



## **Original article**

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Scand J Work Environ Health [1998;24\(3\):141-145](#)

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The following articles refer to this text: [2006;32\(6\):502-514](#);  
[2010;36\(2\):96-108](#)

**Key terms:** [extended shift](#); [home-work conflict](#); [nursing](#); [occupational health](#); [path analysis](#); [rotating shift work](#); [structural equation modeling](#); [work schedule](#)

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## Effects of coping strategies, social support and work-nonwork conflict on shift worker's health

by Anne Pisarski, MAP,<sup>1</sup> Philip Bohle, PhD,<sup>1</sup> Victor J Callan, PhD<sup>1</sup>

Pisarski A, Bohle P, Callan VJ. Effects of coping strategies, social support and work-nonwork conflict on shift worker's health. *Scand J Work Environ Health* 1998;24 suppl 3:141—145.

**Objectives** This study examines the direct and mediated effects of shift workers' coping strategies and social support on structural work-nonwork conflict and subjective health.

**Methods** The participants were 172 registered female nurses, aged 21 to 40 years. They all worked full-time, on rapidly rotating, 8-hour shifts in metropolitan general hospitals. All the respondents completed a self-administered questionnaire requesting demographic information and data on sources of social support, work-nonwork conflict, and coping strategies.

**Results** A path model with good fit ( $\chi^2=28.88$ ,  $df=23$ ,  $P>.23$ ,  $CFI=0.97$ ) demonstrated complex effects of social support and coping on structural work-nonwork conflict and health.

**Conclusions** Structural work-nonwork conflict mediated the effects of social support from supervisors and emotionally expressive coping on psychological symptoms. Control of shifts mediated the effect of social support from supervisors on structural work-nonwork conflict. Disengagement coping had direct and mediated effects on psychological and physical health. However, it also had mediated effects, with the effect on psychological health being mediated by support from co-workers and the effect on physical symptoms being mediated by family support. Co-worker support mediated the effect of social support from supervisors on psychological symptoms. Overall, these findings support previous research and clarify the process by which coping strategies and social support affect structural work-nonwork conflict and health in shift work.

**Key terms** extended shifts, home-work conflict, nursing, occupational health, path analysis, rotating shift work, structural equation modeling, work schedules.

In a review of research on stress among nurses, Linder-Pelz (1) identified shift work and lack of support from management as significant sources of stress. Similarly, Seymour & Buscherhof (2) found that nurses' greatest dissatisfaction resulted from structural or institutional problems, which included problems with shifts, inflexibility, lack of support from supervisors, and negative health effects. Shift workers have generally been identified as a group at risk of acute and possibly chronic health effects.

Several theoretical models have attempted to explain the elevated risk (3, 4). According to Taylor and her co-workers (4), these models tend to be hypothetical, mapping the potential relationships in the shift work domain. Initial shiftwork models portrayed these relationships linearly, but more recent conceptions have attempted to depict the complexities of the interrelationships between shiftwork variables by incorporating psychological variables such as coping (4). These conceptual models

provide a more robust and comprehensive understanding of the general processes by which shift work affects health, but they have yet to be thoroughly tested.

The changing nature of work has led to a growing concern about the interplay between work and nonwork experiences, in particular the impact of conflict between home and work roles (5). The limited evidence available suggests there may be a relationship between structural work-nonwork conflict and shiftwork tolerance (6). Structural work-nonwork conflict occurs when the *time* available for social and domestic activities is limited by work requirements. It is a particular problem for shift workers required to work on evening, night, or weekend shifts. The available evidence suggests that the psychological health effects caused by conflict between home and work roles can range from psychological strain, anxiety and depression to burnout and substance abuse (5). Bohle & Tilley (6, 7), for example, found a link between self-reports of structural work-nonwork conflict and shift

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workers' fatigue and general psychological well-being. At present, however, the variables and processes influencing work-nonwork conflict in shift work are not well understood.

Studies of occupational stress suggest that the negative effects of shift work can be mediated by social support. For instance, there is evidence that support diminishes work-related stress and that work-related social support modifies the impact of occupational stress on psychological and physical health (8, 9). Employees report receiving support from various sources, including co-workers, family or friends (10). There is also evidence that positive social support from supervisors, co-workers, family, or friends reduces structural work-nonwork conflict and symptoms and that a lack of support exacerbates these effects (11). Studies of shift workers reveal that support from supervisors predicts psychological well-being and support from co-workers predicts vigor on night shift (6, 7). Social support is likely to be particularly important for female shift workers, especially since the social and domestic responsibilities of women appear to make the adaptation to shift work more difficult than it is for men (6).

The appraisal processes used by employees influences their selection of coping strategies which, in turn, affects the type and level of support that is offered (12). Support from supervisors, co-workers, family, or friends at home or at work influences the subsequent coping strategy adopted by people at work (13). However, while coping strategies may communicate that support is needed and indicate the type of support that is desired, some forms of coping also make it difficult for people to provide support (9). Research on coping styles reveals that active, problem-focused coping generally has a positive impact on well-being and that emotion-focused and avoidance strategies result in poorer long-term psychological adjustment (14). Consequently, it is important for people to be encouraged to use problem-focused strategies. However, when problem-focused strategies are used and fail, or the problem is perceived to be too intractable, the result may be an increase in levels of stress and depression (15). Organizations therefore have a responsibility to provide sufficient support for problem-focused strategies to be successful.

Unfortunately, little research has been done on coping strategies and social support in shift work, and further investigation is needed to enhance the understanding of the relationships between these factors and health outcomes for shift workers. This study explores the relationships between structural work-nonwork conflict and health in rotating shift work and examines the direct and mediated effects of social support and coping on these outcomes. It focuses on female registered nurses working rotating 8-hour shifts and aims at developing a more sophisticated understanding of the factors affecting

work-nonwork conflict and health in this population. It is expected that social support and coping strategies have both direct and indirect effects on structural work-nonwork conflict. Emotion-focused coping strategies and poor support from supervisors, co-workers, and family are expected to be linked to higher levels of psychological and physical symptoms, either directly or indirectly through increased work-nonwork conflict.

## ***Subjects and method***

### *Participants and procedure*

The participants were 172 registered female nurses employed full-time on rapidly rotating 8-hour shifts in metropolitan general hospitals. They were between 21 and 40 (mean 27) years of age. All of them had less than 20 years' experience in shift work, 83 were single, 72 had a partner, and 17 had a partner and dependent children. Age (<40 years), experience with shift work (<20 years), job description (registered nurse), employment status (full-time), and work schedule were controlled for confounding effects on structural work-nonwork conflict and symptoms. Questionnaires and an introductory letter were distributed directly to the hospitals and returned via the mail or collected from the hospitals.

### *Measures*

The 12-item version of the General Health Questionnaire (16) was employed to measure psychological symptoms, and the Physical Health Questionnaire (17) was used for physical symptoms. The measure of perceived structural work-nonwork conflict was based on the items devised by Shamir (18), but was modified to a 5-item scale which more explicitly measures the impact of shift work (19). The 24-item coping questionnaire developed by Spelten et al (20) was used to measure the shift workers' coping strategies. Social support from supervisors, co-workers, and family was measured using the 12-item scale developed by Caplan et al (21). Control of shifts was measured using a single item, "I have sufficient control over the shifts I work", which was rated on a 5-point scale (1= completely false, 5= completely true).

### *Statistical methods*

Summary statistics and graphic displays of raw scores on all the variables were examined for nonnormal distributions, outliers, and missing data. Negative skewness (-1.237) in the support from family variable was corrected using the "reflex" procedure described by Tabachnick & Fidell (22) followed by square root transformation. Z scores and box plots were used to identify univariate outliers. Calculating the Mahalanobis distance for each case identified multivariate outliers. Univariate outliers were

found for the family support variables, and multivariate outliers were identified for both physical and psychological symptom variables. Univariate outliers were reduced to 1 unit greater than the next most extreme score, as recommended by Tabachnick & Fidell (22). A small number of observations was missing on the structural work-nonwork conflict, coping, and social support variables. If less than 10% of the data on any variable or any individual participant was missing, the data were replaced with column means. Where more than 10% of the data was missing, the case was deleted from subsequent analyses, as recommended by Tabachnick & Fidell (22).

Table 1 shows the means, standard deviations, range, and internal consistencies (Cronbach's alpha) for all the variables after the transformations, the adjustment for outliers, and the replacement of missing data.

## Results

Coping strategies can be divided into those that are problem-focused and those that are emotion-focused (13). An exploratory factor analysis was conducted on the coping responses to assess whether they had a similar structure. A principal component analysis followed by varimax rotation produced 3 factors accounting for 44% of the total variance. Each factor had an eigenvalue greater than 1, and items loading 0.40 or more were retained. Table 2 shows the eigenvalues and the percentage of the variance accounted for by each factor.

The first 2 dimensions were emotion-focused forms of coping. Factor 1, labeled "disengagement coping strategies" (12 items), comprised various strategies workers might employ to disengage from problems at work by avoiding thinking about the situation, by wishing the situation away, by self-criticism, and by social withdrawal. Factor 2, labeled "emotionally expressive coping" (6 items), included letting emotions out or talking to someone about feelings.

The third factor, labeled "problem-focused coping", consisted of 6 items. These items represented both behavioral and cognitive restructuring strategies, such as active problem solving or reorganizing the way a situation was viewed. The items in each factor were summed to form the 3 scales. There was a small correlation between problem-focused and emotionally expressive coping ( $r = 0.28$ ), but no correlation between the other factors, indicating that the strategies were empirically distinct.

The internal consistencies (Cronbach's alpha) obtained from the disengagement and emotionally expressive coping scales were high ( $\alpha = 0.85, 0.81$ ). The alpha obtained from the problem-focused coping scale was unsatisfactory ( $\alpha = 0.63$ ). The low reliability of the problem-focused coping scale could be partly attributed

to 2 items, but even with these items removed the internal consistency was low ( $\alpha = 0.66$ ). The limited internal consistency of this scale was likely to diminish the probability of identifying significant relationships between it and other variables, and it was, therefore, not used in subsequent analyses.

## Path analysis

Structural equation modeling using EQS (23) was used to confirm the utility of a model describing the relationships between coping strategies, social support from various sources, structural work-nonwork conflict, and psychological and physical symptoms. The model was drawn from the shift work and occupational stress literature cited in the introduction. EQS provides several methods for examining the efficacy of a model. The methods include a chi-square test, goodness-of-fit indices, the distribution of residuals, and the Lagrange multiplier and Wald tests for testing individual paths. The chi-square values and the comparative fit index for the proposed model are presented in table 3. They suggest that the proposed model was not a good fit. Results from the Lagrange multiplier

**Table 1.** Descriptive statistics and internal consistencies (Cronbach's alpha) for all the composite scales.

Variable	Mean	SD	Range	Cronbach's alpha
Disengagement coping	31.68	8.73	11-55	0.85
Emotionally expressive coping	20.66	4.82	7-30	0.81
Problem-focused coping	14.35	2.87	6-20	0.63
Physical symptoms	38.39	10.77	19-66	0.83
Psychological symptoms	13.55	5.16	3-29	0.89
Structural work-nonwork conflict	17.83	3.90	7-25	0.70
Support from co-workers	14.34	2.95	6-20	0.82
Support from family, partner and friends	1.64	.92	0-3.317	0.87
Support from supervisor	12.52	4.11	4-20	0.88

**Table 2.** Summary of the principal component analysis of the coping items.

Factor	Eigenvalue	Percentage of variance	Cumulative percentage of variance
1 Disengagement coping strategies	5.4768	22.8	22.8
2 Emotionally expressive coping strategies	3.2526	13.6	36.4
3 Problem-focused coping strategies	1.8833	7.8	44.2

**Table 3.** Goodness-of-fit summary for the structural equation model. (CFI=comparative fit index, df= degrees of freedom)

Model	Chi-square	df	P	Chi-square change	df change	CFI
Proposed	80.40	18	<.01	n/a	n/a	0.65
Modified	28.88	23	>.23	51.52	5	0.97

test suggested that the model would be improved by adding direct paths from disengagement coping strategies to family support and physical symptoms, from emotionally expressive coping to structural work-nonwork conflict, and from supervisor support to co-worker support. The general stress literature suggests that poor social support and emotion-focused coping strategies increase the impact of stressors on health and that supervisor support can also buffer the negative effects of work overload and role conflict (13, 24–27). As the suggested paths were compatible with existing theoretical or empirical evidence, they were added to the model. The Wald test suggested that the paths from the social support variables to structural work-nonwork conflict and from support from family and supervisors to psychological symptoms should be dropped. The resultant model fit the data considerably better than the original model. The chi-square was non-significant, the comparative fit index was high, the distribution of residuals was symmetric and approached zero, and the standardized off diagonal was low. (See table 3.) This model, including path coefficients, is presented in figure 1.

### Discussion

This study demonstrates that coping, social support, and work-nonwork conflict have complex, interrelated effects on the psychological and physical health of female nurses doing rotating shift work. The path model lends support to some of the relationships posited by Folkard (3). It also expands our understanding of the specific effects of various forms of social support and coping on structural work-nonwork conflict and health in shift work.

Social support has both direct and mediating effects on both structural work-nonwork conflict and symptoms. Social support from co-workers and family had direct effects on psychological and physical symptoms respectively, and therefore the findings of Dunkel-Schetter et

al (9) received support. The effect of social support from supervisors on psychological symptoms was mediated by co-worker support, a finding indicating that a supportive co-worker milieu is dependent to some extent on the support given by supervisory staff. Interestingly, the effect of supervisory support on structural work-nonwork conflict was mediated by the control shift workers could exert over shift allocations. This finding supports previous evidence of a link between supervisor support and work-nonwork conflict (28), but it highlights the important role played by supervisors in allowing workers sufficient control over shifts to diminish structural conflict.

Coping strategies also had complex effects. The effect of emotionally expressive coping on physical health was mediated by family support. This form of coping increased support from families, which, in turn, reduced physical symptoms. There was also a series of positive paths from emotionally expressive coping to work-nonwork conflict, psychological symptoms, and then to physical symptoms. This finding indicates that the negative effect of emotionally expressive coping on structural work-nonwork conflict produced subsequent negative effects on both psychological and physical symptoms. These results support the findings of Bohle & Tilley (6) concerning the relationship between structural work-nonwork conflict and psychological symptoms, and it extends the effects to physical symptoms.

Disengagement strategies had both direct and mediated effects on both psychological and physical symptoms. The direct effects indicated that disengagement coping produced higher levels of both psychological and physical symptoms. These results are consistent with previous evidence that disengagement strategies result in poorer psychological adjustment (20, 29), and they provide additional evidence of an effect on physical health. Disengagement strategies also had effects on psychological and physical symptoms that were mediated by support from co-workers and family, respectively. Consistent with the findings of Holahan & Moos (30),

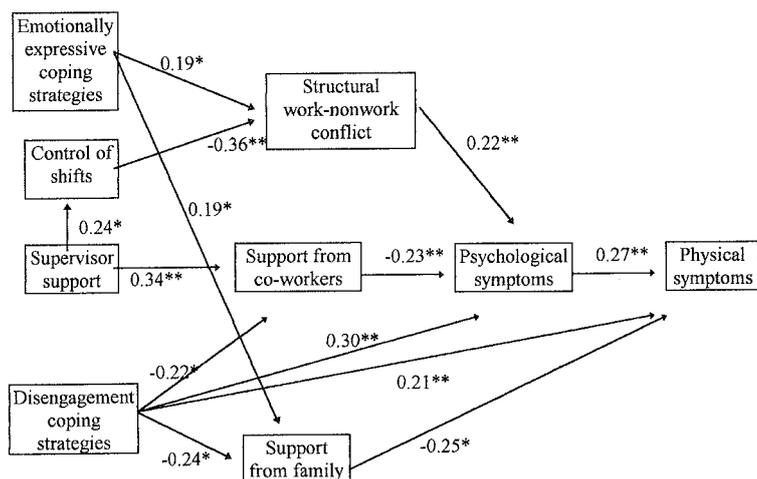


Figure 1. Standardized path coefficients for significant paths in the final model (\* P <0.01, \*\*P<0.001).

disengagement strategies were associated with lower support from both sources.

The limited internal consistency of the problem-focused coping scale resulted in an inability to use this measure in the analyses. The poor performance of the problem-focused coping scale may reflect either the unreliability of the scale or, as suggested by Terry et al (13), these strategies may be less salient when workers perceive a lack of control over the work situation which renders problem-focused coping to be inappropriate. These issues warrant further investigation because of the potential benefits to shift workers from the use of problem-focused coping strategies.

Overall, the results of this study indicate that social support, structural work-nonwork conflict, and coping strategies all influence the health and well-being of shift workers. However, the exact nature of the support, the contexts in which it is offered, and the importance of problem-focused coping have as yet to be established, as does the generalizability of the present results to men and other industries and work schedules. A better understanding of the distinctive contributions of various forms of support, such as instrumental or emotional support, to alleviating the health effects of shift work must still be investigated. This understanding should provide a stronger basis for the development of more effective organizational and individual coping strategies for shift workers in the future. Nonetheless, this study does make a significant contribution to the knowledge of the impact of coping strategies, social support, and structural work-nonwork conflict on the health and well-being of shift workers.

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