

The Effect of Employee Self-Management Training on Personal and Organizational Quality

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ABSTRACT

This research examined the effect of an Inner Quality Management (IQM) training program on 54 employees in the Information Technology Services Division of a state agency which was experiencing change-related turmoil. Measures of personal and organizational quality in the trained employees were compared to those of a 64-member comparison group that had not received the training. After the completion of the training, seven weeks from the initial assessment, the study group reported significant decreases in dimensions of negative affect and stress and significant increases in dimensions of positive affect in relation to the comparison group. Also, perceptions of goal clarity and productivity increased significantly. Implications for individual and organizational wellness are discussed.

BACKGROUND

The Information Technology Services Division (ITSD) of a state agency had recently initiated major changes to meet new challenges in the information services marketplace. This division had shifted from a known technology that had outgrown its utility to a new technology that required division employees to learn new skills. The ITSD change management team informed the researchers that the introduction of a new technological platform challenged this work force's sense of mastery and security. Simultaneous changes in leadership also added uncertainty to this organization's direction and future. These changes created an emotionally charged and potentially stressful atmosphere, and many individuals reportedly felt angry, resentful and anxious. Managers were concerned that this combination of anxiety and negative affect might compromise the ability of the division to accept the changes and adapt to the new leadership style and technological direction.

Division leaders retained the Institute of HeartMath (IHM), a non-profit research and training organization, to provide emotional self-management training to Division employees. The program selected was IHM's Inner Quality Management (IQM), a stress and emotional management intervention specifically designed to improve organizational effectiveness and quality. This program provides techniques intended in part to reduce stress and negative affect, while increasing positive affect (Childre & Cryer, 1999).

The Impact of Occupational Stress

The Division leadership was particularly concerned about the stress generated by the changes, and by the resulting dysfunctional personal interactions. These concerns were well founded. Occupational stress is pervasive and invasive. Concerns about the effects of stress on employees and organizations are supported by voluminous evidence. A recent study of full-time employees conducted by Northwestern National Life Insurance revealed some important facts about job stress (Northwestern National Life Insurance Company, 1991). In their study of 600 employees they found that one in three considered quitting work in 1990 due to stress, and one in three expected to burn out on the job in the future. Fourteen percent quit or changed jobs during the year due to job stress. Seven out of ten said job stress lowered their productivity. Finally, stress-related disability cases doubled from 1981 to 1990. These statistics highlight the pervasive and growing effect of occupational stress.

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The economic impact of job stress is equally staggering. It is now estimated that job stress costs employers approximately \$200 billion annually in absenteeism, tardiness, burnout, lower productivity, high turnover, worker's compensation and health insurance costs (National Safety Council, 1995).

Many researchers have concluded that stress has a negative impact on the health of workers, influencing coronary heart disease (Cooper & Marshall, 1976), mental illness (Karasek, 1979) and cancer (Fackelman & Raloff, 1993). Other research has linked stress to asthma, hypertension, ulcers, colitis, acne (DeVito, 1994) and other psychosomatic complaints (Frese, 1985). Studies have also shown a relationship between stress and burnout (Meyerson, 1994), as well as depression and some elements of job performance (Motowidlo, Packard & Manning, 1986). One investigation which followed over ten thousand government employees found that workers with low perceived job control, which can be a significant source of stress for many employees, had a highly increased risk of developing coronary heart disease (Bosma et al., 1997).

While some studies have proposed intervening variables and alternate explanations for the relationship between stress and illness (e.g. Frese, 1985), the evidence for a direct, but perhaps moderated, relationship is compelling.

Negative Affect

Negative affect (moods, emotions, and feelings) has also been associated with illness, most commonly in studies of Type A personalities, who are prone to exhibit negative emotions such as hostility (Matthews & Haynes, 1986; Miller, Smith, Turner, Guijarro & Hallet, 1996). Negative affect has also been linked to stress. Marco and Suls (1993) found that persons with high negative affectivity were more reactive to current stressors, were more distressed by current problems, and recovered more slowly from previous problems than did persons with low negative affectivity.

Additionally, negative affect has been shown to influence immunity. One study (Rein, Atkinson & McCraty, 1995) examined the effect of negative affect on secretory immunoglobulin A (S-IgA), an antibody class that plays an impor-

tant role in mucosal defense against acute upper respiratory tract infections. Subjects re-experienced an episode of anger for five minutes and S-IgA levels were measured from saliva samples at one-hour intervals for six hours afterwards. Following an initial increase, S-IgA dropped markedly soon after the episode of recalled anger and did not return to baseline levels for six hours.

Positive Affect

Researchers have recently shown an increased interest in positive affect, particularly in organizational settings. Positive affect has been predicted to be a precursor to organizational spontaneity (George & Brief, 1992). Further, in one study individuals with high positive affect performed better and had higher managerial potential than those with low positive affect (Staw & Barsade, 1993). In another study, pharmacists reported higher job and career satisfaction when feeling positive moods (Woodward & Chen, 1994).

Studies conducted across a broad range of settings have found that positive affect also increases cognitive flexibility and innovative problem solving (Ashby, Isen & Turken, 1999) and can improve negotiation style (Carnevale & Isen, 1986), helpfulness (Levin & Isen, 1975), creativity (Isen, Daubman & Nowicki, 1987), memory, (Isen, Shalcker, Clark & Karp, 1978), conflict resolution (Baron, 1984), absenteeism (Iverson, Olerals & Erwin, 1994), job performance (Wright & Staw, 1994), job satisfaction (Butcher, Brief & Roberson, 1993), job achievement (Staw, Sutton & Pelled, 1994) and stress (Holmes, 1984).

Research on the relationship between positive affect and health is less common. However, there is evidence to suggest that individuals who exhibit greater affiliative tendencies (loving and caring psychological characteristics) have less life stress and diminished susceptibility to disease (Jemmott, 1987). Other research has examined the real-time physiological effects of actively experiencing a positive emotional state (McCraty, Atkinson, Rein & Watkins, 1996; McCraty, Atkinson, Tiller, Rein & Watkins, 1995; Rein et al., 1995; Tiller, McCraty & Atkinson, 1996). In one study, participants recalled a pleasant experience that generated feelings of appreciation and

were instructed to sustain that feeling state for five minutes. Measurements of S-IgA were taken before and several times after the interval of positive affect. S-IgA rose over this period, remaining above baseline levels for six hours (Rein et al., 1995).

In another study, the positive emotion of appreciation was shown to increase the coherence in heart rate variability patterns and produce a shift in autonomic balance toward increased parasympathetic activity, which may be beneficial in the treatment of hypertension and reduce the likelihood of sudden death in patients with congestive heart failure and coronary artery disease (McCraty et al., 1995).

The Stress Model

It must be stated that not all stress responses are harmful. Occasionally one needs to fight or flee, and being “energized” to meet short-term challenges can produce effective results. However, this is not the type of stress that is causing concern in organizations. The focus of this study and the IQM techniques is the reduction of inappropriate stress responses which unnecessarily activate the body’s adaptive systems over time.

This study is guided by one well-accepted model of the stress process (Lazarus, 1981; Lazarus & Folkman, 1984). In this model, potential stressors exist in the environment and arise in the individual. These potential stressors interact with one’s interpretive style (Thomas & Tymon, 1995), or perceptual tendency, to produce an appraisal of the event. The appraisal results in a judgment of threat (or harm), challenge (or gain), neutrality or irrelevance. The valence and import one assigns to the stressor determines the nature and degree of physiological stress and affective responses, which in turn influence behavior and health.

Therefore, reduced stress responses, improved workplace well-being and productivity can be achieved if individuals acquire an interpretive style that results in appraisals of stressors that are more neutral, less harmful, more challenging or less relevant. This modification of interpretive style and the ensuing re-patterning of draining automatic mental and emotional responses is one goal of the techniques of the IQM program reported on here.

The Inner Quality Management Training Program

The Inner Quality Management training program selected by the ITSD offers a research-based set of self-management techniques designed to modify interpretive styles and enhance communication, workplace climate, personal performance and business processes (Childre & Cryer, 1999). These techniques have been shown to reduce stress, tension and negative emotion, while enhancing positive emotion, communication and job satisfaction (Barrios-Choplin, 1997; Barrios-Choplin, McCraty & Cryer, 1997; McCraty, Barrios-Choplin, Rozman, Atkinson & Watkins, 1998; Rozman, Whitaker, Beckman & Jones, 1996). Additionally, practice of the techniques taught in the IQM program has been shown to have significant physiological benefits, including enhancing autonomic nervous system balance (McCraty et al., 1995), reducing cortisol levels and increasing DHEA (McCraty et al., 1998), boosting immunity (McCraty et al., 1996; Rein et al., 1995), improving cardiovascular coherence (Tiller et al., 1996) and reducing blood pressure in hypertensive individuals (Barrios-Choplin et al., 1997).

The IQM technology differs from other commonly used stress management approaches in several key respects. Unlike meditation and relaxation techniques, which focus on calming or quieting the mind and body, the IQM techniques involve actively engaging a positive emotional state, which favorably affects both physiological and mental processes. The IQM techniques are distinct from visualization methods in that their emphasis is upon genuinely re-experiencing a positive *feeling state* rather than simply calling up a pleasant mental memory or image. Finally, many meditation and relaxation procedures, as well as exercise, fitness and nutritional education programs currently in use by individuals and organizations require extended blocks of time and/or a separate space outside of the normal workplace environment. In contrast, most of the IQM techniques are designed to transform inefficient mental and emotional reactions in the moment, and are intended to be used in the midst of day-to-day stressful situations, when they are most needed.

The IQM program consists of four training modules: 1) Freeze-Frame (shifting perception to transform reactions to potential stressors), 2) Coherent Communication (enhancing communication, teamwork and goal clarity), 3) Power Tools for Inner Quality (creating a caring culture and increasing job satisfaction) and 4) Quantum Management (applying the above tools in an organizational context). Several of the core techniques of the IQM are described briefly in the following paragraphs. More detailed descriptions of the techniques, their conceptual basis and their applications in organizational settings can be found elsewhere (Childre & Cryer, 1999; Childre & Martin, 1999).

Freeze-Frame (Childre, 1998) is a technique designed to aid people in revising their interpretive styles so they may effectively deal with stressors in the moment an inappropriate stress response is recognized, or, with practice, prevent the inappropriate response altogether. In essence, the technique instructs people to consciously disengage from inefficient, negative mental and emotional reactions as they occur by shifting their attention from the mind to the area of the heart and self-generating a sincere positive feeling state, such as appreciation or care. This prevents or reverses the body's normal destructive stress response, and changes the bodily feedback sent to the brain, thus arresting physiological and psychological wear and tear. As a result of using Freeze-Frame, one can think more clearly and often transform an inefficient, emotionally draining response into a proactive, creative one. With practice, this tool can be used effectively in less than one minute. A previous study using the Freeze-Frame technique in a psychological intervention program resulted in significant reductions in life stress, state and trait anxiety levels, and self-assessed physical symptoms in a group of HIV-positive individuals (Rozman et al., 1996). The technique has also been shown to yield immediate physiological benefits: Practicing Freeze-Frame for a five-minute period has been demonstrated to increase S-IgA levels (Rein et al., 1995), improve autonomic balance (McCraty et al., 1995; Tiller et al., 1996) and reduce blood pressure in hypertensive individuals (Barrios-Choplin et al., 1997).

The Coherent Communication module of the IQM program is intended to provide practical

tools which enhance communication between co-workers, improve team coherence and goal clarity. Communication issues are a major source of stress. Lack of effective communication between co-workers and between managers and the workforce is often the source of much of the affective inner turmoil that preoccupies one's thought processes. This often leads to feelings of hostility, mistrust and separation between team members and has a negative impact on productivity, teamwork and creativity. Often it is difficult to hear others because we are preoccupied by our own internal thought processes. The Intuitive Listening technique (Childre & Cryer, 1999) facilitates the sharing of information with greater sincerity and effectiveness. Individuals learn to communicate more openly and honestly, and to stop inner dialogue in order to listen to others more deeply and intuitively. This communication technique allows people to more readily understand the essence of a conversation and often to perceive additional levels of subtlety within the information being communicated.

The Heart Lock-In technique (Childre & Martin, 1999) enables people to establish and sustain positive affective states in order to boost their energy, heighten peace and clarity, and effectively re-train their physiology to sustain longer periods of balanced, coherent function. The technique involves focusing one's attention on the area around the heart and experiencing a sincere positive feeling state such as appreciation, while listening to music specifically designed to facilitate stress reduction and promote mental clarity and emotional balance (Childre, 1991; Childre, 1995). Practice of the Heart Lock-In has been demonstrated to boost S-IgA levels (McCraty et al., 1996). In another study, a group of healthy individuals who regularly used the Heart Lock-In over one month's time as part of an emotional management intervention experienced a mean 23% reduction in cortisol and a 100% increase in DHEA, accompanied by significant increases in positive affect and reduced stress and negative affect (McCraty et al., 1998).

Other tools covered in the IQM program help individuals actualize the inner attitudes of appreciation, care and self-care in both personal and organizational contexts, and apply the key techniques and concepts learned in the program to increase planning and decision making effectiveness (Childre & Cryer, 1999).

HYPOTHESES

The IQM techniques are designed to improve personal and organizational quality by reducing stress, managing emotions, and improving key elements of workplace well being. In this study, the following hypotheses were tested:

H1. At time two (two weeks after the completion of the final IQM training session and seven weeks from the initial measurement point) the study group will report less frequent occurrences of negative affect than will the comparison group.

H2. At time two the study group will report less frequent occurrences of physical symptoms of stress than will the comparison group.

H3. At time two the study group will report more frequent occurrences of positive affect than will the comparison group.

H4. At time two the study group will report higher levels of organizational quality than will the comparison group.

METHODS

Intervention

The Inner Quality Management training was delivered in one 6-hour session and two 3-hour sessions over the course of six weeks to 54 volunteers in the Information Technology Services Division, along with some members of the Change Management Team and the Human Resources Division. Participants spent this time learning and applying IQM tools and techniques to the stressors, challenges, and opportunities inherent in fundamental organizational change.

Data Collection

The 54 study participants voluntarily completed a questionnaire during the week prior to the first training session and again seven weeks later (two weeks after the completion of the final training session). A group of 64 volunteers who were awaiting training also completed the survey at the same points as the study group and served as a comparison group.

Measures

The instrument was titled "Personal and Organizational Quality Assessment" (POQA) (Barrios-Choplin & Atkinson, 1997). The POQA has achieved acceptable psychometric characteristics. The survey has been normed over a sample of 1567 working adults (age ranging from late teens to sixties, job levels from production worker to executives, 43% male and 57% female). A test-retest was performed on a sub-sample of 64 individuals, with the correlations of the constructs from time one to time two (7 weeks later) ranging from .50 to .86.

Scales were formed and subjected to internal reliability analysis (Table 1). The Personal Quality construct was conceptualized as having elements of Negative Affect, Positive Affect, and physical symptoms of stress. Negative Affect scales and their reliability were as follows: Anger ($\alpha=.81$: angry, mad, annoyed); Distress ($\alpha=.74$: tense, uneasy, worried); Fatigue ($\alpha=.90$: tired, fatigued, exhausted); Depression ($\alpha=.81$: depressed, hopeless, worthless); and Sadness ($\alpha=.88$: unhappy, sad, blue). The scales representing Positive Affect were: Positive Disposition ($\alpha=.80$: caring, loving, kind, cheerful, happy); Peacefulness ($\alpha=.82$: calm, peaceful, relaxed); and Vitality ($\alpha=.91$: physically fit, active, healthy, energetic, well, lively). Also, five individual stress symptoms were measured: sleeplessness, anxiety, body aches, indigestion and rapid heartbeats.

The response format for the above items had five intervals. The stem was "We are asking about your feelings over the last month. Please blacken the bubble which reflects how often you felt the following during the last month:" The choices were 1=never, 2=rarely, 3=occasionally, 4=often, 5=most of the time.

The response format for the following Organizational Quality items had five intervals, ranging from "strongly disagree" to "strongly agree." The scales formed were: Job Satisfaction ($\alpha=.89$: I feel like quitting my job, I feel like leaving this organization, I like my job, I feel good about what I do at work, I am satisfied with my duties at work); Goal Clarity ($\alpha=.77$: I understand the priorities of my work goals, the goals of my work organization are clear to me, my work goals and my organization's work goals are the same, my work objectives are very specific); Communica-

Table 1. Scale Reliability

	Number of Items	Internal Consistency (α) N=118
Personal Quality		
Negative Affect		
Anger	3	.81
Distress	3	.74
Depression	3	.81
Sadness	3	.88
Fatigue	3	.90
Positive Affect		
Positive Disposition	5	.80
Peacefulness	3	.82
Vitality	6	.91
Organizational Quality		
Job Satisfaction	5	.89
Goal Clarity	4	.77
Productivity	4	.82
Communication Effectiveness	6	.71

tion Effectiveness ($\alpha=.71$: we listen carefully to each other at work, my supervisor and I communicate well with each other, our meetings at work are well organized, people where I work feel free to express their opinions, I listen closely to my coworkers, I communicate with “higher ups” at work when needed); and Work Productivity ($\alpha=.82$: I am efficient at work, I am productive at work, my work produces excellent results, I accomplish my objectives at work).

RESULTS

Table 2 displays the results of an ANCOVA. The mean of the study group at time two was compared to the mean of the comparison group at time two, controlling for the baseline measures of both groups.

Hypothesis 1 was supported. The study group reported significantly less frequent occurrences of negative affect in terms of distress, fatigue, anger, sadness and depression than did the comparison group.

Hypothesis 2 was partially supported. The study group reported significantly less frequent occurrences of sleeplessness, anxiety, and rapid heartbeats than did the comparison group, but there were no significant differences between the groups in body aches or indigestion.

Hypothesis 3 was partially supported. The study group reported significantly more frequent occurrences of vitality and peacefulness, although the change in positive disposition was not significant.

Hypothesis 4 was partially supported. The study group reported significantly higher productivity and goal clarity, but there was no sig-

Table 2. Personal and Organizational Quality Assessment Mean Scores Pre and Post IQM Training

	Experimental Group		Comparison Group		p<
	Pre Score Mean \pm SD	Post Score Mean \pm SD	Pre Score Mean \pm SD	Post Score Mean \pm SD	
Personal Quality					
Negative Affect					
Anger	2.82 \pm .73	2.25 \pm .65	2.81 \pm .80	2.52 \pm .80	.05
Distress	2.96 \pm .73	2.34 \pm .66	2.98 \pm .81	2.63 \pm .82	.05
Depression	2.00 \pm .78	1.49 \pm .53	1.90 \pm .90	1.83 \pm .84	.001
Sadness	2.54 \pm .93	1.98 \pm .72	2.38 \pm .81	2.21 \pm .94	.05
Fatigue	3.53 \pm .87	2.69 \pm .84	3.14 \pm .82	3.06 \pm .96	.001
Positive Affect					
Positive Disposition	4.13 \pm .57	4.31 \pm .49	4.16 \pm .63	4.16 \pm .79	ns
Peacefulness	3.10 \pm .71	3.81 \pm .60	3.47 \pm .81	3.53 \pm .86	.001
Vitality	3.36 \pm .83	3.70 \pm .77	3.75 \pm .92	3.73 \pm .93	.01
Stress Symptoms					
Sleeplessness	2.72 \pm 1.02	2.06 \pm .92	2.65 \pm 1.30	2.51 \pm 1.13	.001
Anxiety	3.07 \pm .89	2.43 \pm .79	3.02 \pm .92	2.76 \pm .95	.05
Body Aches	3.33 \pm 1.10	2.76 \pm 1.01	3.03 \pm 1.12	2.84 \pm 1.15	ns
Indigestion	2.56 \pm 1.16	2.20 \pm 1.11	2.29 \pm 1.16	2.10 \pm 1.12	ns
Rapid Heartbeats	2.02 \pm .92	1.63 \pm .81	1.92 \pm .89	2.00 \pm .92	.01
Organizational Quality					
Job Satisfaction	3.80 \pm .98	4.05 \pm .90	3.65 \pm 1.09	3.77 \pm .96	ns
Goal Clarity	3.65 \pm .82	3.97 \pm .65	3.49 \pm .89	3.62 \pm .85	.05
Productivity	4.04 \pm .77	4.22 \pm .63	4.02 \pm .71	3.92 \pm .87	.05
Communication Effectiveness	3.56 \pm .64	3.75 \pm .62	3.51 \pm .79	3.61 \pm .76	ns

N= 54 experimental group subjects and 64 comparison group subjects

ANCOVA F * p<.05, ** p<.01, *** p<.001

nificant difference between the groups on job satisfaction or communication effectiveness.

Changes in measures of personal and organizational quality following the IQM intervention are depicted graphically in Figure 1.

DISCUSSION

The intervention employed in this study was designed to facilitate a change management and implementation process. Change of any kind requires the ability to flex and adapt. Without emotional flexibility, people operate in an internal environment of uncertainty, anxiety, frustration and tension. These internal factors are not only destructive to personal health, but they are counterproductive to the development of effective, flexible, high-performing organizations.

The results show a reduction in stress and negative affect, and an increase in positive affect and organizational quality among the division

employees. These changes are noteworthy in light of the major challenges faced by the participants and the relatively short time in which the improvements took place. An additional longer-term measurement point would have permitted us to determine whether the improvements were sustained over time. However, the organization's qualitative reports to the authors suggest that this has indeed been the case.

The results of this study suggest that the IQM intervention provided individuals with techniques that facilitated increased self-management of their mental and emotional reactions. In teaching the participants how to manage their perceptions, the true source of their stress was modified. The reduction of stress responses increased participants' capacity to adapt to change with less resistance and friction. As the data reflect, this has led to a more harmonious change implementation process.

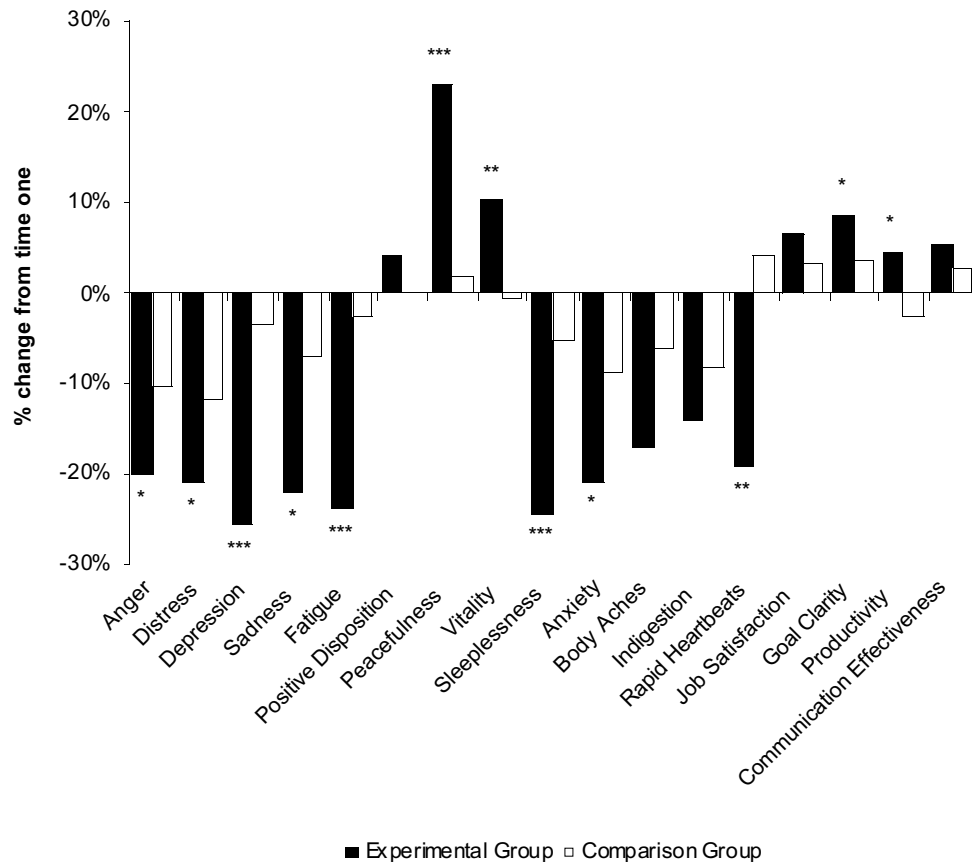


Figure 1. Changes in measures of personal and organizational quality following the IQM intervention. Percent change in measures of negative affect, positive affect, physical stress symptoms and organizational quality from time one (prior to the IQM training sessions) to time two (seven weeks later) are shown for the experimental and comparison groups. Asterisks indicate a significant difference between the two groups in raw score means at time two, after adjusting for baseline differences (ANCOVA). * $p < .05$, ** $p < .01$, *** $p < .001$.

Recommendations for Future Studies

There is evidence to suggest that in modifying individuals' emotional responses to stress, the techniques provided in the IQM program can have a significant positive impact on health, primarily by reducing inappropriate autonomic nervous system activation and improving autonomic balance (McCraty et al., 1995; Tiller et al., 1996). Sympathetic activity is known to increase and parasympathetic activity to decrease when individuals are under stress (Sloan et al., 1994). The autonomic nervous system is involved in the regulation of every major organ system in the body and chronic autonomic dysfunction or imbalance is implicated in numerous common diseases and disorders (Öri, Monir, Weiss, Sayhouni & Singer, 1992), including diabetes, fatigue (McCraty, Lanson & Atkinson, 1997) and many forms of cardiovascular disease. In a study at Motorola which tracked both physiological and psychological measures following an IQM training, a decrease in stress was accompanied by a significant reduction in blood pressure in hypertensive individuals over six month's time, without the aid of blood pressure-controlling medications or alterations to their diet, exercise or health care regimens of any kind. Other physical symptoms of stress also significantly improved among the participants in this study (Barrios-Choplin et al., 1997). It is recommended that future investigations measure physiological variables such as pre/post blood pressure and heart rate variability (HRV), which provides a quantitative measure of autonomic nervous system function and balance (Öri et al., 1992). A study collecting these data would allow for a more complete assessment of the impact of the intervention on employees' overall well being.

Changes in work-related issues and physiological measures may take a longer time than psychological changes to manifest. Therefore, it is recommended that future studies include a three-month and a six-month measurement point to capture these more slowly-changing phenomena. Longer study duration may also address the question of whether improvements in stress and affect associated with the training are sustained on a long-term basis.

CONCLUSIONS

The results of this study further validate self-management techniques as a cost- and time-effective means to enhance employees' psychological well being and capacity to adapt efficiently and harmoniously to the challenges inherent in organizational life. Training that helps individuals revise their interpretive styles and manage their mental and emotional responses to stress can be of particular value in facilitating major change implementation processes in organizations. In addition, such interventions have the potential to produce long-term improvements in employee health, performance and productivity.

REFERENCES

- Ashby, F. G., Isen, A. M., & Turken, U. (1999). A neuropsychological theory of positive affect and its influence on cognition. *Psychological Review*, 106(3), 529.
- Baron, R. A. (1984). Reducing organizational conflict: an incompatible response approach. *Journal of Applied Psychology*, 69(2), 272.
- Barrios-Choplin, B. (1997). Restructuring employees' interpretive styles to reduce tension and burnout: One company's experience. *Working paper*.
- Barrios-Choplin, B., & Atkinson, M. (1997). *Personal and Organizational Quality Assessment Survey*. Boulder Creek, CA: Institute of HeartMath.
- Barrios-Choplin, B., McCraty, R., & Cryer, B. (1997). A new approach to reducing stress and improving physical and emotional well being at work. *Stress Medicine*, 13, 193.
- Bosma, H., Marmot, M. G., Hemingway, H., Nicholson, A. C., Brunner, E., & Stansfeld, S. A. (1997). Low job control and risk of coronary heart disease in Whitehall II (prospective cohort) study. *British Medical Journal*, 314(7080), 558.
- Butcher, A., Brief, A., & Roberson, P. (1993). Cookies, disposition, and job attitudes: The effect of positive mood inducing events and negative affectivity on job satisfaction in a field experiment. *Working paper*.
- Carnevale, P., & Isen, A. (1986). The influence of positive affect and visual access on the discovery of integrative solutions in bilateral negotiations. *Organizational Behavior and Human Decision Processes*, 37, 1.
- Childre, D. (1998). *Freeze-Frame®: A Scientifically Proven Technique for Clear Decision Making and Improved Health*. Boulder Creek, CA: Planetary Publications.
- Childre, D., & Cryer, B. (1999). *From Chaos to Coherence: Advancing Emotional and Organizational Intelligence Through Inner Quality Management*. Boston: Butterworth-Heinemann.
- Childre, D., & Martin, H. (1999). *The HeartMath Solution*. San Francisco: HarperSanFrancisco.
- Childre, D. L. (1991). *Heart Zones*. Boulder Creek, CA: Planetary Publications.
- Childre, D. L. (1995). *Speed of Balance - A Musical Adventure for Emotional and Mental Regeneration*. Boulder Creek, CA:

- Planetary Publications.
- Northwestern National Life Insurance Company. (1991). *Employee burnout: America's newest epidemic*. Minneapolis, MN: Northwestern National Life Insurance Company.
- Cooper, C., & Marshall, J. (1976). Occupational sources of stress: A review of the literature relating to coronary heart disease and mental health. *Journal of Occupational Psychology*, 49, 11.
- National Safety Council. (1995). *Stress Management*. Boston: Jones and Bartlett Publishers.
- DeVito, P. (1994). The immune system vs. stress. *USA Today*, 123(2590), 27.
- Fackelman, K., & Raloff, J. (1993, Sept. 25). Psychological stress linked to cancer. *Science News*, 144, 196.
- Frese, M. (1985). Stress at work and psychosomatic complaints: a causal interpretation. *Journal of Applied Psychology*, 70(2), 314.
- George, J. M., & Brief, A. P. (1992). Feeling good-doing good: a conceptual analysis of the mood at work- organizational spontaneity relationship. *Psychological Bulletin*, 112(2), 310.
- Holmes, D. (1984). Meditation and somatic arousal reduction: A review of the experimental evidence. *American Psychologist*, 39(1), 1.
- Isen, A. M., Daubman, K. A., & Nowicki, G. P. (1987). Positive affect facilitates creative problem solving. *Journal of Personality and Social Psychology*, 52(6), 1122.
- Isen, A. M., Shalcker, T. E., Clark, M., & Karp, L. (1978). Affect, accessibility of material in memory, and behavior: a cognitive loop? *Journal of Personality and Social Psychology*, 36(1), 1.
- Iverson, L., Oleralns, M., & Erwin, P. (1994). Affectivity, organizational stressors and absenteeism: A causal model of burnout and its consequences. *Working paper, University of Melbourne, Australia*.
- Jemmott, J. B. (1987). Social motives and susceptibility to disease: stalking individual differences in health risks. *Journal of Personality*, 55(2), 267.
- Karasek, R. (1979). Job demands, job decision latitude and mental strain: implications for job design. *Administrative Science Quarterly*, 24, 285.
- Lazarus, R. (1981). The stress and coping paradigm. In C. Eisdorfer, D. Cohen, A. Kleinman, & P. Maxim (Eds.), *Models for clinical psychopathology*, (pp. 177-214). New York: Spectrum.
- Lazarus, R., & Folkman, S. (1984). *Stress, appraisal and coping*. New York: Springer.
- Levin, P., & Isen, A. (1975). Something you can still get for a dime: Further studies on the effect of feeling good on helping. *Sociometry*, 38, 141.
- Marco, C. A., & Suls, J. (1993). Daily stress and the trajectory of mood: spillover, response assimilation, contrast, and chronic negative affectivity. *Journal of Personality and Social Psychology*, 64(6), 1053.
- Matthews, K. A., & Haynes, S. G. (1986). Type A behavior pattern and coronary disease risk. Update and critical evaluation. *American Journal of Epidemiology*, 123(6), 923.
- McCraty, R., Atkinson, M., Rein, G., & Watkins, A. D. (1996). Music enhances the effect of positive emotional states on salivary IgA. *Stress Medicine*, 12, 167.
- McCraty, R., Atkinson, M., Tiller, W. A., Rein, G., & Watkins, A. (1995). The effects of emotions on short term heart rate variability using power spectrum analysis. *American Journal of Cardiology*, 76, 1089.
- McCraty, R., Barrios-Choplin, B., Rozman, D., Atkinson, M., & Watkins, A. (1998). The impact of a new emotional self-management program on stress, emotions, heart rate variability, DHEA and cortisol. *Integrative Physiological and Behavioral Science*, 33(2), 151.
- McCraty, R., Lanson, S., & Atkinson, M. (1997). Assessment of autonomic function and balance in chronic fatigue patients using 24-hour heart rate variability analysis. *Clinical Autonomic Research*, 7(5), 237.
- Meyerson, D. (1994). Interpretations of stress in institutions: The cultural production of ambiguity and burnout. *Administrative Science Quarterly*, 39, 628.
- Miller, T. Q., Smith, T. W., Turner, C. W., Guijarro, M. L., & Hallet, A. J. (1996). A meta-analytic review of research on hostility and physical health. *Psychological Bulletin*, 119(2), 322.
- Motowidlo, S. J., Packard, J. S., & Manning, M. R. (1986). Occupational stress: Its causes and consequences for job performance. *Journal of Applied Psychology*, 71(4), 618.
- Öri, Z., Monir, G., Weiss, J., Sayhouni, X., & Singer, D. H. (1992). Heart rate variability: frequency domain analysis. *Ambulatory Electrocardiography*, 10(3), 499.
- Rein, G., Atkinson, M., & McCraty, R. (1995). The physiological and psychological effects of compassion and anger. *Journal of Advancement in Medicine*, 8(2), 87.
- Rozman, D., Whitaker, R., Beckman, T., & Jones, D. (1996). A pilot intervention program which reduces psychological symptomatology in individuals with human immunodeficiency virus. *Complementary Therapies in Medicine*, 4, 226.
- Sloan, R. P., Shapiro, P. A., Bagiella, E., Boni, S. M., Paik, M., Bigger, J. T., Jr., Steinman, R. C., & Gorman, J. M. (1994). Effect of mental stress throughout the day on cardiac autonomic control. *Biological Psychology*, 37(2), 89.
- Staw, B., & Barsade, S. (1993). Affect and managerial performance: A test of the sadder-but-wiser vs. happier-and-smarter hypothesis. *Administrative Science Quarterly*, 38, 304.
- Staw, B., Sutton, R., & Pelled, L. (1994). Employee positive emotion and favorable outcomes at the workplace. *Organization Science*, 5, 51.
- Thomas, K., & Tymon, W. (1995). Interpretive styles that contribute to job related stress: two studies of managerial and professional employees. *Stress, Anxiety and Coping*, 8, 235.
- Tiller, W., McCraty, R., & Atkinson, M. (1996). Cardiac coherence: A new, noninvasive measure of autonomic nervous system order. *Alternative Therapies in Health and Medicine*, 2(1), 52.
- Woodward, J. M., & Chen, I. C. (1994). Effect of "mood that day" on pharmacists' job and career satisfaction. *Psychological Reports*, 74(2), 393.
- Wright, T., & Staw, B. (1994). In search of the happy/productive worker: A longitudinal study of affect and performance. *Academy of Management Proceedings*, 274.