Effects of Daily Workload on Subsequent Behavior During Marital Interaction: The Roles of Social Withdrawal and Spouse Support

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This article examines daily variability in 2 marital behaviors, social withdrawal and the expression of anger, as a function of daily taskload at work. Thirty-three air traffic controllers (ATCs) and 27 wives completed surveys on 3 consecutive days. Subjective and objective indicators of daily workload (air traffic volume and visibility at the airport) were related to the couples' descriptions of the ATCs' behavior after work. Despite a positive association between withdrawal and anger, workload seemed to influence these 2 behaviors in opposite ways. On high spouse-support evenings, work overload was associated with increased social withdrawal and less expression of anger. Social withdrawal may help an aroused individual return to a baseline emotional and physiological state. By facilitating their stressed partner's social withdrawal, supportive spouses may buffer the effects of minor daily stressors.

People usually think of behavior in close relationships as being determined by stable personality and situational variables. However, as everyone in a close relationship knows, there is substantial day-to-day variability in a couple's behavior. These variations and the factors that influence them are often overlooked in psychological research. Some of the variability in marital interaction may be due to conditions that an employed person faces at work each day. The study reported here addresses two questions: How do married people behave when they return home after a stressful day at work, and how does a spouse's behavior influence the employee's delayed response to job-related stress?

A growing body of research investigates the relation between an individual's habitual experiences at work and typical patterns of social interaction within the family (Bronfenbrenner & Crouter, 1982; Hoffman, 1985; Piotrkowski, Rapoport, & Rapoport, 1987). Much of the literature has focused on a spillover model, which proposes that psychological responses to work, such as gratification or emotional depletion, carry over into the home (Piotrkowski, 1979). Almost all of the relevant studies have examined job stress as an individual difference variable. Using between-subjects designs, investigators have found that there is a significant association between repeated exposure to job stressors and generally less satisfying family relations, such as the employed person's decreased availability to and involvement with family members, and increased signs of anger and aggression in the family (Barling & Rosenbaum, 1986; Burke, 1982; Jackson & Maslach, 1982; Piotrkowski & Crits-Christoph, 1982; Repetti, 1987).

However, as typically described, the spillover model refers to a *short-term* psychological process, in which job stress is best viewed as a within-subjects variable that changes from day to day. Crouter, Perry-Jenkins, Huston, and Crawford (1989) recently found that in a sample of employed men self-reported feelings of stress after work were associated with their wives' reports of a greater number of negative marital interactions later that evening. Most measures of unsatisfying marital interaction incorporate two related but different components: *social withdrawal* and the *active expression of anger*. For example, in the Crouter et al. study the "negative" marital behaviors that were assessed included both seeming bored and uninterested as well as yelling and criticizing. The following review suggests that at this point in the understanding of work–family linkages, it may be worthwhile to distinguish between these two types of marital behavior.

Social withdrawal appears to be a common short-term response to job strain. On the basis of an intensive interview and observation study, Piotrkowski (1979) found that a stressful day at work is sometimes followed by diminished availability to family members, conveyed by behavioral changes such as fewer positive initiations and responses to others. In another interview study, bank employees reported a reduction in their sensitivity and responsiveness to family members after a difficult day at work (Repetti, 1987). Consistent with this, experimental research suggests that residual negative feeling states from prior situations are sometimes associated with decreased social responsiveness in subsequent situations, perhaps because negative mood states generate an inward focus on one's own needs and concerns (Isen, 1984; Moore, Underwood, & Rosenhan, 1984).

Why might the experience of stress at work be followed by social withdrawal at home? One possibility is that social isolation facilitates relaxation and recovery from elevated levels of arousal. A period of solitude also seems to have a positive after-effect on mood (Larson & Csikszentmihalyi, 1983). Rather than view social withdrawal as a dysfunctional work–family spill-over, the position taken here is that it sometimes represents an effective short-term response to certain job stressors. A with-drawal response, as described here, would seem especially appropriate when a stressful day at work results in high levels of arousal.

Evidence for the proposition that there is more *active expression of anger* at home after a stressful day at work is mixed. Some forms of daily job stress seem to lead, on a short-term basis, to the displacement of anger at home, whereas other types of job stress do not appear to have this effect. In a recent daily diary study, arguments at work were followed by an increase in arguments with a spouse (Bolger, DeLongis, Kessler, & Wethington, 1989). Interview studies have also indicated that when angry feelings are engendered at work they may later be expressed at home, through discussion of the distressing job-related events or in the form of irritability and angry interactions with family members (Piotrkowski, 1979; Repetti, 1987). However, in the Bolger et al. diary study, overloads at work did not lead to more marital arguments. In fact, there was a nonsignificant decrease in arguments after a high load day at work. Overloads at work were also followed by a significant decrease in household work (Bolger et al., 1989).

Why the inconsistency between within-subjects studies, which indicate that only when job stressors provoke anger is there more likely to be an immediate display of anger at home, and between-subjects studies, which suggest that most forms of chronic job stress are associated with increased aggression at home? Dynamics set in motion by transient factors may differ substantially from the long-term patterns of family interaction that result from these same factors. For example, Piotrkowski (1979) observed that a repeated pattern of social withdrawal in response to job stress can, over time, lead to increased family conflict.

Researchers have found that *social support from a spouse* can help to buffer the depressive effects of major and minor stressors, including job stressors (S. Cohen & Wills, 1985; House & Wells, 1978; Vanfossen, 1981). There is also evidence that spouse support may be helpful by facilitating the use of effective coping strategies (Manne & Zautra, 1989). However, researchers do not know what a supportive spouse does in order to help an employed husband or wife cope after a difficult day at work. One clue may be found in the observation, from two interview studies, that a spouse's response to signs of job stress helps to shape the way job-related moods are experienced and expressed in the family (Piotrkowski, 1979; Repetti, 1987). Perhaps once the employed person returns home, a spouse's supportive behavior facilitates health-enhancing reactions to job stress and curtails debilitating work–family spillovers.

The Present Study

The relation between day-to-day variations in taskload at work and changes in daily marital behavior at home was investi-

gated in a sample of air traffic controllers and their spouses. A within-subjects design was used to analyze data collected from each couple over 3 consecutive days. Workload was chosen as an indicator of job stress for this study because it can be precisely defined, it is an important and salient dimension of almost all jobs, and because high workload has been associated with increased risk of coronary heart disease and other physical and mental health problems among air traffic controllers and others (Jenkins, 1982; Repetti, Matthews, & Waldron, in press; Rose, Jenkins, & Hurst, 1978).

Air traffic controllers (ATCs) are a unique occupational population that is particularly well suited for a study of the effects of workload on marital behavior. Unlike many occupations, an ATC's workload can vary quite a bit from day to day, and as described later, objective measures of ATC workload are available. In addition, increased load for an ATC does not necessarily mean more time spent at work. The usual confounding of workload with time available to spend with one's family is a problem because any observed changes in marital interaction could be explained by less time available to the couple to spend together. However, because federal regulations limit the number of hours that an ATC may work, daily workload in this study was independent of the number of hours spent at the airport.

Hypotheses

Hypothesis 1. On the basis of prior research, it was hypothesized that an increase in daily workload is associated with subsequent social withdrawal during marital interaction. It was argued earlier that social withdrawal may be a particularly effective way of coping with stressors that cause increases in arousal, which appears to be the case for high levels of air traffic control workload (Rose et al., 1978).

Hypothesis 2. The second hypothesis predicts that an increase in daily workload is associated with a subsequent decrease in active expressions of anger at home. There is no reason to expect an ATC to be angered by a temporary increase in workload, which is determined by factors like the weather, and not by individuals. Moreover, a social withdrawal response to high workload should entail a decrease in expressions of all emotion, including anger.

Hypothesis 3. Because prior research suggests that support from a spouse facilitates effective coping, it was hypothesized that spouse support moderates the effect that job stress has on marital behavior, such that under conditions of high support the relation between high workload and social withdrawal is strengthened. No prediction was made regarding the effect of spouse support on the relation between workload and anger expression.

Methodological Issues

Almost all quantitative studies of work–family linkages have used cross-sectional research designs. This approach has led to two shortcomings in the literature: inconclusive causal priority and respondent biases.

Experiences in the family influence work life at least as much as job conditions affect family interaction (Bolger et al., 1989; Gutek, Repetti, & Silver, 1988). Although investigators in the

field generally acknowledge that work–family relations are most likely circular, there have been few attempts to separate the two causal processes empirically. A time series design is one way of addressing the problem. In this study, ATCs and their spouses provided data over 3 consecutive days so that fluctuations in taskload at work could be related to subsequent changes in the ATCs' marital behavior. Thus, a sequentially specific relation between workload and marital interaction was tested.

Another way to address the problem of inconclusive causal priority is to choose variables for which it is logically or empirically impossible for circularity to occur. In the present study, weather and traffic conditions at the airport serve as indicators of workload because, to a large extent, an ATC's daily taskload is determined by visibility and traffic volume. In addition, reverse causation (marital interaction influencing the earlier weather or air traffic conditions) can be ruled out.

Respondent biases that inflate correlations present a second shortcoming in the literature. Much of the research in this area has relied on the same individual's assessments of conditions both at work and at home, although some researchers have used other family members as informants. This study includes spouses as independent raters of the ATCs' marital behavior. In addition, National Climatic Center and Federal Aviation Administration (FAA) records of daily weather and traffic conditions at the airport serve as objective measures of workload.

Method

Design and Procedure

This study uses a time-samples design with repeated daily measurements of both taskload at work and marital behavior. The analyses reported here are based on records of daily weather and traffic conditions at the airport, and ATCs' and their spouses' responses to daily report surveys completed on 3 consecutive days.

Selection of subjects. The participating ATCs all worked at the same major international airport in the United States. To solicit participation, the investigator or her assistant met with small groups of ATCs during their weekly team meetings ($N = 68$ ATCs present at 16 team meetings) and briefly described the procedures involved in the study. ATCs who thought they might be interested in participating further in the study filled out a card with their name and telephone number. They were telephoned within a few days, and the study's procedures were described in detail. At that time spouses were asked to participate. Nineteen ATCs who were not present at their team meetings were sent letters and were individually telephoned to request their participation.

Response rates. Seventy-seven percent of the ATCs (67 out of the 87 who were asked) agreed to participate. Of the 46 married ATCs[1] who agreed, 38, or 80%, remained in the study long enough to contribute daily reports. Of the 44 spouses (96%) who agreed to participate, 34 (77%) remained in the study long enough to contribute daily reports. Because of their very small numbers, reports from 3 female ATCs and their husbands are not included here. In addition, data from 2 ATCs and 4 spouses were dropped for a variety of reasons, such as the couple's not seeing each other or because the forms were not correctly completed.

All participants except 2 ATCs and 1 wife completed daily surveys on all 3 days. To ensure that participants had a reasonable sample of marital behavior to rate, only data from evenings during which a couple reported spending at least 1 hr together were included in the analyses. This resulted in a loss of 1 evening of data from each of 5 ATCs and 3 wives.[2] Thus, the regression analyses reported here are based on 92 daily

report surveys from 33 married male air traffic controllers and 76 daily surveys from 27 of their wives.

Data collection. Data collection spanned a 6-month period. Monthly work schedules were used to select 3 consecutive daily report days during which an ATC's work hours would approximate a "normal" working day (i.e., beginning no earlier than 7:00 a.m. and ending no later than 7:00 p.m.). Each participant received three daily report surveys and written instructions a few days before the first daily report day. Reminder telephone calls were made on the first daily report evening, and if the couple wished, on the following two evenings. Participants were instructed to complete a daily report survey each night before going to bed and to seal it immediately in a special envelope provided. They were also asked not to discuss their responses until all three forms had been returned. Completed surveys were returned by mail.

Measures

Workload. Four measures of daily workload were used in this study. Two objective measures were based on daily weather and traffic conditions at the airport. Less visibility around the airport and greater air traffic volume increase an ATC's workload. The objective measure of weather conditions was based on hourly weather observations made at the airport, which were obtained from the National Climatic Data Center. The records were used to compute the average visibility during an ATC's shift on each daily report day. In this study, average visibility during a shift ranged from 1 to 47 miles. The Low Visibility measure is the average shift visibility multiplied by -1, so that high scores indicate lower visibility or greater workload.

Data for the objective measure of traffic volume were obtained from FAA daily traffic summary records. High Traffic Volume is a measure of the total number of aircraft of all types handled at the airport on each day. It includes all categories of air traffic, such as the number of take-offs, landings, and overflights. Scores on this variable ranged from 928 to 2,049 aircraft. Because hourly traffic data were not available, this measure is based on a 24-h period rather than an 8-h shift. However, it is a good estimate of the ATC's workload because most air traffic, and most of the variability in traffic volume, occur during daytime shifts, which were the shifts sampled in this study.

Two other daily workload measures were used. Subjective ratings of workload were derived from a factor analysis of 10 workload items written for this study and included on the ATC's daily report survey. Each item was rated by the ATC on a 4-point scale indicating how accurately the statement described his shift at work that day. A principal-axis factor analysis (based on ratings from all ATCs, married and single) with varimax rotation yielded two factors with eigenvalues greater than or equal to 1. Two factor-based measures of workload were constructed in which each item was weighted equally. An item was retained as a measure of a factor if its correlation with that factor was greater than or equal to .40 and its correlation with the other factors was less than .40. Eight of the 10 items met this criterion.

The Busyday scale ($\alpha = .81$) consisted of five items describing a busy shift (e.g., It was a very busy shift), and one item (reverse scored) describing a slow shift. The Difficult Conditions Scale ($\alpha = .74$) consisted of three items describing favorable weather and traffic conditions during the ATC's shift (e.g., We had the kind of weather conditions I would like to have every day at work). Responses to all items on this second scale were reverse scored. Scores for both scales were computed by averaging

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[1] Included in this sample were three couples who indicated that they were living together in long-term committed relationships, but were not legally married. However, for the sake of fluency, the terms *spouse, wife,* and *married* are used to describe the sample.

[2] There was no change in the results when these observations were included in the analyses.

responses to the items on each scale. Thus, the possible range was 1–4, with higher scores indicating greater workload that day (Busyday Scale, $M = 2.17$, $SD = 0.65$; Difficult Conditions Scale, $M = 2.41$; $SD = 0.74$). The two scales were positively correlated ($r = .32$, $p \leq .0001$). Some evidence for the validity of the two subjective workload scales was found in their significant correlations with the objective measures of daily workload, Low Visibility and High Traffic Volume (Busyday Scale, $r = .26$, $p \leq .001$, and $r = .35$, $p \leq .0001$; Difficult Conditions Scale, $r = .30$, $p \leq .001$, and $r = .20$, $p \leq .05$). In addition, both subjective workload ratings were moderately correlated with daily factor-based measures, adapted from Nowlis's (1965) scale, of self-reported negative mood (10 items; $\alpha = .87$) and positive mood (6 items; $\alpha = .78$) after work (Busyday Scale, $r = .25$, $p \leq .01$, and $r = -.16$, $p \leq .05$; Difficult Conditions Scale, $r = .14$, $p \leq .10$, and $r = -.26$, $p \leq .01$).

Marital behavior. All participants (ATCs and wives) used the daily report forms to rate their own and their partner's behavior during the couple's interactions. Three categories of daily marital behavior are of interest here: the ATCs' social withdrawal, the ATCs' active expressions of anger and aggression, and the wives' provision of social support. Because there were no adequate existing daily report scales, measures were created for this study. Most of the items were adapted from the Spouse Observation Checklist (Weiss & Perry, 1983), which was originally designed for clinical application. Other items were written by the investigator. The daily report survey contained 57 randomly ordered statements describing one's own behavior and a separate set of 54 randomly ordered statements describing the behavior of one's partner. Most of the items describing partner behavior were analogous to the statements describing own behavior (e.g., I criticized my partner, My partner criticized me). Participants responded *true, false,* or *not applicable* to each statement to indicate whether it was an accurate description of their own or their partner's behavior during the couple's interactions that evening. The score for each marital behavior scale is the sum of *true* responses assigned to items in that scale.

A participant's ratings of statements describing his or her own daily marital behavior were used to create three scales. The statements constituting the My Marital Withdrawal scale (12 items; $\alpha = .85$) describe someone who is not involved or interested in social interaction, and who is distracted and nonresponsive (e.g., I wanted to be alone, I read the paper [or watched TV] when my partner probably would have preferred some attention). Statements in the My Marital Anger scale (19 items; $\alpha = .94$) describe provocative behavior, including criticism, sarcasm, and disapproval (e.g., I started an argument, I got angry and wouldn't tell my partner why). The My Supportive Behavior scale (10 items; $\alpha = .73$) consisted of items describing the provision of emotional support, such as providing comfort and sympathy, and the expression of appreciation (e.g., I was understanding, I tried to cheer my partner up).

Daily ratings of a partner's behavior were combined to create two scales. Statements constituting the Partner's Marital Withdrawal scale (10 items; $\alpha = .71$) describe the respondent's perception of his or her partner's withdrawal from interaction (e.g., My partner seemed to be in his/her own world, My partner just wanted to be alone). Items in the Partner's Marital Anger scale (18 items; $\alpha = .91$) assessed the individual's perception of his or her partner's expressions of anger and aggression during marital interactions (e.g., My partner took out his/her frustrations on me, My partner was sarcastic to me).

Mean ratings and standard deviations for the marital behavior scales are presented in Table 1.

Attempts were made to evaluate the psychometric properties of the marital behavior scales. First, the 3-day temporal stability of the ratings was assessed. The intraclass correlation coefficients presented in Table 1 indicate that there was a high degree of stability in self-ratings of social support behaviors. Ratings of marital withdrawal and marital anger

Table 1

Descriptive Statistics for the Marital Behavior Scales

Marital behavior scales	M[a]	SD[a]	Possible range	Intraclass correlation coefficient[b]
My Marital Anger	2.77	2.44	0–19	.41
My Marital Withdrawal	1.83	1.67	0–12	.65
My Supportive Behavior	4.41	1.86	0–11	.89
Partner's Marital Anger	2.23	2.04	0–18	.37
Partner's Marital Withdrawal	1.27	1.05	0–10	.48

[a] Based on participants' (air traffic controllers' and spouses') mean scores, averaged over the daily report days.
[b] The intraclass correlation coefficients were computed across the daily report days using data from all respondents (air traffic controllers and spouses). They indicate the degree of stability in ratings made by the same person over 3 days.

were less stable. Thus, there was a fair amount of day-to-day variability in marital behavior.

Members of a couple tended to agree with each other when evaluating the evening's marital interaction. For marital anger and withdrawal scores, an individual's self-rating was correlated with the partner's rating of his or her behavior on the same evening. Partner agreement was indicated by significant mean correlations averaged across the 3 days (i.e., the average of the Day 1, Day 2, and Day 3 partner-agreement correlations): for anger, the mean correlation was .47 ($p \leq .01$); for social withdrawal, it was .49 ($p \leq .01$). These results were similar to partner-agreement correlations reported for composite scores from the Spouse Observation Checklist (Christensen & Nies, 1980).

When partner-agreement correlations between behavioral categories were examined, there was a significant average correlation between a participant's self-rating of marital anger and the partner's rating of his or her social withdrawal on the same evening ($r = .41$, $p \leq .01$). There was also a significant correlation between mean self-ratings of marital anger and withdrawal ($r = .53$, $p \leq .0001$). The correlations between the withdrawal and anger scores probably, in part, reflect shared method variance, as well as a naturally occurring covariance between anger and withdrawal. Their overlap may also represent a third type of marital behavior, the passive expression of anger through silence and a refusal to respond. Because of the interest here in distinguishing between the active expression of anger and social withdrawal, the results reported reflect each marital outcome after controlling for the other marital behavior score in the analysis. The residuals, after controlling for the other marital behavior score, may be interpreted as measures of nonangry social withdrawal (low involvement that is not an expression of hostility) and the active expression of anger (aggressive behavior that is proactive). This procedure was used in an effort to measure the intended marital behavior variables as accurately as possible. However, the results of the study were the same whether the raw marital behavior scores or the residuals were analyzed.

Results

Data Analytic Approach

Separate regressions were performed to assess the bivariate relation between each workload variable and each marital behavior outcome. The basic statistical model was

$$Y1_{ij} = (\beta_1 SUBJ_1 + \cdots + \beta_n SUBJ_n) + \beta_{y2} Y2_{ij} + \beta_x X_{ij},$$

where $Y1_{ij}$ is the marital behavior outcome score (anger or with-

drawal) for respondent *j* on day *i*; the dummy variable SUBJ$_j$ equals 1 for respondent *j*, and 0 otherwise; Y2 is the marital anger score if Y1 is marital withdrawal, and vice versa; and X$_{ij}$ is a measure of workload for respondent *j* on day *i*. The regression coefficients (βs) were estimated with least squares. The sample size for this model was 92 observations when Y1 was the ATCs' self-ratings of a marital behavior, and 76 observations when Y1 was the wives' ratings of an ATC marital behavior.

The effect of a workload predictor variable (X$_{ij}$) was measured after controlling for all of the other variables. Two types of controls were used in the analyses. First, between-subjects variance in the marital outcome (Y1) scores was controlled by a set of dummy variables, one for each subject (SUBJ$_1$ $\cdots$ SUBJ$_n$) (J. Cohen & Cohen, 1975). (This necessitates exclusion of a constant to prevent perfect multicollinearity.) Thus, when the dependent variable (Y1) was ATCs' self-ratings of marital behavior, 33 SUBJ dummy variables were entered in the model. When wives' ratings were used as the outcome, 27 SUBJ dummy variables were entered.

For example, consider a regression in which ATCs' daily self-reported marital anger is the dependent variable. The three observations (days of data) from 1 ATC are arbitrarily assigned the dummy variable SUBJ8. For the three observations associated with this ATC, SUBJ8 is 1; SUBJ8 is 0 for all other observations included in the analysis. This procedure controls for each ATC's tendency, over 3 days, to respond to the marital anger questions in a particular way. Once the set of dummy variables has been entered, (a) each ATC's baseline level (3-day average) of self-reported marital anger is controlled, and (b) for each ATC 1 degree of freedom is (appropriately) lost.

Thus, using this procedure, the marital behavior outcome being predicted is that particular day's deviation from the subject's 3-day average. This conservative approach limits problems associated with the nonindependence of daily residuals in the regression, which can bias statistical inferences. In sum, the regression model represents a within-subjects design, exploring the determinants of day-to-day fluctuations in marital behavior.

A second type of control was added because of the positive association between the marital anger and marital withdrawal scores. When analyzing each marital behavior outcome (Y1), the other outcome (Y2) was controlled in the regression.

Overall Effects of Workload on Marital Behavior

The main hypothesis predicted that an increase in daily workload would be associated with social withdrawal during marital interaction. Multiple regressions were performed using the ATCs' and the wives' ratings of the ATCs' marital withdrawal as separate outcome variables. The results are presented in the first 2 rows of Table 2. The hypothesis was supported in analyses using the subjective measures of workload, but not in analyses using the objective measures of workload. Both daily subjective workload measures were significant predictors of an ATC's self-rating on the My Marital Withdrawal scale. The ATCs' reports of Difficult Conditions was a marginally significant predictor of the wives' daily ratings of ATC withdrawal behavior. Thus, the hypothesis was partially supported. ATCs and wives tended to describe the ATC as more withdrawn after

Table 2

Results of Multiple Regressions Predicting Day-To-Day Changes in Air Traffic Controllers' (ATCs') Marital Behavior From Daily Workload

| | Workload predictors | | | |
| | Subjective measures | | Objective measures | |
ATCs' marital behavior	Difficult conditions (β)[a]	Busy day (β)[a]	Low visibility (β)[a]	High traffic volume (β)[a]
Marital withdrawal				
ATC reports	.22**	.28***	−.03	.03
Wife reports	.28*	.01	.10	.02
Marital anger				
ATC reports	−.41***	−.37***	−.35**	−.37**
Wife reports	−.39**	.03	−.12	.14

Note. ATC = air traffic controller. Each workload predictor was tested in a separate equation after controlling for the individual's 3-day baseline level of marital behavior and the other marital behavior outcome. ATCs' marital behavior was assessed by ATCs' scores on the daily report scales My Marital Withdrawal and My Marital Anger and by wives' scores on the daily report scales Partner's Marital Withdrawal and Partner's Marital Anger.
[a] Standardized beta.
* $p \le .10$. ** $p \le .05$. *** $p \le .01$.

work shifts that had been described by the ATC as busier and more difficult.[3]

The second hypothesis predicted that an increase in daily workload would be associated with a subsequent decrease in active expressions of anger at home. ATC and wife ratings of the ATC's marital anger were analyzed as separate outcome variables. The results are reported in the bottom two rows of Table 2. Here, each of the four workload variables was negatively associated with an ATC's daily report of his expression of marital anger. Thus, the ATCs reported expressing significantly less anger at home after workdays during which there was lower visibility and higher traffic volume at the airport, as well as a subjective perception of a very demanding shift and unfavorable weather and traffic conditions.[4] The one significant workload predictor of wives' ratings was the ATCs' subjective report on

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[3] The pattern of results for this set of regressions, as well as for all other regressions reported in this article, was the same when raw marital behavior scores were used as outcome variables rather than the residuals after controlling for the other outcome variable (Y2). When the regressions reported in Table 2 were performed without Y2, there was only one change from a statistically significant result. Regressing ATCs' raw scores for marital withdrawal onto the Difficult Conditions Scale yielded a nonsignificant positive beta.

[4] One might question whether the link between visibility at the airport and the subsequent decrease in anger during marital interactions was due, not to an effect of workload, but to a general effect of weather on mood and behavior. To evaluate this possibility, the same regression was tested, this time predicting wives' marital behavior. Weather conditions were not significant predictors of the wives' marital anger or of their marital withdrawal. The results support the interpretation of visibility as an ATC workload variable.

the Difficult Conditions scale. Thus, the wives also reported that their husbands expressed less anger on evenings that followed work shifts with unfavorable weather and traffic conditions, as described by the ATCs.

In sum, when the ATCs returned home from a high-load workshift they tended to be more socially withdrawn and less aggressive during marital interactions. Despite the positive correlation between marital anger and withdrawal, these two behaviors were related to daily workload in opposite directions. This finding also held when raw marital behavior scores were used (i.e., without controlling for Y2, the other outcome variable).

An additional set of analyses was performed to evaluate whether the associations between workload and subsequent behavior were mediated simply by physical weariness. ATCs' daily self-ratings on two mood adjectives, tired and energetic (reverse scored), were combined to create a measure of fatigue after work. When the regressions reported in Table 2 were repeated, this time controlling for ATCs' fatigue, the pattern of results and significance levels remained the same. Thus, the effect of workload on marital behavior could not be explained by the ATCs' self-reported fatigue following a hard day at work. Similar analyses were performed in order to rule out the possibility that ATCs' self-ratings of their marital behavior represented not their actual behavior after work, but perceptions that were colored by their overall mood after work. When ATCs' ratings of their positive and negative mood after work were included as additional control variables, the results reported in Table 2 did not change.

Role of Spouse Support

It was hypothesized that social support from a spouse would moderate the relation between daily job stress and marital behavior, such that under conditions of high support the relation between high workload and social withdrawal would be strengthened. Data used in the analyses that follow were based on each member of the couple's description of his or her own behavior. The single moderator variable in all cases was the wife's daily report of her provision of support to the ATC (i.e., her score on the My Supportive Behavior scale). The two outcome variables tested were the ATCs' daily descriptions of their marital withdrawal and anger.[5] The effect of spouse support on the relation between workload and marital anger was an exploratory aspect of the study. Spouse support ratings were independent of ATC marital withdrawal ($r = .17, p \geq .05$) and marital anger ($r = .06, p \geq .05$) measured on the same evening. Three out of the four workload measures also were not correlated with that day's spouse support (rs ranged from .01 to .11). However, the Difficult Conditions scale was positively correlated with daily spouse support ($r = .24, p \leq .05$).

The role of daily spouse support was tested by a product term in a multiple regression model. In each regression, four sets of variables were controlled before the interaction between daily workload and spouse support was added: (a) a set of dummy variables to control for the ATC's 3-day average on the marital outcome measure, (b) the ATC's score on the other marital outcome variable (anger or withdrawal), (c) the workload predictor, and (d) the spouse support variable. The regression model was

Table 3
Results of Multiple Regressions to Test the Moderating Role of Spouse Support

Interaction between spouse support and a workload variable	ATCs' marital behavior	
	Marital withdrawal ΔR^2	Marital anger ΔR^2
Subjective measures		
Difficult conditions	.02**	.03**
Busy day	.01*	.03**
Objective measures		
Low visibility	.03***	.05***
High traffic volume	.06****	.01

Note. ATC = air traffic controller. Each interaction was tested in a separate equation. The ATCs' marital behavior outcomes were assessed by ATCs' self-ratings and spouse support was assessed by wives' self-ratings. Change in R^2 reflects the interaction term's contribution to the model after all control variables have been added.
$*p \leq .10.$ $**p \leq .05.$ $***p \leq .01.$ $****p \leq .001.$

the same as the one used in the previous analyses, with the addition of the spouse support variable (SS_{ij} is the score for spouse j on day i) and the product term ($X_{ij} \times SS_{ij}$):

$$Y1_{ij} = (\beta_1 SUBJ_1 + \cdots + \beta_n SUBJ_n)$$
$$+ \beta_{y2} Y2_{ij} + \beta_x X_{ij} + \beta_{ss} SS_{ij} + \beta_{xss}(X_{ij} \times SS_{ij})$$

The results are summarized in Table 3, which presents each product term's contribution to the model after controlling for all of the other variables. The first column of findings supported the hypothesis. With the ATCs' marital withdrawal rating as the outcome, all four tests of interactions between a measure of workload and spouse support were statistically significant or approached significance. Consistent with the hypothesis, the betas associated with the interaction terms were all positive, indicating that a higher level of support was associated with a stronger positive relation between daily workload and marital withdrawal.

The exploratory findings are reported in Table 3's second column of results. With the ATCs' marital anger score as the outcome, three of the four tests of interactions between a workload variable and spouse support were statistically significant. Here, the betas associated with the interaction terms were all negative, indicating that higher levels of spouse support were associated with a stronger negative relation between daily workload and marital anger.

In sum, the results in Table 3 suggest that the relation between daily workload and subsequent marital behavior was moderated by the level of spouse support provided that eve-

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[5] This particular set of analyses is presented because it was reasoned that each individual could best represent his or her own behavior. However, the regressions were performed using all combinations of ATCs' and wives' ratings of ATC marital behavior and spouse support. The pattern of results was the same as those reported here, with variations across the different analyses in levels of statistical significance.

Table 4

Regression Analysis Predicting Daily Marital Behavior From Workload on High- and Low-Spouse-Support Evenings

ATCs' marital behavior and workload predictors	High-spouse-support evenings $(\beta)^a$	Low-spouse-support evenings $(\beta)^a$
Marital withdrawal		
Difficult conditions	.61****	.17
Busy day	.60***	−.03
Low visibility	.63***	−.45***
High traffic volume	.38*	−.58****
Marital anger		
Difficult conditions	−.16	−.13
Busy day	−.47**	.00
Low visibility	−.64****	.07
High traffic volume	−.34	.13

Note. ATC = air traffic controller. Couples contributed 1 day of data to each group. Each workload predictor was tested in a separate equation after controlling for the other marital behavior outcome. The ATCs' marital behavior outcomes were assessed by ATC's self-ratings, and spouse support was assessed by wives' self-ratings.
[a] Standardized beta.
$* p \leq .10.$ $** p \leq .05.$ $*** p \leq .01.$ $**** p \leq .001.$

ning.[6] The pattern of results was the same when the other outcome variable (Y2) was not controlled in the analysis.[7] Because of high multicollinearity in this type of analysis, there were small increments in the proportion of variance accounted for by the product terms (Pedhazur, 1982). A secondary within-subjects analysis of high-support and low-support days was therefore performed in order to clarify the significance of the spouse-support interactions.

Two groups of days were created on the basis of the wives' daily ratings on the My Supportive Behavior scale. Every couple contributed 1 day of data to each group. The group labeled high-spouse-support evenings consisted of data obtained during the evening with the highest level of spouse support, for each couple. The group labeled low-spouse-support evenings consisted of data from the evening of lowest spouse support, for each couple. Within each of the two groups, separate multiple regressions were performed predicting an ATC's marital behavior from each of the workload variables. As before, with marital anger as the dependent variable, the same day's marital withdrawal score was first entered as a control variable, and with marital withdrawal as the outcome marital anger scores were controlled.

Results of the regression analysis are presented in Table 4. The hypothesized role played by spouse support in the link between workload and marital withdrawal is clearly illustrated in the top half of the table. On the one hand, during the relatively high-spouse-support evenings there was a strong positive relation between workload and the ATCs' marital withdrawal. Thus, as predicted, spouse support seemed to facilitate a social withdrawal response to high workload. On the other hand, during the relatively low-spouse-support evenings there was a significant negative relation between the objective measures of weather and traffic conditions at the airport and the ATCs' marital withdrawal.

As shown in the bottom half of Table 4, with the ATCs' mari-

tal anger as the outcome, the pattern was reversed, although the effects were not as strong. On the high-spouse-support evenings, greater workload was associated with a decrease in marital anger, and on the low-spouse-support evenings there was no relation between workload and marital anger. Thus, the marital withdrawal and anger responses to work overload were observed only on evenings during which the wives reported a relatively high level of spouse support.

Because some spouses tend to be supportive and some spouses tend not to be supportive, a within-subjects test of the moderating role of spouse support is very conservative. In this analysis, moreover, the high- and low-spouse-support days were selected from a pool of only 3 days for each couple. The high stability of the support ratings over the 3 daily report days (see intraclass correlation coefficients in Table 1) imposed a severe restriction of range in the variability of spouse support for each couple. Yet the interaction between daily levels of spouse support and workload was a significant predictor of day-to-day changes in marital behavior.

Discussion

This study was primarily designed to examine day-to-day changes in two marital behaviors as a function of objective measures of daily weather and traffic conditions at the airport, effectively ruling out reverse causation and inflated results due to third variables such as respondent biases. Indeed, it is difficult to imagine a variable that might influence, on the one hand, both airport weather and traffic, and on the other hand, marital behavior. Two out of three hypotheses were supported using the objective workload variables. Results involving the objective measures indicate that (a) high workload is associated with a subsequent decrease in active expressions of anger at home, and (b) spouse support moderates the association between workload and marital withdrawal. Higher levels of workload were followed by an increase in social withdrawal and less expression

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[6] Rather than indicating that a wife was less supportive on a low spouse-support day, it is possible to interpret a low spouse-support score as an indication that the wife did not perceive a need to provide support to the ATC that evening (i.e., a relatively low number of *true* responses because of many *not applicable* responses, not because of a high number of *false* responses). To test this possibility, a new spouse-support score was computed using the same items included in the My Supportive Behavior scale. Rather than sum the items rated as true descriptions of her behavior that evening, each wife's support score was recomputed as the ratio of the number of true statements to the sum of true and false statements. Thus, only statements considered applicable by the respondent were included as part of the new score. When the regressions reported in Table 3 were repeated, this time using the new spouse-support ratio scores, the results were very similar. The signs of the betas did not change, and except for one workload predictor (Low Visibility), the same interactions between workload variables and spouse support were statistically significant or approached significance.

[7] In the analyses that did not include the other outcome variable (Y2) as a control, there tended to be more highly significant increments in R^2 when the product terms were added to regressions predicting marital withdrawal, and higher p values (lower statistical significance) were associated with increments in R^2 when the product terms were added to regressions for marital anger.

of anger on evenings during which wives were supportive. These associations were not observed on relatively low-spouse-support evenings. Without the stringent criterion of objectively measured workload, the pattern of results was the same except for one additional finding: a significant overall association between high workload and marital withdrawal.

Findings based on wives' descriptions of the ATCs' behavior after work were fairly weak. Each of the first 2 hypotheses were at least marginally supported in only one out of four tests using spouses' ratings. In contrast, the third hypothesis was tested in analyses using wives' descriptions of their own supportive behavior, and the results were convincing. The difference is perhaps not surprising. A number of the anger and withdrawal items required a wife to draw inferences about her husband's internal state. Examples are "My partner was impatient" and "My partner was too tired to do anything." It seems likely that husbands were more accurate than their wives in rating items like these.

Evidence that ATCs' perceptions of their behavior were not confounded with their mood after work increases confidence in the accuracy of their marital reports. Controlling for after-work mood did not change the relation between daily workload and marital behavior. This finding also indicates that the effect of workload on marital behavior involves more than a simple spillover of mood from work to home. Different job stressors probably have different short-term effects on behavior. Interpersonal conflict and other events that provoke anger at work may be associated with an immediate spillover of anger into the home. However, overloads at work appear to be associated with decrements in the active expression of anger.

Social Withdrawal as a Recovery Behavior

More withdrawn and less aggressive behavior after a demanding day at work may be part of a single process. Under supportive conditions, social withdrawal may be a means of controlling internal and external cues, with the ultimate objective being recovery from stress, or the return to a baseline emotional and physiological state. Decreased emotional responsiveness, including fewer expressions of emotions such as anger, may be a by-product of this process.

Quiet solitary time may facilitate relaxation and unwinding from an elevated level of sympathetic arousal. This is more than rest to recover from fatigue. Controlling for self-reported fatigue after work did not change the relation between workload and marital behavior. There is a significant increase in ATCs' systolic and diastolic blood pressure during work on high-load shifts (Rose et al., 1978). Frankenhaeuser and her colleagues have identified a pattern of physiological unwinding that occurs *after returning home* from a stressful day at work. The unwinding process consists of a gradual decrement in heart rate, blood pressure, and levels of circulating catecholamines (Frankenhaeuser, 1979, 1981). Although the behavioral correlates of the unwinding response have not yet been studied, social withdrawal is one promising candidate.

Social withdrawal also allows someone who has been overloaded all day to avoid certain types of social stimuli at home that would further increase levels of emotional and physiological arousal. Blood pressure and heart rate have been found to

increase during even simple social conversation (Lynch, Thomas, Paskewitz, Malinow, & Long, 1982). Just as the phobic person avoids anxiety-arousing stimuli, an overloaded individual may withdraw from potentially arousing social stimuli in the current environment. Engaging in nonsocial activities, such as reading a magazine or watching television, may also help to distract oneself from thoughts and memories of stressful events at work (Kubey, 1986). Fewer opportunities than usual to become engaged in angry marital interactions might account for the observed decrease in active expressions of anger following a high-workload day. This interpretation of the results is indirectly supported by analyses showing that ATCs reported spending significantly less time with their wives after work shifts that they rated as busy and difficult.

Although they are not addressed in this article, there may be important individual differences, sex differences, and occupational differences in the use of social withdrawal. Individual variability in the extent to which people are arousal avoidant and in the intensity of their responses to minor daily events may influence the extent to which withdrawal occurs after a hard day at work (Larsen, Diener, & Emmons, 1986; Martin, Kuiper, Olinger, & Dobbin, 1987). The family responsibilities and level of support in the home environment of employed wives may not allow them to withdraw as easily as the men in this study did when they return home from a hard day at work. Evidence suggests that when their husbands have had a demanding day at work, wives compensate by increasing their workload at home, but that husbands do not respond in kind (Bolger et al., 1989). In another recent study, the physiological unwinding response was observed in male managers after a stressful day at work, but female managers did not show evidence of unwinding (Frankenhauser et al., in press). Finally, the work–family linkages found here may not generalize to less stressful occupations.

The Important Role of Support From a Spouse

The results of this study suggest that a spouse's emotional support is a necessary condition in the proposed process of recovery from overload. The increased social withdrawal and diminished anger responses to work overload were not observed on evenings during which there was a relatively low level of spouse support. This pattern of results, together with the preceding account, suggests that one possible mechanism by which spouse support operates to enhance well being is by facilitating a stressed partner's recovery through social withdrawal.

Under conditions of low support, it may not be possible to engage in the self-preoccupation required to recover. Perhaps under these circumstances the aroused individual engages in more social interaction than usual. This might account for the association observed on low-support evenings between high workload and decreased social withdrawal.

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