Daily work stress, mood and interpersonal job performance: a mediational model

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Keywords: Work stress; Mood; Interpersonal job performance; Objective/subjective stressors.

A model suggesting that daily work stress influences daily job performance through its influence on mood was developed and tested. Seventy-one subjects (physicians, nurses and technologists) from three outpatient cancer clinics completed questionnaires measuring objective and subjective stressors, mood and interpersonal job performance at the end of each workday. Empirical support for the model was obtained and cross-validated using path analysis. As predicted, lagged effects on next day's job performance were much weaker. Job-related variables (namely, job experience, job satisfaction, role ambiguity and informational social support) moderated the stress-mood and stress-performance relationships.

1. Introduction

Work stress remains one of the most common research topics in organizational psychology (Barling and Milligan 1987). Typically, work stress has been viewed as either a chronic phenomenon or an acute event (Barling et al. 1987). Chronic stressors have no clear time of onset, vary in duration and may be of low or high intensity; acute stressors have clearly defined times of onset, occur relatively infrequently and are generally of high intensity (Pratt and Barling 1988). Recently, research has indicated that daily stressors exert a significant role on psychological and physiological well-being as chronic and acute stressors (Barling and MacIntyre 1993, DeLongis et al. 1982, Eckenrode 1984, Kanner et al. 1981, Stone et al. 1987). Daily stressors also occur relatively infrequently, but are of short duration (for example, an argument with the boss). The source of the daily stressor is also important in determining its impact. Stone (1987) reported that work-related daily stressors were more strongly related to negative mood than were daily stressors originating from other sources (e.g. family-related, financial, leisure, health). In the present study, the impact of daily work-related stressors on daily mood and daily job performance will be examined. The model proposed differentiates between objective stressors and subjective job stress. Objective stressors reflect objective, quantifiable events, whereas subjective stress refers to the perceived intensity of the event (Pratt and Barling 1988). Within this context, daily work stress influences daily job performance through their negative impact on mood.

Although some research has been conducted purportedly studying the effects of daily stressors on mood and job performance, many of these studies have not captured the meaning of daily stressors (DeLongis et al. 1988, Ivancevich 1986, Kanner et al. 1981). The daily index in these studies is typically a single measure of stressors averaged across days, which cannot accurately reflect the day-to-day variability in stressor scores. More recently, studies that reflect daily variability in work-related stressors have been reported. Repetti (1989) found that daily workload in air traffic controllers negatively affects spousal

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interactions. Bolger et al. (1989) showed that daily stressors involving interpersonal conflicts had the most detrimental influence on negative mood. Interestingly, conflicts with family members were not as distressing as conflicts with other persons, many of which occurred in the workplace. Barling and Kryl (1990) showed that daily work stressors were associated with negative mood in a group of nurses. Barling and MacIntyre (1993) reported that daily work role ambiguity and overload influenced mood. However, none of these studies measured job performance as the outcome.

1.1. Same-day model

The model proposed has four links or relationships, namely: objective stressor—subjective stress, subjective stress—mood, mood—job performance, and subjective stress—job performance (Figure 1).

The criterion of daily job performance used is interpersonal effectiveness of healthcare professionals when interacting with cancer patients. Interpersonal effectiveness, in this context, includes conveying feelings of empathy, warmth and respect for the patient (Kahn et al. 1969). Within health-care settings, this component of job performance is viewed as critical by both patients and staff. Nurses rate empathy and interpersonal relations with patients as the most important dimension of job performance (Zedeck and Kafry 1977), and nurses working with the critically ill or dying patient view interacting with patients and families as a more salient aspect of their job than they do management and organizational duties (Cooper and Mitchell 1990). Studies in doctor-patient communication show that patients who believe their physician informs them about their illness and expresses feelings of concern report fewer feelings of depression and anxiety and are less frightened about their situation (Brody 1980, Greenfield et al. 1985).

Second, the decision to focus on interpersonal effectiveness as the criterion of job performance was motivated by data showing that following exposure to stressors, social behaviours are affected and insensitivity towards others increases (Cohen 1980). Studies on altruism reveal that the negative emotions resulting from elevated stress are associated with less helping behaviour (Aderman 1972). More specifically, individuals experiencing stress focus on cues most relevant to task performance, possibly leading to an insensitivity to others' needs. Thus, it is suggested that in the treatment of cancer, the focus of care may be centred on the disease with less attention directed at the needs of the patient.

Finally, there are data showing that chronic work stress has a greater influence on interpersonal effectiveness than it does on the cognitive aspects of job performance (Motowidlo et al. 1986). This may support the hypothesis of Cohen (1980): under elevated levels of work stress the interpersonal component of job performance is more readily affected than the cognitive domains of job performance. Each link in the proposed model will now be discussed.
Objective work overload predicts subjective stress but objective stressors do not affect work performance. In the daily study of Repetti (1989), the subjective measure of overload but not the objective measure of overload was related to withdrawal from daily marital interactions. This suggests that the objective measure of overload (poor visibility and weather conditions) is not directly related to interpersonal behavior. Rather, the objective work stressors influence the level of subjective stress that may then affect strain. Certainly, objective work stressors predict subjective stress in nurses and technologists (Constable and Russell 1986, Motowidlo et al. 1986). In the present study, the objective stressor measure was the number of patients seen that day. For healthcare professionals, the daily patient load represents a measure of objective overload. The proposed model suggests that objective stressors (in this case, patient load) are positively related to subjective stress.

Several studies have indicated that daily subjective stress has a negative influence on mood (Casp et al. 1987, Clark and Watson 1988, DeLongis et al. 1988, Eckenrode 1984). In fact, mood may represent the most frequently studied outcome of daily stress. A little more recently, it has been reported that daily work-related stressors have a more detrimental impact on mood than do daily stressors from other life areas (Stone 1987). Two more recent studies have shown that daily work stress is negatively associated with mood (Barling and Kryl 1990, Barling and MacIntyre 1993). Accordingly, it is hypothesized that subjective stress will be directly associated with negative mood.

Previous studies have not investigated the relationship between daily mood and daily job performance. However, Motowidlo et al. (1986) studied the psychological consequences of chronic work stress, and how mood influenced job performance. They indicated that subjective stress originating from events at work was related to a decrease in mood, which in turn predicted lower job performance. Interpersonal effectiveness, one dimension of job performance, was found to be more strongly associated with negative mood than were aspects of cognitive performance on the job. Thus, it is anticipated that daily mood will predict daily interpersonal effectiveness on the job.

The proposed model predicts that subjective stress will also have a direct effect on job performance. Earlier research studying chronic stress supported this hypothesis. Cohen (1980) suggested that stressors (e.g., noise, bureaucratic frustration and task load) are an additional energy drain resulting in cognitive fatigue, lowered task performance and a decrease in helping behaviors. It is anticipated in the present study that daily subjective stress on the job will be negatively associated with daily interpersonal job performance.

1.2. Lagged effects
In addition to studying the same-day model described above, the effect that daily work stress and daily mood have on the next day's job performance will be explored. It has been suggested that the effects of a stressor only last as long as the stressor itself, and daily stressors differ from acute and chronic stressors in that they occur relatively infrequently, have a specific time onset and do not last longer than a day (Pratt and Barling 1988). Thus, it is predicted that any lagged effects of daily work stressors will be minimal. Although there are findings suggesting that daily stressors have an enduring effect on health (DeLongis et al. 1988, Stone et al. 1987), the effects of the daily stressors on the immune system are probably immediate. Specific physical symptoms only appear a few days later, however, because it takes time for the effects to become manifest. Previous studies have examined whether stressful daily events exert a lagged impact (Casp et al. 1987, DeLongis et al. 1988, Stone et al. 1987), but no lagged relationship exists between stress and next day mood (DeLongis et al. 1988, Stone and Neale, 1984), although there are indications of a 'rebound effect': on the
1.3. Moderating variables

Much of the current research on stress is directed at finding out what variables moderate the negative effects of job-related stress. A moderating function occurs when the relationship between two variables (i.e., stress and performance) is not consistent over varying levels of a third (the moderating variable; Barling 1986). In the present study, several work-related variables were studied to determine whether they moderate the negative impact of stress on mood and job performance. Although these variables are frequently identified as job stressors, they were conceptualized as moderators in the present study because they reflect more stable conditions of the job. These included informational and emotional social support, work autonomy and job satisfaction. Both emotional and informational support consistently moderate the stress-strain relationship such that elevated levels of these variables are related to a reduction in the stress-strain relationship (Cohen and Wills 1985). Research has shown that decreased feelings of work autonomy are associated with increased work stress (Karasek 1979). When employees are given a participative role in decision-making they experience increased feelings of job control and report lower job stress (Jackson 1983). Barling and Kryl (1990) found that three facets of job satisfaction (supervisor, co-workers and work itself) moderated the relationship between daily work stressors and mood. Individuals who are satisfied with their job are more likely to tolerate the effects of daily work stressors. In addition, three role stressors (role overload, role conflict and role ambiguity) were treated as potential moderating variables in this study. In the same way that high levels of chronic life stress exacerbate the relationship between daily stress and negative mood, it is hypothesized that it may be more difficult for individuals to cope with daily work stress when work roles are ambiguous, conflictive and overwhelming.

Research has also suggested that some personality factors predispose individuals to be more susceptible to the negative influences of stress (Brief et al. 1988, Watson and Clark 1984). One such factor that may moderate the stress-performance relationship is depression. Depressed individuals report more events as being stressful and indicate a greater level of distress from the stressful events (Brief et al. 1986, Watson and Clark 1984). The possible moderating function of major life events were also explored. Caspi et al. (1987) showed that the effect of daily stressors on mood was dependent on the level of chronic life stress that the person was currently experiencing.

In summary, the aim of the study was to determine how objective work stressors and subjective work stressors influence same-day mood and interpersonal job performance of healthcare professionals when interacting with cancer patients. The lagged effect of daily subjective stress and daily mood on next day’s job performance was also examined. Moderating variables (both work-related and personal variables) were studied to determine which variables are effective at lessening the detrimental impact of the daily work stressors.

2. Method

2.1. Pilot study

A pilot study was conducted to develop the required measures because of the unavailability of questionnaires to measure daily work stressors for healthcare professionals working in...
cancer clinics and interpersonal effectiveness when interacting with patients. Twelve physicians, nurses, and technologists (23–58 years of age) at the Kingston Regional Cancer Centre, Ontario volunteered to help to develop the stressor questionnaire and the interpersonal behavioural checklist.

Each participant recorded all stressful events that they experienced each day for 1 week. A stressful event was described to participants as any occurrence that irritated, upset, frustrated, or in other ways interfered with their work day. It was explained that these daily events should not be ongoing. In addition, each of the volunteers recorded behaviours they believed represented job-related interpersonal effectiveness when interacting with cancer patients. Composite lists of the daily stressors were compiled for each professional group. Group meetings were then held to discuss what items should be included. Items were included if they were reported by more than one participant, and additional items were added if they occur relatively infrequently but did not happen to occur during the week of the pilot study. The list of 20 daily stressors for each professional group included conflict with other staff, supervisor or patients, job-specific items, job overload items and administrative items. The 20 effective interpersonal behaviour items were identical for each professional group, and consisted of items directly associated with optimal patient care. These questionnaires were used in the main study.

3. Main study

3.1. Subjects

Ninety-six of the 151 physicians, nurses and technologists employed full-time at three outpatient cancer clinics in Ontario volunteered to participate. Of these 96, 87 began the daily study, but the data from 16 subjects were excluded from the analysis as they completed fewer than 11 daily questionnaires. Therefore, there were 71 professionals (47 % of total eligible sample) who participated in the 20-day study (17 physicians, 27 nurses, 27 technologists; 13 males, 58 females). The age range for all participants was from 22 to 61 years (M = 37.39 years, SD = 9.76 years). Forty-nine had completed a college education; the remaining 22 had completed a university degree. The average number of years in their profession was 13.94 years (SD = 10.14 years). The average number of years employed in the organization was 6.62 years (SD = 6.65 years).

3.2. Procedure

The volunteers completed the questionnaires assessing possible moderator variables prior to the completion of the daily questionnaires. This information was collected only once as it was believed that the moderator variables reflected more stable job features. Each participant completed the daily stressor questionnaire, the interpersonal behaviour questionnaire, and a daily mood measure at the end of each working day. They also indicated the number of patients seen on that day. Questionnaires were returned at the end of each week (copies of questionnaires are available from the second author on request).

3.3. Daily measures

Visual analogue scales (100 mm) were used to measure all the daily variables (except for the number of patients seen per day). To accurately measure the distance across the visual analogue scale where the slash was placed, a GRAF-Pin sonic digitizing device was used.
3.3.1. **Objective work stressor.** The objective stressor measure was the number of patients the healthcare professional interacted with that day. The average number of patients seen each day was 14 (SD = 10.47; range = 1–56).

3.3.2. **Subjective work stress:** Daily work-related stress was assessed using the items developed in the pilot study. There were separate questionnaires for the physicians, nurses and technologists. Each participant indicated whether the event occurred to him/her that day, and how stressful it was (using a visual analogue scale). The analogue bar was anchored at one end by ‘not at all stressful’ and at the other end by ‘very stressful’. Items common to each group were, ‘I had a confrontation with another staff member’, and ‘I was impatient or short with a patient/family.’ Specific items for the professional groups included, ‘I had to fill in for another physician’s clinic’ (physicians), ‘I had difficulty getting an IV established’ (nurses), and ‘The machines were down’ (technologists). For each day a subjective stress score (overall stress intensity measure) was calculated by summing the intensity measures for the stressful events that had occurred that day. The average daily subjective stress score was 106.24 (SD = 134.82), and ranged from 0–895.60 (with a theoretical maximum of 2000). A score of zero indicates that the subject did not experience any of the daily stressors that day.

3.3.3. **Daily mood measure:** Daily mood was assessed with a one-item measure (Caspi et al. 1987) asking, ‘How were your spirits today?’ The visual analogue scale was anchored at one end by ‘very high’ and at the opposite end by ‘very low’. The mean daily mood score was 65.87 (SD = 22.70) and ranged from .70 to 100 (maximum possible = 100).

3.3.4. **Job performance:** The interpersonal job performance questionnaire consisted of 20 items (for example, ‘I explained procedures to patients telling them what to expect’ and ‘I followed through on promises, e.g. returned phone calls, filled out insurance and/or home care forms’). An analogue scale was also used to measure interpersonal effectiveness and was anchored at one end by ‘not at all’ and at the other end by ‘very much so’. If there was no opportunity to perform that behaviour on a given day, the participant was asked to print not applicable (N.A.) next to that item (e.g. ‘I gave as much attention to patients who are disfigured or have unpleasant odours’). The internal consistency of this 20-item scale was .85 for day 1 of the study and .86 for the second day of the study. Each day the interpersonal job performance score was calculated by averaging the scores of the applicable behavioural measures. The mean performance measure was 77.40 (SD = 13.67; range = 28.34 to 98.41, theoretical maximum score = 100).

3.4. **Moderating variables**
Table 1 details the work-related and personal variables that were examined in this investigation as potential moderator variables. Descriptive data obtained in this study, and reliability data obtained here and in other studies are presented in this table.

3.5. **Data analysis**
When using visual analogue scales, participants may have idiosyncratic response patterns where they tend to respond in a similar manner over the 20-day study period. For this reason, we followed Bolger et al. (1989) and calculated within-subject residualized scores for each of the four daily variables for each subject. The occupation-specific items on the
Table 1. Work-related and personal moderator variables studied.

<table>
<thead>
<tr>
<th>Questionnaire</th>
<th>Number of items</th>
<th>Response format</th>
<th>M</th>
<th>SD</th>
<th>Alpha in literature</th>
<th>Alpha in study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work-related variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work autonomy (Breaugh 1985)</td>
<td>9</td>
<td>1-7</td>
<td>37.94</td>
<td>11.72</td>
<td>.77</td>
<td>.89</td>
</tr>
<tr>
<td>Role ambiguity (Rizzo et al. 1970)</td>
<td>7</td>
<td>1-7</td>
<td>30.77</td>
<td>6.40</td>
<td>.81</td>
<td>.79</td>
</tr>
<tr>
<td>Role conflict (Rizzo et al. 1970)</td>
<td>7</td>
<td>1-7</td>
<td>32.67</td>
<td>9.64</td>
<td>.82</td>
<td>.80</td>
</tr>
<tr>
<td>Role overload (Beehr et al. 1976)</td>
<td>3</td>
<td>1-7</td>
<td>10.13</td>
<td>4.26</td>
<td>.56</td>
<td>.65</td>
</tr>
<tr>
<td>Job satisfaction (Wart et al. 1979)</td>
<td>16</td>
<td>1-7</td>
<td>76.62</td>
<td>13.02</td>
<td>&gt;.65</td>
<td>.86</td>
</tr>
<tr>
<td>Informational social support</td>
<td>7</td>
<td>1-4</td>
<td>16.63</td>
<td>3.85</td>
<td>.81</td>
<td>.85</td>
</tr>
<tr>
<td>Emotional social support</td>
<td>11</td>
<td>1-4</td>
<td>23.37</td>
<td>7.13</td>
<td>.83</td>
<td>.92</td>
</tr>
<tr>
<td>Personal variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CES-Depression (Radloff 1977)</td>
<td>20</td>
<td>0-3</td>
<td>29.18</td>
<td>7.06</td>
<td>.84-.90</td>
<td>.82</td>
</tr>
<tr>
<td>Life experiences (Sarason et al. 1987)</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive events</td>
<td>0-3</td>
<td>9.48</td>
<td>9.65</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative events</td>
<td>-3-0</td>
<td>7.73</td>
<td>7.17</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

daily subjective stress scales and the interpersonal job performance scales were standardized within-person across days, and then pooled for all three professional groups. This procedure controls statistically for idiosyncratic response patterns.

To test the proposed model for the group of technologists, path analyses were conducted (Pedhazur 1982). The model proposed (figure 1) represented the over-identified model and was contrasted with the just-identified model, i.e. a model in which all possible paths between exogenous and endogenous variables are tested. This procedure was also followed in assessing the lagged effects of stress and mood on the next day’s performance. Specht's Q, a ratio of the variance explained in the trimmed model to that explained in the just-identified model, was calculated to determine if the data fit the trimmed model. The closer this value is to unity, the better the fit.

The physicians, nurses and technologists showed significant and substantial differences on all four endogenous and exogenous variables (table 2). Accordingly, path analyses were

Table 2. Daily measures for the three professional groups.

<table>
<thead>
<tr>
<th></th>
<th>Technologists</th>
<th>Nurses</th>
<th>Physicians</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
</tr>
<tr>
<td>Objective stress</td>
<td>17.19</td>
<td>10.28</td>
<td>13.78</td>
</tr>
<tr>
<td>Subjective stress</td>
<td>142.59</td>
<td>169.37</td>
<td>75.48</td>
</tr>
<tr>
<td>Mood</td>
<td>64.34</td>
<td>25.06</td>
<td>68.40</td>
</tr>
<tr>
<td>Job performance</td>
<td>80.83</td>
<td>11.76</td>
<td>76.81</td>
</tr>
</tbody>
</table>

*p < .01; **p < .001.
conducted first to assess whether the model fitted the data obtained from the technologists. Thereafter, the model derived from the technologists was cross-validated by the nurses and physicians separately.

Finally, the effectiveness of various work-related and personal moderating variables was studied using sub-group analyses. Each moderator variable was dichotomized at the median score. Pearson correlations were then computed between all the relationships under consideration (e.g. mood/performance) for the two sub-groups created; and tests for significant differences between these two groups were computed.

4. Results

Pearson correlations between all variables (residuals and moderator variables) were calculated to assess the assumption of multicollinearity (tables 3 and 4). None of the intercorrelations exceed .80, suggesting that the multicollinearity assumption was not violated (Lewis-Beck 1980). In addition, the Durbin-Watson statistics were within the normal range (−2 to +2), indicating that autocorrelation was not a problem.

Seventy-one professionals participated in this 20-day study, yielding 1420 subject days. On 136 (9.6%) of these subject days, subjects provided incomplete data, and the data for the person day was coded as missing.

4.1. Same-day model

The goodness of fit of any model can be assessed using path analysis in a two-step process in which the over-identified model (figure 1) is contrasted with the just-identified model, i.e., that model in which all possible paths between the variables are included. In the over-identified model for the technologists, all four hypothesized paths were found to be statistically significant (Figure 2). The goodness of fit of this model was tested and Specht’s Q was .99. Hence, omission of the two insignificant paths (namely, the path from objective stressor to mood (B = −.02) and objective stressor to job performance (B = −.01)) did not compromise the integrity of the over-identified model. The large number of person days (n = 486) meant that Specht’s Q was not converted into a W value, as W’s distribution approximates that of $X^2$ and therefore is influenced greatly by sample size (Pedhazur 1982).

To determine if the model obtained from the technologists was appropriate for the nurse and physician groups, a cross-validation strategy was followed. The over-identified model derived from the technologists was compared with the just-identified model for each of these two groups. Following this procedure, the Q statistic indicated that the goodness of fit for each of these samples (physicians = .98; nurses = .99) paralleled that of the

| Table 3. Intercorrelation matrix for daily variables (n = 1111–1284). |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                              | 1                           | 2                           | 3                           | 4                           | 5                           |
| 1. Objective stressor        | .28**                       | −.05                        | .10**                       | .10**                       |
| 2. Subjective stress         |                             | −.05                        | −.11**                      | −.06*                       |
| 3. Mood                      |                             |                             | .31**                       | .22**                       |
| 4. Job performance (same day)|                             |                             |                             | .79**                       |
| 5. Job performance (next day)|                             |                             |                             |                             |

* $p < .05$; ** $p < .01$. 


Table 4. Intercorrelation matrix for the moderator variables (n = 71).

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Job experience</td>
<td>-.24*</td>
<td>-.07</td>
<td>-.18</td>
<td>.06</td>
<td>-.14</td>
<td>-.33**</td>
<td>.02</td>
<td>.33**</td>
<td>-.29**</td>
<td></td>
</tr>
<tr>
<td>2. Education</td>
<td></td>
<td>-.28**</td>
<td>-.05</td>
<td>.16</td>
<td>.19</td>
<td>.18</td>
<td>.02</td>
<td>.05</td>
<td>-.15</td>
<td></td>
</tr>
<tr>
<td>3. Negative life events</td>
<td></td>
<td></td>
<td>-.23*</td>
<td>-.26*</td>
<td>.25*</td>
<td>.21*</td>
<td>.25*</td>
<td>.14</td>
<td></td>
<td>.10</td>
</tr>
<tr>
<td>4. Depression</td>
<td></td>
<td></td>
<td></td>
<td>.07</td>
<td>.19</td>
<td>.20*</td>
<td>.06</td>
<td>.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Job satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.41**</td>
<td>-.34**</td>
<td>-.50**</td>
<td>.30**</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>6. Role overload</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.49**</td>
<td>.42**</td>
<td>.11</td>
<td>.02</td>
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<tr>
<td>7. Role conflict</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.25**</td>
<td>.11</td>
<td>.07</td>
<td></td>
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<tr>
<td>8. Role ambiguity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.14</td>
<td>-.11</td>
<td></td>
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<tr>
<td>9. Informational social support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.70**</td>
<td></td>
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<tr>
<td>10. Emotional social support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

*p < .05; **p < .01.*
technologists. The model is similar, hence the data are pooled for all further analyses. (The proposed model was also tested for the three clinic locations and was found to fit the data in all three locations; all Qs > .98).

4.2.Logged model
In assessing the influence of stressors and mood on the next day’s performance, path analysis was again computed. The paths between objective stressor, subjective stress and mood remain the same as those computed in the total sample for the same-day model; only paths linking these exogenous variables with next day performance might differ. As predicted, the paths from objective stressor to mood (B = .008), and objective stressor and next day’s job performance (B = .029) were not significant. However, unlike the same-day daily stressor model, the path from subjective stress to next day’s job performance (B = –.020) was not significant. After eliminating these three paths, the over-identified model was computed (figure 3). The data were still found to fit the model (Specht’s Q = .99).

4.3. Moderator effects
Moderator effects were tested using sub-group analyses. Table 5 presents the results of these analyses. Four work-related variables, namely, the number of years in the professions, job satisfaction, role ambiguity, and informational social support moderated the subjective stress-mood and subjective stress-performance relationships (table 5). These variables functioned as moderators in the following way. Subjective stress was more negatively associated with mood when job experience was lower, job satisfaction was lower or when role ambiguity was higher. In addition, the relationship between subjective work stress and performance was more significantly negative when role ambiguity was higher or informational social support was lower.

The only personal variable that functioned as a moderator was negative life events. The negative relationship between subjective stress and mood was higher when the negative life events score was lowest.
Table 5. Moderators of the stress-mood and stress-performance relationships.

<table>
<thead>
<tr>
<th>Work-related factors</th>
<th>Median split</th>
<th>( t )</th>
<th>( z )</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job experience (yrs)</td>
<td>&lt; 11.5 ((n = 620))</td>
<td>-0.305</td>
<td>-2.37</td>
<td>Stress-Mood</td>
</tr>
<tr>
<td></td>
<td>&gt; 11.5 ((n = 611))</td>
<td>-0.179</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>&lt; 78 ((n = 637))</td>
<td>-0.302</td>
<td>-2.16</td>
<td>Stress-Mood</td>
</tr>
<tr>
<td></td>
<td>&gt; 78 ((n = 611))</td>
<td>-0.188</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role ambiguity</td>
<td>&lt; 31 ((n = 707))</td>
<td>-0.126</td>
<td>-5.25</td>
<td>Stress-Mood</td>
</tr>
<tr>
<td></td>
<td>&gt; 31 ((n = 543))</td>
<td>-0.423</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role ambiguity</td>
<td>&lt; 31 ((n = 732))</td>
<td>-0.138</td>
<td>-2.08</td>
<td>Stress-Performance</td>
</tr>
<tr>
<td></td>
<td>&gt; 31 ((n = 522))</td>
<td>-0.256</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informational social support</td>
<td>&lt; 16 ((n = 719))</td>
<td>-0.259</td>
<td>-2.07</td>
<td>Stress-Performance</td>
</tr>
<tr>
<td></td>
<td>&gt; 16 ((n = 565))</td>
<td>-0.123</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal factors</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative life events</td>
<td>&lt; 6 ((n = 665))</td>
<td>-0.309</td>
<td>-2.23</td>
<td>Stress-Mood</td>
</tr>
<tr>
<td></td>
<td>&gt; 6 ((n = 585))</td>
<td>-0.183</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Discussion

5.1. Same-day model
The model developed in this study to explain how daily work stressors influence same-day interpersonal job performance received empirical support from the path analyses computed. The model indicated that the objective stressor influenced subjective stress. Subjective stress was negatively associated with same-day mood; in turn, mood was positively related to same-day job performance. Subjective stress also directly and negatively predicted same-day job performance. This model was similar for the three divergent occupational groups: namely, physicians, nurses, and technologists.

The finding that the objective stressor influences subjective stress replicates previous findings (Motowidlo et al. 1986, Repetti 1989). The results reported here substantiate earlier findings that objective workload is associated with the subjective perception of stress (Constable and Russell 1986, Motowidlo et al. 1986). Although the objective measure of overload had a positive and significant association with subjective stress, this relationship may have been stronger if the subjective stress measure reflected subjective overload, rather than reflecting general daily work stress. Nevertheless, just how objective work stressors influenced subjective work stress remains to be explored.

A number of studies have shown that chronic stressors (Cohen 1980, Motowidlo et al. 1986), daily stressors (Caspi et al. 1987, DeLongis et al. 1988), and daily work stressors (Stone 1987, Barling and Kyl 1990, Barling and MacIntyre 1993) are negatively related to mood. With the exception of the study by Motowidlo et al. (1986) these investigations have not examined the differential relationships between mood and objective stress, and mood and subjective stress. The results of the present study suggest that subjective work stress is directly associated with mood, whereas objective stress exerts only indirect effects on mood. Thus, it is not the objective event (number of patients seen per day) that directly influences mood, but rather the subjective perception of the daily work stressors that impacts on mood.

The model also indicates that mood is negatively related to interpersonal job performance. Under lower levels of mood, healthcare professionals interact less effectively with their patients. In their chronic work stress study, feelings associated with negative mood resulted in lower job performance (Motowidlo et al. 1986). The result of the present
study also indicate that mood is a mediating factor between subjective work stress and daily job performance.

Some researchers have viewed negative mood as a stable variable that should be controlled when studying stress-strain relationships (Brief et al. 1988, Watson and Clark 1984). If mood is a dispositional factor then the mood scores should remain relatively constant over time. However, the results here suggest that mood does not remain constant. Instead, mood fluctuates daily (table 2), and fluctuates within-subject across the 20 study days. Indeed, if within-person mood scores are stable over time, correlations between subjective stress and mood, and mood and job performance would be reduced because of range restriction. Thus, rather than having the status of a confounding variable that would need to be controlled statistically, the present study indicates that mood fulfills a particular role in the model. Not only does negative mood transmit some of the effects of daily subjective work stress onto interpersonal job performance, but the findings (e.g. for the technologists) show indirect influence of subjective stress on job performance (through mood) \( B = -0.383 \) is nearly twice as strong as the direct relationship between subjective stress and job performance \( B = -0.209 \).

The dimension of job performance studied here was interpersonal effectiveness. The results support Cohen’s theory (1980) and the findings of Motowidlo et al. (1986) that interpersonal helping behaviours are affected by increased stress. Similarly, MacEwen and Barling (1991) reported that when employed mothers experience inter-role conflict, interactions with their children are negatively affected. This again indicates that interpersonal relationships (either work- or family-related) are negatively associated with work stress. All of these studies, however, investigated chronic work stress. The present results indicate that the interpersonal component of job performance for healthcare professionals is sensitive to the effects of daily work stressors. Although Ivancevich (1986) did not find a significant relationship between elevated hassle scores and a reduction in job performance, he focused on task performance and did not capture daily variations in stressors. Further daily studies should be undertaken to examine the impact of daily work stressors on both the cognitive and interpersonal domains of job performance. In so doing, it would be possible to determine if indeed daily work stressors have a greater influence on the interpersonal rather than the cognitive competencies of job performance.

5.2. Lagged effects

Although the lagged effect of daily stress and daily mood on next day’s interpersonal job performance score was significant, the magnitude of the effect for the lagged relationship was moderate at best. The beta weight for the relationship between mood and next day’s job performance (for the total sample) was .096, which is nearly three times less than the relationship between mood and same-day job performance \( B = .253 \). The significant relationship between same-day mood and next day’s job performance may reflect the large number of study days \( n = 1284 \). Obviously, the lagged relationship found here is modest in magnitude, and is consistent with previous research findings (Caspi et al. 1987, DeLongis et al. 1988, Stone and Neale 1984). More importantly, perhaps, no significant relationship emerged between subjective work stress and next day’s job performance. This is consistent with the notion that the consequences of work stress endure only as long as the stress itself (Pratt and Barling 1988).

5.3. Moderating variables

The variables found to have a significant moderating effect on the subjective stress-mood relationship were mainly work-related; namely, job experience, job satisfaction, and role...
ambiguity. First, job experience moderated the stress-mood relationship. This suggests that experience in one's job may provide employees with formal (training programmes) or informal (socialization) opportunities to develop coping strategies that enable them to function effectively in a stressful setting. Second, job satisfaction moderated the stress-mood relationship. As suggested previously (Barling and Kryl 1990), it is possible that individuals who experience job satisfaction are more prepared to endure feelings of subjective work stress than individuals experiencing job dissatisfaction. Third, role ambiguity moderated both the stress-mood and stress-performance relationships. Elevated levels of role ambiguity indicate that there is a lack of clarity about one's job expectations and the scope of responsibilities. Although typically described as a chronic job stressor, role ambiguity could influence the extent to which daily work stressors are negatively associated with daily mood and job performance by increasing the sense of frustration and helplessness experienced under conditions of high stress. That role ambiguity functioned as a moderator variable while role conflict did not may be consistent with findings from two meta-analytic studies showing that role ambiguity is consistently more highly associated with strain than is role conflict (Fisher and Gitelson 1983, Jackson and Schuler 1985). Fourth, when informational social support was higher, the negative association between daily subjective stress and interpersonal performance on the job was lower. Previous studies have reported that informational support received from co-workers or supervisors is helpful at reducing the negative impact of work-related stressors (Cohen and Wills 1985). It is possible that, in contrast to role ambiguity, informational social support functions as a moderator because it results in clear expectations about job performance and enhances problem-solving skills relevant to job performance. Therefore, when useful advice is given to help to solve a problem, daily work stressors are less likely to be associated with a decrease in job performance.

The only personal factor that functioned as a moderator variable was negative life events, and it moderated the stress-mood relationship in a manner similar to that reported by Caspi et al. (1987). Under high levels of negative life events, the negative relationship between subjective stress and mood was lower. This represents the second study that shows that the impact of daily subjective stress is diminished when individuals are simultaneously confronted with other, major negative events. This suggests that the effects of stress are not necessarily cumulative. One explanation for this could be that individuals learn coping skills when dealing with stressors, and when they encounter new and different stressors, they may be better prepared to manage them.

It appears, then, that the majority of the variables found to moderate the negative impact of stress on mood and job performance in this study, are work-related in nature. Two implications emerge. First, the contextual nature of the moderators suggests that interventions might be introduced in the workplace to reduce the negative effects of work stress. Some of the negative effects of work stressors on job performance might be decreased by creating work environments conducive to human development (Morf 1989). Second, by understanding that work-related variables effectively moderate the stress-strain relationships, less victim blaming will ensue.

5.4 Study limitations
Although path analysis allows the researcher to investigate direct and indirect effects simultaneously, there are several reasons for treating any conclusions based on path analyses cautiously. First, an important assumption of path analysis is that there are unidirectional causal relationships among the variables (James et al. 1982). Although the data fit the proposed model, that does not negate the possibility of bidirectional relationships or other
models fitting the data. For instance, poor interpersonal job performance may also result in a decrease in mood. Second, the validity of path analysis requires all possible causes to be included in the model (James et al. 1982), yet there may be other relevant variables that influence the stress-mood, stress-performance, and mood-performance relationships that were not included in this model.

One potential methodological limitation of the present study was our use of self-reports for measuring all the endogenous and exogenous variables. However, if a monomethod bias exists, then all variables should be significantly correlated. Clearly this was not the case (table 3). Nevertheless, although the healthcare professional provided data on subjective stress and mood, future research should obtain external reports of the number of patients seen per day (e.g. from archives) and interpersonal job performance (e.g. from supervisors or patients). One important indicator of the quality of healthcare professionals’ interpersonal job performance would be patients’ reports. Future research should be directed at finding out from the ‘client’ if he/she was satisfied with the interaction. However, methodological difficulties (i.e. patients’ satisfaction may depend on their prognosis, or the interpersonal attention the patient receives may not be related to the quality of the medical care) make this a challenging question to pursue.

In addition, the distinction between subjective stressors as predictor variables and job performance variables was not always clear. That is, an event characterized as a stressor could also be interpreted as a measure of interpersonal job performance. Future studies should attempt to disentangle these events.

6. Conclusions
This study provides a model which indicates that subjective daily work stress is negatively associated with mood, mood is related to interpersonal job performance and subjective stress also predicts such job performance. Although it is important to establish how work stress influences job performance (i.e. through mood), it is just as crucial to learn what can be done to reduce the negative effects of daily work stressors. Work-related variables moderated the relationships between subjective stress and mood, and subjective stress and interpersonal job performance, suggesting that organizational interventions can be implemented to reduce the negative effects of daily work stressors on mood and job performance.

Acknowledgements
This research was supported in part by grants from the Social Sciences and Humanities Research Council of Canada (Grant No. 410-88-0891) and Imperial Oil to the second author. The authors express their appreciation to Dr. A.D. Ginsburg for his help throughout all phases of this project and to Karyl E. MacEwen and E. Kevin Kelloway for their constructive comments regarding earlier versions of this manuscript.

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