

FEELING THE HEAT: EFFECTS OF STRESS, COMMITMENT, AND JOB EXPERIENCE ON JOB PERFORMANCE

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We examine the relationships between bank branch employees' felt job stress, organizational commitment, job experience, and performance. Our findings are consistent with the attention view of stress. Employees with higher levels of affective commitment and higher levels of job experience channeled felt stress more effectively into sales performance. Felt stress had neutral to negative effects on performance for employees with lower levels of commitment and job experience. Commitment, like stress, was more strongly related to performance when employees had more job experience. The results suggest that consideration of moderators of the stress-performance relationship is important both theoretically and practically.

Restructuring of contemporary organizations has placed increasing pressure on front-line employees to contribute in measurable ways to their employers (Cappelli, 1999). To take one example, contemporary banks are transforming themselves from stodgy, service-oriented bureaucracies into retail-oriented financial stores, converting employees “from tellers to sellers” (Regini, Kitay, & Baethge, 1999). Such changes place workers in unfamiliar jobs, cause previously loyal workers to question their commitment to their employers, and challenge workers to perform under stress (Hunter, Bernhardt, Hughes, & Skuratowicz, 2001; Korczynski & Ott, 2005).

Our article investigates the relationships among stress, commitment, job experience, and workers' performance. Do workers who feel high levels of stress in their jobs perform more effectively? Does stress affect workers who are highly committed to their organizations differently from the way it affects workers who are less committed? Does stress

have different implications for workers who are new to their jobs than for those who are more experienced? Does stress affect the performance of workers who are both committed and experienced differently from the performance of those who are less committed and less experienced? These questions matter especially as organizations turn up the pressure on employees to perform.

The central contribution of our work follows from observations that the effects of stress (Jex, 1998) on job performance are likely to be contingent on other moderating factors and that the mixed and contradictory results of earlier studies can be attributed in part to these contingencies. We theorized that both organizational commitment and job experience are likely to affect the stress-performance relationship. Data from employees in branches of a large U.S. bank allowed us to examine these claims empirically.

THEORY AND HYPOTHESES

As Chajut and Algom noted, “It is difficult to overstate the practical significance of resolving the question of performance under stress,” (2003: 231) but much remains to be learned about the relationship between stress and job performance. Our discussion draws chiefly on the “attention view” of stress (Easterbrook, 1959), for which there has been extensive empirical support in a laboratory setting (Chajut & Algom, 2003) but less evidence in the workplace. The aspects of our study that are novel both theoretically and empirically are those concerning interactive relationships: we consider whether the effects of stress on employee perfor-

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mance depend on workers' levels of affective commitment to their organization and on workers' experience in their jobs. This focus, however, also suggests an additional interaction of interest. The interdependence between commitment and experience is subject to some controversy in the literature; our study design also allows us to shed new empirical light on this interaction.

Main Effects of Stress

Generally, stress refers to an emotional experience associated with nervousness, tension, and strain (cf. Cooke & Rousseau, 1984). The literature on stress features a variety of approaches to its conceptualization, its antecedents, and its effects. Stressors can be understood as "stimuli that evoke the stress process" (LePine, Podsakoff, & LePine, 2005: 764). Workers subject to similar stressors may differ in the extent to which they feel nervousness or tension as a result of personal experiences or happenings in their work setting (Parker & DeCotiis, 1983). These kinds of feelings can be described as "strain" (Van Dyne, Jehn, & Cummings 2002) or as "felt job stress" (Motowidlo, Packard, & Manning, 1986; Parker & DeCotiis, 1983). Felt job stress refers to a sense of time pressure, anxiety, and worry that is associated with job tasks. The mere presence of stressors does not automatically lead to such felt stress. Individuals may endure stressors or dissipate their effects either cognitively or behaviorally, and thus felt job stress can be distinguished both from stressors and from physiological symptoms.

The attention theory of stress suggests that there should be a positive association between felt job stress and job performance. Extensive experimental research supports Easterbrook's (1959) argument that although stress depletes an individual's resources, it paradoxically has the effect of concentrating remaining resources on the task at hand (Huguet, Galvaing, Monteil, & Dumas, 1999). Yet workplace-based evidence for a relationship between felt job stress and job performance is weak and inconsistent (Beehr, 1995; Jex, 1998). In part this is the result of inadequate attention to the sources of stress. LePine and his colleagues (2005) showed through meta-analysis that stressors that are hindrance-oriented (e.g., organizational politics, red tape, role ambiguity) are negatively related to job performance, but challenge-oriented stressors (e.g., high workload, time pressure, job scope) motivate workers and can be positively related to job performance even as they evoke other strains such as fatigue and exhaustion.

There are likely to be limits to the range, even in

response to challenges, within which increased stress results in the productive redirection of attention. Researchers have long suggested such limits: Yerkes and Dodson (1908) hypothesized an inverted U-shaped relationship between stress and performance. LePine et al. (2005) argued that countervailing negative effects of strains can accompany the positive effects of felt stress resulting from challenges to perform, even when hindrance stressors are not present. As individuals devote increasing attention to symptoms of stress such as fatigue, they may become less able to give the focused attention to the task at hand that, attention theory suggests, will drive performance.

The logic of the attention approach implies not just limits to the stress-performance relationship, but possible moderators of that relationship. Attention theory distinguishes between job or task attributes that are to be responded to and attributes that are to be ignored. Individuals who feel stress deploy their attention differentially, so that performance on attributes of the dimensions requiring a response may increase even as responses to ignorable dimensions diminish sharply (Matthews & Margetts, 1991). The attention approach is particularly salient when an assigned task has a high priority for an individual and when the task is familiar to the individual (Easterbrook, 1959; Matthews & Margetts, 1991). Thus, in an organizational setting, organizational commitment and job experience are likely to moderate the stress-performance relationship. Commitment (which leads individuals to strive toward organizational goals) and experience (which breeds task familiarity) each should lead individuals to focus more heavily on job performance under stress. We therefore turn next to discussions of these potential moderators and associated hypotheses regarding their effects on performance. In doing so, we also review briefly what is known about the main effects of these variables.

Commitment as a Moderator of the Stress-Performance Relationship

Main effects of commitment. Organizational commitment has been studied extensively and has been conceptually linked to work outcomes such as job performance and absenteeism. At least six meta-analyses address the relationship between commitment and performance (Cohen, 1991; Jaramillo, Mulki, & Marshall, 2005; Mathieu & Zajac, 1990; Randall, 1990; Riketta, 2002; Wright & Bonett, 2002). Despite extensive research and strong theoretical reasons to expect that individuals with higher levels of organizational commit-

ment will perform better, evidence of this relationship is, surprisingly, mixed (Mowday, Porter, & Steers, 1982; Wright & Bonett, 2002).

Refining the commitment construct helps to resolve some of the conflicting results. For example, many studies of the commitment-performance relationship have used a commitment construct that encompasses both affective and calculative dimensions (Siders, George, & Dharwadkar, 2001). Studies separating these two dimensions indicate that job performance should be influenced more heavily by affective commitment, "the relative strength of an individual's identification with and involvement in a particular organization" (Mowday, Porter, & Steers, 1982: 27) than by calculative commitment, which encompasses investments in continued employment and tends to influence turnover (Meyer, Allen, & Smith, 1993). Following this reasoning, we focus on affective commitment, which has been shown to be positively related to organizationally rewarded job performance (Siders et al., 2001).

The stress-commitment interaction. Jex (1998), in calling for more research on factors that affect the stress-performance relationship, pointed specifically to organizational commitment as a potential moderator of this relationship. The attention approach supplies the rationale for such an effect: according to attention theory, performance will be influenced by the extent to which workers under stress identify key work tasks as attributes of a job that merit the expenditure of scarce resources, rather than as distractions to be ignored.

Commitment influences job performance through identification and internalization. Affectively committed individuals identify with an organization and therefore adopt attitudes and behaviors endorsed by the organization in order to demonstrate a satisfying, self-defining relationship with it (Becker, Billings, Eveleth, & Gilbert, 1996). Further, they actively accept the values and goals of the organization and exert effort toward these goals (Mayer & Schoorman, 1992; Porter et al., 1974). Workers who are highly committed to their organization are therefore more likely, when under stress, to direct their efforts toward important work tasks and to reduce resources devoted to other activities. Employees with low commitment, in contrast, may respond to felt stress by ignoring work tasks and withholding effort (Jamal, 1984, 1985).

Several studies have provided indirect support for the idea that commitment influences the direction of attention under stress. Begley and Czajka (1993) showed that stress had negative effects on job satisfaction and a composite measure of job

"displeasure" only when employees also had low organizational commitment. Similarly, Siu and Cooper (1998) found that commitment moderated the effect of felt job stress on job satisfaction as well as on self-reported psychological distress, such as depression. And Jamal (1985) observed negative relationships between felt stress and supervisor-assessed job performance for individuals with low commitment but not for those with high commitment; however, he did not formally test the differences between the two groups. No prior research has specifically tested the effect of the stress-commitment interaction on job performance.

Hypothesis 1. Affective organizational commitment moderates the relationship between felt stress and job performance. Stress is positively associated with performance when commitment is relatively high and negatively associated with performance when commitment is relatively low.

Job Experience as a Moderator of the Stress-Performance Relationship

Main effects of job experience. Human capital theory (Becker, 1962) suggests that more experienced employees perform better than employees new to a job, because they accumulate skills in the job. Tenure in a job is positively associated with performance because "experience provides the medium for learning" (Schmidt, Hunter, & Outerbridge, 1986: 167). Schmidt and Hunter (2004) reviewed the extensive evidence in support of the link between experience and performance. Experience has a bigger impact on performance when workers have relatively low tenure and are still learning their jobs; the positive relationship between experience and performance typically declines as workers gain experience (Schmidt & Hunter, 2004).

The stress-job experience interaction. The attention view suggests that experience and stress are likely to influence job performance jointly. Experience facilitates the cognitive simplification of job-related routines and behaviors (Earley, Lee, & Hanson, 1990). Baron (1986) demonstrated that felt stress is more likely to facilitate aspects of performance that have been well learned, because individuals under stress are more likely to direct their attention to tasks that they understand. Generally, because job experience is associated with learning and increased competence, experienced employees under stress are more likely than inexperienced employees to direct their attention to tasks that are central to their job.

Van Dyne and her colleagues (2002), for example, found that hair stylists performed better under high job stress, theorizing that the stylists focused on habitual actions. Van Dyne et al. did not, however, analyze the extent to which job experience moderated the stress-performance relationship, and the mean tenure of the workers they studied was quite high (six years). The attention view suggests that less experienced employees could be less successful under stress. As Jex (1998) noted, less competent employees are less able to direct their limited resources toward job tasks. Until employees have accumulated enough experience to understand how to do their jobs, stress may be negatively associated with performance. As competence grows with experience, the negative effects of felt stress on performance should wane.

Although much of the research examining the effects of experience has used job and organizational experience interchangeably, these two kinds of experience have differing conceptual implications with respect to our variables of interest and are thus not simple proxies for one another. Our theory suggests that effects are more likely to result from job experience than from broader organizational experience. For example, tenure in a specific job is more closely associated with the accumulation of skills and knowledge required for job performance than is overall organizational tenure (Schmidt & Hunter, 2004), and thus job tenure is more likely to enable individuals to redirect resources to job tasks under stress. Following the logic of attention theory, we suggest that job experience moderates the effects of felt stress on performance:

Hypothesis 2. Job experience moderates the relationship between felt stress and job performance. Stress is positively associated with performance when job experience is relatively high and negatively associated with performance when job experience is relatively low.

The Job Experience–Commitment Interaction

In contrast to the scant empirical research into moderators of the effects of stress on workplace performance, the theoretical and empirical literature on the commitment-performance relationship and its moderators, including experience (Wright & Bonett, 2002), is extensive. Here we depart briefly from our focus on attention theory and felt stress to consider the interaction between job experience and commitment, for two reasons. First, even after many studies and several meta-analyses, evidence on the interactive effects of job experience and commitment on performance remains mixed. Our

study sheds additional light on the controversy. Second, we will return to attention theory in considering a three-way interaction between stress, commitment, and experience, and it is essential to include all lower terms (two-way interactions as well as main effects) in modeling such interactions (Aiken & West, 1991).

Cohen (1991) theorized that the accumulation of skills through experience positively moderates the effects of commitment on performance, showing that the commitment-performance relationship was stronger in late career than in mid career. Cohen's meta-analysis did not distinguish affective commitment from other forms of commitment, but that of Riketta (2002) specifically studied moderators of the relationship between affective commitment and job performance and, in contrast to Cohen's, identified no moderating effects of tenure. Wright and Bonett's (2002) meta-analysis, in contrast to both Riketta's and Cohen's results, uncovered significant, *negative* moderating effects of experience on the commitment-performance relationship.

The mixed results of these studies are in part explicable with reference to measurement issues, with respect both to distinctions between job and organizational experience and to the use of objective and subjective performance measures. We return to these issues later in the article. For now we note that more committed employees are more likely to identify with organizational goals and to exert effort toward achieving such goals and that, as employees gain experience in their jobs, they acquire skills that enable them to perform job tasks central to these aims. This framework suggests that the relationship between affective commitment and performance outcomes will strengthen with greater job experience, at least over the period in which individuals continue to accumulate human capital that is relevant to job performance.

Hypothesis 3. Job experience moderates the relationship between affective organizational commitment and job performance. The positive relationship between commitment and performance is of the greatest magnitude when job experience is high.

The Three-Way Interaction between Stress, Commitment, and Experience

Per the logic of attention theory, higher job performance under stress results when individuals direct scarce resources to tasks that are integral to job performance and ignore tasks that are not central to performing well on the job. From Hypothesis 1, we expect stress to lead to more effective channeling of

attention into performance-related tasks when individuals are committed to their organization. This redirection of attention should be further enhanced to the extent that individuals have experience in their jobs that is such that they understand which tasks are central to performance. The interaction between commitment and stress should therefore emerge more clearly when experience is high. The relative absence of job experience, in contrast, should reduce the positive effects of affective commitment on the stress-performance relationship. Under stress, even highly committed workers will be less able to direct their attention to tasks required to generate performance outcomes if they are not sure which tasks these are, or how to do them. Thus, attention theory can be extended to make the case for a three-way interaction between stress, commitment, and experience and job performance.

Hypothesis 4. Job experience moderates the relationship between felt job stress, affective commitment, and job performance. The (expected) positive interaction between stress and commitment is of the greatest magnitude when job experience is high.

METHODS

Organizational Setting

Our research is set in "National Bank," a large American financial services firm that operates bank branches in many states. We studied National over a three-year period between 1997 and 2000, observing employees and conducting interviews and surveys in five states. Our study coincided with a major restructuring of the branch system at National. The redesign centralized and standardized both products and processes over regions; many branch employees spent more time on sales activities and less on routine account servicing after the redesign.

We studied branch employees in three jobs. Workers in *customer service representative* positions performed a mix of sales and service tasks. Compared to the customer service representatives, *financial representatives* had expertise in a wider range of financial products and spent more time on sales. *Personal bankers* had the broadest knowledge and sales responsibilities and did less routine servicing than workers in either of the other two jobs. Both managers and employees suggested in interviews that a typical employee came up to full speed in any of these jobs in one to two years. The jobs required selling financial products to existing customers (not "cold calling" prospects). During

our study, the organization revised sales performance targets several times and tied pay more heavily to sales performance.

Several features of this work environment had implications for our study. First, workers in these jobs reported heavy workloads, time pressure, and anxiety stemming from sales performance requirements; success in hitting targets led to rewards. Such conditions meet the criteria for "challenge" stressors described by LePine et al. (2005). Second, the challenging aspects of job performance were objectively measured and clearly identifiable. Information from the sales tracking system was accessible to all employees, so that workers could observe both their own performance levels and those of other workers. Third, restructuring and the emphasis on sales performance changed the terms of the psychological contract (Dabos & Rousseau, 2004) at National Bank. Our interviews suggested that prior to restructuring, most employees had expected the bank to provide stable employment, with the bank in turn depending on a committed workforce to provide reliable customer service. With restructuring, the emphasis on sales success led some workers to question their commitment to National Bank. Fourth, nearly all of the workers we studied had only modest amounts of experience in the specific jobs they held at the time of the study. Many of the workers we studied were long-term bank employees, but as a result of the restructuring program, most of these workers were somewhat new to their positions.

Data Sources

We assembled data for our study from multiple sources. We sent surveys to 419 employees responsible for sales in National Bank branches in five states. For each branch, we sent surveys in bulk to a branch manager, accompanied by instructions to distribute labeled survey envelopes to individual employees. Each respondent then returned his/her survey directly to us. A pilot survey in one of the five states in late 1997 achieved a response rate of 60 percent. In a revised version of this survey, we omitted some demographic questions (those asking for identification of gender, race, position, and age), in an attempt to increase the response rate. This effort was successful; response rates averaged 76 percent for the second survey, administered in early 1998. The surveys were confidential but not anonymous. Each survey was marked to enable matching to archival personnel records (our source of demographic information, hiring dates, and starting dates for specific jobs) and to sales records. After matching, we had usable data for 270 employ-

ees—an effective response rate of 64 percent of the sales employees in the branches we studied.

Measures

Performance measurement. Access to objective, comparable measures of individual employee performance is an important aspect of our study. The mixed findings of prior research on the stress-performance relationship stem in part from studies' reliance on subjective assessments of performance (Jex, 1998). Further, to the extent that supervisory ratings of job performance reflect stress-related behaviors (Murphy & Balzer, 1989), findings from studies such as Jamal's (1985) may be difficult to generalize to performance on objectively measurable job tasks. Similarly, with respect to commitment, subjective assessments of performance are vulnerable to "halos," similarity error, and other spillovers (Meyer et al., 1993; Siders et al., 2001). Thus, studies that address the relationship of commitment to subjective and objective assessments of performance have produced mixed results (e.g., Mathieu & Zajac, 1990; Riketta 2002; Wright & Bonett, 2002). Though the prior work suggests that affective commitment is clearly related to higher supervisory ratings, relatively few studies of commitment feature objective performance measures that are comparable over a large group of employees (Jaramillo et al., 2005).

Dependent variables. We obtained monthly sales performance data from the sales-tracking system at National Bank for July 1997 through June 2000. For each branch employee the system provided data on sales of financial products such as certificates of deposit, annuities, and investment accounts. We examined two dependent variables. First, *mean monthly products sold*, an unweighted aggregate measure of the products each employee sold each month, was a parsimonious measure of individual sales performance. We also examined *mean monthly revenue points*, a measure that the bank derived by assigning weights to sold products. The formula for revenue points changed frequently to reflect the shifting importance of different products to National's sales strategy. Our measure of revenue points provided the basis for incentive compensation. Our analysis focuses first on the simpler products sold measure. We report analyses for revenue points as a robustness check.

Independent variables. *Felt stress* was self-reported in the employee survey. Parker and DeCotiis (1983) found that, using a 13-item scale, they could separate felt stress into two distinct dimensions: time stress and anxiety. Subsequent research using the Parker and DeCotiis scale has typically indi-

cated that felt stress has a single dimension (Jamal, 1984, 1985; Van Dyne et al., 2002; Xie & Johns, 1995). Bank management encouraged us to make the survey as short as possible, and we thus chose to use a subset of the 13 items. We began by eliminating 4 items with relatively low factor loadings as reported by Parker and DeCotiis. Interviews with managers and workers suggested that 6 of the remaining 9 items (2 from the anxiety scale and 4 from the time stress scale) had especially high face validity at National Bank: "My job gets to me more than it should," "There are lots of times when my job drives me right up the wall," "Working at [National] makes it hard to spend enough time with my family," "Working at [National] leaves little time for other activities," "I feel like I never have a day off," and "Too many people at my level in [National] get burned out by job demands." The final survey used a seven-point Likert-style scale to assess agreement with each of these six statements.

Factor analysis of these six items suggested a single dimension for felt stress. The first factor in a principal factor analysis explained over 90 percent of the variance. This result was consistent with past research. We therefore combined the six items into a single scale, and reliability for this scale as indicated by Cronbach's coefficient alpha was .92. Our interviews consistently confirmed that the principal source of this stress was the pressure to sell. Reinforcing this view, the mean among nonsales employees (not studied in this research) who completed the same survey items was 3.59 on the seven-point felt stress scale, compared with a mean score of 4.69 for the sales employees who made up the sample in this study.

We measured *affective commitment* to the organization with a six-item, seven-point Likert-style scale adapted from Allen and Meyer (1990): "I would be very happy to spend the rest of my career with [National]," "I enjoy discussing [National] with people outside it," "I do not feel like 'part of the family' at [National]" (reverse-coded), "I feel a high degree of similarity between myself and other employees in [National]," "I do not feel a strong sense of belonging to [National]" (reverse-coded), and "Generally, I feel that I am like the other employees in [National]." Cronbach's alpha for this scale was .72.

From personnel files, we measured job experience as *job tenure*, denominated in years, starting from the year the employee began the job that he/she held at the time of the survey.

Control variables. We controlled for individual, organizational, and environmental features that might be associated with performance and with our study variables. From personnel records, we ob-

tained information on the sex and race of employees. *Female* and *white* were dummy variables for these characteristics. To distinguish between organizational and job experience, we included *organizational tenure*, in years, calculated from the date of hiring into National Bank indicated in personnel records. We also controlled for the three different job categories; *financial representative* and *personal banker* were dummy variables, with *customer service representative* the omitted category. Branches in each of the five states in the study reported through different management structures, and thus we included state dummy variables. Because branches chiefly served local areas, characteristics of those areas might have influenced commitment and stress on the one hand, and sales performance on the other. We thus controlled for characteristics of local neighborhoods. We matched census data to branch zip codes and included in our models the median household income for a neighborhood and the shares of residents in the neighborhood who were over 65 years old, white, and students (these variables were significant as a group in predicting individual sales performance).

Modeling

We have data on commitment and stress only as of the date of the survey. Job stress is likely to be felt relatively constantly by a particular employee; indeed, Beehr, Jex, Stacy, and Murray (2000) described it as “chronic.” Commitment is also a relatively stable construct—in contrast with, for example, job satisfaction (Mayer & Schoorman, 1992). We did have monthly sales performance records and, wishing to use as many of these data as we could, we matched the survey responses to sales records for each month following the survey month (to a maximum of two years). Our dependent variables were monthly counts of products sold and revenue points for a maximum of two years following the survey. Some employees changed sales jobs after the survey. Job changes raise the possibility that the conditions leading to reported stress changed and may have been associated with recalculations of organizational commitment. We excluded from analysis any performance observed after such a job change.

In five of our observed months, system problems prevented reporting of performance data for some employees. In four cases, this situation concerned less than 10 percent of our sample, but in the fifth case, it affected nearly half the sample. These data were missing nonrandomly—that is, we failed to capture performance for all employees in a given

branch in month X. If monthly data were missing, then sales that should have been credited to a given employee for that month were never captured (that is, they do not appear in later months). The missing months suggested that averaging or smoothing would be less desirable than estimating predictors of sales for each month for which we had data. Actual observations averaged 12.4 months per employee. In other words, for the average employee in our sample, we had monthly data on performance for about one year in the job the employee held at the time of the survey.

We employed a population-averaged general estimating equations (GEE) model (Ballinger, 2004; Hardin & Hilbe, 2003) using Stata 9.0 to predict performance for each employee-month. The model took the following form:

$$E[y_{it}] = \mathbf{x}_{it}\boldsymbol{\beta},$$

where y_{it} represented the number of products sold for employee i in month t , \mathbf{x}_{it} was a vector of covariates for the i th employee at time t , and $\boldsymbol{\beta}$ was a vector of regression parameters. Some of the \mathbf{x} 's varied over time. We controlled for seasonal effects and time-specific idiosyncrasies by including a dummy variable for each month in the study. A first-order autoregressive covariance structure (Ballinger, 2004) was specified. Results reported below were robust to this choice; estimation using the Huber-White empirical variance estimator, which would yield valid standard errors even if the within-group correlations were not those that we specified (Wooldridge, 2002), produced similar results.

We tested our hypotheses by constructing interaction terms after centering our variables of interest (Aiken & West, 1991). Centering reduces multicollinearity without altering the structure of the relationships between variables and allows direct interpretation of coefficients in both baseline and interaction equations (Jaccard, Turrisi, & Wan, 1990). We centered stress and commitment by standardizing each at a mean of 0 and standard deviation of 1. We centered job tenure by subtracting the pooled sample mean (1.48 years) from each observation. Although we accounted for nonlinearity by including quadratic terms for organizational tenure, job tenure, and felt stress, we do not report results for models of higher-order interactions (e.g. stress \times tenure squared), as our simple multiplicative interactions and quadratic terms are likely to capture most of the effects in the proposed hypotheses (Aiken & West, 1991; Cortina, 1993).

RESULTS

Table 1 reports descriptive data and correlations for our sample. Women comprise 85 percent of the workers in the sample; age ranges from 20 to 78 years, with a median of 37. The mean employee in our sample had worked at National Bank for over 10 years, and at the time of our survey had occupied his/her current job for slightly less than a year. Two of our main variables of interest, commitment and felt stress, are strongly negatively correlated ($r = -.42$), but diagnostics suggest that this presents no serious problems of interpretation. As expected, our two performance measures are positively correlated ($r = .74$).

Table 2 reports population-averaged regression coefficients for models predicting sales performance, with products sold as the dependent variable. The first column displays results for a control model. Job categories are strongly associated with sales performance: employees in the personal banker position, which concentrates most heavily on sales, sold more products per month than those in other categories. Model 1 suggests that organizational experience may be valuable but at a declining rate; the linear effect is nearly statistically significant at conventional levels ($p = 0.051$) and positive, but the quadratic term is significant and negative.

Model 2 adds job tenure to the estimation. Although we expected job experience to be positively associated with performance, neither organizational nor job tenure predict performance when both are included in the model. Four employees in the sample with job tenures of more than four years

had a disproportionate influence on these results. Reestimation excluding these outliers yielded a significant, positive coefficient on job tenure, and a significant, negative coefficient for tenure squared, altering no other results. Although job tenure did not appear to explain performance for these four long-tenured employees, we had no other reason to exclude them from our analyses, and thus all analyses reported below include them.

Model 3 of Table 2 shows that the relationship between affective commitment and job performance is positive. The inclusion of felt job stress in the model reported in model 4 gives a better sense of the independent effects of commitment, since stress and commitment are related negatively. The stress coefficient, like that for commitment, is positively related to performance. In model 5 we report results obtained when a quadratic term for felt stress was added, modeling the inverted U-shape of the Yerkes-Dodson model (1908). The coefficient on this term is negative but not statistically significant, suggesting that, within the range of stress felt by survey respondents at National Bank, there are not diminishing performance returns to stress. We estimated all subsequent models both including and excluding the stress squared term. We report results from the models excluding the term because inclusion of a quadratic complicates interpretation of effects of interactions; this exclusion does not change any of our substantive conclusions.

Models 6 through 10 test our research hypotheses. Results in model 6 are consistent with Hypothesis 1: the stress-commitment interaction term is positive and statistically significant. Model 7

TABLE 1
Sample Characteristics and Correlations^a

Variables	Mean	s.d.	1	2	3	4	5	6	7	8	9	10
1. Mean monthly products sold	73.7	32.5										
2. Mean monthly revenue points	32,113.	15,313.	.74**									
3. Organizational tenure	10.3	8.1	-.03	-.04								
4. Job tenure	0.88	0.80	-.07	-.11	.12							
5. Female	0.85	0.36	-.05	-.11	.26**	.13*						
6. White	0.79	0.41	.13*	.10	.02	-.08	-.02					
7. Personal banker	0.44	0.50	.35**	.54**	-.11	-.28**	-.14*	.09				
8. Financial representative	0.14	0.35	.06	-.16**	-.06	.15*	-.00	.11	-.36**			
9. Customer service representative	0.42	0.49	-.40*	-.43**	.16**	.18**	.15*	-.17**	-.75**	-.35**		
10. Felt stress	4.69	1.60	.08	-.00	.08	.07	.13*	.03	.14*	.02	-.16*	
11. Affective commitment	4.85	1.11	.14*	.09	-.02	.01	.06	.11	.02	-.03	.00	-.42**

^a $n = 270$ employees. Mean tenure in job and with organization are reported in years for the month in which the survey was administered. Products sold and revenue points are monthly means for employee for all months with nonzero observations during the study period. Sex and race are dummy variables with 1 equal to "female" and "white," respectively.

* $p < .05$

** $p < .01$

TABLE 2
Estimates from Population-Averaged Linear Models for Sales Performance Measured as Products Sold^a

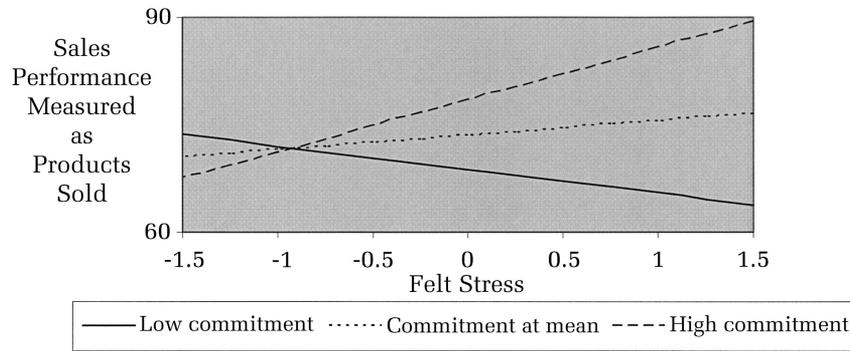
Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Female	-1.71 (3.94)	-1.91 (3.94)	-2.55 (3.89)	-3.65 (3.91)	-3.23 (3.94)	-3.33 (3.85)	-3.47 (3.89)	-3.41 (3.89)	-2.57 (3.78)	-2.62 (3.76)
White	1.03 (3.73)	0.90 (3.75)	-0.76 (3.73)	-1.38 (3.73)	-0.91 (3.77)	0.30 (3.70)	-1.45 (3.71)	-1.63 (3.72)	-0.30 (3.64)	-0.17 (3.62)
Personal banker	63.04** (10.50)	70.30** (11.94)	71.77** (11.80)	71.80** (11.75)	71.12** (11.77)	69.57** (11.59)	71.57** (11.69)	72.37** (11.71)	70.14** (11.38)	71.51** (11.36)
Financial representative	20.00** (4.95)	19.41** (4.98)	20.91** (4.93)	20.50** (4.92)	20.29** (4.93)	19.60** (4.86)	20.91** (4.90)	20.99** (4.91)	21.33** (4.79)	21.90** (4.78)
Organizational tenure	1.09 (0.56)	0.85 (0.59)	0.82 (0.58)	0.54 (0.60)	0.47 (0.60)	0.64 (0.58)	0.57 (0.59)	0.46 (0.60)	0.55 (0.58)	0.58 (0.58)
Organizational tenure squared	-0.04*	-0.03 (0.02)	-0.03 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.03 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.03 (0.02)
Job tenure	4.68 (3.68)	4.97 (3.68)	4.97 (3.63)	4.69 (3.62)	4.86 (3.63)	4.62 (3.57)	4.98 (3.61)	5.11 (3.62)	5.94 (3.53)	7.50* (3.63)
Job tenure squared	-0.80 (0.86)	-0.98 (0.86)	-0.98 (0.85)	-0.92 (0.85)	-0.94 (0.85)	-0.76 (0.84)	-0.76 (0.85)	-1.38 (0.87)	-1.39 (0.85)	-1.47 (0.85)
Affective commitment			4.73** (1.40)	6.10** (1.55)	6.03** (1.55)	4.64** (1.57)	5.99** (1.54)	6.40** (1.55)	4.96** (1.55)	4.94** (1.54)
Felt stress				3.30* (1.62)	2.71* (1.75)	1.81 (1.64)	3.46* (1.62)	3.23* (1.62)	2.02 (1.62)	1.79 (1.61)
Felt stress squared					-1.20 (1.31)					
Felt stress × commitment						5.37** (1.37)			5.28** (1.34)	5.56** (1.34)
Felt stress × job tenure							2.99 (1.65)		5.96** (1.83)	5.22** (1.87)
Commitment × job tenure								3.57* (1.63)	6.28** (1.80)	6.08** (1.80)
Felt stress × commitment × job tenure										2.64 (1.48)
Wald chi-square	538.6	556.5	563.93	562.8	563.93	587.1	568.6	569.9	613.0	618.7
df	42	45	47	46	47	47	47	47	49	50
Probability greater than chi-square for additional variables	0.00**	0.00**	0.36	0.04*	0.36	0.00**	0.07	0.03*	0.00**	0.08
			Compared to model 5	Compared to model 9						

^a $n = 3,347$ observations for 270 employees. Standard errors are in parentheses. The omitted category is a male customer service representative who is not white. All models include a constant, dummies for individual months and five regions, and characteristics of the local population (median income, share of college students, share of population over 65, share of population that is non-Hispanic white).

* $p < .05$

** $p < .01$

FIGURE 1
Effects of Felt Stress on Performance at Different Values of Commitment



shows a positive coefficient for the interaction between job tenure and felt stress, as predicted in Hypothesis 2, but the term is statistically insignificant at conventional levels ($p = 0.071$). Model 8 introduces the interaction between commitment and job tenure. This interaction is, as predicted by Hypothesis 3, positive and statistically significant. The results reported in model 9 reflect inclusion of all three two-way interaction terms: here, each interaction is positive and statistically significant at conventional levels, suggesting support for Hypotheses 1, 2, and 3. Model 10 of Table 2 reports results for our testing Hypothesis 4 by adding a three-way interaction between felt stress, commitment, and job tenure. The three-way interaction term is positive, as expected, but it is not statistically significant at conventional levels ($p = 0.075$). Coefficients on the other interaction terms change only slightly from model 9 to model 10.

We illustrate the results presented in model 9 with three figures. Figure 1 displays the estimated felt stress–performance relationships at low, medium, and high levels of commitment. At a level of commitment one standard deviation above the

sample mean, the line slopes sharply upward. At the sample mean, the slope is relatively flat, and at one standard deviation below the sample mean for commitment, the stress–performance line slopes down. Figure 2 displays the interaction between felt stress and job tenure with three lines, representing employees with a half year, one and a half years, and two and a half years in their jobs. At a half year of job tenure, felt stress is negatively related to products sold. With more experience, the slopes of the lines are positive: the higher the job tenure, the greater the slope. Similarly, Figure 3 illustrates the interaction between commitment and job tenure. Here the slope is upward and steep at two and a half years of experience, but for relatively new employees, the line slopes slightly downward.

Our research hypotheses suggested that the effects of stress on performance would vary in direction at differing levels of commitment and job experience. In models (such as those reported in Table 2) that include interaction terms, the marginal effects of moderating variables may vary with the values of the moderators (Aiken & West, 1991).

FIGURE 2
Effects of Felt Stress on Performance at Different Levels of Job Tenure

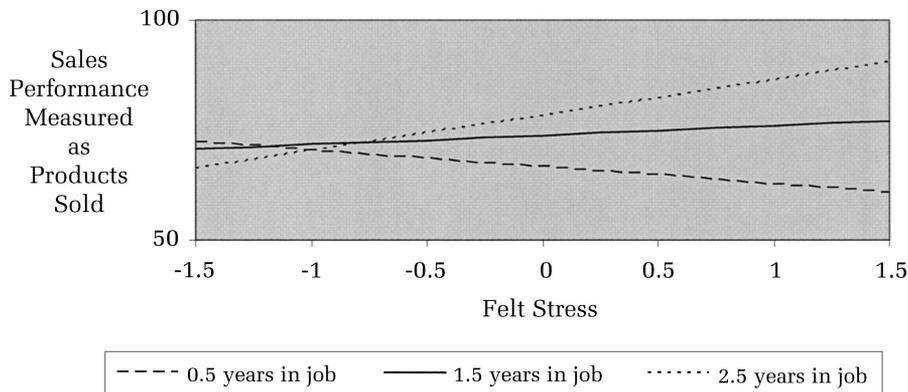
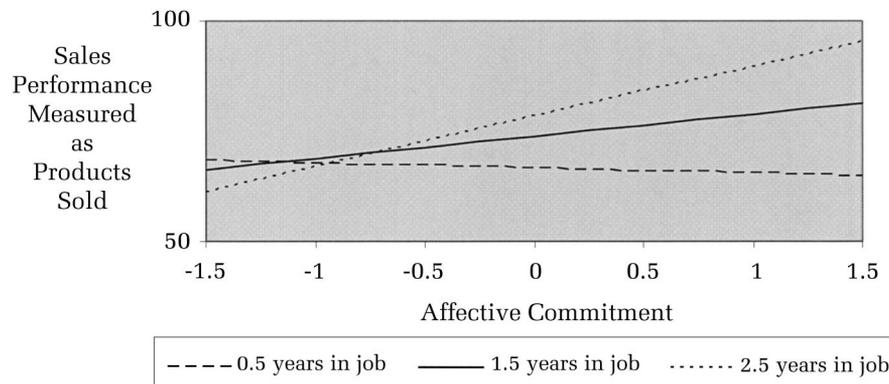


FIGURE 3
Effects of Commitment on Performance at Different Levels of Job Tenure



We derive marginal effects of felt stress on sales performance at varying levels of commitment from model 9 in Table 2. These effects, reported in Table 3, are the slopes of the lines displayed in Figure 1, plus slopes at very low and very high levels of commitment. Although the effects of stress on performance at low and medium levels of commitment are statistically insignificant, the effect of felt stress on performance at a high level of commitment is positive and statistically significant. At very high values of commitment, the estimated influence of felt stress is especially strong.

Table 4 reports estimated marginal effects of felt stress and commitment on sales performance at levels of job tenure ranging from zero to three years. These results, which are consistent with those displayed in Figures 2 and 3, show that marginal effects of felt stress and commitment on performance are positive and significant for employees with high levels of job experience. As shown in row 1 of Table 4, estimates of the effects of felt stress on sales performance for relatively new employees are negative, though statistically insignificant for all but the newest. Only at two

years of job experience do positive effects of felt stress on sales performance emerge. Row 2 of Table 4 shows that for employees with no job experience, the estimated effects of commitment on performance are statistically insignificant. As with felt stress, positive effects of commitment emerge at higher levels of job experience—this time, at about the pooled mean.

The sales performance effects we identify are meaningful both statistically and in real terms. Half a standard deviation increase in felt stress, for example, translates here to about 0.8 on a seven-point Likert scale. Table 3 shows that for a relatively highly committed employee, such an increase in felt stress would be associated with 3.65 additional products sold per month, or about 5 percent higher sales. For workers at very high commitment levels, an increase in felt stress of one standard deviation is associated with 12.6 additional products sold per month, or 17 percent more than what would otherwise be expected. Effects can also be calculated from Table 4. For example, at two years of job tenure, an increase of one unit (one standard deviation) in the stress scale is associated with more

TABLE 3
Marginal Effects of Felt Job Stress on Sales Performance Measured as Products Sold by Level of Affective Commitment^a

Variables	Very Low Commitment: 2 s.d. below Sample Mean	Low Commitment: 1 s.d. below Sample Mean	Medium Commitment: at Sample Mean	High Commitment: 1 s. d. above Sample Mean	Very High Commitment: 2 s.d. above Sample Mean
Marginal effect of felt stress	-8.55* (3.44)	-3.27 (2.33)	2.02 (1.62)	7.30** (1.85)	12.59** (2.79)

^a Values are slope coefficients (with standard errors in parentheses) derived from the linear model reported in Table 2, model 9, for the specified level of commitment (with all other variables held constant at the sample mean).

* $p < .05$

** $p < .01$

TABLE 4
Marginal Effects of Felt Job Stress and Commitment on Sales Performance
Measured as Products Sold by Level of Job Tenure^a

Variables	Job Tenure in Years						
	0	0.5	1	1.5	2	2.5	3
Marginal effect of felt stress	-6.80* (3.08)	-3.82 (2.35)	-0.84 (1.79)	2.14 (1.62)	5.12** (1.92)	8.10** (2.54)	11.08** (3.29)
Marginal effect of commitment	-4.34 (2.97)	-1.20 (2.25)	1.94 (1.71)	5.08** (1.55)	8.22** (1.87)	11.36** (2.49)	14.50** (3.25)

^a Values are slope coefficients (with standard errors in parentheses) derived from the linear model reported in Table 2, model 9, for the specified level of job tenure (with all other variables held constant at the sample mean).

* $p < .05$

** $p < .01$

than 5 additional products sold per month. Similarly, a one-unit movement on the commitment scale for two-year employees is associated with over 8 additional products sold per month.

In Table 5, we report results for models with revenue points as the dependent variable. Because this variable takes on large values, we improved model fit by taking the natural logarithm of revenue points for each observation. Models 1–6 in Table 5 reveal results for revenue points that are generally consistent with those reported for products sold in models 1 and 6–10 in Table 2. Some small differ-

ences exist. The effect of the three-way interaction between felt stress, commitment, and job experience on revenue points is statistically significant at conventional levels, unlike the effect on products sold. Further, the positive main effects of commitment on performance and of stress on performance that are observable with products sold as the dependent variable are not observable when performance is measured by revenue points.

We performed further checks on the robustness of the results presented in Tables 2 through 5 by estimating models with interaction terms between

TABLE 5
Estimates from Population-Averaged Linear Models for Sales Performance Measured as Revenue Points^a

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Female	-0.19* (0.08)	-0.18* (0.08)	-0.18* (0.08)	-0.18* (0.08)	-0.16* (0.08)	-0.16* (0.08)
White	-0.04 (0.08)	-0.01 (0.08)	-0.05 (0.08)	-0.05 (0.08)	-0.03 (0.08)	-0.03 (0.08)
Personal banker	1.23** (0.26)	1.20** (0.25)	1.22** (0.26)	1.25** (0.26)	1.20** (0.25)	1.25** (0.24)
Financial representative	0.08 (0.11)	0.06 (0.10)	0.10 (0.10)	0.09 (0.11)	0.11 (0.10)	0.13 (0.10)
Organizational tenure	0.02 (0.010)	0.02 (0.010)	0.02 (0.010)	0.02 (0.010)	0.02 (0.010)	0.02 (0.010)
Organizational tenure squared	-0.001 (0.000)	-0.001* (0.000)	-0.001* (0.000)	-0.001 (0.000)	-0.001* (0.000)	-0.001* (0.000)
Job tenure	0.05 (0.08)	0.05 (0.08)	0.06 (0.08)	0.06 (0.08)	0.09 (0.08)	0.14 (0.08)
Job tenure squared	-0.01 (0.02)	-0.004 (0.02)	-0.002 (0.02)	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Affective commitment	0.02 (0.03)	-0.01 (0.03)	0.02 (0.03)	0.03 (0.03)	0.01 (0.03)	0.01 (0.03)
Felt stress	0.05 (0.04)	0.03 (0.04)	0.06 (0.03)	0.05 (0.04)	0.04 (0.04)	0.03 (0.03)
Felt stress × commitment		0.09** (0.03)			0.09** (0.03)	0.10** (0.03)
Felt stress × job tenure			0.12** (0.04)		0.20** (0.04)	0.17** (0.04)
Commitment × job tenure				0.06 (0.04)	0.15** (0.04)	0.15** (0.04)
Felt stress × commitment × job tenure						0.09** (0.03)
Wald chi-square	383.88	402.1	400.7	387.5	441.0	460.0
df	46	47	47	47	49	50
Probability chi-square for added variables ^b		0.00**	0.00**	0.08	0.00**	0.01**

^a $n = 3,197$ observations on 270 employees. Standard errors are in parentheses. The omitted category is a male customer service representative who is not white. All models include a constant, dummies for individual months and five regions, and characteristics of local population (median income, share of college students, share of population over 65, share of population that is non-Hispanic white).

^b Models 2–5 are compared to model 1. Model 6 is compared to model 5.

* $p < .05$

** $p < .01$

felt job stress, commitment, and organizational (rather than job) tenure. We also considered whether effects of stress, commitment, or experience might differ systematically by race, gender, job category, or state location. Interaction terms between these terms and the study variables were never statistically significant, and other results were substantively unchanged.

DISCUSSION

Do employees who “feel the heat” perform better? Previous studies examining links between felt stress and job performance have been inconclusive. Drawing on the attention view of stress (Easterbrook, 1959), we tie together some of the disparate strands of this research. According to attention theory, stress leads to high performance when individuals under stress direct their concentration toward key tasks. Under the laboratory conditions in which researchers have found empirical support for attention theory, subjects have the skills they need to perform their assigned tasks and are motivated to perform well (Chajut & Algom, 2003). In field settings, these conditions may not hold equally for all workers. We theorized and found that higher performance under stress occurred among workers who were more committed to their employer and who were more experienced in their jobs. The logic of attention theory also implied a three-way interaction between stress, commitment, and job tenure. The evidence on this was mixed: it was statistically significant with respect to the revenue points formula, less convincing with respect to the count of products sold.

Supporting Siders et al. (2001), we found that the affective commitment of employees to their organization was positively associated with employee performance. We also showed that job experience positively moderated the commitment-performance relationship. These positive moderating effects appear to differ from Wright and Bonett's (2002) findings but, in fact, the results of our study and theirs can be reconciled by distinguishing between types of experience. The studies reviewed by Wright and Bonett that measured job rather than organizational tenure actually indicated a positive correlation between job tenure and the commitment-performance correlation ($r = .14$). Our study suggests that job tenure (but not organizational tenure) is associated with the skills that enable committed employees to achieve higher performance.

Our findings reinforce the importance of distinguishing objective indicators of performance from self- or supervisory ratings. The attention view suggests that workers under stress concentrate on key

tasks, to the exclusion of others; if supervisors base judgments of workers on aspects of a job that the workers ignore, performance ratings could be affected. With respect to commitment and experience, new, highly committed employees could focus on investing in future performance via such efforts as developing skills and an understanding of products and customers (Mowday et al., 1982). Such behaviors could lead quickly to high self- or supervisory ratings but would likely not be quickly reflected in objective performance measures such as sales.

Limitations and Future Research

Our study has limitations that suggest areas for future research. Per attention theory, positive effects of felt stress result from a narrowing of workers' focus. Our study did not specifically examine this focusing process. Subsequent work might bridge the gap between the laboratory and the field by directly observing workers' activities under stress in organizational settings. Finer-grained data on task performance could also illuminate further the mechanisms through which moderating effects of job experience are realized. We focused on accumulated skills but did not measure them directly. Further research might also examine the moderating effects of skills obtained in jobs outside a focal organization. We did not have such a measure, and the typical worker in our study was a long-time employee at National Bank, but our theory suggests that related experience in other jobs could matter.

Nearly all of the workers we studied had been in their specific jobs for fewer than four years, suggesting further limits on generalizability. Our sample did not allow us to analyze the relationships between stress, commitment, and performance in employees who remained in their jobs for years after achieving mastery. Future research could address whether positive effects of felt stress and commitment diminish at high levels of job tenure.

Relatively few studies of the effects of felt stress or commitment have considered objective performance outcomes. Our data set measured these outcomes over time, but multiple measures of stress and commitment would have added even more to our understanding. We addressed concerns about causal direction by observing performance only after our survey was administered, but repeated measures of stress and commitment would provide insights into the extent to which these phenomena are themselves affected by job performance.

We did not find the diminishing returns to stress associated with the Yerkes-Dodson model, but we did identify patterns of negative relationships be-

tween felt stress and performance for new employees and those with very low levels of commitment. Our results could be reinterpreted to suggest that the attention theory of stress holds for committed, experienced workers but that other theories better explain the effects of stress on the performance of inexperienced workers or of those who do not wholeheartedly identify with their organizations. Chajut and Algom (2003), for example, found more support in the laboratory for attention theory than for "capacity-resource" or "thought-suppression" approaches, each of which suggests a rationale for negative relationships between stress and performance. With respect to our sample, the capacity-resource view would imply that inexperienced or less committed workers under stress diminished the resources they allocated to all tasks, including sales. The thought suppression approach, in contrast, would suggest that these workers directed their focus to sources of stress.

Our findings may be most relevant for jobs that involve straightforward, challenging objectives, achievable through focused attention on a relatively narrow set of tasks. Sales jobs provide one such setting. The attention theory of stress may generalize less readily to jobs with wider ranges of required tasks, or to jobs in which performance ratings are less clearly defined or encompass a broad set of behaviors or results, such as the jobs of manager, teacher, or nurse. It would be worthwhile to consider to what extent our findings extend to other workers whose jobs require performance on a small set of closely related dimensions, such as surgeons, computer programmers, and authors, and to what extent the measurability of performance matters. Generally, the boundary conditions under which the attention view holds, and the extent to which our findings generalize to other jobs, skill sets, and performance outcomes, merit further investigation.

Conclusions

Although some of the data used in this study date back to late 1997, the phenomena that set the context for our research remain highly relevant, as organizations continue to emphasize sales efforts among front-line employees (Korczyński & Ott, 2005). For example, credit card phone representatives are now challenged to sell products such as identity theft insurance and bonus programs to customers who call for routine service. Our study suggests that such employees, if they are committed to their employers or are experienced in their jobs, will sell more when they feel job stress as they focus more of their attention on crucial tasks, chan-

neling stress into higher performance. But managers must walk a fine line, because high levels of felt stress may also cause physiological problems and lead to withdrawal, absenteeism, and turnover.

Our findings also suggest that organizational restructuring can create a paradox for managers. One goal of restructuring is to place more employees in front-line positions where those employees feel more pressure to reach performance goals. But restructuring itself may undermine the conditions that enable employees to channel the stress they feel into higher performance. Changes in workplace practices may weaken employees' commitment to their organizations and disrupt skill accumulation by shifting employees into unfamiliar jobs. Should restructuring responsibilities disrupt the psychological contract between employees and firms, or should the pressure to perform be experienced by employees with little job experience, such pressure may have negative effects. Managers trying to generate heat could find themselves fighting fires instead.

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