Pearlin & Schooler, 1978) suggest that the study of the work stressor-health outcome relationship must examine the complex interplay of multiple factors, including social environmental factors and individual responses to stressors.

The purpose of the present study is to examine the relationship of work stressors, active and avoidance coping, and social support to psychological symptoms among a sample of female secretarial employees. These relationships are assessed in both cross-sectional and longitudinal structural equation models. This study is important for a number of reasons. First, it includes a longitudinal analysis of a stress, coping, and social support model. To date, few longitudinal studies have been reported. As a result, we continue to have a limited understanding of how the relationships among these factors operate over time to effect health outcomes. Second, the study contributes to our knowledge base about the stress process among working women. Finally, it helps to further delineate those risk and protective factors that might be the focus of preventive interventions in the workplace.
Following a brief review of literature on work stressors, coping, and social support, a number of specific hypotheses are advanced.

1.1. Work stressors
Considerable cross-sectional research evidence indicates that higher levels of job stressors (e.g., role stressors, work load, job strain, environmental conditions) are related to increases in psychological symptoms, including depression, anxiety, and somatic complaints in samples of both female and male employees (Bhagat, Allie, & Ford, 1991; Bromet, Dew, Parkinson, & Schulberg, 1988; Day & Livingstone, 2001; Donat, Neal, & Addleton, 1991; Hendrix, Cantrell, & Steel, 1988; Karasek, Gardell, & Lindell, 1987; Kinnunen & Mauno, 1998; Pompe & Heus, 1993; Schonfeld, 1990; Shinn, Wong, Simko, & Ortiz-Tomes, 1989). Similarly, higher levels of work-family conflict (i.e., conflict between work and family roles and demands) are associated with increased symptoms (Carbone, 1992; Bromet, Dew, & Parkinson, 1990; Krause & Geyer-Pestello, 1985; Greenglass, Pantony, & Burke, 1988; Frone, Russell, & Barnes, 1996; Frone, Russell, & Cooper, 1991; Netemeyer, Boles, & McMurrian, 1996).

Only a limited number of studies have examined the longitudinal effects of work stressors on psychological outcomes, and the results are inconsistent. Some investigations have demonstrated long-term detrimental effects of work and work-family stressors (Frone, Russell, & Cooper, 1997; Ingledew, Hardy, & Cooper, 1997). A limitation of the study by Ingledew et al. (1997), however, is the use of Time 1 to Time 2 change scores in their longitudinal analyses, making it difficult to disentangle the directionality of the effect they report. It is not possible to give causal priority to change in stressors as leading to change in symptoms, when the opposite direction of the effect is also plausible. By contrast to those studies observing longitudinal effects, Aneshensel and Frerichs (1982) found that the effects of work stressors are often restricted to a more limited time period and have little relationship to symptoms experienced at later periods.

1.2. Active and avoidance coping
The role that coping plays in the stressor-symptom relationship proves to be quite complex, and the nature of this relationship appears to vary by type of coping. In this paper, we refer to two broad categories of coping strategies—active coping (i.e., active efforts to manage or control aspects of the stressful event such as problem-solving, cognitive restructuring, and seeking social support) and avoidance coping (i.e., efforts to avoid the stressful situation or thinking about the stressful event). Support for conceptualizing active and avoidance coping as two higher-order dimensions of coping derives from both theoretical and empirical literature (Koeske, Kirk, & Koeske, 1993; Mullen & Suls, 1982; Scheier, Weintraub, & Carver, 1986; Tobin, Holroyd, Reynolds, & Wigal, 1989).

In the case of active coping, there is substantial research, primarily cross-sectional in nature, indicating that it functions as a protective factor, either through its direct positive effects on outcomes or as a moderator of the stressor-symptom relationship. In the first instance, active coping would offset the negative effects of stressors by contributing directly to decreased symptoms or improved adjustment. A number of cross-sectional analyses have demonstrated direct effects of active coping, either through a negative relationship to psychological symptoms, or a positive relationship to indices of increased adjustment (Decker & Borgen, 1993; Ingledew et al., 1997; Kirkcaldy, Cooper, & Brown, 1995; O’Neill & Zeichner, 1985; Parkes, 1990; Shinn et al., 1989; Srivastava & Singh, 1988;
Relatively few longitudinal studies have been reported assessing the direct effects of active coping. These studies suggest that active coping may have longer-term benefits as well. Aspinwall and Taylor (1992) observed that active coping was positively related to later adjustment, and Ingledew et al. (1997) found that Time 1 to Time 2 change in active coping was negatively related to change over the same time period in psychological symptoms. This finding suggested a beneficial effect of active coping on well-being. Again, their use of change-change analysis limits the ability to make causal inferences about the longitudinal effects of active coping on symptoms.

In examining the direct effects of active coping, it also appears that the use of these coping strategies operates relatively independently of work stressors (i.e., active coping does not serve as an indirect or mediating pathway between stressors and symptoms). The preponderance of evidence shows that correlations between job stressors and active coping are not significant (Bhagat et al., 1991; Griffith, Steptoe, & Cropley, 1999; Ingledew et al., 1997; Parkes, 1990; Shinn et al., 1989). When significant correlations are observed (Day & Livingstone, 2001; Frone et al., 1991; Kirkcaldy et al., 1995; Nelson & Sutton, 1990), they tend to be relatively modest and are not consistently positive or negative. Many factors may contribute to the nature of this relationship. Certain stressors may not influence active coping while others may be differentially predictive of greater or lesser utilization of this type of coping strategy. For example, Day and Livingstone (2001) found that among four chronic work stressors assessed, role overload and role responsibilities were positively correlated with problem-focused coping, while lack of job stimulation and work-role ambiguity were negatively correlated with it.

The second mechanism, involving active coping as a moderator of the effect of stressors on outcomes, would be operative if the beneficial effects of active coping strategies were observed only under certain conditions of stress but not others. In these instances, one would observe a Stress × Coping interaction in which those individuals making greater use of active coping strategies would show fewer symptoms in high stress situations than those making less use of active coping. Under conditions of low stress, differences in the use of active coping would not affect symptoms (Wheaton, 1985). Findings in this area are mixed. In some instances, the moderating effects of active coping are not observed (Day & Livingstone, 2001; Frone et al., 1991; Kirkcaldy et al., 1995; Tyler & Cushway, 1995), while other studies have found that the use of these strategies can serve to moderate the stressor–symptom relationship (Bhagat et al., 1991; Felsten, 1998; Greenglass & Burke, 1991; Koeske et al., 1993; Parkes, 1990). Only the study by Koeske et al. (1993) is of a longitudinal nature.

In contrast, several studies indicate that avoidance coping may serve to mediate the effects of stressors on symptoms. First, higher stressor levels are positively related to increased use of avoidance coping strategies (Ingledew et al., 1997; Koeske et al., 1993; Shinn et al., 1989). Second, there is also strong and consistent evidence from both cross-sectional (Day & Livingstone, 2001; Felsten, 1998; O’Neill & Zeichner, 1985; Pisarski, Bohle, & Callan, 1998; Srivastava & Singh, 1988; Tyler & Cushway, 1995) and longitudinal (Aspinwall & Taylor, 1992; Ingledew et al., 1997; Koeske et al., 1993) studies that avoidance coping is predictive of increased symptoms and poorer adjustment. Moreover, one study found that these effects were more likely to occur for those who used avoidance coping strategies predominantly or exclusively (Koeske et al., 1993). The results of these studies strongly suggest that avoidance coping operates as a mediator in the stressor-
symptom relationship, but the explicit test of this mediating effect is typically not conducted. In the present study, we assess the potential mediational role of avoidance coping in both cross-sectional and longitudinal models.

Studies examining the potential moderating effects of avoidance coping, on the other hand, have not found support for this mechanism (Ingledew et al., 1997; Koeske et al., 1993; Parkes, 1990; Tyler & Cushway, 1995). As further evidence, Day and Livingstone (2001) examined avoidance coping interactions with both acute and chronic work stressors in separate regression models. In both instances, the interaction terms failed to explain a significant increase in the variance in symptoms.

1.3. Social support
Social support is a significant feature of an individual’s social environment and varying levels of support will be perceived as available to the individual in times of need. Recent attention has turned to examining the role of social support in the stress process in two ways. The first has been to reconceptualize social support as coping assistance (Thoits, 1986). In this view, the coping methods utilized by an individual in response to stressors are seen as the same methods utilized by others to assist that individual. For example, problem-solving coping on the part of the individual and instrumental support from others are both aimed at modifying or managing the stressful situation. If this is the case, social support should enhance the utilization of active coping by an individual when confronted with stressful circumstances. In a test of Thoits’ proposal that coping mediates the relationship between social support and adjustment to stress, Terry, Rawle, and Callan (1997) examined this model in two contexts—work stress and women’s adjustment to birth of a first child. Results were consistent with the model in both instances. The effects of colleague support on adjustment to work stressors in the first study, and the effects of partner support on adjustment to childbirth in the second study, were mediated through coping responses. Social support had no direct relationship to adjustment in either case. A limitation of these two studies, however, was that baseline adjustment was not controlled in predicting later adjustment. Other studies provide further evidence of a relationship between social support and active coping responses. In Ingledew et al. (1997), change in social support from Time 1 to Time 2 was positively related to change in active coping. In a longitudinal study of manufacturing plant employees (Heaney, House, Israel, & Mero, 1997), supportive work relationships were found to positively influence subsequent active coping behaviour. There appears to be no evidence in the literature that social support is related to avoidance coping.

A second way that social support may operate in the stress process is to reduce the perception or experience of work stressors and, therefore, indirectly reduce the likelihood of negative outcomes such as psychological symptoms. Just as active coping may serve to mediate the effects of social support on symptoms, work stressors may also operate as another mediating pathway. Support for this hypothesis is found in several cross-sectional studies in which greater perceived social support was related to lower levels of reported work stressors (Griffith et al., 1999; Jayaratne, Himle, & Chess, 1988; Kumari & Sharma, 1990; Pompe & Heus, 1993). Moreover, in a study of female nurses, work-nonwork conflict was shown to mediate the relationship between supervisor support and psychological symptoms (Pisarski et al., 1998). No longitudinal studies assessing the mediational role of work stressors in the relationship of social support to symptoms were found.

Overall, then, from these two lines of research, there is a basis to conceptualize social support as an important contextual variable that influences the individual’s utilization of
active coping strategies and their perceptions of work stressors. Unlike previous research, the current study assessed the mediating role of these two factors on social support in the same model. We expected that the effect of social support on psychological symptoms would be mediated by both active coping and work stressors.

1.4. Hypotheses
Based on the literature reviewed above, a number of specific hypotheses were tested. For the cross-sectional model, the following predictions were made.

Hypothesis 1. Work stressors will be positively related to avoidance coping and psychological symptoms (no prediction was made regarding the relationship of work stressors to active coping).
Hypothesis 2. Active coping will have a direct, negative relationship with symptoms (the moderator effect of active coping was also assessed but no prediction was made).
Hypothesis 3. Avoidance coping will serve as a mediator of the relationship between work stressors and psychological symptoms, with work stressors positively related to avoidance coping which, in turn, would be positively related to psychological symptoms.
Hypothesis 4. The influence of work-related social support on symptoms will be mediated by work stressors and active coping, with support negatively related to work stressors and positively related to active coping. No relationship between social support and psychological symptoms was expected.

For the longitudinal model, the following predictions were made.

Hypothesis 5. Active coping at Time 1 would have a direct, negative effect on psychological symptoms at Time 2 (again, the moderator effect of active coping was assessed but no prediction was made).
Hypothesis 6. Avoidance coping at Time 1 would mediate the relationship between work stressors at Time 1 and psychological symptoms at Time 2.
Hypothesis 7. The effects of social support at Time 1 on psychological symptoms at Time 2 would be mediated through Time 1 active coping and work stressors.
Hypothesis 8. No prediction was made regarding the relationship of work stressors at Time 1 to psychological symptoms at Time 2.

2. Method
2.1. Sample
Participants were 239 female, secretarial employees working at one of four job sites in Connecticut-based corporations. Site 1 was a large manufacturing company; sites 2, 3, and 4 were utility and telecommunications companies.

Of the 239 employees, 136 participated in an intervention conducted in the workplace on how to manage work and family stressors, and 103 served as control participants. The intervention consisted of 15, 1 1/2-h, weekly sessions conducted at the workplace and designed to teach participants coping strategies for reducing the negative influence of
identified risk factors (e.g. work and family stressors) and for enhancing the beneficial effects of protective factors (e.g. active coping or social support). The results of the intervention are reported elsewhere (Snow & Kline, 1995; Snow, Swan, & Wilton, 2002) and are not the focus of the present study.

The sample was predominantly white (83%), had completed high school or vocational training (43%) or some college (46%), had worked in the company for an average of 9.4 years, and had an annual family income ranging from less than $30,000 (37%) to more than $50,000 (36%). Participants’ mean age was 40.2 years, and over one-half were married or living with their partner (59%), while the others were either single (18%) or separated, divorced, or widowed (24%). About one-half (53%) of the women had children living at home.

2.2. Procedures

Participants were recruited first by circulating a programme description to all eligible employees within each workplace inviting their participation. It was explained that one-half of those who volunteered would be randomly selected to receive an intervention and one-half would serve as control participants. Given that individuals were asked to volunteer for the study, the participants represent a non-probabilistic sample. Participants were told that they would complete a set of research measures prior to and at the completion of the intervention (4 months later), and at 6- and 22-month follow-up periods. Each company provided release time to allow employees to participate in the intervention and to complete research measures. This paper presents analyses of the Time 1 (pre-test) and Time 2 (post-test) data.

2.3. Measures

At Time 1, participants completed the Work and Family Stress Questionnaire (Snow & Grady, 1989), a self-report instrument that included sections on demographic information; family history of health problems; and assessments of work and family stressors, coping, social support, psychological symptoms, and substance use. This same instrument, with the exception of the demographic and family history items, was readministered 4 months later at Time 2 (subsequent to the completion of the intervention phase). Since this paper involves analyses of the stressor, coping, social support, and psychological symptom variables, only these measures will be identified below.

2.3.1. Work stressors: Two work-related stressor variables emphasizing dimensions of work stressors related to role conflict and demand were employed in this study. A measure of employee role stressors was obtained using the Role Quality Scale (Baruch & Barnett, 1986). Respondents indicated to what extent each of 19 items was currently a source of concern or demand for them. Items assessed various aspects of the employee’s work role such as ‘having too much to do’, ‘having to juggle conflicting tasks’, and ‘having to do things that are not part of the job’. Internal consistency for this scale was quite high in the present study (Cronbach’s $\alpha = .88$). In addition, work-family role stressors were assessed using a 4-item scale developed specifically for this project (Cronbach’s $\alpha = .81$). These items assessed the extent to which the multiple demands from employment and family were perceived as too extensive, conflictual, or overlapping. Examples of items are: ‘Considering your different roles, how often do the things you do add up to being just too much?’ and ‘How much
does your work life interfere with your family or personal life?" The employee role and work-family role stressor variables were used to create a latent variable of work stressors.

2.3.2. Coping: The Health and Daily Living Form (Moos, Cronkite, Billings, & Finney, 1987) was used to assess individuals’ strategies for addressing problem situations or events. This 33-item instrument provided an indication of the extent to which participants utilized behavioural, cognitive, and avoidance coping strategies. The a priori behavioural, cognitive, and avoidance subscales developed by Moos et al. (1987) had unacceptably low reliability coefficients in the present sample. This problem also was encountered by Koeske et al. (1993), and led them to conduct their own factor analysis of the original scale. Thus, the coping items were subjected to a principal component factor analysis with varimax rotation to determine a more reliable factor structure. Items that loaded on more than one factor or that had factor loadings < .40 were dropped. The analysis yielded a 4-factor model. The first three factors, those generally recognized as representing more active dimensions of coping, consisted of a 6-item cognitive coping subscale (Cronbach’s $\alpha = .75$), a 5-item behavioural coping subscale (Cronbach’s $\alpha = .70$), and a 4-item social support coping subscale (Cronbach’s $\alpha = .73$). Representative items were, ‘Tried to see the positive side of the situation’ (cognitive coping), ‘Made a plan of action and followed it’ (behavioural coping), and ‘Talked with spouse or relative about the problem’ (social support coping). The fourth factor consisted of a 5-item avoidance coping subscale (Cronbach’s $\alpha = .58$). This subscale included problem-avoidance items such as ‘Avoided being with people in general’ or ‘Tried to reduce tension by drinking alcohol’. As a final step, a confirmatory factor analysis was conducted of the four coping variables with each serving as an indicator of a latent variable of coping. Consistent with the literature, the three active coping variables had highly significant factor loadings ($p < .001$) on the latent variable, while avoidance coping had a low and non-significant factor loading. Therefore, cognitive, behavioural, and social support coping were used to create a latent variable of active coping. Avoidance coping was entered separately as an observed variable.

2.3.3. Social support: Work-related social support was assessed using an adaptation of House’s (1980) measure of perceived social support. Participants rated the extent to which their supervisor, co-workers, spouse/partner, family, and friends were perceived as supportive regarding difficulties or demands at work. Ratings across all sources of social support pertaining to stressors in the work domain were combined to create a measure of social support about work-related stressors (Cronbach’s $\alpha = .83$ for the present study).

2.3.4. Psychological symptoms: Three measures of psychological symptoms were employed as outcome measures. The state-anxiety subscale of the Spielberger State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970) was used as a measure of transitory feelings of tension, apprehension, and heightened autonomic nervous system activity. Participants were asked to rate whether or not they were currently experiencing 20 anxiety-related mood states. Spielberger et al. (1970) found the reliability for this subscale to range from .83 to .92 ($\alpha = .92$ for the present study). The Center for Epidemiologic Studies-Depression (CES-D) Scale was utilized to assess the current level of depressive symptomatology. The CES-D has proven useful in discriminating between samples of psychiatric patients and the general population (Radloff, 1977). Participants rated 20 items, indicating the frequency of depressive symptoms during the last week. The CES-D has been found to have high internal consistency, with reliability coefficients ranging from .85 to .90 ($\alpha = .89$ for the present study). Lastly, somatic complaints were assessed using the
Cohen-Hoberman Inventory of Physical Symptoms (Cohen & Hoberman, 1983). This scale assesses how much each of 39 common physical symptoms had bothered or distressed the respondents during the past 2 weeks. In order to shorten the scale to reduce the time needed to complete the Work and Family Stress Questionnaire at subsequent administrations, the Cohen-Hoberman measure was reduced to 20 items following Time 1 data collection and then compared to the overall 39-item scale. The original inventory has been found (Cohen & Hoberman) to have relatively high internal consistency (Cronbach’s α = .89), and the shortened version had an α = .87 for the present study. In addition, the correlation of the 20-item scale and the original 39-item scale was highly significant (r = .94, p < .001). Therefore, the 20-item scale was utilized throughout the remainder of the study and for the current analyses. The anxiety, depression, and somatic complaints scales were used to create a latent variable of psychological symptoms.

Therefore, the components of the cross-sectional model utilized in this study consisted of two observed variables and three latent variables. The observed variables were the Time 1 scores on avoidance coping and work-related social support. The latent variables at Time 1 were work stressors (comprised of employee role and work-family role stressor variables), active coping (comprised of cognitive, behavioural, and social support coping), and psychological symptoms (comprised of measures of anxiety, depression, and somatic complaints). An additional latent and observed variable were added to the longitudinal model. The new latent variable was Time 2 psychological symptoms (comprised of the Time 2 measures of anxiety, depression, and somatic complaints). The observed variable was condition (i.e. intervention) and was entered to control for any intervention effects that might influence Time 2 symptoms.

3. Data analysis

Study variables first were assessed for assumptions of normality. All variables met these assumptions with the exception of somatic complaints (which showed a moderate level of skew and kurtosis at Time 1 and a slight elevation in skew and kurtosis at Time 2). A square root transformation was performed for somatic complaints that produced a normal distribution for this variable at both time periods. Although depression and anxiety did not violate assumptions of normality, we also conducted square root transformations for these two variables, since all three variables served as indicators of the same latent variable in the two models.

Missing data was replaced using the SPSS 11.0.1 implementation of the EM algorithm (expectation-maximization; SPSS Inc., 2001), a statistical technique for imputing missing data that uses an iterative estimation procedure to impute missing values using maximum-likelihood estimation (Dempster, Laird, & Rubin, 1977; Little & Rubin, 1987). Use of EM and other maximum-likelihood estimation procedures for missing data involves the assumption that data is missing either completely at random (MCAR; i.e. ‘missingness’ is unrelated to other measured variables or the underlying values of the variable itself), or that data is missing at random (MAR; i.e. ‘missingness’ may be correlated with or dependent on other observed variables, but is unrelated to the underlying values of the variable itself). Little’s multivariate test of MCAR was non-significant, χ² (485) = 523.97, p = .11, suggesting that the missing data pattern is consistent with the assumption of MCAR (Little & Schenker, 1995). Missing data rates for the 239 participants were quite low for Time 1 variables (between 0.4% and 5.4% for study variables), while Time 2 symptom variables were missing for 14.6% of participants, indicating that 35 participants were lost to follow-up. The EM algorithm was implemented using key demographic variables and all other
study variables to maximize the likelihood that all available data was used to estimate missing values. The resulting data set was then analyzed using complete data methods for the sample of 239 participants.

The AMOS 4.0 statistical program was utilized to analyze structural equation models, obtain maximum-likelihood estimates of model parameters, and provide goodness-of-fit indices. The two-stage least squares regression approach (2SLS; Bollen & Paxton, 1998) was used to test for interaction effects between the work stressors and active coping latent variables on psychological symptoms, as a test for moderation effects. The 2SLS method involves substitution of observed reference indicator variables (i.e. the variables used to provide the scale to the latent variable—in this case work-family stressors, behavioural coping, work-family stressors × behavioural coping cross-product, and depression) for latent variables in the original model, and the use of instrumental variable methods to estimate parameters. All exogenous observed variables (i.e. social support) and non-scalar observed variables (i.e. employee role stressors, cognitive coping, social support coping) and their cross-products were used as instrumental variables for the 2SLS analyses. This approach to modelling of interaction and moderation effects has a number of advantages over other techniques for modelling such effects (i.e. multiple-product-indicator and single-product-indicator approaches), including ease of implementation, the ability to model observed variables (rather than deviation scores), and the robustness to lack of normality in observed variables and cross-products (Bollen, 1996; Li & Harmer, 1998).

4. Results

4.1. Correlations and descriptive statistics
Correlations, means and standard deviations of the study variables are presented in Table 1. Among the stronger correlations, stressor variables were positively associated with avoidance coping and with psychological symptoms at Times 1 and 2. Work-related social support was negatively related to work stressors and to symptoms at Times 1 and 2. Of the three active coping variables, cognitive coping had the strongest relationships (negative) with psychological symptoms, especially at Time 2, while avoidance coping was positively correlated with all symptom measures at both Times 1 and 2.

4.2. Structural equation models
Separate structural equation models were conducted to test the cross-sectional and longitudinal models employed in this study.

4.2.1. Cross-sectional model: The first analysis examined the relationships of work stressors, active and avoidance coping, and work-related social support with psychological symptoms at Time 1. The cross-sectional model, along with the standardized parameter estimates for each path, is shown in Figure 1. The model provided a good fit to the data, with a non-significant Chi-square, \( \chi^2(29, 239) = 34.42, \quad p = .22 \), with \( \chi^2/df = 1.19 \), GFI = .97, Adjusted GFI = .95, RMSEA = .028.

As hypothesized, greater levels of work stressors predicted more psychological symptoms of depression, anxiety and somatic complaints (path coefficient = .56, \( p < .01 \)). Work stressors also had indirect relationships to symptoms through both active and avoidance coping, representing different protective and risk processes, respectively. Higher reported stressor levels predicted increased use of active coping at a level approaching significance (.18, \( p < .06 \)). As hypothesized, active coping, in turn, predicted fewer
Table 1. Means, standard deviations, and intercorrelations of study variables (N = 239).

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<td>2. Work/Family role stressors</td>
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<td>3. Work-related social support</td>
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<td>4. Avoidance coping</td>
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<td>14.1</td>
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<td>.37**</td>
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<td>.24**</td>
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* p < .05; ** p < .01.
symptoms ($- .15$, $p < .05$). Those individuals who responded to greater job stressors by increasing their use of active methods of coping reported less psychological distress. Also as predicted, higher perceived work stressors predicted greater use of avoidance coping (.47, $p < .01$), and increased reliance on avoidance coping was related to higher levels of symptoms (.28, $p < .01$). The magnitude of the coefficients for these two paths indicated a likely mediating effect of avoidance coping on the relationship between work stressors and psychological symptoms. To test for this effect, the path coefficients from work stressors to avoidance coping and from avoidance coping to symptoms were set to zero. The result was an increase in the path coefficient between work stressors and symptoms from .56 to .68 (a value significant at $p < .001$). As a further test of mediation, the product of coefficients test (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Sobel, 1982) was performed and found to be significant ($z = 3.13$, $p < .001$). Therefore, the inclusion of avoidance coping in the model significantly reduced the magnitude of the relationship between work stressors and psychological symptoms, thus demonstrating a partial mediating effect of avoidance coping, although the magnitude of the relationship between stressors and symptoms remained relatively high. No mediating effect was found for active coping.

To test whether active coping moderated the relationship between work stressors and symptoms, a 2SLS regression procedure was conducted. The interaction effect of Active coping $\times$ Work stressors was not significant ($t = 0.01$, $p = .99$) indicating that active coping did not serve as a moderator of work stressors for the present sample.

Finally, as hypothesized, there was no significant relationship between work-related social support and psychological symptoms. Instead, as predicted, social support was negatively related to work stressors ($- .30$, $p < .01$) and positively related to active coping (.21, $p < .01$). To test whether active coping mediated the relationship between work-related social support and psychological symptoms, the path coefficients from social support
to active coping and from active coping to symptoms were set to zero. Contrary to the hypothesis, controlling for active coping had a negligible effect on the path coefficient from social support to symptoms, with the value increasing only from -.03 to -.07 and remaining non-significant. Therefore, while active coping served as an indirect pathway between support and symptoms, it did not mediate this relationship. On the other hand, when the paths from social support to work stressors and from work stressors to symptoms were controlled, the path coefficient between social support and symptoms increased from -.03 to -.17, a value significant at $p < .01$. The product of coefficients test yielded a $z$-score of 6.96 ($p < .001$). These findings indicate that work stressors, as predicted, served to mediate the relationship between work-related social support and psychological symptoms. Employees who reported greater availability of work-related support from supervisors, coworkers, family, and friends experienced lower levels of work stressors and, in turn, lower levels of work stressors were related to fewer psychological symptoms.

4.2.2. Longitudinal model: A second structural equation model was employed to assess the impact of work stressors, work-related social support, active and avoidance coping, and psychological symptoms at Time 1 on psychological symptoms at Time 2. Paths that proved to be non-significant in the cross-sectional model were not included in this analysis. The longitudinal model, along with the standardized parameter estimates for each path, is shown in Figure 2. The model provided a good fit to the data, with a non-significant Chi-square, $\chi^2(65, 239) = 78.09$, $p = .13$, with $\chi^2/df = 1.20$, GFI = .96, Adjusted GFI = .93, RMSEA = .029.

As shown in Figure 2, work stressors at Time 1 had no direct relationship to psychological outcomes at Time 2. Instead, higher levels of work stressors at Time 1 were related to greater use of active (.19, $p = .05$) and avoidance (.48, $p < .01$) coping strategies.
and increased psychological symptoms (.59, p < .01) at Time 1. In turn, as hypothesized, active coping predicted fewer symptoms at Time 2 (−.16, p < .05), while both avoidance coping and Time 1 symptoms predicted poorer psychological outcomes at Time 2 (.14, p < .05 and .61, p < .01, respectively). Thus, the impact of Time 1 work stressors on Time 2 symptoms was only indirect, and primarily mediated by Time 1 symptoms. This mediating effect was demonstrated when the path coefficients from work stressors to Time 1 symptoms and from Time 1 to Time 2 symptoms were set to zero, resulting in the path coefficient between work stressors and Time 2 symptoms increasing from −.05 to .28 and becoming significant (p < .01). The product of coefficients test also was significant (z = 8.34, p < .001).

By contrast, the direct relationships of active and avoidance coping to symptoms observed in the cross-sectional model held up over time. Active coping served a protective function on a longitudinal basis with higher use of cognitive, behavioural, and social support coping strategies related to decreased symptoms. Greater use of avoidance coping strategies, on the other hand, served to increase risk and directly predicted increased symptoms at Time 2. Contrary to predictions, tests for potential mediating effects of avoidance and active coping on the relationship of work stressors to Time 2 symptoms were not significant.

To test whether active coping at Time 1 served to moderate the relationship between work stressors at Time 1 and psychological symptoms at Time 2 in the longitudinal model, a 2SLS regression procedure again was conducted. The interaction term was not significant (t = 0.50, p = .62), again indicating that active coping did not serve as a moderator of work stressors on psychological symptoms.

The hypothesis that work-related social support at Time 1 would have an indirect, positive effect on symptoms at Time 2, via its impact on active coping and work stressors, also was supported. Higher perceived social support at Time 1 was related to greater use of active coping strategies at Time 1 (.22, p < .01), which in turn predicted fewer psychological symptoms at Time 2 (−.16, p < .05). This indirect effect of social support on Time 2 symptoms through active coping, however, is relatively modest given the small product of these two coefficients (−.04). In contrast, the indirect, protective influence of social support through work stressors is stronger given the greater magnitude of the path coefficients from social support to work stressors (−.30, p < .01) and, in turn, from work stressors to Time 1 symptoms (.59, p < .01) and from Time 1 to Time 2 symptoms (.60, p < .01). Finally, condition did have a significant effect on Time 2 outcomes (.16, p < .01), with those in the intervention group reporting fewer psychological symptoms than those in the control group.

5. Discussion

5.1. Overview
Understanding whether and under what conditions work stressors, in this case employee role stressors and work-family role stressors, contribute to negative psychological and physical health outcomes continue to be an important emphasis for workplace research. The various frameworks that have been advanced for examining these phenomena have increasingly emphasized that the study of the work stressor–health outcome relationship must take into account the complex interrelationship of both person and situational factors. Drawing on this tradition, the present study examined the relationship of work stressors, active and avoidance coping, and work-related social support to psychological symptoms among a sample of female, secretarial employees utilizing both cross-sectional and
longitudinal structural equation models. In each instance, the model provided a good fit to the data. A number of the findings from these analyses have relevance to the growing knowledge base regarding work-related risk and protective processes.

First, work stressors clearly emerged as a risk factor for psychological symptoms. This latent variable consisted of stressors related to employee role demands and work-family role conflict. Those employees who reported higher demands, pressures, and role conflicts were significantly more likely to experience symptoms of depression, anxiety and somatic complaints. Theoretically, as these stressors increase, they exceed the capacities of the individual, increasing the likelihood of eliciting a broad array of psychological and psychosomatic symptoms (Lazarus & Folkman, 1984; Quick et al., 1997). The pathways through which work stressors influenced symptoms differed, however, for the cross-sectional and longitudinal models. The negative relationship between work stressors and symptoms at Time 1 was primarily direct. In addition, work stressors were related to increased use of active coping that, in turn, predicted fewer symptoms, providing a certain measure of protection. At the same time, however, the adverse influence of work stressors on symptoms was amplified by the indirect pathway through avoidance coping. Consistent with the literature (Day & Livingstone, 2001; Frone et al., 1991; Kirkcaldy et al., 1995), the magnitude of this pathway (cross-product of path coefficients = .13) proved to be much more substantial than the indirect effect through active coping (cross product = −.03). Clearly, the experience of work stressors by employees appears to be related to a range of coping responses, but the findings suggest that higher levels of work stressors are more likely to be associated with the greater use of avoidance rather than active coping strategies and, in turn, avoidance coping is more highly related to negative psychological outcomes. By contrast, in the longitudinal model, the effect of work stressors on Time 2 symptoms was only indirect through Time 1 symptoms and active and avoidance coping.

The question of whether work stressors, measured at a given time, have direct relationships to psychological outcomes assessed at later time periods is an area of inconsistency in the literature (Aneshensel & Frerichs, 1982; Frone et al., 1997; Ingledew et al., 1997). A number of factors come into play here, including the nature of the stressors and outcomes studied, length of time interval(s), and type of statistical procedures employed. Identifying the conditions under which work stressors have direct effects over time will require further research. One focus might be to compare the relationships of work stressors to symptoms over multiple time periods utilizing repeated measures of the stressor and other variables. This would allow testing the influence of distal versus more proximal stressors and how the effects of stressors are influenced over time by other environmental or individual factors. This line of research is suggested by findings that stressors can exhibit a low degree of stability over time as compared to other variables such as symptoms and social support (Aneshensel & Frerichs, 1982).

Second, the hypotheses concerning active and avoidance coping were largely confirmed with each contributing to the models but with opposite effects. As predicted, active coping had a negative relationship to symptoms in both the cross-sectional and longitudinal analyses, with greater active coping at Time 1 predicting fewer symptoms at both Times 1 and 2. In addition, it served, as discussed above, as an indirect pathway from work stressors to symptoms, given the positive relationship of work stressors to active coping. Previous research has revealed inconsistent findings regarding the relationship between work stressors and active coping. One possible explanation is that the association between stressors and active coping may vary depending on the nature of the stressors involved. In the study by Day and Livingstone (2001), for example, stressors related to lack of job stimulation and work-role ambiguity had negative correlations with active coping, while stressors related to
role overload and responsibilities, similar to those assessed in the present study, had positive correlations. It may be that certain work stressors, such as work load, are viewed by employees as more amenable to change through use of active coping strategies, while other stressors are not, resulting in non-significant or even negative correlations.

The potential moderating role of active coping in the relationship of work stressors to symptoms was tested also. No moderating effect was found for either model. Therefore, the protective influence of active coping was found to operate as a main effect, and not as a moderator or mediator of work stressors. In this way, it served to compensate to some degree for the negative influence of work stressors. The significant longitudinal effect of active coping reinforces the notion that active efforts to solve and rethink problems and to engage and change one’s environment can have long-lasting, beneficial effects. This, in part, may be due to a certain degree of stability over time in the use of these types of coping strategies, and that once individuals have learned and utilized these methods of coping, they will employ them in new situations that arise along the way, but in a manner that is influenced by a variety of situational factors.

Based on previous research, it was hypothesized that avoidance coping would serve to mediate the relationship between work stressors and psychological symptoms. These expectations were partially supported by the data. In both the cross-sectional and longitudinal models, higher stressor levels led to greater use of avoidance coping strategies. In turn, greater use of these strategies was positively related to psychological symptoms at both Time 1 and Time 2. The role played by avoidance coping, therefore, is consistent with a mediating amplification model (Sandler, Tein, & West, 1994) in which the mobilizing of avoidance coping strategies when confronted with increased pressures and adverse conditions serves to add to the negative effects of work stressors, further increasing the likelihood of negative consequences. The relative magnitude of the effects of avoidance coping on symptoms is quite substantial in the cross-sectional model, and maintains a moderate level effect in the longitudinal model. These effects are surpassed only by work stressors in the cross-sectional model and, after controlling for Time 1 symptoms, contribute to increased symptoms in the longitudinal model. It is apparent that the combination of high levels of work stressors and reliance on avoidance coping strategies can result in significant and problematic levels of symptomatology.

This latter point deserves some further clarification. Everyone uses a range of coping strategies to varying degrees, including some use of avoidance or denial. There is some evidence that, under certain conditions, avoidance coping strategies can be adaptive in the short-run. However, over time the greater effectiveness of active coping strategies and the deleterious effects of avoidance strategies emerges (Suls & Fletcher, 1985). Moreover, the use of avoidance strategies under conditions of low use of active strategies leads to particularly negative outcomes (Koeske et al., 1993).

Avoidance coping strategies may be utilized more often in situations that are viewed as uncontrollable. Lower scores on locus of control have been found to predict greater use of avoidance coping (Aspinwall & Taylor, 1992). Whether the use of these strategies is beneficial in situations where the individual has limited control is unclear, although prolonged use of avoidance coping under these circumstances is likely to be detrimental. This issue is of particular relevance to employee groups who have less control within their work settings (Karasek & Theorell, 1990; Karasek et al., 1987), such as the secretarial and clerical employees who participated in the current study. In a comparison of female managers and clerical workers, Long (1998) found that clerical workers had fewer coping resources, appraised stressful events as less controllable, experienced more work demands and less support, and used relatively less active coping. These findings suggest that this
employee group is at particularly high risk for exhibiting psychological symptoms, as would be individuals in other high-strain occupational roles where lack of control and other factors may foster the use of avoidance coping strategies.

Finally, work-related social support was included in the models as a particularly salient aspect of the individual’s social environment. Perceived availability of support can be seen as an individual’s internal representation of the social context in which she is embedded and which can be accessed to help to address various demands or problems encountered in relation to the workplace. Based on this view, it was predicted that work-related social support would operate as a protective factor in two ways. Following Thoits’ (1986) notion of social support as coping assistance, work-related social support was expected to enhance the use of active coping strategies. Building on other research findings (Heaney et al., 1997; Ingledew et al., 1997; Terry et al., 1997), this study provided further support for Thoits’ conceptualization of the role of social support. Employees who perceived greater availability of support for work-related problems from supervisors, co-workers, spouse, family, and friends reported significantly greater use of active coping strategies. Thoits’ (1986) conceptualization of social support assumes congruence between the methods used by those in the social environment to give assistance and the coping methods utilized by the individual. This congruence fosters the use of active coping strategies. This theoretical perspective is worth further investigation as a framework for determining under what conditions social support serves to enhance the use of effective coping strategies. While the relationship of social support to active coping in the present study was significant, active coping did not mediate the relationship between work-related social support and symptoms, and the indirect, positive effect of social support on symptoms via active coping was relatively modest in both the cross-sectional and longitudinal models. Whether the magnitude of these relationships can be enhanced through targeted interventions is another area worth further consideration.

Moreover, the relationship between social support and active coping may operate in a causally reciprocal process over time. Two longitudinal studies lend some support to this notion. In the study by Heaney et al. (1997) of manufacturing workers, organizational and social coping resources were found to increase the subsequent use of active, problem-solving coping. Moreover, employees who perceived their supervisors and co-workers as more supportive were more likely to increase their utilization of that support when confronted with stress in the workplace. The mobilization of support in order to enhance the use of active coping strategies would be in line with Thoits’ (1986) theory of social support as coping assistance. Further evidence of a bi-directional relationship between social support and coping is found in a study of male and female postal workers (Monnier, Stone, Hobfoll, & Johnson, 1998) and draws on the Dual-Axis Model of Coping conceptualized by Hobfoll, Dunahoo, Ben-Porath, and Monnier (1994). This model addresses coping in a social context. Monnier et al. (1998) found that supervisor and co-worker support predicted greater use of prosocial coping at Time 1 that, in turn, predicted greater social support at Time 2. Although not a complete test of the bi-directional relationships between these variables over time, it does lend further support to the hypothesis of a causally reciprocal relationship between social support and coping. This appears to be a potentially fruitful direction for further research.

Also as predicted, work-related social support was negatively related to work stressors. Employees who saw themselves as richer in social resources perceived themselves as under less demanding, conflictual, and adverse conditions. This finding is consistent with other research involving various samples of female employees (Jayaratne et al., 1988; Pisarski et al., 1998; Pompe & Heus, 1993). The sense of being embedded in a social context with
potentially helpful resources and/or the actual, ongoing utilization of these resources may account for this relationship. Whether this effect is as strong among male employees needs to be tested, but it is the case that women are more likely to seek and feel comfortable with social support than men (Endler & Parker, 1990; Hobfoll & Vaux, 1993).

In addition, work stressors were found to mediate the relationship between work-related social support and symptoms in the cross-sectional model, while stressors provided indirect, but not mediational, pathways for the effects of social support on symptoms in the longitudinal model. Work-related social support, therefore, was found to have a protective influence in relation to psychological symptoms through its positive effect on work stressors, but the pathways of influence clearly varied between the two models.

5.2 Study limitations
Several limitations to the interpretation of the study findings must be considered. First, as Meier (1991) reported, measures of stressors and psychological outcomes such as depression and anxiety tend to be highly inter-correlated, thereby weakening the discriminant validity of the stressor variables. Whether this contributes to the strength of the relationships between work stressors and psychological symptoms in the present study is unclear. One approach to this problem (Ingledew et al., 1997) is to control for the potential confounding effect of negative affectivity, a relatively stable dimension of personality consisting of chronic negative emotions, including anger, depression and anxiety (Aspinwall & Taylor, 1992). A related issue involves the reliance on self-report measures introducing the possibility that common method variance may underlie some of the findings. Use of multi-method assessment approaches by supplementing self-report with objective sources of data such as physiological measures or reports from supervisors, co-workers, or partners would strengthen the research design. The study also revealed the need to build stronger measures of avoidance coping using multiple dimensions analogous to the measurement of active coping. This would probably improve the reliability of the measurement of this construct. It also would provide a basis for creating a latent variable that would better control for measurement error. Finally, the study does involve a nested design (participants recruited from four worksites) that could result in ‘natural clusters’ within participants. Multilevel structural equation modelling (Muthén, 1989) has been advanced to assess potential clustering effects on study findings. However, the relatively small within-group sample size and the small number of groups (only four worksites) in the present study does not allow use of this analysis because it would probably result in biased estimates (Hox & Maas, 2000). For these reasons, it is typically not possible to test for clustering effects in current workplace research, especially when the number of groups is small. While there is no particular indication that the results reported in the present study are biased by the hierarchical structure of the design, larger scale studies are needed to test whether clustering effects influence the relationships among the variables of interest in this study and related workplace research.

5.3 Implications for future research and workplace interventions
Risk and protective factor research provides the empirical basis for developing interventions in the workplace to prevent the occurrence, or to reduce the severity, of psychological and behavioural problems experienced by employees. As was the case in the present study, research of this type seeks to identify modifiable properties of the environment (stressors, social support) and the person (coping strategies) that operate through various processes to
influence health outcomes. These properties then become the focus of change efforts within the workplace. Based on the results reported in this paper, interventions should be designed in particular to reduce levels of work stressors impacting on employees as well as individuals’ reliance on avoidance coping strategies. These risk factors accounted for the greatest portion of variance in psychological symptoms. In addition, interventions should be directed at promoting greater use of active coping and enhancing the availability and utilization of social support for work-related problems since these factors appear to play a protective role. Of course, replication of the current study with other population subgroups is necessary to test the generalizability of the study findings and the implications for interventions.

The accumulated knowledge from risk and protective factor research in the workplace, particularly those studies pertaining to work stressors, coping, and social support, has led to the design and testing of a number of workplace preventive interventions. This research either has involved person-centred interventions, primarily focused on modifying coping strategies and teaching stress management techniques, and/or system-level interventions that attempt to reduce or remove stressors at their source, promote higher levels of social support from supervisors and co-workers, and/or change the individual’s role in the setting. Positive results of coping-skills interventions in reducing psychological symptoms have been reported for women and men from various occupational groups (Harig, Price, Oleshansky, Fava, & Littman, 1992; Kline & Snow, 1994; Raymer, Sime, & Setterlind, 1992; Snow & Kline, 1995; Snow et al., 2002; Tableman, Marciniak, Johnson, & Rogers, 1982). Similarly, a number of studies targeting organizational stressors have demonstrated reductions in psychological symptoms (Heaney, Price, & Rafferty, 1992; Jackson, 1983; Wall & Clegg, 1981). Finally, in a recent study, Bond and Bunce (2001) found that a work reorganization intervention aimed at increasing job control led to decreases in psychological and physical health symptoms as well as improvements in self-rated performance at 1-year follow-up. The results of these studies are promising and underscore the important link between risk and protective factor and intervention research. Studying the mechanisms (pathways) leading to positive outcomes as a result of these interventions provides a further test of the models on which they were initially constructed.

In order to build models of greater explanatory power on which to base intervention efforts, future research needs to more specifically delineate the similarities and differences in the nature of relationships among risk and protective factors across important contexts, such as sociodemographic subgroups (e.g. gender or occupation); setting (e.g. type of worksite); and domain (e.g. work and family). In addition, more attention needs to be given to examining the interrelationship of risk and protective factors and outcomes over time in order to generate longitudinal, transactional models of the stress process. The testing of such models not only identifies the individual and environmental factors that contribute significantly to a given model, but also creates greater clarity about the pathways (direct and indirect) through which these factors influence psychological and behavioural outcomes. Expanding our knowledge base in these ways is essential to designing effective intervention strategies.

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References


