

# Stress Management: An Assessment Questionnaire for Evaluating Interventions and Comparing Groups

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*A stress questionnaire was developed and administered to employees and students participating in a stress program. The questionnaire consists of three components: stressful conditions, stress symptoms, and measures used to relax. The present study focused on the validation of the stressful conditions portion. Factor analysis demonstrated that the questionnaire had three meaningful factors. Based on the analysis, composite scores were obtained reflecting these three dimensions. Alpha reliability analysis demonstrated that each of the factors was reliable at an acceptable level ( $r > .80$ ). The first factor represented an organizational or external cluster, while the second factor reflected an internal or personal construct. The first factor was shown to correlate negatively with fatigue, worry, agitation, impatience, anger and similar symptoms, while the second factor correlated positively with these complaints. Studies of group differences revealed that defined occupational groups differed on scores for all portions of the questionnaire. In addition, groups participating in a stress management course changed significantly on the first two factors. The third factor related to handling conflict and contained only a few items. Replication studies showed that the factors were stable across different versions of the scales with different groups. The results suggest that the assessment method may be promising for future studies on stress management.*

Stress literature is burgeoning and confusing. The increasing popularity of the concept has resulted in many different groups of professionals conducting investigations

or doing clinical work related to stress which compounds the latest theories of current gurus, and the public the explosion. Despite the widespread interest in psychological stress, the exact causes of and remedies for stress are not well understood.

## Life Stress and Work Stress

During the last two decades psychologists and psychiatrists have devoted considerable attention to the measurement of life stress.<sup>1</sup> Although measurement of life events enjoys a rich literature, less attention has been paid to the impact of specific stressful environments. Measurement of occupational stress is one area that has received less research attention. Most articles focus on the effects of intrinsic sources of stress on the job.<sup>2-4</sup> Less attention has been given to personal styles of coping with stress and the relationship between specific organizational factors and patterns of adaptation. Recent evidence suggests that personality factors and styles of coping with stressful events can have a causal impact on job tension and task performance.<sup>5</sup>

In the general area of job-related stress, there are reports comparing specific occupations in terms of stress,<sup>6</sup> as well as reports on both blue-collar,<sup>7</sup> and white-collar employees.<sup>8</sup> In a review of literature on occupational sources of stress,<sup>9</sup> a variety of contributing factors were cited. Environmental stressors may include poor working conditions, quantitative or qualitative work overload, lack of clarity in work objectives, role conflict and pressures of responsibility. These authors also examined the interactions of the individual characteristics of a person and the potential sources of stress in the work environment.<sup>2</sup>

One of the purposes of the present research was to develop a measure of occupational stress and to relate this measure to methods of adaptation with stressful circumstances. This measure should have value as an assessment device and as an outcome measure for studies attempting to evaluate stress reduction methods. Additional objectives were: (1) to assess the sources of stress through the Conflict-Stress Questionnaire; (2) to examine stressors and symptoms in various occupations; and (3) to determine the effects of a stress management program on stress symptoms and stressful working conditions.

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## Method

The study examined the sources of stress and stress symptoms among various occupations using a Conflict-Stress Questionnaire. A second focus was to provide some preliminary data on the effectiveness of a stress management program on amelioration of symptoms and ability to handle stressful working conditions.

**Instrument Development** — The Conflict-Stress Questionnaire has been evolving at the University of California Medical Center, San Diego, since 1976. Originally, the questionnaire was a one-page instrument concerned solely with global perceptions of job-related stress and the resulting stress symptoms. The original questionnaire, administered to hospital employees and volunteer coordinators, asked: "Generally, how stressful is your job for you;" "How consistent is the stress." They were asked to rate stress symptoms experienced on the job, such as headaches, stomachaches, backaches, etc. These were to be checked either "often," "sometimes," or "never."

The questionnaire was expanded to include specific job-related stress questions — "Aspects of your job that cause you stress," such as relating with the public, supervisors, peer staff members, performance evaluations, etc. — and questions regarding measures used to relax on the job (take aspirin, drink coffee, eat frequently, etc.) The method of responding to the instrument changed from individually checking items that applied to the participant, to making a choice on a Likert-type scale. That scale asked the participant to check a five-part continuum from "extremely stressful" to "completely unstressful" to determine working condition stressors.

The Conflict-Stress Questionnaire developed into a more sophisticated tool with the addition of a section on stressful work conditions. This addition sought to elicit information on work sources of stress, either organizational or personal in nature, and placed much of the emphasis of the questionnaire on conflict or stress at work. In this section participants were asked such questions as "Others I work with seem unclear about what my job is" . . . or, "I lack confidence in 'management'." With the addition of the second section on stressful working conditions, the stress questionnaire could more easily be amended according to the various groups for which the program was given. For example, stressful working conditions characteristic of social workers, hospital administrators, employees of fund raising societies, or bank executives, could be added to the list of organizational or personal job-related stressors. At the time that the second part of the questionnaire was changed, the first part of the questionnaire was changed as well. Five categories to be checked (never, rarely, sometimes, often, always) were posed to participants (subjects) regarding stress symptoms and measures to relax, instead of the previous three (often, sometimes, never).

The more recent Conflict-Stress Questionnaire delineates stressful working conditions into types of stressors: Physical (P), Social (S), Organizational (O), and "Self-Talk" (ST). Self-talk stressors refer to those unreasonable expectations a person may have of him/herself in job-related activities. Also denoted on the most recent questionnaire are stress symptoms that are categorized as physiological stress (P), emotional stress (E) or behavioral stress (B). The identification of the different types of

stressors and the different types of stress symptoms provided additional information to the participant on the differences between types of stress. These categories were determined in a factor analysis on version II of the questionnaire at the University Hospital and were replicated in a large study of law enforcement officers in Arizona.<sup>10</sup>

The Conflict-Stress Questionnaire evolved as the stress management program evolved. In the early stages of the program, the questionnaire was simple and brief. As the program progressed and became more formalized the questionnaire became more sophisticated and more instructive in its format. It introduced the topic of stress symptoms and stressful working conditions in the context of different types of stress or stressors.

**Sample** — The first portion of the study used six general occupational groups: nurses (n=15), managers (n=42), administrators (n=79), technicians (n=24), mental health workers (n=82), and a mixed group (n=24). The mixed group comprised various administrative and health care professionals who happened to join the same stress management groups. These occupational groups were administered the most recent of the Conflict-Stress questionnaires on a pretest, posttest basis. A total of 243 persons completed an earlier 37-item questionnaire. Those persons were from a variety of occupations, including pediatric nurses (n=7), social workers (n=9), Cancer Society employess (n=36), health professionals (n=39), clerical workers (n=15), mixed group (n=17), administrators (n=27), hospital managers (n=41), clinical nurses (n=11) and nursing managers (n=41).

The pretest is administered at the beginning of the stress management program before any instruction begins. The topic areas covered in the program are as follows: an overview of stress management and the stress cycle; feedback on stressors and resultant stress; relaxation techniques; cognitive restructuring; active listening; assertion training; giving and receiving negative feedback; and dealing with aggressive people. A videotaped practice session is also included. The formats for presenting the material can vary from two hours per week for four weeks to 1½ hours per week for six weeks. A full-day, eight-hour session also can cover the material (or it can be broken into two, four-hour sessions), or the material can be abbreviated into a one-time, four-hour session.

At the end of the program, usually at the last session, participants are given the posttest to complete. If the class has been presented in the full-day, eight-hour format, the posttest might be administered a few weeks after the class has taken place.

Factor	Eigenvalue	% of Variance	Common % of Variance*
1	9.49	23.2	51.5
2	5.54	13.5	30.0
3	1.77	4.3	9.5
4	1.64	4.0	8.8

\* Percent of common variance may not add up to 100% due to rounding error

## Results

**Analysis of Conflict-Stress Questionnaire** – The first step in the data analysis was to create a correlation matrix between the 41 items in the stressful situation's portion of the Conflict-Stress Questionnaire. The principal components of the correlation matrix were obtained using unit values as communality estimates. Components with eigenvalues greater than 1.5 were extracted and rotated to a VARIMAX solution. The eigenvalues and the percentages of variance accounted for by the four factors are displayed in Table 1.

The items and their loadings on the first four factors

are presented in Table 2. Examination of Table 2 reveals that each of the first three factors had conceptual focus. The largest factor, Factor 1, was represented by items indicating that the respondent was not appreciated at work. This factor appears to be an external, organizational factor since the stressors were not internal to the respondent, unless the respondent generally felt unappreciated everywhere. Items with high loading on this factor included item V6 (other's demands for my time at work are in conflict with each other,  $r=.62$ ); item V8 (management expects me to interrupt my work for new priorities,  $r=.64$ ); item V18 (I have unsettled conflicts with other departments,  $r=.76$ );

**Table 2 – VARIMAX Rotated Factor Matrix for Stressful Conditions Scale**

Item (abbreviated)	Factor				
	1	2	3	4	
V1	Uncomfortable meeting strangers	0.165	0.095	0.271	0.346
V2	Uncomfortable speaking before group	-0.083	0.507	0.140	0.071
V3	Concern re: ability to do all I want	0.145	0.493	-0.018	0.099
V4	Others unclear about my job	0.589	-0.218	0.102	0.154
V5	Opinion difference with superiors	0.141	0.343	0.143	-0.366
V6	Others demands on me in conflict	0.623	-0.012	-0.093	0.190
V7	I lack confidence in management	0.476	0.324	0.113	0.042
V8	Management priorities interrupt	0.641	0.054	0.103	-0.034
V9	Conflict in unit cooperation	0.553	0.147	0.040	-0.222
V10	Get unsatisfactory feedback only	0.541	0.258	0.115	-0.295
V11	Changes affecting me made sans me	0.513	0.308	0.082	-0.293
V12	Too much to do—too little time	-0.046	0.583	-0.177	0.151
V13	Overqualified for work I do	0.621	0.036	-0.115	0.051
V14	Underqualified for work I do	0.690	-0.147	0.072	0.327
V15	Associates trained different field	0.702	-0.147	0.018	0.110
V16	Must go elsewhere to get job done	0.706	-0.091	0.058	-0.041
V17	My department conflicts unsettled	0.645	-0.073	-0.006	0.069
V18	My conflicts without dept unsettled	0.767	-0.261	0.121	0.043
V19	Get little support from co-workers	0.741	-0.223	-0.009	0.148
V20	Fighting fires approach vs plan	0.498	0.183	0.056	0.178
V21	Feel family pressure about hours	0.454	0.014	-0.193	0.461
V22	Deadline demands self-imposed	0.211	0.428	0.116	0.445
V23	Hard giving peers negative feedback	-0.113	0.493	0.325	0.381
V24	Hard giving subordinates negative feedback	0.080	0.437	0.315	0.150
V25	Difficulty with aggressive people	-0.103	0.635	0.176	0.015
V26	Difficulty with passive people	-0.273	0.762	-0.000	-0.076
V27	Overlapping responsibility problems	0.244	0.322	0.037	0.458
V28	Hard to arbitrate peer conflict	0.215	0.473	0.331	0.107
V29	Arbitrating subordinates conflict hard	0.496	-0.129	0.189	0.278
V30	I avoid conflicts with peers	-0.041	0.283	0.736	0.005
V31	I avoid conflicts with superiors	0.137	0.172	0.773	-0.033
V32	I avoid conflicts with subordinates	0.407	-0.187	0.565	0.050
V33	Resource allocation conflict	0.708	-0.331	0.155	0.071
V34	Conflicting procedures frustration	0.524	-0.009	0.206	0.032
V35	Personal needs v organization	0.173	0.231	0.086	0.465
V36	Bothered by noisy environment	0.601	-0.239	0.222	0.184
V37	Difficulty staying focused on a task	0.509	0.136	0.209	0.378
V38	Spouse makes too many demands on me	-0.057	0.443	-0.134	0.284
V39	Concern over my parent's health	-0.351	0.654	0.067	-0.176
V40	Communication with my children difficult	-0.313	0.661	-0.000	-0.205
V41	I have difficulty saying what I feel	-0.420	0.728	-0.098	-0.064

\* V indicates variable

and item V19 (I get little personal support from the people I work with,  $r=.74$ ).

Items with high loadings on the second factor tended to indicate low assertiveness and to be focused within the respondent. Therefore, we termed this an internal factor. For example, items with high loadings on this factor included: item V25 (I have difficulty dealing with aggressive people,  $r=.63$ ); item V26 (I have difficulty dealing with passive people,  $r=.76$ ); and item V41 (I have difficulty saying what I feel,  $r=.72$ ).

The third factor appeared to represent avoidance of conflicts with other workers. Items with high loadings on this factor included item V30 (I avoid conflicts with peers,  $r=.73$ ); item V31 (I avoid conflicts with superiors,  $r=.77$ ); and item V32 (I avoid conflicts with subordinates,  $r=.56$ ).

The fourth factor had only three items that obtained loadings beyond the .45 criterion for inclusion. These items were item V27 (Overlapping responsibilities cause me problems,  $r=.45$ ); item V22 (I have self-imposed demands to meet scheduled deadlines,  $r=.46$ ), and item V35 (My personal needs are in conflict with the organization,  $r=.46$ ).

### Reliability Analysis

On the basis of the factor analysis, it appears that the first three factors may be of value for further use. Reliability analysis was used to determine the dependability of these factors. Factor composites were created summing together all items with high loadings on each factor. For Factor 1, these included items V4, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 21, 29, 33, 34, 36, and 37. For Factor 2, these items included items V2, 3, 12, 23, 25, 26, 28, 38, 39, 40, and 41. Finally, for Factor 3, the items included V30, 31, and 32. Reliability for the factors was assessed using the alpha method.<sup>11</sup> The reliability for Factor 1 was .91, and the reliabilities for Factors 2 and 3 were .82 and .80, respectively. Since each of these factors obtained a reliability higher than .80, the composites were used in further analysis. The scores to be reported hereafter represent average scores for items associated with a particular factor, for example, the reported scores for Factor 1 represent the mean response to items that are included in that factor.

### Correlations With Symptoms

Table 3 presents the correlations of composite scores on each factor with a variety of symptoms. The composite scores on the factors were obtained by extracting items with factor loadings greater than .45, summing scores across those items, and then dividing by the number of items included in the factor. Symptoms that correlated significantly with the first or external factor included: stomachaches, low fatigue, compulsive gum chewing, low worry, low agitation, low impatience, low anger, low frustration, and compulsive smoking ( $r$  values  $> .25$ ). In general, these symptoms suggest that those with scores high on Factor 1 tended not to experience a great number of psychosomatic problems at work.

Factor 2, which is characterized by high internality and low assertion, was associated with a different pattern of symptoms. Some of the symptoms correlating strongly with Factor 2 included stiffness in the neck, high fatigue, blaming, low gum chewing, compulsive overeating, worrying, high

depression, high agitation, high impatience, high anger, high frustration, high feelings of powerlessness, and low smoking.

Factor 3 was associated with avoidance of conflict. We considered this factor somewhat less reliable since only three items demonstrated substantial loadings. As shown in Table 3, Factor 3 was not associated with any specific symptoms. Inspection of Table 3 suggests that individuals high on the external factor, who perceive stressful situations as associated with work and others, have lower frequencies for reporting symptoms such as stiff necks, fatigue, compulsive eating, worrying, depression, agitation, impatience, anger, frustration, etc., than people scoring low on the external factor. Interestingly, just the opposite pattern emerges for Factor 2. Those with high scores on Factor 2, suggesting high internalization of work pressures, also tend to have high scores for a variety of symptoms, including stiffness of neck, fatigue, worrying, depression, agitation, impatience, anger, frustration, and powerlessness. This relationship between symptoms and Factors 1 and 2 is reversed for a few items such as compulsive smoking, teeth grinding and gum chewing. In other words, these data suggest that those who blame the organization and others for stress tend to cope by smoking, gum chewing and grinding teeth. In contrast, those who take personal responsibilities for problems, smoke, grind teeth and chew gum less, but have higher scores for stiffness of neck, compulsive eating, worrying, depression, agitation, anger, etc.

**Table 3 – Correlations Between Symptoms and Scores on Factors 1-3**

Symptom*	1	Factor 2	3
P Headaches	-.03	.17	.00
P Stomachaches	.25	.18	.08
P Backaches	.18	-.10	.01
P Stiffness in neck	-.22	.40	-.07
P Elevated blood pressure	.05	.04	.05
P Fatigue	-.26	.34	-.03
B Crying	.04	.00	-.02
B Forgetfulness	-.09	.22	-.02
B Yelling	-.14	.14	-.08
B Blaming	-.12	.25	-.06
B Bossiness	.01	.03	.04
B Gum chewing	.32	-.40	.00
B Compulsive eating	-.23	.30	-.06
E Worrying	-.50	.64	-.04
E Depression	-.21	.26	-.09
B Agitation	-.31	.43	-.01
E Impatience	-.35	.41	-.13
B Anger	-.40	.58	-.06
E Frustration	-.44	.61	-.08
E Loneliness	-.14	.22	-.06
E Powerlessness	-.11	.39	.05
E Inflexibility	.22	-.16	.03
B Compulsive smoking	.31	-.30	.04
B Teeth grinding	.20	-.23	.00

\* P indicates physical symptoms; E, emotional symptoms; B, behavioral symptoms

In addition to the specific sets of symptoms associated with different factors, there was also some evidence that the factors were associated with different techniques of relaxation. Factor 1, the external factor, was associated with the use of relaxation techniques such as meditation and yoga, and negatively associated with the use of humor as a mechanism for coping. Factor 2, the internal factor, was associated with high coffee consumption, low use of relaxation methods such as meditation, and more use of humor. This factor also tended to be associated with use of exercise and alcoholic beverages. As with symptom reporting, Factor 3 was unassociated with specific use of the relaxation methods.

#### Factor Analysis for Symptoms

Correlations between symptoms were obtained and the resultant correlation matrix was subjected to factor analysis. The analysis was performed by obtaining the principal components of the correlation matrix (using unit values as communality estimates) and rotating to a VARIMAX solution. Three factors were selected for rotation and the loadings for symptoms are shown in Table 4. The eigenvalues for these factors were 6.31, 3.66, and 1.39, respectively.

Inspection of the variable loadings in Table 4 suggests that the first factor represents emotionality. Symptoms with high loadings on this factor included worry, depression, agitation, impatience, anger, frustration, powerlessness, in addition to stiffness of neck and fatigue. The second factor represented behavioral manifestations of anxiety, including yelling, blaming, bossiness, inflexibility, crying

and elevated blood pressure. Although accounting for a smaller percentage of the variance, the third factor appeared to represent specific somatic complaints, such as headaches, stomachaches and backaches.

#### Factor Analysis for Methods of Relaxation

The portion of the questionnaire concerning measures used to relax was subjected also to factor analysis using the same method (principal components with VARIMAX rotation). In this analysis the first three factors obtained eigenvalues greater than 1.0 (2.97, 2.04, and 1.15, respectively). The loadings of the relaxation methods on these factors are shown in Table 5. Relaxation methods loading on the first factor tended to be associated with avoiding the situation — or passive methods of coping. These included drinking coffee, exercise, talking, leaving work, using humor and drinking. The methods loading highly on the second factor were designed to deal directly with symptoms of anxiety. For example, using tranquilizers, and use of both formal and informal relaxation methods obtained high loadings on this factor. The third factor represented substances taken through the mouth, such as aspirin, tranquilizers, smoking and drinking.

#### Replication of Factor Analysis

In order to replicate the findings, each factor analysis was recalculated using an earlier version of the questionnaire and an independent sample of the subjects (N=243). The analysis confirmed and replicated the factors obtained in the original factor analysis. Indeed, the factor analysis

Table 4 — VARIMAX Rotated Factor Matrix for Symptoms

Symptom	Factor		
	1	2	3
S1 Headache	0.420	0.384	0.420
S2 Stomachaches or tension	0.021	-0.090	0.702
S3 Backaches	0.088	0.209	0.558
S4 Stiffness in the neck and shoulders	0.648	0.067	0.109
S5 Elevated blood pressure	0.047	0.546	0.094
S6 Fatigue	0.574	0.271	-0.046
S7 Crying	0.207	0.468	0.208
S8 Forgetfulness	0.400	0.473	0.099
S9 Yelling	0.411	0.533	-0.021
S10 Blaming	0.496	0.482	0.070
S11 Bossiness	0.146	0.675	0.095
S12 Compulsive gum chewing	-0.279	0.370	0.584
S13 Compulsive eating	0.529	0.157	-0.040
S14 Worrying	0.777	-0.067	-0.135
S15 Depression	0.562	0.232	0.025
S16 Agitation	0.656	0.219	-0.135
S17 Impatience	0.588	0.117	-0.218
S18 Anger	0.763	0.138	-0.215
S19 Frustration	0.791	0.026	-0.205
S20 Loneliness	0.477	0.305	0.328
S21 Powerlessness	0.601	0.043	0.179
S22 Inflexibility	0.000	0.446	0.452
S23 Compulsive smoking	-0.210	0.036	0.601
S24 Teeth grinding	-0.118	0.158	0.544

appeared to be "cleaner" in this replication. (A report describing this replication is available from us.)

### Discriminant Analysis

In order to compare differences between groups, discriminant analysis was performed. The first analysis considered six groups: mixed, managers, administrators, mental health workers, technicians, and nurses. Since there were a variety of dependent variables, univariate analysis of variance that compares the six groups on each variable may not be an unbiased method because the multiple comparisons are not independent of one another. Therefore, we employed multivariate analysis of variance to investigate the existence of differences between group "centroids." Using discriminant functions analysis, it is possible to determine the loci of group differences and "mapping" of group centroids.<sup>12-14</sup> The mapping of similarity between groups in discriminant space can easily be accomplished using multivariate techniques. That is, it is possible to determine which variables provide the greatest discrimination among groups. The resulting analysis also provides an index of both group similarity and group difference.

Discriminant analysis extracts linear combinations of variables that provide maximum discrimination between groups. The first discriminant function accounts for the largest percentage of the variance in group differences. The second discriminant function is the linear combination of variables that best separates groups after the first function has been partialled out, and so on.

Discriminant function analysis revealed a highly significant difference between group centroids for Function I ( $\chi^2=636.02$ ,  $df=205$ ,  $p<.001$ ), Function II ( $\chi^2=273.10$ ,  $df=160$ ,  $p<.001$ ) and Function III ( $\chi^2=155.18$ ,  $df=117$ ,  $p<.01$ ), were statistically significant also.

Since the first two discriminant functions were highly significant, differences between groups on these functions were mapped in discriminant space. The meaning of discriminant functions is defined by the loading of variables on them. In this analysis, it appears that the first two discriminant functions were analogous to the first two factors in the factor analysis. Variables with high loadings on the first function referred to the organization, and variables

with high loadings on the second function tended to concern self. Fig. 1 shows the mapping within the space created by these two functions. Inspection of Fig. 1 suggests that the managers and administrators scored approximately the same on the organizational factor followed by the mental health workers and nurses who also scored about the same as each other. The most negative scores were obtained by the mixed group and the technicians. When considering the second function, the mental health workers obtained the highest score, followed by the nurses, managers, administrators, mixed group and technicians. This suggests that the mental health workers gave the highest responses to self-related stressors followed by nurses, managers, administrators, mixed group and technicians. Although the managers and administrators appeared to attribute more stress to organizational variables, they appear to hold middle ground in the endorsement of self-related statements.

Discriminant analysis was also performed to account for differences between the six groups with regard to the reporting of symptoms. Fig. 2 presents a centroid map showing the similarities and differences between the six groups in the space created by the two strongest discriminant functions. The first discriminant function for symptoms was highly significant ( $\chi^2=402.44$ ,  $df=120$ ,  $p<.00001$ ). In addition, the second discriminant function was also highly significant ( $\chi^2=134.03$ ,  $df=92$ ,  $p<.003$ ). The first discriminant function was described by symptoms such as worry, anger and frustration. Negatively associated with this function were bossiness, gum chewing and smoking.

The second discriminant function obtained high loadings for loneliness and yelling with a negative weighting for agitation. As Fig. 2 shows, the administrators, the mixed group and the technicians all were high on the first discriminant function. Managers were next and mental health workers and nurses obtained the lowest score.

The second discriminant function, which was defined by agitation, loneliness and yelling, shows both the nurses and administrators with the highest scores, followed closely by mental health workers. Managers and technicians were apparently lowest in agitation, loneliness and yelling.

The discriminant function analysis for methods of relaxation revealed some interesting results. The first two dis-

Table 5 – VARIMAX Rotated Factor Matrix for Methods of Relaxation

Relaxation Method	Factor		
	1	2	3
R1 Take aspirin	0.13	0.14	0.68
R2 Use tranquilizers, medication	-0.15	0.51	0.49
R3 Drink coffee, coke, eat	0.57	-0.01	0.27
R4 Use relaxation techniques	-0.09	0.85	0.15
R5 Informal relaxation techniques	0.13	0.84	0.00
R6 Exercise	0.60	0.47	-0.05
R7 Talk to someone you know	0.75	-0.07	0.02
R8 Leave your work area	0.64	0.14	0.20
R9 Smoke	0.12	-0.02	0.64
R10 Use humor	0.71	-0.08	-0.02
R11 Have a drink to relax	0.45	-0.07	0.48

criminant functions again were highly significant. The first function accounted for a substantial portion of the variance ( $\chi^2=265.94$ ,  $df=60$ ,  $p<.0001$ ). The second discriminant function was significant also ( $\chi^2=80.53$ ,  $df=44$ ,  $p<.001$ ).

The first discriminant function was defined (through loading of variables) by using relaxation (.549) and infrequent drinking of coffee, cola or of eating frequently (-.584). Thus, this function was defined by use of relaxation methods and abstention from coffee, coke, etc. The second function was defined by use of alcohol (.549) and negative or low use of humor (-.789).

Fig. 3 shows the centroid map. As Fig. 3 suggests, mental health workers, managers and nurses tended to have positive scores on Function I, suggesting that they had a greater tendency to use relaxation methods, and a lesser tendency to drink coffee, colas, or eat than the groups of technicians, administrators and the mixed group. On function II, it appeared that the technicians had a strong positive score, and the nurses had a strong negative score. This suggests that the technicians tend to drink more and use humor less, and the nurses tend to drink less, but use humor more than the other groups.

#### Analyses on Change

A variety of studies were conducted to determine how individuals change as a function of the stress management class. The analyses were done in two different ways. In pilot studies we compared groups who anonymously filled out the questionnaire prior to and at the conclusion of the stress management course. The second phase involves a more intensive study of a group of medical students enrolled in the stress management course.

In the pilot study the mixed group and a group of psychiatric technicians were used because these two groups appear to be quite similar in the early analyses. The two groups did not differ from one another for any dependent

variable. However, there was a consistent difference between groups for the pretest and posttest factor. For Factor 1, the organizational factor, it appears that dissatisfaction with the organization tended to increase in both groups, perhaps because the class members reinforced individual's complaints against the organization, management or supervisors. There were also significant decreases for Factor 2. This factor represents individual change that is the focus of most interventions in the course, e.g., relaxation, cognitive change and communication skills. Decreases on this factor were highly significant ( $F 1/76 = 102.01$ ,  $p<.0001$ ). Finally, there was also a modest increase in scores for Factor 3 which deals with conflicts ( $F 1/76 = 10.34$ ,  $p<.003$ ).

We are somewhat hesitant to interpret these pilot results for several reasons. First, we have no assurance that the people taking the stress test are a representative sample of those who completed the pretest. Thus, the pre/post change may be confounded with composition of group. A second problem is that the analysis is incapable of controlling for individual variations. Because identification was not obtained, it was impossible to match any posttest questionnaire to a pretest. In order to study these problems in more detail, we examined a group of medical students ( $n=16$ ) for whom pretest and posttest questionnaires could be matched. A summary of the changes for medical students is presented in Table 6. As suggested in Table 6, there were significant changes among the medical students for both the external or organizational factor and the internal factor. On the organizational factor, unlike the other groups, the medical students slightly decreased in their complaints about the organization. Further, there was a significant decrease for the internal factor among the medical students. Changes for all other variables were nonsignificant.

In the absence of a control group it is not possible to conclude that the stress management class caused the changes on the first two factors. Yet, these results are encouraging.

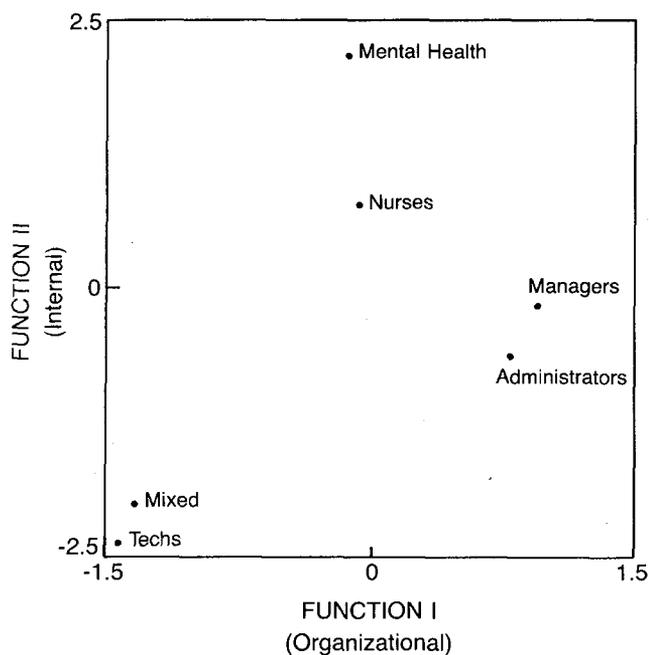


Fig. 1 – Discriminant analysis of centroids for group differences on stressful conditions.

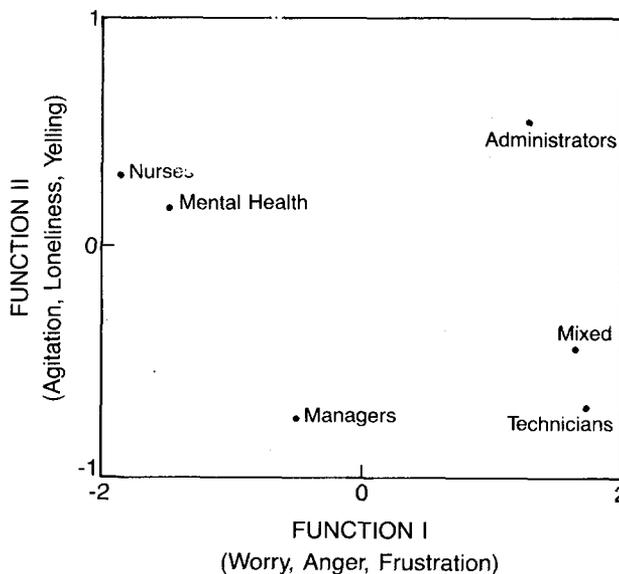


Fig. 2 – Discriminant analysis of group differences for symptom reporting.

## Discussion

In this report we have suggested that a stressful work conditions questionnaire may be of practical value for assessing stress in the workplace. The questionnaire contains at least two reliable factors that identify independent sources of stress. One factor is an organizational or external factor that includes concerns about being overtrained for a particular job, getting little support from co-workers, conflict in resource allocation, etc. A second factor deals more clearly with internalized work stress, for example, having difficulty dealing with other workers, difficulty in saying what one feels, too much time pressure, etc.

In a series of analyses, we have shown that these factors correlate with identifiable clusters of symptoms. For example, high scores on the first factor appear to be associated with low worry, low agitation, low impatience, low anger, etc. Thus, it appears that "externalizing" the causes of one's stress correlates with low emotional stress and higher oral responses (gum chewing, cigarettes and grinding of teeth). Conversely, high scores on the second factor appear to be related to frustration, feelings of powerlessness, anger, worry and impatience. Concern over one's ability correlates with the more emotional stress symptoms.

Validation studies suggested that the scale is quite capable of discriminating groups that have different occupational focuses. These discriminations are true for sources of stress and stress symptoms.

Finally, we have suggested that the first two factors of the questionnaire may be responsive to interventions designed to ease occupational stress. The decrease in Factor 2 in all groups gives some credence to the present stress management format. The increase in Factor 1 in two groups, mixed and technicians, is interesting. On examination of the actual seminar behavior, it is possible that reinforcement is given participants for blaming the organization, administration or their supervisors for their stress. And, perhaps, griping does alleviate stress.

Previous studies on stress have tended to focus attention on negative life stress events. Very little attention has been given to the absence of positive feedback in the workplace.<sup>15</sup> Our data suggest that stress is not just based on specific events. A major source of stress appears to be the absence of a positive environment. For example, many of

the items represented by the first factor cannot be considered specific events. For instance, getting little support from co-workers, having conflicts unsettled, having associates trained in different fields, etc. These stressful conditions would not be evaluated by traditional life stress scales.

**Limitations** — There are many limitations in this study and we will focus on only a few here. It is important to note that the groups described in this study should not be considered representative samples from their occupations. The purpose of the comparisons was to demonstrate that the scale can differentiate between occupational groups. These groups represented small and nonrepresentative samples who had volunteered for this exercise. It is highly likely that other groups of nurses, administrators, etc. would differ from those who participated in this study. The use of these samples did allow us to demonstrate that the scale can successfully discriminate between different groups of individuals performing different occupational roles.

Another limitation is that the scales have not been validated against samples of observable behaviors. In the future we hope to show the correspondence between the scores on the different scales and adaptation to observable stressful situations.

Finally, we must be cautious about concluding that the stress management course *caused* change in the medical students. Such a conclusion would require an experimental study with participants randomly assigned to experimental and control groups.

**Future Directions** — The present study provides encouraging results for the use of the stressful work conditions questionnaire. In future adaptations of the questionnaire, it may be most worthwhile to increase the number of items associated with Factor 2. At present the first factor has many more items than the second one. As a result, the first factor has a higher reliability. In order to bring the reliabil-

Variable*	Class Mean		t†	p
	Before	After		
External	1.63	1.42	2.39	.03
Internal	2.46	2.11	3.42	.01
Conflicts	2.33	1.96	1.24	NS‡
Symptoms factor 1	2.76	2.82	-0.85	NS
Symptoms factor 2	2.28	2.33	-0.56	NS
Relax factor 1	1.69	1.68	0.14	NS
Relax factor 2	2.81	2.63	1.21	NS

\* Based on factor analysis

† *df* = 15 for all *t* tests

‡ NS indicates not significant

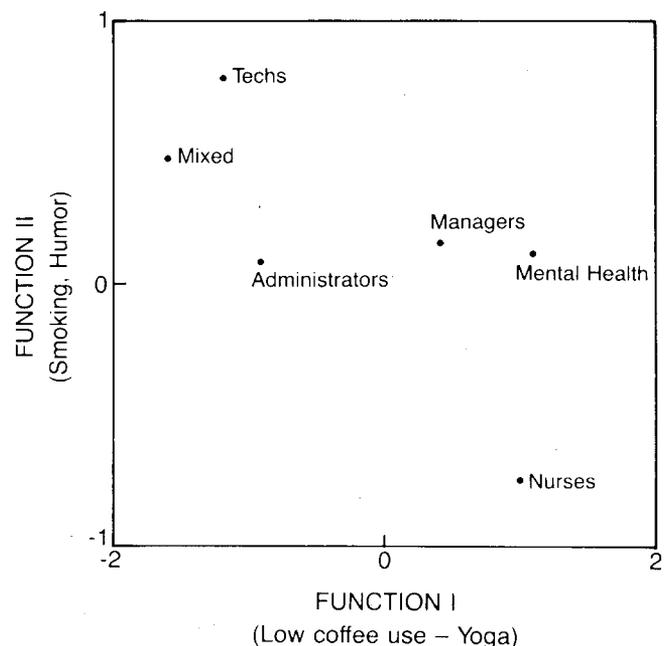


Fig. 3 – Discriminant analysis for relaxation methods (points equal group centroids).

ity of the second factor up to .90, it will be necessary to add items. According to psychometric theory, it is possible to estimate the number of items that must be added to a scale in order to achieve a desired level of reliability. Performing these calculations for the desired reliability of .90, it appears that the second factor would have to be increased in length 2.2 times, or to about 24 items. These calculations suggest that the entire work conditions questionnaire could have two highly reliable factors without greatly increasing its current length (45 items).

Our early postcourse questionnaire results suggest that various groups reported that they profited as a result of different intervention training. Further studies delineating personal cognitive style and the most beneficial training technique might be profitable. At present, we find that the multimodal approach is necessary to meet the needs of any particular group.

Before and after studies that compare program participants and control groups are needed to further evaluate the stress management program with more occupational groups. Although we cannot formally evaluate the question of change, these beginnings are promising.

## References

1. Sarason IG, Spielberger CD (Eds.): *Stress and Anxiety*, vol 6. Washington, D.C.: Hemisphere, 1979.
2. Cooper CL, Marshall J: Occupational sources of stress: A

review of the literature relating to coronary heart disease and mental ill health. *J Occup Psychol* 49:11-28, 1976.

3. French JRP Jr, Caplan RD: Organizational stress and individual strain, in Morrow NJ (Ed.): *The Failure of Success*. New York: AMACOM, 1973, pp 30-66.

4. McLean AA: *Work Stress*. Don Mills: Addison-Wesley, 1979.

5. Friedman M, Roseman RH: *Type A Behavior and Your Heart*. Greenwich, Conn.: Fawcett, 1974.

6. Colligan JJ, Smith MJ, Hurrell JJ: Occupational incidence of rates of mental health disorders. *J Human Stress* 3:34-39, 1977.

7. Shostak A: Blue-collar stressors. *Proceedings: Reducing Occupational Stress*. 73-86. U.S. Dept. of HEW, 1974.

8. Wahlund I, Nerrell G: Stress factors in the working environments of white collar workers. *Proceedings: Reducing Occupational Stress*. 62-73. U.S. Dept. of HEW, 1978.

9. Cooper CL, Payne R: *Stress at Work*. New York: Wiley, 1978.

10. Barber B: Unpublished Study: Arizona Department of Public Safety Stress Survey, 1978-79.

11. Kaplan RM, Saccuzzo DS: *Psychological Testing: Principles, Applications and Issues*. Monterey, Calif: Brooks/Cole, 1982.

12. Cooley W, Lohnes P: *Multivariate Data Analysis*. New York: Wiley, 1971.

13. Kaplan RM, Goldman RD: Interracial perception among black, white and Mexican-American high school students. *J Personality Social Psychol* 28:383-389, 1973.

14. Kaplan RM: Uses of discriminant analysis in psychology. *Proceedings of the Social Statistics Section*. Washington, DC: American Statistic Association, pp 596-601.

15. Kanner AD, Kafry D, Pines A: Conspicuous in its absence: The lack of positive conditions as a source of stress. *J Human Stress* 4:33-39, 1978.