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Relations Between Stressors and Job Performance: An Aggregate-Level

Investigation Using Multiple Criterion Measures

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Abstract

Aggregate-level relations between job-related stressors and performance were examined in a sample of 2403 military personnel, comprising 31 companies in two U.S. Army Combat Brigades. Unlike previous studies that have focused exclusively on in-role performance, we examined relations between stressors and multiple performance criterion measures, which corresponded to in-role performance, extra-role performance, and counterproductive behavior. We also examined whether stressor-performance relations were mediated by job satisfaction and morale. Results indicated considerable variation among these criterion measures in the variance explained by stressors, although no evidence of mediation in the aggregate-level data was found. Post hoc analysis of the data at the individual level suggested that stressors may impact individuals' perceptions of both collective efficacy and OCB by first increasing negative emotions. Implications of the findings are discussed, and suggestions for future research are provided.

Relations Between Stressors and Job Performance: An Aggregate-Level

Investigation Using Multiple Criterion Measures

Occupational stress research investigates the impact of stressful job conditions

(stressors) on a number of employee outcomes (strains) (Kahn & Bysioere, 1992). While

there are numerous strains that have been examined in occupational stress research over

the years, they can be classified into the three general categories of <u>psychological</u>,

<u>physical</u>, and <u>behavioral</u>. Psychological strains include things such as depression,

anxiety, frustration, and lack of satisfaction with work. Physical strains include things

such as psychosomatic symptoms, physiological reactivity, and even disease morbidity.

Behavioral strains include things such as job performance, absenteeism, turnover, and

counterproductive behavior.

Of the three types of strains briefly described above, those in the <u>behavioral</u>

category have been examined much less frequently compared to those that are

psychological or physical strains (Jex & Beehr, 1991). Furthermore, within the

behavioral category, job performance has been the least examined. This lack of research

on the performance-related effects of stressors is quite surprising, given the logical

relation between employee performance and overall organizational effectiveness

(Pritchard, 1992). Performance is also an important determinant of employees'

perceptions of self-efficacy (Bandura, 1997), and may also impact more general

perceptions of competence (Bhagat & Allie, 1989).

According to Jex (1998), one reason performance has been examined infrequently

as an outcome variable in occupational stress research is simply that it is difficult to

obtain performance measures. Researchers typically must obtain performance measures

by having supervisors provide ratings of survey respondents, or they must obtain such ratings through an organization's archival records. Unfortunately, organizations are often reluctant to grant researchers permission to obtain performance ratings, and concerns over employee privacy may preclude access to archival records. Given these practical considerations, occupational stress researchers often choose to focus on more easily obtained outcomes such as psychological strain or self-reported physical symptoms.

The lack of attention given to performance by occupational stress researchers may also reflect the fact that there are few good theoretical models to guide such research. Other than the well-known Yerkes-Dodson law (Yerkes & Dodson, 1908), which specifies that the relation between arousal and performance follows and inverted-U function, researchers have surprisingly little to go on. There is no well-articulated theoretical model that describes how stressors in the workplace impact the job performance, and does so in a way that takes into account the multi-dimensional nature of performance. One of the reasons for this lack of theory is simply that there has not been a unifying theory of job performance within the organizational sciences (for recent exceptions see Campbell, 1990; 1994). This essentially reflects the "criterion problem" that has plagued personnel selection research for many years. This problem is also quite relevant to occupational stress research, because investigating stressor-performance relations is also a form of performance prediction, albeit with different predictors than would be used in personnel selection research.

According to Campbell (1990; 1994), performance in most jobs is multidimensional and can be classified into eight different forms that are summarized in Table 1. A perusal of the eight dimensions in Table 1 indicates that they can be reduced

to three "higher-order" dimensions that correspond to: (1) In-Role Performance, (2) Extra-Role Performance, and (3) Avoidance of Counterproductive behavior. In-role performance corresponds to those aspects of performance that correspond closely with an employee's core job responsibilities. For a college professor, these would include things such as teaching, research, and service activities. Extra-role performance corresponds to those aspects of performance that are not specified in an employee's job description, but that are nevertheless needed in order for an organization to be effective. Forms of extra-role performance can be seen in the work of Organ (1977; 1994) on Organizational Citizenship Behavior (OCB), the more recent focus on Contextual Performance (Borman & Motowidlo, 1997), and by the Organizational Spontaneity concept developed by George and Brief (1991). Finally, the avoidance of counterproductive behavior (e.g., drug use, violence, theft) is included here (see Murphy, 1994) because, even though avoidance of such behaviors does not make an individual a productive employee, individuals who do engage in such behavior are most certainly liabilities to their organizations.

According to Jex (1998), making the distinction between in-role behavior, extra-role behavior, and counterproductive behavior is important in assessing the relations between job-related stressors and performance. This is because each of these forms of behavior has different antecedents, and thus may be impacted differently by stressors in the work environment. For example, research on in-role performance has shown that this behavior is strongly impacted by factors such as cognitive ability, job experience, and conscientiousness (Schmidt & Hunter, 1998). Knowing this, many organizations use selection systems that are designed to select individuals based on these and other

predictors. Such selection systems, if applied properly, ultimately reduce both the range and variability of in-role performance. Organizational reward systems may further reduce such variability because employees stand to lose out on rewards if their in-role performance suffers.

In contrast, research has shown that the antecedents of extra-role behaviors are different than in-role performance. Organ and Ryan (1995), for example, found in a meta-analysis that the strongest predictors of organizational citizenship behavior were job satisfaction and organizational commitment. Employees also typically have greater discretion over the performance of extra-role than in-role behaviors. This is because such behaviors are not formally specified by the organization (Organ, 1988), and are not formally recognized by organizational reward systems. Although employees may at times perform extra-role behaviors for impression management purposes (Bolino, 1999), the consequences of failing to engage in extra-role behaviors are much less negative than failing to perform in-role behaviors.

Counterproductive behavior is defined as any behavior that explicitly runs counter to the goals of an organization (Spector, 1997). Relatively mild forms of counterproductive behavior seen frequently in organizations include unexcused absences, leaving work early, and wasting time. More serious forms of counterproductive behavior include accidents, substance use, sabotage, theft, and even violence. As with in-role and extra-role behavior, counterproductive behavior has somewhat different antecedents and employees may have different amounts of discretion over it. For relatively mild forms of counterproductive behavior such as absenteeism and lateness, considerable research has shown that environmental factors play a key role. For example, both of these behaviors

are strongly related to work group norms related to such behaviors (e.g., Martocchio, 1994), as well as to organizational absence policies (Farrell & Stamm, 1988)

For more serious forms of counterproductive behavior, research has shown both personal and environmental factors to play a role. For example, Ones, Viswesvaran, and Schmidt (1993), in a comprehensive meta-analysis, found that a low level of conscientiousness was the strongest predictor of counterproductive behaviors such as theft. This supports other research that has emphasized trait predictors of deviant workplace behavior (e.g., Bernardin & Cooke, 1993; Hogan & Hogan, 1989; Jones & Boye, 1992). On the environmental side, Spector (1997) has proposed that counterproductive behavior on the job is at least partially related to employees' feelings of frustration on the job. Furthermore, frustration is most likely to lead to counterproductive behavior if employees feel they lack control over organizational conditions that are causing the frustration.

Based on the discussion of in-role, extra-role, and counterproductive behavior, it seems quite probable that job-related stressors would have a different effect on each of these three performance criteria. Unfortunately, since the vast majority of studies that have examined relations between stressors and job performance (for summaries see Jex, 1998; Sullivan & Bhagat, 1993) have used measures of in-role performance, very little is known about differences between criterion types. It would seem logical, however, that in general stressors should have a greater impact on extra-role behavior as compared to in-role and counterproductive behavior. This is because employees typically have a greater amount of discretion over the performance of extra-role behaviors compared to in-role and counterproductive behavior. Thus, when faced with job-related stressors,

withholding extra-role behaviors may be a much safer response than withholding in-role behaviors or engaging in counterproductive behavior.

Levels of Analysis: Individual or Aggregate?

Another issue that is relevant in the investigation of the relation between stressors and performance is the level at which such relations should be examined. Since most occupational stress models have focused on the individual level of analysis (e.g., Bliese & Jex, 1999, in press), one would assume that stressor-performance relations should also be examined at that level. There are, however, reasons that it may be useful to also examine these relations at higher levels of analysis.

One reason for this, as stated earlier, is that within organizations there may be considerable constraints on individual employees' behavior (Johns, 1991). This is due to selection, environmental performance constraints, difficulties measuring performance, and possibly high levels of task interdependence. Individuals' performance of extra-role behavior, on other hand, is less restricted because these behaviors are impacted more strongly by motivation and affect. However, at the individual level, there may still be restrictions on the performance of extra-role behaviors. For example, performing extra-role behavior requires than an employee have some level of discretionary time built into his or her day, something that varies considerably among employees. Also, individual employees may not always be free to withhold all forms of extra-role behavior without negative consequences. For example, withholding extra-role behavior such as attending meetings regularly, or being courteous to others may be met with disapproval, if not an outright reprimand.

As stated earlier, there are also important restrictions on the degree to which individuals can engage in counterproductive behavior. For relatively mild forms of counterproductive behavior such as absenteeism, individuals' behavior may be restricted by both organizational absence policies, and well as group norms surrounding this behavior (Martocchio, 1994). For more severe forms of counterproductive behavior such as sabotage or theft, the threat of being fired or even being arrested may inhibit employees from performing these behaviors even if they want to.

Given these restrictions on individuals' in-role, extra-role, and counterproductive behavior, it may be more fruitful to examine stressor-performance relations at the aggregate, rather than individual, level. By investigating these relations at the aggregate level, the question switches from whether employees who have high levels of stressors in their jobs also perform poorly, to whether groups or organizations in which stressors are perceived to be at high levels also perform poorly. State differently, stressors may not necessarily impact the performance of individual employees but, over time, may negatively impact the performance of groups or even whole organizations. This is similar to argument made by Ostroff (1992) regarding the satisfaction-performance relation. In this study it was found that job satisfaction was related to performance at the aggregate level, even though this relation has been shown to be very weak at the individual level (Podsakoff & Williams, 1986).

Within the occupational stress domain two recent studies have examined stressor-performance relation at an aggregate level of analysis, although the results have been somewhat mixed. Ryan, Schmit, and Johnson (1996) examined aggregate-level relations between workload stress and five measures of organizational effectiveness among 142

branches of an automotive finance company. They found that workload stress was significantly and negative related to customer satisfaction, positively related to both number of delinquent accounts and employee. In the other aggregate-level study study, Jones, Barge, and Steffy (1988) examined relations between aggregate-level stress measures and the frequency of malpractice claims (a measure reflecting counterproductive behavior) among a sample of hospitals. They found stress to be positively related to number of malpractice claims, suggesting that job-related stress may be a factor in physician errors. We are aware of no aggregate-level studies to date that have examined relations between stressors and several different performance criteria.

Mediators of Stressor-Performance Relations

Another issue that has received relatively little attention in the investigation of stressor-performance relations is the process by which stressors may lead to performance decrements. Most occupational stress models propose that stressors are not directly related to outcomes such as health or performance (e.g., French & Kahn, 1962). Rather, when one encounters a stressor, immediate psychological and physiological reactions are evoked, and these ultimately lead to strains such as ill health or performance decrements. Since the focus of the present of the present study is not on health, we limit our focus to immediate psychological responses that may ultimately performance.

Of all the possible psychological responses that could mediate aggregate-level stressor-performance relations, we believe the most logical is job satisfaction. In all likelihood, the most immediate reaction to stressors in the work environment is for employees to dislike their job or their employing organization. Furthermore, such a drop in job satisfaction may in turn lead to a drop in performance. Research has shown that

job satisfaction and in-role performance are related at the aggregate level (Ostroff, 1992), although this is not the case at the individual level (Podsakoff & Williams, 1986). Extra-role performance has also been shown to be related to affective variables such as job satisfaction and organizational commitment (Organ & Ryan, 1995). Thus, we expected that job satisfaction would fully mediate the relations between stressors and performance.

A second likely mediator of stressor-performance relations, and one that will be examined in the present study is group morale. Group morale simply reflects the collective well-being of the members of a group. One of the likely effects of high levels of stressors on groups is that they cause morale within a group to drop, and ultimately the performance of the group will drop as well. This may cause what has been termed a "spiraling effect" whereby the lower level of performance causes further reductions in morale, and the cycle keeps repeating itself (Linsely & Brass, 1999). We therefore expected morale to also fully mediate relations between stressors and performance.

The Current Study

In the current study we examined relations between stressors (work hours, role overload, intra-group conflict, and work-family conflict) and performance. This study, however, differed from past research in three major respects. First, we examined relations between stressors and performance criterion measures corresponding to in-role, extra-role, and counterproductive behavior. Secondly, all relations in this study were examined at the aggregate level of analysis. Specifically, the study examined these relations among a sample of 31 U.S. Army companies with an average unit size of 80 soldiers. This allowed us the avoidance of possible variance restriction problems associated with individual-level performance measures. Finally, in addition to examining

the direct relations between stressors and the various performance criterion measures, we assessed mediational processes. More specifically, we examined whether job satisfaction and group morale mediated relations between stressors and performance measures.

Based on past research and theory, it was hypothesized that:

H1: <u>Stressors will be negatively related to in-role and extra-role performance, and positively related to counterproductive behavior.</u>

H2: <u>Stressors will be most strongly related to extra-role behavior, followed by counterproductive behavior, and finally in-role behavior.</u>

We based the ordering of performance criteria proposed in Hypothesis 2 on the levels of discretion individuals are likely to have over each of these performance criteria. Specifically, the level of extra-role behavior performed within groups is highly discretionary, and thus might be a prime performance-related mechanism for reacting to job-related stressors. With respect to counterproductive behavior, there is some level of discretion, particularly for relatively minor forms. Nevertheless some formal organizational sanctions do exist for such behavior, and thus it is less discretionary than extra-role behavior. Finally, we reasoned that groups would have the least amount of discretion over in-role performance, due to selection effects, difficulty in measuring performance, and because failure to perform in-role behavior is likely to lead to negative consequences.

H3: <u>Relations between stressors and performance will be mediated by job satisfaction.</u>

H4: <u>Relations between stressors and performance will be mediated by group morale.</u>

Hypotheses 3 and 4 are based on the assumption that the most immediate impact of stressors is a reduction in job satisfaction and the morale of group members. These reductions in positive affect are presumed to then lead to reductions in performance.

Method

Sample Characteristics

The sample in the present study consisted of 2,403 soldiers from two active duty U.S. Army combat brigades. In order to examine model variables at the aggregate level, soldiers were nested within 31 company-sized elements--13 companies from one combat brigade and 18 from the other. 91% of the participants were male and 9% were female. Racially, the sample was 50% Caucasian, 18% Hispanic, 16% African-American, 3% Asian or Pacific Islander, 3% Multi-Racial, and 6% Other. 80% of the participating soldiers had high-school diplomas with 15% having an Associate's Degree or some college and 5% having a Bachelor's Degree or higher. 92% of soldier participants were between the ranks of E1 to E6 (Private to Staff Sergeant).

Procedure

Survey and archival data were collected between January and February, 2000 from both combat brigades. Of all soldiers available to participate, 2403 consented to participate which represented roughly 80% of the total population in both brigades. Surveys consisted of items assessing job-related stressors, extra-role behavior, and a number of variables that were not used in the present study. Surveys were administered through each brigade's personnel staff down to each company. Soldiers took approximately 30 minutes to complete the survey. Once completed, the surveys were returned to the brigade personnel office for tabulation.

Measures

Stressors. Stressors examined in this study included those that were salient given the nature of military duty, and particularly in combat arms units that are often deployed or conducting extensive field training the majority of the time. Such is the case with the two brigades in the present sample. These include: average number of hours spent working per day (Bliese & Halverson, 1996), interpersonal conflict (Spector & Jex, 1998), and role overload (Beehr, Jex, Stacy, & Murray, 2000).

Work hours was measured with the following item: "On average, how many hours a day have you worked in the past week?". Responses were on a continuum ranging from 7 or less to 17 or more. The aggregated mean hours worked was 11.30 hours with a standard deviation of 1.03 hours.

Interpersonal Conflict was assessed using a 4-item scale developed by Spector and Jex (1998). A representative item from the scale is, "How often do people in your unit get into arguments with each other at work?". Participants responded along a 5-point Likert scale (1 = never to 5 = very often). The aggregate mean for interpersonal conflict was 2.94 with a standard deviation of .20. Cronbach's alpha for individual-level responses to the scale was .92.

Role overload was measured using a 3-item scale developed by Cammann, Fichman, Jenkins, and Klesh (1983). A representative item from the scale is, "I have so much work to do I can not do everything well." Participants responded along a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The aggregate mean for role overload was 3.09 with a standard deviation of .20. Cronbach's alpha for individual-level responses to the scale was .70.

In-Role Performance. In-role performance was assessed in three different ways:
1) a scale-based measure of unit member perceptions of combat readiness, 2) unit scores
on the Army Physical Fitness Test, and (3) unit scores on the M16 qualifying test.
Combat readiness, a proxy of collective efficacy, was measured with a 4-item scale
developed by Marlowe et al. (1985). A representative item from the scale is, "If we went
to war tomorrow, I would feel good about going with my unit." Responses to these items
were a 5-point response format (1 = strongly disagree to 5 = strongly agree). This was
considered an appropriate measure on in-role performance because the core mission of a
combat brigade is to maintain combat readiness. The aggregate mean for this scale was
3.27 with a standard deviation of .29. Cronbach's alpha for individual-level responses to
this scale was .80.

Both Army Physical Fitness Test (APFT) scores and M16 qualification scores
were obtained from unit records. APFT scores are based on a possible 300 point total
with a maximum of 100 points each given for push-ups, sit-ups, and a 2-mile run
performed to a certain standard. This was considered a measure of in-role performance
because infantry soldiers must maintain a high level of physical fitness in order for units
to carry out their missions, which are typically physically demanding. The aggregate-
level mean for the APFT was 252.84 with a standard deviation of 9.65.

M16 qualification scores are based on the number of targets soldiers are able to
hit over varying distances. The total maximum points possible for M16 qualifying is 40.
This was considered a measure of in-role performance because infantry soldiers need to
be proficient in the use of an M16 rifle, due to the danger of many of the missions their
units undertake. The aggregate-level mean for M16 qualification scores was 32.59 with a

standard deviation of 3.14. In order to cut down on the number of performance indices, we combined APFT and M16 qualifying scores by standardizing each, summing them together, and dividing by 2.

Extra-Role Performance. Extra-role performance was measured with a 6-item scale taken from Morrison (1994). These items, which correspond to the altruism dimension of Organizational Citizenship Behavior (OCB: Organ, 1988), were reworded so that responses were made in terms of each respondent's unit (e.g., "Members of my unit volunteer to do things without being asked."). Responses were provided on a 5-point scale (1 = not at all to 5 = very often). The mean of this scale was 2.43 with a standard deviation of .14. Cronbach's alpha for individual-level responses to this scale was .84.

Counterproductive Behavior. Counterproductive behavior was measured by making use of a system the military uses for tracking counterproductive behaviors ranging from minor insubordination to more serious violations that that could lead to criminal prosecution--the Uniformed Code of Military Justice (UCMJ). Unit commanders provided access to records indicating the frequencies of violations per unit during the fiscal year prior to the collection of the self-report data, without regard to specific kinds of violations (e.g., absence without leave or AWOL, insubordination, conduct unbecoming, etc.). Based on feedback from unit commanders, however, the vast majority of the UCMJ violations represented relatively mild forms of counterproductive behavior. The aggregated mean number of violations against the UCMJ was 12.50, with a standard deviation of 9.29.

Mediators. We tested two mediators of the aggregate-level stressor-performance relationship, job satisfaction and morale. In order to assess job satisfaction we used a

scale based on the Job Diagnostic Survey General Satisfaction Scale (Hackman & Oldham, 1975). The items were modified slightly to reflect soldier satisfaction or dissatisfaction with their job in the Army. A representative item from the scale was, "I am satisfied with my job in the Army." Responses were made to items along a 5-point Likert scale with 1 = strongly disagree and 5 = strongly agree. The scale's aggregate mean was 3.14 with a standard deviation of .22. The scale demonstrated good internal consistency among items with a Cronbach's alpha of .86.

Additionally, we measured morale at the aggregate level as a mediator. The scale used to tap morale was a five-item measure designed and used by the Walter Reed Army Institute of Research with Army populations. At the individual level, this could be a measure of general well-being. A representative item from the scale was, "Please indicate the level of your personal morale." Respondents rated their morale along a 5-point Likert scale where 1 = very low and a 5 = very high. In aggregate, the mean for the scale was 3.24 with a standard deviation of .20. Cronbach's alpha was .88.

Results

Table 2 contains correlations among all variables. With respect to Hypothesis 1, work hours was significantly and positively correlated with both extra-role behavior (r = .34, p < .10), and with the M16-APFT composite (r = .51, p < .01). Recall that hypothesis 1 proposed that stressors would be negatively associated with these performance measures, so these correlations fail to support hypothesis 1. Neither of the other two stressors was related to any of the performance measures, again failing to support hypothesis 1.

To assess hypothesis 2, multiple regression analyses were performed in which each performance measure was regressed onto the set of three stressors. Of interest here was the difference in the amount of variance explained in the four performance measures. Table 3 contains the amount of variance explained in each of these measures. As can be seen, the greatest amount of variance was explained in extra-role performance ($R^2 = .29$, $p < .05$), followed by the M16-APFT composite ($R^2 = .28$, $p < .05$), UCMJ violations ($R^2 = .10$, $p > .05$), and finally combat readiness ($R^2 = .05$, $p > .05$).

Hypothesis 2 predicted that the greatest amount of variance would be explained in extra-role behavior, which is supported by this analysis. It was also predicted that the next greatest amount of variance would be explained in counterproductive behavior. This hypothesis was only partially supported because the variance explained in the M16-APFT composite, a measure of in-role performance, was the next largest. Notice, however, the amount of variance explained in UCMJ violations was twice as large as that explained in combat readiness, the other measure of in-role performance. Recall that it was predicted that the variance in counterproductive behavior would be larger than that explained in in-role performance. This supports hypothesis 2, although one must be cautious in drawing conclusions based on this comparison because the variance explained in both of these measures was not statistically significant.

Hypotheses 3 and 4 were tested with path analysis using LISREL 8.1a (Joreskog & Sorbom, 1996). In the models tested, stressors were proposed to lead to reductions in positive affect, which in turn were proposed to lead to performance decrements. Based on a number of fit indices, unfortunately none of these models fit the data well, and thus neither Hypothesis 3 or 4 was supported.

Undoubtedly one of the reasons the mediational hypotheses were not supported was the small sample size ($\underline{n}$ = 31). Therefore, as a post hoc analysis we reexamined the mediational hypotheses at the individual level of analysis (n = 2,403). Figure 1 presents the four path models that were tested. Notice that in Figure 1a it is proposed that the three stressors (work hours was not included because it was unrelated to both performance measures at the individual level of analysis) are negatively associated with job satisfaction, and that satisfaction is subsequently related to OCB. The model depicted in Figure 1b is similar except that in this case it was proposed that well-being (recall that this was aggregated to create the group morale index) mediated the relations between the stressors and altruism. Figures 1c and 1d test both mediators of the relations between stressors and collective efficacy. It was not possible in this individual-level analysis to include the archival measures because they existed only at the aggregate level.

Table 4 contains the model fit statistics for all four models tested. As is recommended, we included several statistics that assess the extent to which each model fit the data. The Chi-Square statistic, which is the most common indicator of model fit, indicates the divergence between each proposed model and the data. A non-significant Chi-Square indicates the best model fit. Other fit statistics included the Root Mean Square Error of Approximation (RMSEA), the Adjusted Goodness of Fit Index (AGFI), the Non Normed Fit Index (NNFI), and the Comparative Fit Index (CFI). In the case of the RMSEA, values smaller than .06 indicate acceptable fit (Hu & Bentler, 1999). For the AGFI, NNFI, and CFI, values greater than .95 indicate acceptable fit (Hu & Bentler, 1999).

As can be seen in Table 4, the overall fit of all four models was rather poor, despite the fact that the coefficients representing each of the proposed paths were significantly different from zero. This suggests that some important paths were left out of the model. Thus, in order to improve the fit of the for models, we considered modification indices and, in all four cases, these indicated that model fit could be improved by adding a direct path from interpersonal conflict to both of the measures of mediation.

All four revised models were revised by adding a path from interpersonal conflict to the measure of group process. The overall fit statistics for each of the revised models are presented in Table 5. As can be seen, these models fit the data considerably better than those initially tested and, as with the initial tests, all path coefficients are significantly different from zero. In addition to the overall fit statistics, we directly compared each revised model to the original on which it was based by using a Chi-Square difference test. This shows whether the reductions in the Chi-Square statistic that resulted from adding the direct paths from interpersonal conflict to group process were statistically significant. This test indicated that model 1a (X^2_{diff} = 57.07, df = 1, $p < .05$), model 1b (X^2_{diff} = 52.21, df = 1, $p < .05$), model 1c (X^2_{diff} = 140.77, df = 1, $p < .05$), and model 1d (X^2_{diff} = 152.14, df=1, $p < .05$) were all improved significantly by adding this path. Thus the results of the model testing suggest that the impact of interpersonal conflict on perceptions of performance is only <u>partially</u> mediated by job satisfaction and well-being. However, in the case of role overload and work-family conflict, the results are consistent with our initial hypothesis of a full mediation model.

<center>Discussion</center>

Unlike past studies that have focused primarily on in-role behavior, however, we investigated multiple performance criteria that corresponded to in-role, extra-role, and counterproductive behavior. We also examined all relations at the aggregate level in order to avoid potential problems with range restriction and lack of variability. The results of this study indicated that only one of the three stressors examined was related to any of the performance criterion measures. Specifically, work hours was positively related to both extra-role behavior and one of the measures of in-role performance (M16-APFT composite). These findings fail to support the first of our two hypotheses, which stated that stressors would be negatively related to performance. These findings are indeed inconsistent with the bulk of occupational stress research, which has found that work-related stressors have a negative impact on performance (e.g., Motowidlo, Packard, & Manning, 1986).

These findings, however, are consistent with the more general proposition that the impact of stressors on performance depends to a large degree on the nature of the performance criterion examined (Jex, 1998). It is possible that in this particular sample, working long hours, which is normally considered a stressor (e.g., Sparks, Cooper, Fried, & Shirom, 1997), led to more cohesiveness within units, and hence higher levels of extra-role behavior. Similarly, units that worked long hours may have had greater opportunities to practice using their M16s, and put more time into physical training activities. This may explain the positive relation between work hours and the M16-APFT composite. Interestingly, Beehr, Jex, Stacy, and Murray (2000) found that role overload, which is also a workload stressor, was positively related to the performance door-to-door

salespeople. The present findings, combined with Beehr et al. (2000) suggest that workload stressors may actually enhance performance on some criterion measures.

In the regression analysis the amount of variance explained by stressors in each of the performance criterion measures was compared. This comparison showed, as predicted, that the greatest amount of variance explained by the three stressors was in extra-role behavior. The least amount of variance was explained in perceived combat readiness, one of the measures of in-role performance. The variance in UCMJ violations, the measure of counterproductive behavior, was twice that of combat readiness. Finally, the variance explained in the M16-APFT composite, the other measure of in-role performance was only slightly less than the variance explained in extra-role behavior.

While this ordering of variance explained does not conform precisely to that proposed in Hypothesis 2, it is certainly not far off. Moreover, it again supports the general idea that the magnitude of stressor-performance relations may be quite different depending on whether one is measuring the performance in terms of in-role, extra-role, or counterproductive behavior. Furthermore, it is interesting to note that even the two measures of in-role performance differed considerably in the amount of variance explained by stressors. Had we used only combat readiness or the M16-APFT composite as our measure of in-role performance, the conclusions we would have drawn regarding the relations between stressors and performance would have clearly been quite different. This suggests that even in-role performance is multi-dimensional, and thus may be differentially impacted by stressors.

The results of the path analysis provided no support for the hypothesis that relations between stressors and performance were mediated by either job satisfaction or

morale at the aggregate level. Given the fact that stressors were generally not strongly related to performance measures, this is hardly surprising. Post hoc individual-level analyses, however, provided strong support for the idea that affective states may mediate the relation between stressors and <u>individuals</u>' perceptions of both collective efficacy and OCB within units. This is consistent with the notion that stress-related processes may differ considerably depending on the level at which they are examined (Bliese & Jex, 1999; in press). Future research is needed to determine whether these individual-level relations translate into <u>actual</u> reductions in unit performance.

<u>Study Limitations</u>

While it was felt that examining all relations at the aggregate level would allow for greater variability (e.g., Ostroff, 1992), this did result in a very low sample size ($\underline{n}$ = 31). Due to practical limitations, we were unable to aggregate at a lower level within the unit (e.g., platoon level). Had we been able to do so, this would have more or less tripled the aggregate group size. Nonetheless, as a result of this low sample size, the power to detect relations that reflected relatively small effect sizes was undoubtedly quite low. In future research, this type of investigation would clearly be more revealing if conduced on two or three times the number of units. This could be accomplished with studies at the platoon level in a US Army Combat Brigade

Another limitation was that many of the relations examined in this study were based on same source data, and thus may have been inflated due to common method bias. We note, however, that two of the performance criterion measures were obtained from archival data, and thus common method bias would not have inflated relations involving these variables. It is also interesting to note (see Table 2) that two of the strongest

correlations obtained in this study (work hours-M16-APFT composite - .51; extra-role behavior-M16-APFT composite - .57) involved archival measures.

A final limitation of this study was the nature of the sample used. The work performed by infantry soldiers is clearly different from that performed by employees in most organizations. We would point out, however, that past occupational stress research which has utilized military samples (e.g., Bliese & Castro, 2000; Bliese & Halverson, 1996; Jex & Bliese, 1999; Jex, Bliese, Buzzell, & Primeau, 2001) has generally produced results that are consistent with civilian samples. Nevertheless, it is still advisable to be cautious in generalizing the present results to employees in other types of organizations.

Future Research

The present study represents a first, and somewhat exploratory, attempt to examine relations between stressors and multiple performance criteria. The "criterion problem" is certainly not new in organizational research, although it has only recently began to attract the attention of occupational stress researchers (Jex, 1998). It is our hope that the present study will generate further research that tests relations between stressors and a variety of performance criterion measures. Such research will undoubtedly generate greater insight into stressor-performance relations. Perhaps equally important, however, is that such research will serve as the basis for more elegant theories of the impact of stressors on different aspects of performance. At present, theories of stress and performance are quite general, and thus provide the researcher interested in multiple criterion measures with little to go on.

A second fruitful area for further research is to examine variables that may moderate the relation between stressors and different performance criteria. Differences in

the impact stressors have on different performance criteria reflect, to a large extent, the performance-related <u>choices</u> employees make when confronted with stressors. That is, when faced with a stressor such as interpersonal conflict, for example, an employee may choose to focus on in-role tasks to the exclusion of extra-role behavior, focus on extra-role behavior to the exclusion of in-role tasks, or perhaps engage in some form of counterproductive behavior. Moderator variables may help us to more fully understand differences in this choice process and, on a more practical level, help provide organizations with strategies for decreasing the negative performance-related impact of stressors.

A final area for future research is to examine stressor-performance relations at <u>both</u> the individual and group levels of analyses. Although the processes operating at these two levels may be similar in some ways, they may also be quite different as was suggested by the results of the post-hoc path analysis. According to Bliese (2000), aggregate-level variables are often only "fuzzy" representations of the individual variables on which they are based. Thus, the reader must be cautious in applying the results of the present study to <u>individual</u> stressor-performance relations. In the future, examining such relations at both levels of analysis would provide the most insight into stressor-performance relations.

References

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Beehr, T.A., Jex, S.M., Stacy, B., & Murray, M. (2000). Work stressors and coworker support as predictors of individual strains and performance. *Journal of Organizational Behavior, 21,* 391-405.

Bernardin, H.J., & Cooke, D.K. (1993). Validity of an honesty test in predicting theft among convenience store employees. *Academy of Management Journal, 36,* 1097-1108.

Bhagat, R.S., & Allie, S.M. (1989). Organizational stress, personal life stress, and symptoms of life strain: An examination of the moderating role of sense of competence. *Journal of Vocational Behavior, 35,* 231-253.

Bliese, P.D. (2000). Within-group agreement, non-independence, and reliability: Implications for data aggregation and analysis. In K.J. Klein & S.W. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 349-381). San Francisco, CA: Jossey-Bass, Inc.

Bliese, P. D. & Castro, C. A. (2000). Role clarity, work overload and organizational support: Multilevel evidence of the importance of support. *Work and Stress, 14,* 65-73.

Bliese, P.D., & Halverson, R.R. (1996). Individual and nomothetic methods of job stress: An examination of work hours, cohesion, and well-being. *Journal of Applied Social Psychology, 26,* 1171-1189.

Bliese, P.D., & Jex, S.M. (1999). Incorporating multiple levels of analysis into occupational stress research. *Work & Stress, 13,* 1-6.

Bolino, M.C. (1999). Citizenship and impression management: Good soldiers or good

actors. *Academy of Management Review, 24*, 82-98.

Borman, W.C., & Motowidlo, S.J. (1997). Task performance and contextual

performance: The meaning for personnel selection and research. *Human Performance,*

10, 99-109.

Campbell, J.P. (1990). Modeling the performance prediction problem in industrial and

organizational psychology. In M.D. Dunnette & L.M. Hough (Eds.), *Handbook*

of industrial and organizational psychology (2nd ed., Vol. 1, pp. 687-732). Palo

Alto, CA: Consulting Psychologists Press.

Campbell, J.P. (1994). Alternative models of job performance and their implications for

selection and classification. In M.G. Rumsey, C.B. Walker, & J.H. Harris (Eds.),

Personnel selection and classification (pp. 33-51). Hillsdale, NJ: Lawrence

Erlbaum.

Cammann, C., Fichman, M., Jenkins, G.D., & Klesh, J. (1983). Michigan organizational

assessment questionnaire. In S.E. Seashore, E.E. Lawler, P.H. Mirvis, & C.

Cammann (Eds.), *Assessing organizational change: A guide to methods,*

measures, and practices (pp. 71-138). New York: Wiley-Interscience.

Farrell, D., & Stamm, C.L. (1988). Meta-analysis of the correlates of employee absence.

Human Relations, 41, 211-227.

George, J.M., & Brief, A.P. (1991). Feeling good-doing good: A conceptual analysis of

the mood at work-organizational spontaneity relationship. *Psychological Bulletin,*

112, 310-329.

Hackman, J. R. & Oldham, G. R. (1975). Development of the Job Diagnostic Survey. *Journal of Applied Psychology, 60*, 159-170.

Hogan, J., & Hogan, R. (1989). How to measure employee reliability. *Journal of Applied Psychology, 74*, 273-279.

Jex, S.M. (1998). *Stress and job performance: Theory, research, and implications for managerial practice*. Thousand Oaks, CA: Sage.

Jex, S.M., & Beehr, T.A. (1991). Emerging theoretical and methodological issues in the study of work-related stressors. In G.R. Ferris & K.M. Rowland (Eds.), *Research in personnel and human resources management* (Vol. 9, pp. 311-365). Greenwich, CT: JAI Press.

Jex, S.M., & Bliese, P.D. (2001). *Incorporating multiple levels of analysis into occupational stress research: Theoretical, methodological, and practical implications*. Manuscript under review.

Jex, S.M., Bliese, P.D., Buzzell, S., & Primeau, J. (2001). The impact of self-efficacy on stressor-strain relations: Coping style as an explanatory mechanism. *Journal of Applied Psychology*.

Johns, G. (1991). Substantive and methodological constraints on behavior and attitudes in organizational research. *Organizational Behavior and Human Decision Processes, 49*, 80-104.

Jones, J.W., Barge, B.N., Steffy, B.D., Fay, L.M., Kunz, & Wuebker, L.J. (1988). Stress and medical malpractice: Organizational risk assessment and intervention. *Journal of Applied Psychology, 73*, 727-735.

Jones, J.W., & Boye, M.W. (1992). Job stress and employee counterproductivity. In

    J.C. Quick, J.J. Hurrell, & L.R. Murphy (Eds.), *Stress and well-being at work* (pp.

    239-251). Washington, DC: American Psychological Association.

Kahn, R.L., & Byosiere, P. (1992). Stress in organizations. In M.D. Dunnette & L.M.

Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., Vol. 2, pp.

571-650). Palo Alto, CA: Consulting Psychologists Press.

Marlowe, D.H., Furukawa, T.P., Griffith, J.E., Ingraham, L.H., Kirkland, F.R., Martin,

    J.A., Schneider, R.J., & Teitelbaum, J.M. (1985). *New Manning System Field*

    Evaluation: Technical Report No.1. Washington, DC: Walter Reed Army

    Institute of Research.

Martocchio, J.J. (1994). The effects of absence culture on individual absence. *Human*

    Relations, 47, 243-262.

Morrison, E.W. (1994). Role definitions and organizational citizenship behavior: The

    importance of the employee's perspective. *Academy of Management Journal, 37,*

    1543-1567.

Motowidlo, S.J., Packard, J.S., & Manning, M.R. (1986). Occupational stress: Its causes

    and consequences for job performance. *Journal of Applied Psychology, 71,* 618-

    629.

Murphy, K.R. (1994). Toward a broader conceptualization of jobs and job performance:

    Impact of changes in the military environment on the structure, assessment, and

    prediction of job performance. In M.G. Rumsey, C.B. Walker, & J.H. Harris

    (Eds.), *Personnel selection and classification* (pp. 85-102). Hillsdale, NJ:

    Lawrence Erlbaum.

Ones, D.S., Viswesvaran, C., & Schmidt, F.L. (1993). Comprehensive meta-analysis of integrity test validities: Findings and implications for personnel selection and theories of performance. *Journal of Applied Psychology, 78*, 679-703.

Organ, D.W. (1977). A reappraisal and reinterpretation of the satisfaction-causes-performance hypothesis. *Academy of Management Review, 2*, 46-53.

Organ, D.W. (1988). *Organizational citizenship behavior: The good soldier syndrome.* Lexington, MA: Lexington Books.

Organ, D.W. (1994). Organizational behavior and the good soldier. In M.G. Rumsey, C.B. Walker, & J.H. Harris (Eds.), *Personnel selection and classification* (pp. 53-67). Hillsdale, NJ: Lawrence Erlbaum.

Organ, D.W., & Ryan, K. (1995). A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. *Personnel Psychology, 48*, 775-802.

Ostroff, C. (1992). The relationship between satisfaction, attitudes, and performance: An organizational-level analysis. *Journal of Applied Psychology, 77*, 963-974.

Podsakoff, P.M., & Williams, L.J. (1986). The relationship between job satisfaction and job performance. In E.A. Locke (Ed.), *Generalizing from laboratory to field settings* (pp. 207-253). Lexington, MA: Heath.

Pritchard, R.D. (1992). Organizational productivity. In M.D. Dunnette & L.M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., Vol. 3, pp. 443-471). Palo Alto, CA: Consulting Psychologists Press.

Ryan, A.M., Schmit, M.J., & Johnson, R. (1996). Attitudes and effectiveness: Examining relations at an organizational level. *Personnel Psychology, 49*, 853-882.

Schmidt, F.L., & Hunter, J.E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin, 124*, 262-274.

Sparks, K., Cooper, C.L., Fried, Y., & Shirom, A. (1997). The effect of hours of work on health: A meta-analytic review. *Journal of Occupational and Organizational Psychology, 70*, 391-408.

Spector, P.E. (1997). The role of frustration in anti-social behavior at work. In R.A. Giacalone & J. Greenberg (Eds.), *Anti-social behavior in the workplace* (pp. 1-17). Thousand Oaks, CA: Sage.

Spector, P.E., & Jex, S.M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal Conflict at Work Scale, Organizational Constraints Scale, Quantitative Workload Inventory, and Physical Symptoms Inventory. *Journal of Occupational Health Psychology, 3*, 356-367.

Sullivan, S.E., & Bhagat, R.S. (1992). Organizational stress, job satisfaction, and job performance: Where do we go from here? *Journal of Management, 18*, 353-374.

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit formation. *Journal of Comparative Neurological Psychology, 18*, 459-

Table 1.

Behavioral Dimensions of Performance under the Campbell Model (1990; 1994)

Behavioral Dimension of Performance	Definition
Job-Specific Task Proficiency--	Reflects the level of proficiency with which the individual/unit performs core substantive or technical tasks that distinguish the content of ones job from another.
Non-Job Specific Task Proficiency--	Reflects the level of proficiency at behaviors that are required to execute performance but are not specific to the particular job.
Written/Oral Communication--	A reflection of how well an individual/unit makes formal oral/written presentations to groups of varying size. It includes the proficiency with which the individual/unit writes or speaks, communicates.
Demonstration of Effort--	A reflection of the degree to which the individual/unit commits to all job tasks, work at a high level of intensity, and keep working adverse conditions.
Maintenance of Personal Discipline--	The degree to which the individual/unit avoids counterproductive behavior.
Facilitating Peer/Team Performance--	The degree to which the individual/unit supports peers, helps them with job problems, and acts as de-facto trainers. It encompasses how well an individual/unit facilitates group functioning by being a good model, keeping the group goal-oriented, and reinforces participation.
Management/Administration--	Distinct from supervision, it reflects the degree to which individuals/units articulate goals, organize people and resources to meet them, monitor progress, help solve problems, and overcome crises that stand in the way of accomplishing goals.
Supervision--	The level of proficiency reflected in all behaviors directed at influencing the performance of subordinates through face-to-face interpersonal interactions by setting goals, teaching, and modeling appropriate behavior.

Table 2.

Aggregate-Level Pearson Correlations between Study Variables (N = 31 Units).

Variable	1	2	3	4	5	6	7	8	9	10
1. Work Hours	--									
2. Interpersonal Conflict	.31	--								
3. Role Overload	.26	*.53	--							
4. OCB-Altruism	.34	-.22	-.27	--						
5. UCMJ Violations	-.20	.13	.15	-.23	--					
6. Combat Readiness	-.07	-.14	-.22	*.44	.11	--				
7 M16-APFT Composite	*.51	.20	.04	**.57	-.33	-.17	--			
8. Work-Fam Conflict	.32	*.51	**.85	-.01	.09	-.05	.13	--		
9. Job Satisfaction	-.23	**-.72	**-.53	.12	-.01	.31	-.25	**-.58	--	
10. Morale	.04	*-.47	**-.53	*.39	-.11	**.49	.03	**-.53	**.65	--

Note. Work Hours is the average number of hours worked per day over the past week.
** $p. < .01$, *$p. < .05$,

Table 3.

<u>Variance in Unit Performance (Extra-Role, In-Role, Counterproductive Behavior)</u>

<u>accounted for by Aggregate Stressors (n = 31).</u>

Criterion	Stressors	<u>R</u>	<u>R^2</u>
Extra-Role Performance-OCB Altruism	Work Hours Interpersonal Conflict Role Overload	.53	.29
Counterproductive Behavior-UCMJ Violations	Work Hours Interpersonal Conflict Role Overload	.31	.10
In-Role Performance-Combat Readiness	Work Hours Interpersonal Conflict Role Overload	.22	.05
In-Role Performance APFT-M16 Composite	Work Hours Interpersonal Conflict Role Overload	.53	.28

Note. All variables were z-transformed. Workhours represents the average number of

hours worked per over the last week.

Table 4.

<u>Overall Fit Statistics for all Initial Model Tests</u>

Model	X^2	df	RMSEA	AGFI	NNFI	CFI
1a	73.79*	3	0.11	0.93	0.88	0.96
1b	62.04*	3	0.10	0.94	0.92	0.98
1c	148.06*	3	0.09	0.86	0.80	0.94
1d	158.40*	3	0.16	0.85	0.81	0.94

<u>Note</u>: N = 2081; RMSEA = Root Mean Square Error of Approximation;
AGFI = Adjusted Goodness of Fit Index; NNFI = Non-Normed Fit Index;
CFI = Comparative Fit Index; *p < .05, two-tailed.

Table 5

Overall Fit Statistics for the Revised Models

Model	X^2	df	RMSEA	AIC	NNFI	CFI
1a	16.72*	2	0.06	42.72	0.96	0.99
1b	9.83*	2	0.04	35.83	0.98	1.00
1c	7.29*	2	0.04	33.29	0.99	1.00
1d	6.26*	2	0.03	32.26	0.99	1.00

Note: N = 2081; RMSEA = Root Mean Square Error of Approximation; AGFI = Adjusted Goodness of Fit Index; NNFI = Non-Normed Fit Index; CFI = Comparative Fit Index; *p < .05, two-tailed.

Figure Caption

Figure 1. <u>A summary of the four path models tested</u>. <u>Note</u>. RO = Role overload; IPC =

Interpersonal Conflict; WFC = Work-Family Conflict; JS = Job Satisfaction; WB = Well-

Being; OCB-Alt = Altruism; CE = Collective Efficacy.

1a

RO, IPC, WFC → JS → OCB – Alt

1b

RO, IPC, WFC → WB → CE

1c

RO, IPC, WFC → JS → OCB - Alt

1d

RO, IPC, WFC → WB → CE