This article presents a view of progress in the stress management field during the past decade, gleaned from work on a revision of the previous edition of Principles and Practice of Stress Management. In addition to better validation of existing stress management techniques, much has been learned about the psychobiology of stress, and new stress management techniques have been developed and have gained wide popularity.

Principles and Practice of Stress Management

A Review of Advances in the Field

The field of stress management has changed appreciably during the past decade. Advances have been made in the way that we understand the psychophysiology of stress; more has been found out about previously popular stress management methods, and a respectable body of empirical evidence has accumulated for some methods that previously were primarily of speculative interest. During the past several years, I and my co-editors, Wes Sime and Robert Woolfolk, have been working on an update of the widely used book Principles and Practice of Stress Management, whose third edition will soon appear. Here I will share some of what I have learned in the process.

In redoing our volume, we had two aims: (a) to present each method in the voice of an originator or definitive contributor to the method and (b) to emphasize methods having a reasonable degree of empirical validation. We then describe each method; evaluate its validity; describe its applications, side effects, and contraindications; and present case examples. The revised edition was written with the interests of the biofeedback and applied psychophysiology community specifically in mind. We also wanted to present a general understanding of the psychophysiology of stress and outline the applications and limits of stress management methods in general.

Continuity Amid Change

Meditation. It is interesting to note areas of change as well as continuity in the field of stress and stress management. For example, interest in meditation methods remains strong, yet a shift has occurred in topics of empirical study, not necessarily because older methods have proven less useful but more likely because of changes in fashion and the popularity of particular methods. Thus, relatively few additional studies have appeared on the topic of mantra meditation, whereas many studies have been performed on mindfulness. Interest in mindfulness has grown dramatically, prompted no doubt by the influential writings of Thich Nhat Hanh and Jon Kabat-Zinn. Mindfulness has become a major goal in a variety of methods, including mindfulness meditation and the widely used acceptance and commitment therapy, best described by the work of Steven Hayes. In our view, it may be particularly useful for treating borderline personality, as described by Marsha Linehan, and eating disorders, as researched by Jean Kristeller. It specifically helps people to experience and accept their own feelings and their own bodies. Kristeller has prepared a new chapter on this method for our book.

Empirical validation of new methods. Methods that have more recently developed a body of empirical validation research include heart rate variability (HRV) biofeedback, EMDR, and neurofeedback. I have personally been involved in HRV biofeedback research. It differs from some other biofeedback techniques in that rather than aiming to decrease the level of arousal or changing the sympathetic/parasympathetic balance, it works by exercising the baroreflex, one of the important homeostatic reflexes governing autonomic stability. In this way, its mechanism overlaps with that of aerobic exercise as a stress management method. Physical exercise also strengthens modulatory reflexes. The theory behind HRV biofeedback is more similar to that behind autogenic training than that of progressive relaxation. The aim of autogenic training is to free the body to allow endogenous modulatory reflexes to do their work with less encumbrance from inhibitory processes. The aim of progressive relaxation is to decrease sympathetic arousal, a very different mechanism.

Facilitation of human performance. Also, a body of literature has developed on the facilitation of human performance by stress management, made possible by
advances in the design and availability of equipment for ambulatory physiological monitoring and expansion of data on the relationship between emotion and sport performance, facilitating as well as debilitating levels and aspects of stress, the effects of various coping styles, and specific stressors experienced by athletes. Human factors research on the relationships among work load, psychophysiological responsiveness, and performance accuracy also has expanded, particularly in aerospace applications (e.g., among airplane pilots and air traffic controllers).

Neural pathways of the human stress response. In addition, we have learned a considerable amount about neural pathways for the stress response beyond the autonomic nervous system and the fight-or-flight reaction (including interactions with the immune system and inflammatory activity) and the important role of the parasympathetic nervous system in both modulating and expressing the stress response. For example, knowledge of how the hypothalamic-pituitary-adrenal axis is regulated has greatly expanded. Research is also beginning to appear using the technology of functional magnetic resonance imaging. We now have evidence for ways that stress may influence thinking by stimulation of brain centers involved in higher mental processing. We also now know that serum levels of some of the inflammatory cytokines (e.g., interleukin 1 and interleukin 6) are particularly influenced by chronic stress, that serum levels of catecholamines and cortisol seem to be particularly responsive to acute stress, and that susceptibility to infectious illness increases after a period of chronic stress.

Understanding the role of stress in illness. Further evidence has also accumulated on the effects of stress on chronic respiratory, gastrointestinal, and cardiovascular illness. Considerable research has been done on the regulation of stress-related cardiovascular changes through mediation of the baroreflex, one of the important mechanisms for regulating both blood pressure reactivity and, through central nervous system projections, the limbic system and emotional reactivity. The development of new technologies for the functional assessment of various physiological systems has increased our ability to study these various effects, so new information is accumulating exponentially. We also now have better documentation on how the parasympathetic nervous system can be directly stimulated by stress, through parasympathetic rebound effects and direct parasympathetic effects of responses involving a passive coping orientation (e.g., the “playing dead” response) or anticipation of blood loss and perhaps preparation for shock (as in the response of blood phobia or exposure of most people to blood and gore).

The Treatment of Stress and Stress-Related Disease

Advances in newer techniques and treatments. In drug therapy, the proliferation and widespread use of selective serotonin reuptake inhibitors has produced major changes in the treatment of stress and stress-related diseases. Comprehensive biofeedback methods have developed that draw on a variety of feedback modalities and have been applied to a variety of newly defined and better understood conditions, particularly to patients with multiple unexplained somatic symptoms. Jan van Dixhoorn’s method of breathing retraining has had a major impact on cardiac rehabilitation and is now a standard medical intervention in many parts of the world. He now provides a lucid English-language description of the method. Various systems of conceptualization have appeared to integrate the understanding and practice of various stress management methods. Previously, our emphasis was on the specificity of effects for applications emphasizing, respectively, cognitive, psychophysiological, and behavioral components. Although we believe that treatment specificity remains a robust finding, we are intrigued by the work of people such as Jonathan Smith, who has done considerable research on nuances of differences among relaxation methods and implications for their individual and sequential use.

More information on past methods of stress management. Many of the more venerable methods have long had a body of validation research, but the volume of recent research has reinforced previous knowledge and extended the range of applications to which the methods have been put. This seems particularly true for progressive muscle relaxation, autogenic training, cognitive therapies, music therapy, aerobic exercise, and hypnotherapy. For example, there is considerably more information available about muscle spindle activity and its relationship to the sympathetic nervous system (a pathway for the effects of muscle relaxation therapies), the application of such therapies to treating chronic pain, and the effects of muscle relaxation on the autonomic nervous system. Additional research has appeared on the effects of autogenic approaches to motion sickness and airplane pilot performance and the effects of individualized autogenic approaches to treating hypertension, as well as stress symptoms in general.

There is much more information available about specific effects of music therapy on various individuals, and this approach is now finding much wider application in various hospitals and medical clinics: Musicians are increasingly found strolling the patient floors, and recorded music is often available in operating theaters, dental offices, and so forth. Major cardiovascular effects have been documented for singing and chanting, which sometimes
produce cardiorespiratory effects similar to those achieved through heart rate variability biofeedback, perhaps through entrainment of endogenous modulatory biorhythms. More information is available about neural substrates of the hypnotic state as well as applications to chronic pain and psychiatric disease. Research on cognitive substrates of stress and cognitive treatment approaches has also greatly expanded in the past decade.

**The Future**

Stress management, as a field, is seeing increasingly more applications. Recent research on coronary artery disease, for example, has shown that acute as well as chronic stress contributes to changes in the arteries that can be pathogenic and even dangerous in the short run in susceptible people. Research is needed on the best methods for inoculating people to stresses in ways that reduce vulnerability to cardiovascular events. Many other mental as well as somatic diseases are also known to be exacerbated by stress; indeed, for some, stress may even be a causative factor. Finding the most effective stress management methods for each problem is a task for the future. Recent research on performance similarly indicates that stress plays an important role in highly complex tasks, from music instrumental performance to athletics to flying an airplane. Adapting particular stress management methods for these purposes is a growing enterprise.

Unfortunately, much of the stress management field is driven more by popular interest than by scientific data. It is possible that some stress management methods may be better for some disorders than for others, perhaps for psychobiological reasons as well as for reasons of patient acceptance. However, various religious and ethnic communities, as well as various entrepreneurs and even scholars and clinicians, have promoted their own particular stress management methods. A flurry of research and interest often accompanies the latest method, often driven in large part by the charisma of the founders and number of adherents to various philosophical or religious doctrines. The moderating voice of science needs to play a more important role in this process. Particularly, research needs to be done on underlying mechanisms of highly complex methods, such as mindfulness medication, yoga, and qi gong. Effects of specific elements comprising these methods need to be better understood, so that they may work together in particular disciplines. On a psychological plane, such elements certainly include muscle relaxation, breathing alterations, and mental focus. Research on cardiorespiratory effects and neuropsychological function will also be helpful.

Despite the needs for future research, the amount of scientific information about stress management is large. It has grown exponentially in the past three decades. We now know a huge amount about how psychophysiology interacts with disease, sense of well-being, and human performance. Indeed, one of the major shortcomings in modern teaching of psychology and psychotherapy is the relative superficiality of training in applied psychophysiology and stress management; many psychotherapists tend to stick to methods in which they have been trained rather than change with new developments in the field. Although the former Association for Advancement of Behavior Therapy has changed its name to the Association for Cognitive Behavior Therapy, even this empirically oriented group of scientific practitioners ignores the role of psychophysiology in its basic charter. By comparison, how would we feel about physicians who used only medicines and surgical procedures that were in vogue 20 or 30 years ago? Data are fast accumulating to the point at which, from my perspective, it is tantamount to malpractice to treat people psychotherapeutically without having a good grounding in the various methods of stress management.

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