

**COMMENTS
FROM STUDY
PARTICIPANTS**

"I frequently use Freeze-Frame in my work and personal environment. I feel this training has helped me through some difficult and stressful situations. I came into this program not too optimistic. Now I feel all employees at my agency need this training."

"I make better decisions in my personal and professional life. Everyone in law enforcement should attend this class. If I can learn these techniques and make better decisions then anyone can and they should benefit from these techniques."

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HEALTH, PERFORMANCE AND RESILIENCE *A HeartMath® Research Study Report*

Stress and Policing—Background Research

Police officers typically suffer a variety of physiological, psychological and behavioral stress effects. Officers operating under severe and chronic stress may well be at greater risk of error, accidents and overreaction that can compromise performance, jeopardize public safety and pose significant liability costs to the organization. However, police officers are rarely provided with effective stress management strategies to help alleviate these problems. Furthermore, family relationships can be severely impacted by results of job-induced stresses.



- Research has shown that police officers are over twice as likely as people in other occupations to develop cardiovascular disease.
- Being employed in law enforcement places one at a greater risk of developing cardiovascular disease than having high blood pressure, diabetes, being overweight or smoking.
- Police have also been found to die at a higher rate from cancer than the general population.



- At the psychological level, the stress of police work may result in chronic negative emotions such as anger, anxiety or depression, which can lead to burnout or emotional exhaustion.
- California Police Chiefs report that their greatest concerns include the liabilities attached to automobile accidents, rapid decision-making, citizen complaints, inappropriate use of force, workers compensation, and the high post-retirement mortality rates.
- Shift schedules that disrupt normal sleep patterns and social life, authoritarian management styles, poor interpersonal relationships with supervisors, interdepartmental politics, lack of adequate planning and resources, lack of promotion and transfer opportunities, excessive paperwork, lack of autonomy in performing duties and lack of recognition for work accomplishments are among the organizational stressors faced by members of the police force. *(See references at the bottom of page 2)*

HeartMath Research Study Participants

Sixty-four sworn police officers and one city manager from seven police agencies in Santa Clara County, California with a mean age of 39 (age range: 24-55 years) were recruited for this study. The group was comprised of 43 patrol officers, 12 detectives and 9 officers currently serving in administrative duties. Of the 64 sworn officers 16 had 1-5 years experience, 20 had 6-15 years experience and 28 had 16-30 years experience serving on the force. The average level of experience for the group was 14.4 years spent serving on the force. Subjects were randomly divided into an experimental group that received the HeartMath self-management training during the study and a waiting control group that received the training once the study was completed. Care was taken to ensure that there was an approximately equal distribution between the two groups of officers of different levels of experience, from different agencies and of both genders (55 males and 10 females). Some adjustments were subsequently made to accommodate scheduling concerns.

Study Design

This study took place over a 16-week period. Experimental group participants were trained at the Milpitas Police Department in three separate classroom sessions spaced at approximately equal intervals over a period of one month. Baseline physiological and psychological measurements were collected for all participants at the Santa Clara Police Department at the start of the study. Pre and post physiological and psychological measurements were collected for the subgroup of officers involved in the simulated police call scenario portion of the study at Moffett Airfield, Sunnyvale on the days the scenarios were conducted. For those officers not involved in scenarios, pre and post psychological measurements were

collected at the same time points at their respective agencies. The first training session was conducted 3 weeks after the first scenario day, and the last training session was completed 4 weeks before the second scenario day. The waiting control group received the same training after the study was completed.

Study Measures

Areas assessed in this study included: physical health and vitality, emotional well being, coping and interpersonal skills, work performance, workplace effectiveness and climate, family relationships, and physiological and psychological recalibration following acute stress. In addition, physiological measurements using heart rate variability analysis were obtained to determine the real-time cardiovascular impact of acutely stressful situations encountered in simulated police calls used in police training, and to identify officers at increased risk of cardiovascular disease and premature mortality. For the psychological measurements, HeartMath technicians carried out a Personal and Organizational Quality Assessment (POQA)

survey and a Program Impact Assessment. In addition, scenario stress level and participants' performance analysis was conducted during and after each scenario by Sunnyvale Public Safety training officers who asked participants to rate each simulation according to how stressful it was for them.



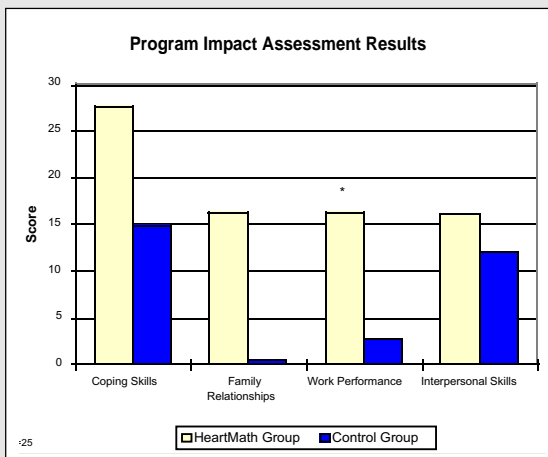
(References from p. 1) Another option for positioning: Brown J, Campbell E. Stress and Policing: Sources and Strategies. Chichester: John Wiley & Sons; 1994; Gaines J, Jermier J. Emotional exhaustion in a high stress organization. Academy of Management Journal 1983; 26(4):567-586; Cooper CL, Davidson MJ, Robinson P. Stress in the police service. J Occup Med 1982; 24(1):30-36; Stotland E, Pendleton M. Workload, stress, and strain among police officers. Behav Med 1989; 15(1):5-17; Franke WD, Collins SA, Hinz PN. Cardiovascular disease morbidity in an Iowa law enforcement cohort, compared with the general Iowa population. J Occup Environ Med 1998; 40(5):441-444; Vena JE, Violanti JM, Marsball J, Fiedler RC. Mortality of a municipal worker cohort: III. Police officers. Am J Ind Med 1986; 10(4):383-397; Burke R, Shearer J, Deszca G. Burnout among men and women in police work: an examination of the Cherniss model. Journal of Health and Human Resource Administration 1984; 7:162-188; Notes from conversations with Police Chiefs Larry Todd, Lucy Carlton, and members of the Santa Clara County Police Chiefs Association. Fall 1998.

Scenario Evaluation Design

Subgroups from the experimental and control group underwent 3 simulated scenarios while wearing a 24-hour holter recorder, so that we could observe the effects of various levels of stress on heart rate variability. These scenarios were common to normal trainings carried out by Sunnyvale Public Safety at Moffet Airfield. Two of the scenarios (building search and high speed pursuit) were run on the same day, 5 weeks after baseline measurements were taken and before the experimental group received the HeartMath training. One scenario (domestic violence episode) was conducted 11 weeks after the HeartMath training was completed. Scenarios included the actual use of firearms “simmunition.”

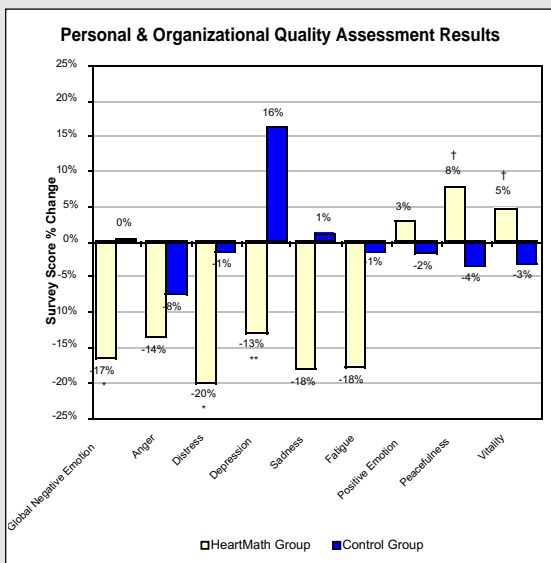
General Results

Post study analysis showed that the HeartMath training improved officers’ capacity to recognize and manage their stress and negative emotions in both work and personal contexts. Over the course of the study, officers trained in the stress management techniques experienced reduction in stress, negative emotions and physical stress symptoms, as well as increased positive emotions and physical vitality as compared to a control group that did not receive the training. Improvements in family relationships, more effective communication and cooperation within work teams and enhanced work performance were also noted.



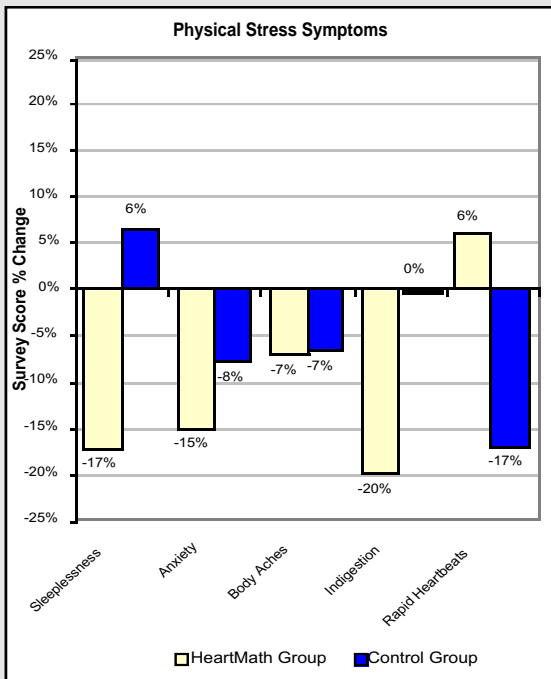
Program Impact Assessment Results

This graph shows coping skills for the experimental group and the control group; likewise for family relationships, work performance and interpersonal skills. Note particularly the improvement in family relationships and work performance. Officers trained in the HeartMath techniques showed improvements in all areas as compared to the control group that did not receive the training. Results were obtained from semi-structured interviews by a clinical psychologist.



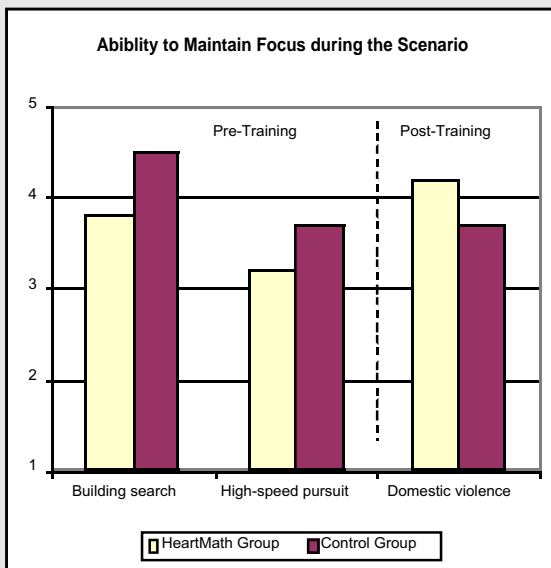
Personal and Organizational Quality Assessment (POQA) Results: stress, emotions and physical stress symptoms

Participants trained in the HeartMath techniques exhibited considerable reductions in stress, negative emotions, depression and fatigue, and increases in positive emotions, peacefulness and vitality over the 16-week study period. The control group showed minimal positive changes and some indications of the worsening of symptoms.



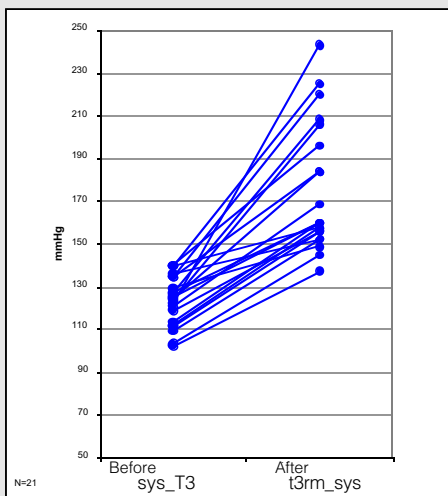
Personal and Organizational Quality Assessment (POQA) Results: physical / emotional stress symptoms

Changes were compared in 5 physical stress symptoms among the experimental and control groups following the HeartMath training. There was a reduction in sleeplessness, anxiety and indigestion in the HeartMath group. The HeartMath group also reported more rapid heartbeats than the control group, which may be due to an increased awareness of their heartbeats after the training program.



Scenario Results

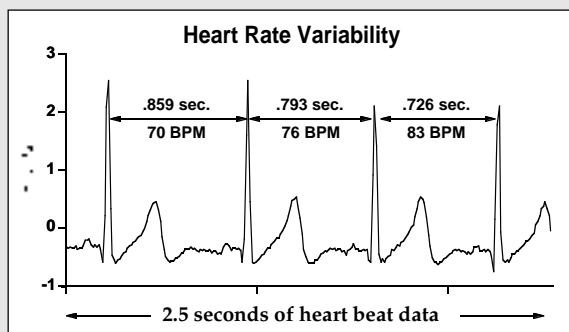
A portion of the study conducted by Sunnyvale Public Safety role players, shows officers' ability to maintain focus during all three scenarios for both the experimental and control groups. Note that the experimental group scored lower than the control group in the 2 scenarios that were conducted prior to the HeartMath training (the building search and high-speed pursuit). After they received training in the HeartMath techniques, this trend reversed; the experimental group scored higher than the control group in the final scenario (domestic violence), which officers reported to be the most stressful.



Systolic Blood Pressure

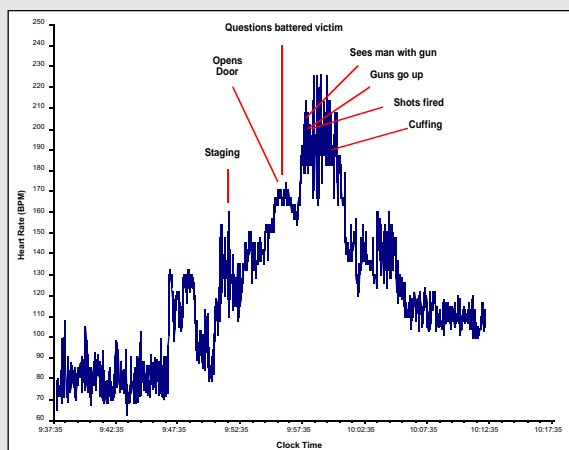
This graph shows the increase in blood pressure experienced by each of the officers tested during the domestic violence scenario. Officers reported this scenario to be the most stressful.

Heart Rate Variability (HRV)

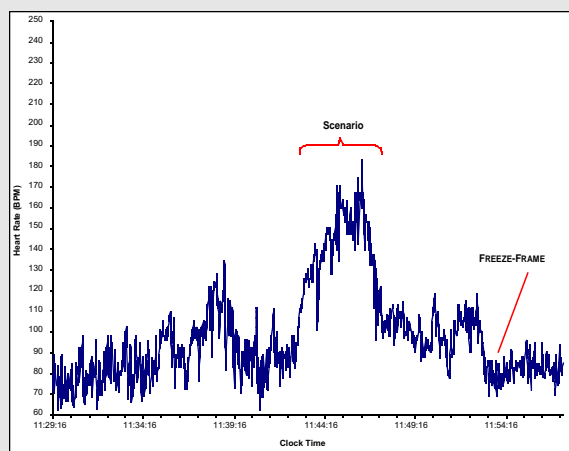


Officers' autonomic function was assessed by the analysis of heart rate variability. The normal resting heart rate in healthy individuals varies dynamically from moment to moment. Heart rate variability, which is derived from the electrocardiogram (ECG), is a measure of these naturally-occurring, beat-to-beat changes in heart rate and is an important indicator of health and fitness. The analysis of HRV is a powerful predictor of future heart disease, and increased risk of sudden death as well as all-cause mortality. Of the officers tested, 11% exhibited substandard heart rate variability and were so informed privately. (See next page for charts)

Heart Rhythm Changes during Stress Event



This graph provides a typical example of an officer's heart rate variability (beat-to-beat changes in heart rate) during the domestic violence scenario. Heart rate begins to rise as the officer prepares to enter the residence. There is an extremely sharp, further increase in heart rate as the participant spots the armed suspect. During the peak stress of the scenario, as gun shots are fired between the officer and suspect, the officer's heart is beating at over 200 beats a minute—faster than 3 beats a second. Heart rate begins to decrease once the scenario has ended, but still remains elevated at a level substantially above baseline. In this particular participant, it took over 2 hours after the scenario ended for heart rate to return to normal.



Recalibration after Stress Event

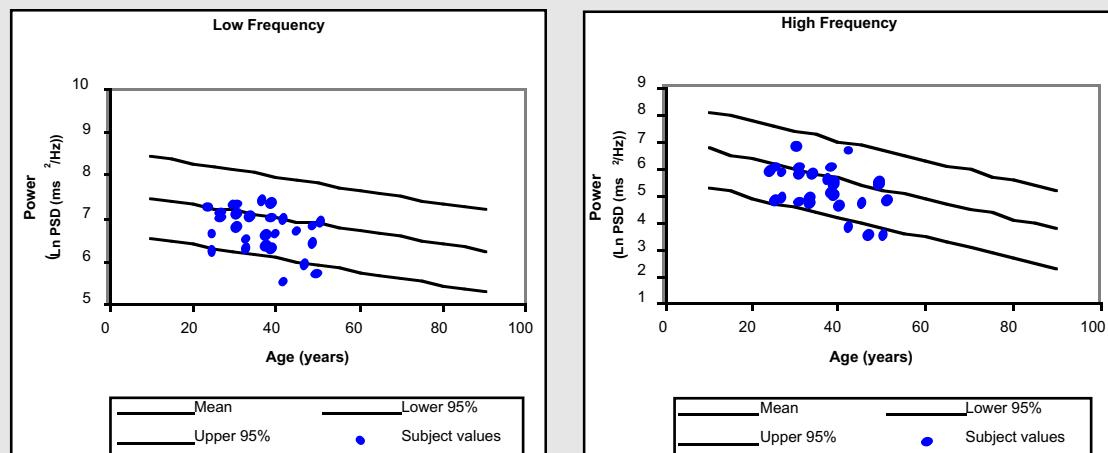
This graph provides an example of the change in heart rate experienced by one officer who used the FREEZE-FRAME® technique to help recalibrate after the domestic violence scenario. Note that when the scenario ends, the participant's heart rate begins to drop, but remains elevated in a range above its normal baseline range. As the officer uses the FREEZE-FRAME technique, there is an immediate, further reduction in heart rate back to baseline.

THE RESULTS...

of this study provided evidence that the application of practical stress and emotional management techniques can reduce damaging physiological and psychological responses to both acute and chronic stress in police, and positively impact a variety of major life areas in a relatively short period of time. Officers who practiced the HeartMath techniques during this study experienced marked reductions in negative emotions, fatigue and physical stress symptoms as well as increased peacefulness, physical vitality and improved work performance.

For complete study details visit our website:
www.heartmath.com/Library/CS.html

These graphs show 2 of 6 key measures derived from 24 hour Heart Rate Variability analysis plotted for each officer in the study. Power is plotted on the vertical axis and age is plotted on the horizontal axis. You will note that 3 individuals are outside the reference zone and are thus at elevated risk in terms of autonomic and cardiac function.



CONCLUSIONS

In particular, significant improvements occurred in communication difficulties at work and in strained family relationships. Results suggest that the techniques provided in this study were effective in reducing the most fundamental source of participant's stress by giving them greater ability to manage and transform stress-producing perceptions and negative, emotional reactive patterns.

This study also provides important insight into the physiological impact of acute on-the-job stress as experienced in real time by police officers, as measured by cardiovascular response to simulated police call scenarios. The acute stress of the scenarios produced rapid and pronounced increases in heart rate and blood pressure, from which it took officers a considerable amount of time to recover. The HeartMath interventions helped officers maintain greater clarity and inner balance under the pressure of these high-stress situations and enabled them to recalibrate more quickly afterwards, both psychologically and physiologically.

In addition, this study points to 24-hour HRV analysis as a useful screening tool to identify officers who are at increased risk of developing serious, long-term health problems, so that efforts can be made to reverse or prevent the onset of disease in these individuals. Intensive training in stress management interventions known to increase HRV and improve autonomic nervous system balance can be of particular benefit for officers who are at-risk.

While additional research is clearly needed to explore the longer-term effects of the interventions employed in this study, the results of this initial investigation suggest that in the long term, gaining increased levels of emotional self-management could potentially benefit police officers in a wide range of capacities.

The integration in police training of the HeartMath program can provide officers with practical and effective self-management techniques for enabling them to perform their jobs with greater effectiveness, to preserve and enhance their physical and emotional health, and ultimately providing better protection to the citizens whom they serve.

**JOSEPH SUNDRAM, ED.M.**

*Executive Director
Organizational Programs Division*

Joseph holds a Master's degree in Education, Administration and New Technologies from Harvard University where he served as a staff member of the Harvard Principal's Center. As a Master Trainer for HeartMath, Joseph is an internationally acclaimed speaker on issues dealing with Intelligence, Learning, Quality, Re-Engineering, Resilience, Violence and Substance Abuse Prevention, Cultural Diversity, Strategic Planning, and community and organizational change. He has worked extensively with all four branches of the US Armed Forces, Chief Executive Officers of Fortune 100 companies, leaders of government and educational institutions, hundreds of educators and thousands of youth, and biomedical researchers and practitioners.

DAVE HALL

Consultant and Trainer

Dave is a former Bureau Chief with California's Peace Officer Standards and Training. He was responsible for the Center for Leadership Development which has programs such as the Command College, the Supervisory Leadership Institute, the Labor/Management Partnership Course, and other leadership and management programs. In his over six years with POST, he spent a majority of his effort researching leadership programs and engaging in future forecasting activities. Dave started his career as a police officer with the San Diego Police Department and retired after over 30 years at the rank of Captain. In addition to having held many varied assignments, he had the opportunity to participate in a variety of studies which ranged from a Police Foundation sponsored study of field Interviews to Police Use of Force. The Use of Force Study took him throughout the country in search of information which ultimately led to over 100 recommendations which dealt with training, tactics, equipment, and management.

**LISA LEHNHOFF**

*Senior Consultant
Organizational Programs Division*

As a Senior Consultant, Organizational Programs Division, Lisa Lehnhoff has been instrumental in developing HeartMath programs for federal, state and local government organizations. She has worked extensively with military personnel to provide Inner Quality Management (IQM)[®] training to bases in transition and change. Lisa has been involved in numerous research and training intervention programs for California state agencies and police agencies of Santa Clara County, which produced dramatic improvements in the working climate. She brings 12 years of management and organizational development experience as an owner and Executive Vice President of an international electronics manufacturing company. Her expertise lies in diagnosing organizational structures and helping to implement more effective measures to enhance change and sustain morale, quality and productivity.

**HOBART JOHNSON**

Consultant

After a successful business career spanning forty years, Hobart Johnson was forced to retire in 1990 following a serious stroke. After visiting HeartMath in 1994, he resolved to overcome the residual effects of the stroke and returned to active business life with his own consulting firm. A 1966 graduate of Stanford Business School, he remains active with the school and has introduced HeartMath programs into the curriculum. He became interested in police work in 1995 and was instrumental in interesting several Santa Clara agencies in the HeartMath intervention program. Hobart brings 15 years of international experience as chief executive for world wide operations of a major mechanical engineering company.

About HeartMath

HeartMath is a research-based, case-study proven leader in the application of stress management. We can help you elevate performance and create excellence throughout your organization while improving personal and organizational health and balance. Other programs talk about emotional management; HeartMath provides instantaneously available, easy-to-use tools. The officers and staff in your organization can utilize these tools for the benefit of their personal and professional lives. We work with you to find the source, not just the symptoms of your organizational challenges. You can choose from a menu of programs and services that includes consulting, facilitation, training, coaching, certification and assessments. We also have a wide range of book, tape and learning program products.

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