

Freedom From Stress: A Meta-Analytic View of Treatment and Intervention Programs

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The purpose of this study is to evaluate, through the use of meta-analysis, the effectiveness of stress management intervention and treatment programs. This meta-analysis used the methodology suggested by Hunter and Schmidt (1990). The results indicate that primary prevention programs specifically using such stress management skills as time management, coping strategies, and problem resolution skills have the greatest effect on reducing employee stress.

Most people would benefit from having a better understanding of the stress in their lives. In order to find a solution to their stress, people must first understand the nature and score of the problem of stress. Stress can take on two forms, “good” stress (eustress), and “bad” stress (distress; Seyle, 1974). Eustress is stress that is transformed and used in a positive and responsible manners and poses challenges for individuals. Distress is just the opposite as it negatively affects individuals. When people react to stress with feelings of hopelessness and frustration, stress takes on the form of distress (Brown, 1983). It is crucial for individuals to realize that not all stress is “bad.” Managed correctly, some amount of stress is desirable and may even motivate people and spur creativity.

When reviewing the literature on workplace stress, it becomes apparent that stress affects many individuals in organizations. It affects women and men, blue- and white-collar workers, and young and old employees alike. Common sources of stress that influence individuals in

the workplace are role ambiguity, role and job demands, demands from the work climate, and relations with workers at all levels (Quick & Quick, 1984).

The symptoms and consequences of stress result in employee ill health and lack of well being in a number of ways. Emotionally, stress can be indicated by depression, anxiety, tension, and frustration. Often people deal with these consequences with such negative coping behaviors as overeating, smoking, and alcohol and drug abuse. Physically, employees may develop migraine headaches, hypertension, fatigue, and ulcers. In addition, stress have been linked to such diseases as coronary heart disease, diabetes, and arthritis. These behavioral and physical effects of stress should be of concern to managers and supervisors, because if left untreated, these effects may pose serious occupational safety hazards to the employees and to others on the job (Donovan, 1987).

Managers in many organizations have become increasingly committed to the development of stress management techniques to prevent physical and psychological burnout (Brodzinski, Scherer, & Goyer, 1989; Murphy, 1984). There is great concern with the effects of stress because of the impact on the performance and productivity of employees, as well as the high costs of stress to the organization (Higgins, 1986; Adams, 1988). Occupation stress results in measurable increases in absenteeism, turnover, accident rates, and health care costs. Employers pay approximately 80% of all private health insurance premiums (Clement & Gibbs, 1983).

Throughout the organization, direct consequences of stress can be seen in decreased organizational effectiveness. Further, with regard to work climate, one might be able to sense a low morale and decreased motivation among employees (Nelson & Quick, 1985). In addition, stress indirectly affects the organization through the individual employee by a decrease in productivity and creativity or effectiveness, an increase in errors on the job, job dissatisfaction, forgetfulness, and an inability to make effective decisions (Davidson & Cooper, 1984). Many states now recognize emotional distress resulting from job stress as a worker-related illness and award workers' compensation benefits (Gettings & Mattox, 1988). Thus an increasing amount of money is being paid by organizations due to job related stress.

In spite of this grim characterization of stress, it has been shown that effective stress management programs have lowered turnover rates, decreased absenteeism and health care costs, and in some cases, even

increased job satisfaction and morale (Matteson & Ivancevich, 1982). It should be of pivotal importance to employers, then, to either develop new programs or modify existing stress intervention and prevention programs.

Quick and Quick (1984) developed a framework that separated individual stress management interventions into primary and secondary intervention techniques. These techniques focused on the prevention or reduction of stress in the work environment. Primary prevention is defined as those techniques that are directed at the source of the stress (e.g., constructive self-talk, time management, social support, and lifestyle management). Secondary prevention is defined as those techniques that are directed at the individual's response to the stress (e.g., progressive relaxation techniques, aerobic exercise, biofeedback, and meditation).

The present study reviews the relevant literature that has been conducted on stress management programs in the workplace, and through meta-analytic techniques, reach a conclusion about the effectiveness of these stress management techniques. After a review of the literature, the studies were separated and organized using Quick and Quick's (1984) framework of preventative management techniques.

Method

Meta-analysis is a statistical approach for cumulating results across research findings. The advantage to using meta-analysis is that one conclusive result is obtained from the relevant research. The present study was conducted in accordance with the methodology described by Hunter and Schmidt (1990). The procedure involved first finding all relevant studies that statistically evaluated stress management programs and that used a reasonably rigorous research design.

Inclusion of Research

Forty-six studies investigating the effects of stress management techniques on stress in the workplace were found through our literature review. Of these 46 studies, only 19 reported any type of statistical results. Of these 19 studies, two were not used because the statistical measures in the articles were not completely reported and thus could not be converted into effect sizes.

Those studies that used several stress reduction techniques were categorized according to Quick and Quick's (1984) framework of primary

and secondary prevention techniques. Those studies that combined treatments were not reported individually as the nature of the statistics did not enable the results to be broken down into separate effect sizes.

The studies were also separated according to the experimental design of the research. Three experimental designs were found: 1) Five studies utilized an experimental group that received stress management intervention and a control group that did not receive any intervention. 2) Nine studies used a pre- and post-assessment design for both the experimental and control groups. 3) Three studies used a pre- and post-assessment design for the experimental group but did not have a control group.

Computation of Effect Size

The effect size, based on the formula by Hunter and Schmidt (1990), is determined by converting all test statistics to a “d score.” Each d is then weighted by multiplying it by the sample size for the study. Mean effect sizes were computed for overall treatment effects, primary and secondary treatment prevention techniques, individual stress management techniques, and type of experimental design.

Search for Moderating Variables

In meta-analysis, after the mean effect size has been calculated, the possibility of moderating variables affecting the results is considered. This is accomplished by calculating the standard deviation in effect sizes, as well as the percentage of observed variance that could be expected by sampling error. If the variability expected by sampling error accounts for at least 75% of the variance in the effect sizes, then a search for moderating variables is not considered necessary. Possible moderating variables that were considered in this study were the level of intervention (primary or secondary), the experimental design of the study, gender and race of the subjects, size of the various organizations, type of organization, length in time of the intervention programs, and subject occupation.

Computation of Confidence Interval

To determine the significance of the mean effect size, a 95% confidence interval is utilized for the overall effect size. A 90%

confidence interval is suggested by Hunter and Schmidt (1990). For this study, however, a more conservative interval of 95% was used.

Fail Safe N

Though meta-analysis requires a thorough search of published research, it often does not take into account research results that are unpublished and thus not available to the person conducting the meta-analysis. A statistical estimate, referred to as the Fail Safe N, is computed to determine how many “hidden” studies would be necessary to decrease or increase the mean effect size to a small or insignificant level.

Results

As shown in Tables 1 and 2, the overall mean effect size was $-.50$, sampling error accounted for 46% of the variance, the 95% confidence interval was $-.57$ to $-.42$, and the Fail Safe N is 13.8. The mean effect size of $-.50$ leads to the conclusion that the stress management techniques have a significant impact on reducing stress. However, because only 46% of the variance in effect sizes would be expected by sampling error, moderating variables need to be explored.

Tables 3 and 4 show that even though both primary and secondary techniques were statistically significant, primary techniques ($d = -.80$) appear to be more effective for reducing stress in the workplace than are secondary techniques ($d = -.49$).

As shown in Tables 5 and 6, the stress management techniques were further broken down by individual techniques to investigate which specific intervention techniques best reduce stress. Such stress management skills as time management, coping skills, goal setting, and problem resolution skills, aimed at the primary prevention level had the largest effect ($d = -1.58$) on reducing stress in the workplace. These techniques were followed by coworker support techniques aimed at the primary level of intervention ($d = -.71$), exercise techniques ($d = -.50$) aimed at the secondary level of prevention, relaxation techniques ($d = -.40$), and scheduled staff meetings ($d = -.48$). Stress inoculation techniques did not have a significant effect on reducing stress.

Table 1
Individual Effect Sizes for Overall Treatment

Study	N	<i>d</i>
Bertoch et al. (1989)	30	- 1.00
Bertoch et al. (1989)	30	- .75
Bertoch et al. (1989)	30	- 1.10
Bertoch et al. (1989)	30	- 1.22
Brunning & Frew (1987)	62	- .77
Carrington (1980)	104	- .72
Cecil & Forman (1990)	54	- .25
Friedman et al. (1983)	85	- .65
Ganster et al. (1982)	36	- .37
Ganster et al. (1982)	31	- .24
Higgins (1986)	53	- .33
Jackson (1983)	87	- .37
Jackson (1983)	66	- .63
King et al. (1986)	56	+ .29
King et al. (1986)	56	+ .35
Long (1988)	55	- .17
Long (1988)	95	- .17
Long & Haney (1988)	39	- .57
Long & Haney (1988)	72	- 1.13
Murphy (1984)	34	- .34
Orpen (1984)	36	- .29
Peters et al. (1977)	126	- .33
Tunnecliffe et al. (1986)	21	- 1.55

Table 2
Meta-Analysis Results for Overall Treatment

Mean effect size	- .50
Total N	1, 288
Number of studies	23
Variance	.16
Variance expected by sampling error	.07
Corrected variance	.09
Fair-safe N	13.80
95% Confidence Interval	
Lower bound	- .42
Upper bound	- .57

Table 3
Effect Sizes for Primary Prevention Treatments

Study	N	<i>d</i>
Brunning & Frew (1987)	62	- .77
Cecil & Forman (1990)	54	- .25
Higgins (1986)	53	- .33
Jackson (1983)	87	- .37
Jackson (1983)	66	- .63
King et al. (1986)	56	+ .29
King et al. (1986)	56	+ .35
Tunnecliffe et al. (1986)	21	- 1.55
Mean		- .80
95% Confidence Interval		
Lower bound		- .62
Upper bound		- .99

Table 4
Effect Sizes for Secondary Prevention Treatments

Study	N	<i>d</i>
Brunning & Frew (1987)	15	- .68
Brunning & Frew (1987)	15	- 1.09
Carrington (1980)	104	- .72
Cecil & Forman (1990)	17	- .24
Ganster et al. (1982)	36	- .37
Higgins (1986)	53	- .33
Long (1988)	55	- .63
Long (1988)	29	- .02
Long (1988)	32	- .03
Long & Haney (1988)	39	- .57
Long & Haney (1988)	25	- 1.13
Long & Haney (1988)	104	- .72
Long & Haney (1988)	25	- .74
Murphy (1984)	15	- .49
Murphy (1984)	11	- .59
Orpen (1984)	36	- .29
Peters et al. (1977)	36	- .08
Peters et al. (1977)	54	- .59
Tunnecliffe et al. (1986)	14	- 1.58
Mean		- .49
95% Confidence Interval		
Lower bound		- .37
Upper bound		- .61

Table 5

Individual Primary Interventions

Intervention/Study	N	d
Management Skills		
Brunning & Frew	16	- 1.00
Higgins	53	- 1.60
King	13	- 8.45
TOTAL	82	- 1.58
Staff Meetings		
Jackson	87	- .37
Jackson	66	- .63
TOTAL	153	- .48
Coworker Support		
Cecil & Forman	17	- .24
King	12	- 8.12
TOTAL	29	- 3.52

Table 6**Individual Secondary Interventions**

Intervention/Study	N	d
Exercise		
Brunning & Frew	15	- .68
Long	32	- .03
Long & Haney	25	- 1.13
TOTAL	72	- .50
Relaxation		
Higgins	53	- .12
Long & Haney	25	- .74
Murphy	11	- .59
Orpen	36	- .29
Peters	54	- .59
Peters	36	- .08
Tunnecliffe	14	- 1.58
TOTAL	239	- .40
Stress Inoculation Training		
Cecil & Forman	17	- .24
Long	29	- .02
TOTAL	46	- .09

Discussion

The results of this meta-analysis suggest that if an organization wants to prevent employee stress, the organization should design a stress management program aimed at the primary level of prevention techniques, specifically using such stress management skills as time management, coping skills, and problem resolution skills. Organizations wanting to reduce employee stress should design a stress management program aimed at the secondary level of prevention, specifically using an exercise program and relaxation program. On the basis of our findings, an effective program would use both primary and secondary prevention techniques such as stress management skills with aerobic exercise.

Because the amount of variance not explained by sampling error was large, it was necessary to investigate moderating variables. The level of intervention whether primary or secondary, and the experimental design of the studies were analyzed as potential moderating variables. Also, the type and the size of the various organizations could not be effectively categorized into groups to be further analyzed. Further, the length of the intervention programs and the subjects' occupations were not analyzed as potential moderating variables as once these variables were separated into the defined categories, there were not enough studies in each category to analyze.

Further research should focus on controlling the length of time between intervention and the follow-up measures to analyze intervention techniques. Many of the studies stopped collecting data on the results of the programs after six months. A longer time frame might be necessary to thoroughly analyze whether the techniques are having any long term effect on reducing stress.

References

- Adams, J. D. (1988). A healthy cut in costs. *Personnel Administrator*, 33(8), 42-47.
- Arndt, R., & Chapman, L. (1984). *Potential office hazards and controls*. Washington, D.C.: Office of Technology Assessment.

- Brown, W. D. (1983). *Welcome stress*. Minneapolis, MN: Compcare Publications.
- Davidson, M. J., & Cooper, C. L. (1984). She needs a wife: Problems of women managers. *Leadership and Organization Development Journal*, 5(3), 3-30.
- Donovan, R. (1987). Stress in the workplace: A framework for research and practice. *Social casework: The Journal of Contemporary Social Work*, May, 259-266.
- Gettings, L., & Maddox, E. N. (1988). When health means wealth. *Training and Development Journal*, April, 81-85.
- Higgins, N. C. (1986). Occupational stress and working women: The effectiveness of two stress reduction programs. *Journal of Vocational Behavior*, 29, 66-78.
- Matteson, M. T., & Ivancevich, J. M. (1982). The how, what, and hwy of stress management training. *Personnel Journal*, 61(10), 768-774.
- Nelson, D. L., & Quick, J. C. (1985). Professional women: Are distress and disease inevitable. *Academy of Management Review*, 10(2), 206-218.
- Perrewe, P. L., & Vickory, F. A. (1988). Combating job stress. *Training and Development Journal*, 42(4), 84-85.
- Quick, J. C., & Quick, J. D. (1984). *Organizational stress and preventative management*. New York: McGraw-Hill.
- Seyle, H. (1974). *Stress without distress*. New York: Lippincott.

Meta-Analysis References

- Bertoch, M. R., Nielsen, E. C., Curley, J. R., & Borg, W. R. (1989). Reducing teacher stress. *Journal of Experimental Education*, 57(2), 117-128.
- Brunning, N. S., & Frew, D. R. (1987). Effects of exercise, relaxation, and management skills training on physiological stress indicators: A field experiment. *Journal of Applied Psychology*, 72(4), 515-521.
- Carrington, P., Collings, G. H., Benson, H., Robinson, H., Wood, L. W., Lehrer, P. M., Woolfolk, R. L., & Cole, J. W. (1980). The use of meditation-relaxation techniques for the management of stress in a working population. *Journal of Occupational Medicine*, 22(4), 221-231.
- Cecil, M. A., & Forman, S. G. (1990). Effects of stress inoculation training and coworker support groups on teachers' stress. *Journal of School Psychology*, 28, 105-118.
- Friedman, G. H., Lehrer, B. E., & Stevens, J. P. (1983). The effectiveness of self-directed and lecture/discussion stress management approaches and the locus of control of teachers. *American Educational Research Journal*, 20(4), 563-580.

- Ganster, D. C., Mayes, B. T., Sime, W. E., & Tharp, G. D. (1982). Managing organizational stress: A field experiment. *Journal of Applied Psychology, 67*(5), 533-542.
- Higgins, N. C. (1986). Occupational stress and working women: The effectiveness of two stress reduction programs. *Journal of Vocational Behavior, 29*, 66-78.
- Jackson, S. E. (1983). Participation in decision making as a strategy for reducing job-related strain. *Journal of Applied Psychology, 68*(1), 3-19.
- King, A. C., Winett, R. A., & Lovett, S. B. (1986). Enhancing coping behaviors in at-risk populations: The effects of time-management instruction and social support in women from dual-earner families. *Behavior Therapy, 19*(1), 75-83.
- Long, B. C. (1984). Aerobic conditioning and stress inoculation: A comparison of stress-management interventions. *Cognitive Therapy and Research, 8*(5), 517-542.
- Long, B. C. (1988). Stress management for school personnel: Stress-inoculation training and exercise. *Psychology in the Schools, 25*, 314-324.
- Long, B. C., & Haney, C. J. (1988). Coping strategies for working women: Aerobic exercise and relaxation interventions. *Behavior Therapy, 19*, 75-83.
- Long, B. C., & Haney, C. J. (1988). Long-term follow-up of stressed working women: A comparison of aerobic exercise and progressive relaxation. *Journal of Sport and Exercise Psychology, 10*, 461-470.
- Murphy, L. R. (1984). Stress management in highway maintenance workers. *Journal of Occupational Medicine, 26*(6), 436-442.
- Orpen, C. (1984). Managerial stress, relaxation and performance. *Journal of Management Development, 3*(2), 34-47.
- Peters, R. K., Benson, H., & Porter, D. (1977). Daily relaxation response breaks in a working population: Effects of self-reported measures of health, performance, and well-being. *American Journal of Public Health, 67*(10), 946-952.
- Tunnecliffe, M. R., Leach, D. J., & Tunnecliffe, L. P. (1986). Relative efficacy of using behavioral consultation as an approach to teach stress management. *Journal of School Psychology, 24*, 123-131.