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Stress Exposure Training

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Imagine that you are assigned a task to sit at your desk and mentally add a series of numbers. Now, imagine that you invite several people into your office, turn a radio and television on, and have someone flick the light switch on and off. For good measure, let's let through all those calls from telephone salespeople asking you to switch your phone service. Furthermore, let's add some consequences to the task: If your calculations are incorrect, you must pay a penalty of $1 for each number that you are off. It is difficult enough to perform even a moderately complex task in a normal or benign performance environment, as the literature on training and skill acquisition attests. However, it would be far more difficult to perform a task effectively under the high-stress or high-demand conditions of this imaginary scenario.

The military offers numerous real-world examples of complex and demanding task environments. Today's ships, airplanes, and tanks are technologically advanced systems that greatly extend the range of human capabilities. For example, military anti-air warfare systems aboard modern naval ships allow military personnel to detect aircraft at great distances. On the other hand, these systems also increase the demands on the operator: The amount and complexity of information that must be processed in a short period of time once a target has been detected is enormous. Therefore, although modern military systems have greatly extended the military's capabilities, they have both increased the stress under which personnel must perform and increased the potential for catastrophic errors. The informational complexity, task load, and time pressure inherent in this environment increases the potential for error, such as the 1988 downing of an Iranian commercial aircraft by the USS *Vincennes*.

Furthermore, there are a large number of applied settings outside of the military that share the commonality of a potentially high-stress, high-demand performance environment. These settings are found in the fields of aviation (Prince, Bowers, & Salas, 1994), emergency medicine (Mackenzie, Craig, Parr, & Horst, 1994), mining (Perrow, 1984), diving (Radloff & Helmreich, 1968), parachuting (Hammerton & Tickner, 1969), bomb disposal (Rachman, 1983), police work (Yuille, Davies, Gibling, Marxsen, & Porter, 1994), and fire fighting (Markowitz, Gutterman, Link, & Rivera, 1987). These stereotypically high-stress environments impose a particularly high demand on those who work in them, and there is a substantial

potential for risk, harm, or error. People who work in these environments often perform under extreme pressures and demands. Emergency or crisis conditions may occur suddenly and unexpectedly, and the consequences of error are immediate and often catastrophic. Although major disasters such as Three Mile Island and Chernobyl are etched in our collective memory, the daily newspapers provide evidence of the almost commonplace occurrence of accidents or near accidents involving ships, trains, and airplanes in which increased environmental demand inevitably plays a role.

Whereas errors that occur in these types of settings are often broadcast on the evening news, on a more personal level everyone is faced at one time or another with having to perform under the pressure of deadlines, while juggling multiple tasks, and in the face of various distractions. In everyday settings such as working in an office or driving home, we may be subjected to stressors such as time pressure, noise, novel or threatening events, demands or requests of others, and other distractions that may disrupt task performance and increase errors.

The impact of stress on the individual has become a primary concern in industry (Spettell & Liebert, 1986), the military (Driskell & Olmstead, 1989), aviation (Prince et al., 1994), sports (Jones & Hardy, 1990), and other applied settings in which effective performance under stress is required. Therefore, the development of effective training interventions to ameliorate the negative effects of stress on performance has taken on increased importance in the training community (see Driskell & Salas, 1991; Ivancevich, Matteson, Freedman, & Phillips, 1990). The goal of stress-exposure training is to prepare personnel to perform tasks effectively under high-demand, high-stress conditions. In this chapter we present a model of stress-exposure training, describe empirical research that supports this approach, and derive guidelines for implementing stress-exposure training.

What Is Stress Training and Why Is It Needed?

We use the term *stress* to describe a process by which environmental demands (e.g., time pressure, novel or threatening events, industrial noises) evoke an appraisal process in which perceived demand exceeds resources and that results in undesirable physiological, psychological, behavioral, or social outcomes (Driskell & Salas, 1996). Evidence indicates that stress is a costly health-related issue, in terms of individual performance and well-being as well as organizational productivity (Ilgen, 1990). Accordingly, a great deal of research has been conducted to examine interventions to reduce the negative outcomes of stress on the individual.

It is important to distinguish between *training* and *stress training*. The primary goal of training is skill acquisition and retention. Therefore, most training takes place under conditions designed to maximize learning: a quiet classroom, the practice of task procedures under predictable conditions, uniformity of presentation, and so forth. In this manner, the tra-

ditional classroom or lecture format, supplemented with skills practice, typically is satisfactory for promoting initial skill acquisition.

However, some tasks must be performed in conditions quite unlike those encountered in the training classroom. For example, high-stress environments include specific task conditions (such as time pressure, ambiguity, increased task load, distractions) and require specific responses (such as the flexibility to adapt to novel and often changing environmental contingencies) that differ from those found in the normal performance environment. Research has shown that, for some tasks, normal training procedures (training conducted under normal, nonstress conditions) often do not improve task performance when the task has to be performed under stress conditions (Zakay & Wooler, 1984). These results suggest that, under certain conditions, the transfer of training from classroom conditions to operational conditions may be poor when there are no stress-inclusive simulations or training.

In brief, the primary purpose of *training* is to ensure the acquisition of required knowledge, skills, and abilities. The primary purpose of *stress training* is to prepare the individual to maintain effective performance in a high-stress environment. Therefore, *stress training* is defined as an intervention to enhance familiarity with the criterion environment and teach the skills necessary to maintain effective task performance under stress conditions.

It may be valuable to consider the general objectives to be met by stress training. The primary purpose of stress training is to prepare the individual to perform effectively in the stress environment. In broad terms, there are three overall goals of stress training: (a) gaining knowledge of and familiarity with the stress environment, (b) training those skills required to maintain effective performance under stress, and (c) building performance confidence. These objectives are outlined in the following sections.

Training Objective 1: To Convey Knowledge of the Stress Environment

In a study of World War II combat aircrews, Janis (1951) found a marked reduction in stress reactions when information on air attacks was provided in advance. More recently, a National Research Council study on enhancing military performance concluded that "stress is reduced by giving an individual as much knowledge and understanding as possible regarding future events" (Druckman & Swets, 1988, p. 21). Providing knowledge about stress effects during training has several beneficial consequences: (a) It enables the individual to form accurate expectations regarding the stress environment, thereby increasing predictability; (b) it decreases the distraction involved in attending to novel sensations and activities in the stress environment; and (c) it allows the individual to identify and avoid performance errors that are likely to occur in the stress environment.

Training Objective 2: To Emphasize Skill Development

Numerous stress effects have been documented in the research literature. Stress may result in *physiological changes* such as quickened heartbeat, labored breathing, and trembling (Rachman, 1983); *emotional reactions* such as fear, anxiety, frustration (Driskell & Salas, 1991), and motivational losses (Innes & Allnutt, 1967); *cognitive effects* such as narrowed attention (Combs & Taylor, 1952; Easterbrook, 1959), decreased search behavior (Streufert & Streufert, 1981), longer reaction time to peripheral cues and decreased vigilance (Wachtel, 1968), degraded problem solving (Yamamoto, 1984), and performance rigidity (Staw, Sandelands, & Dutton, 1981); and changes in *social behavior* such as a loss of team perspective (Driskell, Salas, & Johnston, 1997) and decrease in prosocial behaviors such as helping (Mathews & Canon, 1975). All of these stress effects can affect task performance. Therefore, one objective of stress training is to overcome these decrements. For example, to address the degradation that stems from having to juggle multiple tasks in a high-demand stress environment, stress training may provide practice in time-sharing multiple tasks and in prioritizing critical task demands. Therefore, one primary focus of stress training is to train people in the behavioral and cognitive skills that allow the trainee to maintain effective performance under stress.

Training Objective 3: To Build Confidence in the Ability to Perform

A third goal of stress training is to build confidence in the ability to perform one's task. Research indicates that stress training is effective only when the trainee experiences success or a sense of task mastery during training (Keinan, 1988). Because the stress environment is an extremely high-demand performance environment, individuals can develop either positive or negative expectations regarding their capacity to perform in that environment. Individuals who appraise the task environment in positive terms will have more confidence in their ability to perform and are likely to suffer fewer negative stress effects. They will be less aroused physiologically, less distracted by task-irrelevant concerns, and more likely to focus attention on the task. Research has shown self-efficacy to be a strong predictor of performance (Bandura, Reese, & Adams, 1982; Locke, Frederick, Lee, & Bobko, 1984). Therefore, stress training should build trainee confidence in the ability to perform in the stress environment.

Stress Exposure Training: A Model for Integrated Stress Training

There have been a number of attempts to implement different types of stress training in both civilian and military environments. For example, the military has implemented confidence courses and water-survival train-

ing to build confidence and provide familiarity with stress environments. Some training techniques, such as overlearning, have been mentioned as potentially effective candidates for stress training (Driskell, Willis, & Copper, 1992). However, most of these applications have been stand-alone attempts to improve performance under stress. For example, one study may attempt to implement overlearning as a stress training technique, and another may attempt to impose relaxation training. Some of these efforts have been successful and some have not. Although these efforts allow the cumulation of knowledge on stress training techniques, what has been lacking is an integrated approach to developing stress training. Such an approach would provide a structure for implementing stress training *programs*, not just hit-or-miss techniques. An integrated model of stress training allows the training designer to address critical questions such as these: When should stressors be introduced in training? How should training be sequenced? When should skills training be introduced? What information should be presented regarding stress effects?

The development of a model for integrated stress training, which we term stress-exposure training (SET), provides a structure for designing, developing, and implementing stress training. The SET approach is defined by a three-stage training intervention: (a) an initial stage, in which information is provided regarding stress and stress effects; (b) a skills training phase, in which specific cognitive and behavioral skills are acquired; and (c) the final stage of application and practice of these skills under conditions that increasingly approximate the criterion environment. Table 1 provides an outline of the stress-exposure training model.

During the initial phase of SET, *information provision*, information is provided regarding stress and likely stress effects. The purpose of this phase of training is to emphasize the value and goals of stress training and to provide trainees with basic information on stress, stress symptoms, and likely stress effects in the performance setting. The first phase of stress-exposure training, therefore, provides trainees with preparatory information regarding what to expect in the stressor environment; typical physiological, emotional, and cognitive reactions to stress; and how stress is likely to affect performance in the operational environment. Preparatory information regarding the stressor environment increases a sense of controllability and increases confidence in the ability to perform; enables the trainee to form accurate expectations regarding reactions to stress and

Table 1. Structure of Stress-Exposure Training

Phases	Activities
1. Information provision	Indoctrination and preparatory information
2. Skills acquisition	Behavioral and cognitive skills training
3. Application and practice	Practice of skills under conditions that gradually approximate the stress environment

events likely to occur in the stress performance environment; and decreases the distraction of attending to novel sensations and activities in real time in the stress environment, thus increasing attention devoted to task-relevant stimuli. In addition, preparatory information regarding the effects of stress on performance allows the individual to anticipate performance errors that are likely to occur in the stress environment.

During the second phase of training, *skills acquisition*, specific cognitive and behavioral skills are taught and practiced. Training at this stage may include a wide array of training techniques such as training attentional focus, overlearning, and decision-making skills. The specific training techniques implemented vary according to the specific requirements of the task setting. The goal of training at this stage is to build the high-performance skills that are required to maintain effective performance in the stress environment.

The final phase of SET involves the *application and practice* of these skills while trainees are gradually exposed to task-relevant stressors. Effective task performance requires not only that specific skills be learned, but that they be transferred to the operational setting. This requires practice of skills under operational conditions similar to those likely to be encountered in the stress setting. Allowing skills practice in a graduated manner across increasing levels of stress (from moderate stress scenarios or exercises to higher stress exercises) allows skills learned to be practiced in increasingly realistic task environments.

There are several characteristics of the SET approach that should be emphasized. First, SET is a model for stress training rather than a specific training technique. The SET model describes three stages of training, each with a specific overall objective. However, the specific content of each stage will vary according to the specific training requirements. Both the type of stressors and the skills required for effective performance depend on the specific task setting. Therefore, stress training must be context specific; a training approach applicable to one setting may not be relevant to a different setting. For example, consider a complex decision-making tasks such as Navy shipboard combat information center (CIC) operations. Stress training for this environment must address the particular stressors relevant to that environment in Phase 1 of training (e.g., auditory distraction, time pressure); it must involve skills training relevant to the task in Phase 2 (e.g., decision-making training, time sharing); and it must provide practice of these skills in an environment that simulates these conditions in Phase 3. The design of stress-exposure training for emergency medical technicians will likely involve different stressors, different types of skills training, as well as different types of realistic practice and simulations than that provided in the naval CIC stress training. In brief, the SET approach, which incorporates knowledge of the stressor environment, skills training, and graduated exposure and practice in the simulated stress setting, provides an integrated structure for stress training. Stress-exposure training does not prescribe one type of training that must be applied in all settings, but provides a model to guide the design of stress training for any task environment.

Second, the three-stage SET model is patterned on a cognitive–behavioral approach to stress management called *stress inoculation training* (Meichenbaum, 1985). However, stress inoculation training was originally developed as a clinical treatment program to teach clients to cope with physical pain, anger, and phobic responses. The stress inoculation training approach retains several clinical emphases that may limit its application in applied training environments: (a) the intensive therapeutic involvement of a skilled facilitator; (b) one-on-one individualized treatment; and (c) a primary emphasis on alleviating anxiety, depression, and anger (Johnston & Cannon-Bowers, 1996). Nevertheless, results of a meta-analysis by Saunders, Driskell, Johnston, and Salas (1996) indicated that, in the settings in which it is used, stress inoculation training is an "effective means for reducing state anxiety, reducing skill-specific anxiety, and enhancing performance under stress" (p. 170). Therefore, a modification of this three-stage approach, adapted for an applied training environment, should hold considerable promise for stress training.

Third, SET addresses the three major objectives of stress training: enhancing familiarity with the stress environment, building skills to maintain effective performance under stress, and boosting confidence in the ability to perform. Familiarity is enhanced by providing trainees with accurate information on stress and on specific stress effects that are likely to occur in the operational environment. The acquisition of skills to support effective performance in the operational setting takes place in Phase 2, and these skills are rehearsed in Phase 3 of the SET approach. Finally, trainee confidence can be enhanced by providing the opportunity to practice skills in a setting that gradually approximates the stress environment.

Implementing Stress-Exposure Training

In the following sections, we examine training events that take place within each stage of SET. We describe the empirical research that underlies the activities that constitute each stage and derive guidelines for implementing stress-exposure training.

Phase 1: Information Provision

The primary goal of Phase 1 of stress-exposure training is information provision. Phase 1 includes two primary components: (a) indoctrination, or discussion of why stress training is important, and (b) preparatory information describing what stressors are likely to be encountered in the task environment, the likely effects of stress on how the trainee may feel, and the likely effects of stress on how the trainee may perform.

Indoctrination is aimed at increasing the attention and motivation necessary to acquire the skills required by the particular stressful task setting. Indoctrination often emphasizes the rewards and costs of effective

and ineffective performance in the stress environment in order to under-score the value of training (see Hoehn & Levine, 1951). Indoctrination may be provided by discussing operational incidents in which environmental stress is prevalent. These may include case histories and lessons learned from military and industrial accidents, and other incidents in which factors such as extreme time pressure and task load had a significant impact on performance. This type of indoctrination is standard fare in military training, but it may be particularly relevant for SET because stress training is training above and beyond basic technical training, and thus the concept of "user acceptance" becomes important. That is, the user (in this case, the trainee) must understand the purpose and value of the stress training and be motivated to undertake the training.

The second primary component of Phase 1 is the provision of preparatory information. Stressful, threatening, or demanding situations can lead to a number of undesirable consequences, including heightened anxiety and decrements in performance (see Driskell & Salas, 1991, 1996; Keinan, 1987). There is some evidence that preparatory information can lessen negative reactions to stress. Although the bulk of the existing research has been performed in clinical or medical settings (see Taylor & Clark, 1986), some studies have suggested the efficacy of preparatory information on enhancing performance in applied task environments. In examining the training of soldiers for nuclear combat, Vineberg (1965), noted that the communication of accurate information was critical for clarifying misconceptions, reducing fear of the unknown, and increasing a sense of control in this type of environment. More recently, a National Research Council study on enhancing military performance concluded that "stress is reduced by giving an individual as much knowledge and understanding as possible regarding future events" (Druckman & Swets, 1988, p. 21). However, these authors also noted that this approach often runs counter to military practice, which is to give the individual the least amount of information necessary for a given situation.

It is likely that preparatory information mitigates negative reactions to stress in several different ways. First, preparatory information, by providing a preview of the stress environment, renders the task less novel and unfamiliar (Ausubel, Schiff, & Goldman, 1953). This may lead to a more positive expectation of self-efficacy, which research has shown to be a strong predictor of performance (Bandura, Reese, & Adams, 1982; Locke, et al., 1984). Second, knowledge regarding an upcoming event increases predictability, which can decrease the attentional demands and distraction of having to monitor and interpret novel events in real time (Cohen, 1978). Third, preparatory information may enhance the sense of behavioral or cognitive control over an aversive event by providing the individual with an instrumental means to respond to the stress (Keinan & Friedland, 1996; Thompson, 1981).

High-stress events, such as an airplane crew responding to a mechanical failure in flight, a power plant operator reacting to a system accident, or a work team deliberating a task under extreme deadline pressure, share several common characteristics. First, those involved are likely to expe-

rience a number of novel and unpleasant sensations, such as a pounding heart, muscle tension, and feelings of anxiety, confusion, or frustration. Second, stress may produce a qualitative change in the task environment, in which stressors such as noise, time pressure, threat, and other demands occur suddenly, and individuals are faced with a transition from routine conditions to emergency conditions. The nature of the task environment may change dramatically, from a relatively benign environment to one that is fast paced, aversive, or threatening. Finally, in many cases, these stressors and the individual reactions to stress disrupt goal-oriented behavior, and task performance must be adapted to meet these new demands. For example, to maintain effective performance under stress, individuals may need to attend selectively to task-relevant stimuli to counter the attentional overload imposed by stress conditions (see Singer, Cauraugh, Murphey, Chen, & Lidor, 1991).

Therefore, a comprehensive preparatory information strategy should address how the person is likely to feel in the stress setting, describe the events that are likely to be experienced in the transition from normal to stress conditions, and provide information on how the person may adapt to these changes. We may define three types of preparatory information: sensory, procedural, and instrumental. *Sensory information* is information regarding how the individual is likely to feel when under stress. Under stress, the individual may perceive a number of intrusive physical and emotional sensations. Typical physiological reactions include increased heart rate, sweating, shallow breathing, and muscle tension; emotional reactions to stress may include fear, frustration, and confusion. Although the relationship of physiological and emotional state to performance is complex, these reactions are common and are, at the least, a source of interference and distraction to the task performer.

Furthermore, research has suggested that individuals under stress or novel conditions tend to overinterpret stress symptoms; that is, they assign a heightened importance to physical symptoms such as an increased heart rate. Second, they tend to misinterpret these "normal" stress reactions as catastrophic (Clark, 1988). The problem in this case is not that people experience these symptoms; the problem is that they experience "normal" stress symptoms, but because of the novelty or unfamiliarity of these symptoms, they expend a disproportional amount of attentional capacity attending to them, which distracts from task-focused activity. Worchel and Yohai (1979) found that individuals who were able to label or identify physiological reactions (i.e., individuals who were able to attribute their physiological reactions to some reasonable cause) were less distressed or aroused by those reactions. Therefore, it is likely that providing personnel with accurate information regarding normal physiological symptoms and responses to stress will reduce the distraction of having to interpret or attend to these unfamiliar reactions in the operational task environment.

Procedural information describes the events that are likely to occur in the stress environment. Procedural information may include a description of the setting, the types of stressors that may be encountered, and

the effects the stressors may have. For example, procedural information provided to a novice parachutist may include a description of the activities that will take place prior to a jump, the noises and time pressure that may be present, and the distraction and lapses of attention that these stressors may cause. In an early study of combat aircrews, Janis (1951) found a reduction in negative stress reactions when descriptive information on air attacks was provided in advance.

Finally, the third type of preparatory information, *instrumental information*, describes what to do to counter the undesirable consequences of stress. For example, Egbert, Battit, Welch, and Bartlett (1964) provided individuals with information on how they would feel following a medical operation, as well as what they could do to relieve the discomfort. Preparatory information may be most effective, especially in a performance environment, if it has instrumental value, that is, if the information provides the individual with a means to resolve the problems posed by the stress environment. For example, it may be of value to know not only how noise may contribute to distractions during task performance, but also what one can do to overcome the effects of these distractions.

In a recent study of the effectiveness of preparatory information on enhancing performance under stress, Inzana, Driskell, Salas, and Johnston (1996) implemented a comprehensive preparatory information intervention that incorporated sensory, procedural, and instrumental information. This study is unique in that it examined the effect of preparatory information on task performance in a real-world decision-making environment. Participants performed a computer-based decision-making task under either high-stress or normal-stress conditions, and they were given either general task instructions or instructions that included specific preparatory information regarding the stress environment. Results of this study indicated that those who received preparatory information before performing under high-stress conditions reported less anxiety, were more confident in their ability to perform the task, and made fewer performance errors than those who received no preparatory information.

Phase 2: Skills Acquisition

The primary goal of Phase 2 of SET, *skills training*, is skill acquisition and rehearsal. Training activities in Phase 2 are focused on developing cognitive and behavioral skills that are required to maintain effective performance under stress. Whereas some skills are somewhat generic and are likely to be relevant to most tasks that may be performed under stress conditions (e.g., cognitive control strategies), the implementation of other types of skills training (e.g., decision-making training) is dependent on the specific tasks to be performed in the criterion setting. Therefore, the specific skills-training techniques to be implemented in this phase of stress-exposure training vary depending on the requirements of the task.

The types of skills to be taught can be grouped into two broad categories. Some stress-training strategies are intended to make the trainee

more resistant to stress effects. For example, if an individual overlearns a task, he or she will be less likely to become distracted by novel or stressful events and more resistant to other stress consequences such as narrowing of attention that can lead to error. These approaches attempt to minimize the effects of stress on the individual. On the other hand, in other stress training approaches, these stress-related performance decrements (i.e., narrowed attention) are taken as a given, and attempts are made to train individuals to compensate for these losses in the task situation. For example, the attentional-focus training approach proposed by Singer et al. (1991) represents an attempt to train individuals to maintain attentional focus on task-relevant stimuli in the face of external distractions. In the following sections, we examine several types of stress training strategies that may be incorporated into the skills acquisition phase of SET.

Cognitive control strategies. The term *cognitive control* subsumes a number of cognitive coping strategies that have the purpose of providing the trainee with control over distracting or dysfunctional thoughts and emotions that arise under stress conditions. The primary emphasis of these interventions is to replace negative or distracting cognitions with task-focused cognitions.

Evidence suggests that experiencing novelty in the immediate environment may lead to greater self-attention (Wegner & Giuliano, 1980). Moreover, novel or stressful stimuli may instigate an active search for meaning that involves a turning inward, or self-focus. A primary emphasis of the appraisal process is the evaluation of what novel stimuli mean to *one's self* (Lazarus & Folkman, 1984). Thus, under stress, individuals begin to "time-share" cognitive resources between (a) the task and (b) worrying about the stress itself and how the stressor will affect their own well-being. Performance suffers as attention is distributed between task-relevant and task-irrelevant cognitions.

The primary technique used in cognitive restructuring is the training of individuals to recognize task-irrelevant thoughts and emotions that degrade task performance and to replace them with task-focused cognitions. The key focus of this training approach is to train the individual to regulate emotions (e.g., worry and frustration), regulate distracting thoughts (self-oriented cognitions), and maintain task orientation. As Wine (1971) noted, "performance may be improved by directing attention to task-relevant variables, and away from self-evaluative rumination" (p. 100).

Wine (1971) and Tryon (1980) argued that many stress training techniques may be effective in reducing self-reported anxiety and negative affect but generally show little impact on performance. Therefore, interventions directed at reducing negative emotional response may get participants to feel better; however, these interventions ignore the cognitive components of stress reaction (i.e., interfering self-oriented cognitions and attention reduction), which seem to be more directly related to performance.

Wine (1971, 1980) concluded that this perspective suggests the benefits of *attentional training*, which would focus on the narrowing of attention and self-focused thoughts inherent in performance anxiety, with the goal of focusing attention to task-relevant stimuli. In a recent study of training in attention-focusing skills, Singer et al. (1991) found that this training resulted in improved task performance when participants worked under noise stress. This approach included training to describe when, why, and how attention may be distracted during task performance, as well as practice in performing the task under high-demand conditions, focusing attention, and refocusing attention after distraction. Training that concentrates directly on enhancing attentional focus may help alleviate the distraction and perceptual narrowing that occur in stress environments.

Physiological control strategies. Some training strategies are intended to provide the trainee with control over negative physiological reactions to stress. Progressive muscle relaxation training techniques involve a series of muscle tensing and relaxing exercises, often supplemented with imagery (Burish, Carey, Krozely, & Greco, 1987). The goal of relaxation training is to train the individual to control muscle tension and breathing. The basic premise of relaxation training is that relaxation and stress are incompatible; that is, if someone is physiologically relaxed, he or she is less likely to experience the negative physiological responses brought on by the stress environment. The value of this training is that it attempts to train people in the responses characteristic of effective performers under stress conditions: calmness, relaxation, and control.

Several other types of behavioral training interventions can be identified. For example, biofeedback involves training an individual to control physiological responses (such as systolic blood pressure or heart rate) by using external monitoring devices to indicate when a desired change occurs. Using these devices, individuals can learn to bring their physiological processes under conscious control (e.g., Dobie, May, Fischer, & Elder, 1987; Jones, 1985). Autogenic-feedback training has been used successfully in alleviating space motion sickness and space adaptation syndrome (Cowings & Toscano, 1982). This technique involves the individual in an active effort to monitor and regulate internal cues that signal and exacerbate motion sickness. All of these techniques have in common an effort to increase the extent to which the person's physiological reactions are under conscious control.

Overlearning. Almost all basic military training is intended to reduce the disruptive effects of stress in combat through the use of repetitive drill, providing soldiers with a set of habitual responses that are less vulnerable to stress decrement. The term *overlearning* refers to deliberate overtraining of a performance beyond the level of initial proficiency (Driskell et al., 1992). For example, Schendel and Hagman (1982) examined the effects of overlearning on retention of a military procedural task (disassembly and assembly of an M60 machine gun). They found that the overtrained group made 65% fewer errors than a control group when retested after 8 weeks.

A number of researchers have argued that overlearning is a particularly potent training procedure for the stress environment (see Cascio, 1991; Deese, 1961; Fitts, 1965; Weitz, 1966). Janis (1949) noted that "drill of this type, when repeated so that the response is overlearned, tends to build up an automatic adaptive response" (p. 222). Given that one effect of the stress environment is to reduce or restrict the attentional capacity of the individual, behaviors that are more automatic should be more resistant to degradation. Geen (1989) noted that automated processing of information occurs as tasks become well rehearsed and performance becomes routinized or more automatic. Automated tasks require less active attentional capacity and are less subject to disruption by increased attentional demands.

In a meta-analysis of research on the effects of overlearning, Driskell et al. (1992) found that overlearning resulted in a significant increase in retention. However, they also noted several cautions regarding the use of overlearning in stress training. First, overlearning can lead to rigidity of response. The repetition of a single behavior or response over a large number of trials may result in a loss of flexibility and the tendency to persist with a single response even when the behavior is no longer correct. Second, it is critical that the behavior that is trained or overlearned in the training setting closely reflect the task that is required in the actual performance setting. To the extent that stress in the real-world task environment changes the nature of the task or the types of behavior required for successful performance, the overlearning of a task in a training environment that does not incorporate these factors can lead to the reinforcement of inappropriate or ineffective behavior. For example, Zakay and Wooler (1984) found that training conducted under normal conditions improved decision performance under normal conditions but did not improve performance when subjects performed under time pressure. It may be detrimental to overlearn a set of responses during training, therefore, if the behavior called for in the real-world environment requires a different type of response. In summary, whereas overlearning can lead to enhanced performance, the training designer must ensure that the task that is overlearned is the task called for in the performance setting. When the concern is preparing personnel to perform under stress conditions, the practice conditions provided during training must approximate the stress environment.

Mental practice. Mental practice refers to the cognitive rehearsal of a task in the absence of overt physical movement (Richardson, 1967). When a musician practices a passage by "thinking it through" or when an athlete prepares for an event by visualizing the steps required to perform the task, he or she is engaging in mental practice. Mental practice has been studied most extensively in educational and sports research, and it is a component of many cognitive stress reduction techniques (see Meichenbaum, 1985; Meichenbaum & Cameron, 1983).

In a typical implementation of this procedure, participants mentally practice or mentally rehearse performing a task. Instructions are to sit

quietly and mentally practice performing the task successfully from start to finish. The overall results of research are encouraging: In a recent meta-analysis of the mental practice literature, it was concluded that mental practice was an effective means for enhancing performance, although somewhat less effective than physical practice (Driskell, Copper, & Moran, 1994). Driskell et al. noted that mental practice offers the opportunity to rehearse behaviors and to code behaviors into easily remembered words and images to aid recall. Mental practice does not offer direct knowledge of results or visual and tactile feedback, as does physical practice. However, Driskell et al. (1994) concluded that mental practice may be a particularly effective technique for training complex cognitive tasks, for rehearsing tasks that are dangerous to train physically, and for training tasks in which the opportunity for physical practice seldom occurs.

Training time-sharing skills. High-stress or high-demand performance environments often involve increases in task load and time pressure. Increased task load may result from the imposition of additional tasks (e.g., an air traffic controller whose task suddenly increases from monitoring one aircraft to monitoring multiple aircraft in a given airspace) or from having to attend to novel or unfamiliar stimuli (e.g., a worker whose task is to monitor a visual display while alarms are blaring and other people are running about). Broadly speaking, task load refers to the pressure or demand of performing multiple tasks, and studies show that performing multiple tasks often carries a penalty. Most stressful environments also involve time pressure, or the restriction in time required to perform a task. Research has suggested that time pressure may degrade performance because of the cognitive demands, or information overload, imposed by the requirement to process a given amount of information in a limited amount of time (Wright, 1974).

A number of studies have shown that highly practiced tasks can be performed jointly with little interference. For example, Spelke, Hirst, and Neisser (1976) and Hirst, Spelke, Reaves, Caharack, and Neisser (1980) found that performance dropped dramatically when participants were asked to read prose aloud while taking dictation. However, with substantial dual-task practice—more than 50 hours—participants could more readily read while taking dictation, achieving reading and comprehension rates similar to those of the single-task control groups. However, it is important to note that even extensive practice on each of two tasks performed separately does not seem to enhance performance when those tasks are later performed concurrently (Damos, Bittner, Kennedy, & Harbeson, 1981). Researchers have questioned the existence of a generalized time-sharing ability that is independent of the particular tasks to be performed. Time-sharing is considered a task-specific skill that must be practiced in context. If tasks are likely to be performed together in the operational environment, they must be practiced together in the training environment.

Finally, it may be beneficial to train prioritization skills in multiple-task environments. One vivid example of the need for this type of training is provided by the 1972 crash of an Eastern Airlines L-1011 in the Florida

Everglades just west of Miami. This aircraft was on an approach for landing, a period of high workload for the aircrew, when a landing gear light failed to illuminate. Over the next four minutes of flight, the crew was so preoccupied with this malfunction that they failed to monitor other critical flight activities and literally flew the plane into the ground (National Transportation Safety Board, 1973). In high-workload conditions, individuals often by necessity focus on some tasks to the exclusion of others, and often attention is devoted to low-priority or irrelevant tasks. Training that allows the individual to practice task prioritization under these conditions should prove beneficial.

Training decision-making skills. Some performance strategies work effectively in the training setting but poorly under operational conditions. For example, it may be easy to learn to drive a car by lining up the left fender with the center road stripe, but this strategy is inefficient for more advanced driving performance. In a similar vein, decision-making processes that may be effective in less stressful or less time-limited task situations may be inefficient in high-demand stress environments.

Many situations allow sufficient time to make a structured decision. The normative, *analytic* decision-making process is one in which the decision maker undertakes a systematic, organized information search, considers all available alternatives, generates a large option set, compares options, and successively refines alternative courses of action to select an optimal outcome. Analytic decision making makes efficient use of the resources at the decision maker's disposal and can result in well-informed decisions. Traditionally, deviations from this pattern of decision making have been viewed as indicative of a breakdown in decision making. Beach and Mitchell (1978) noted that, "in general, people in our culture regard the more formally analytic strategies as the ones most likely to yield correct decisions" (p. 445).

However, other researchers, such as Payne, Bettman, and Johnson (1988) and Klein (1996), have argued that the effectiveness of a particular decision-making strategy is dependent on many task and context variables. Under high-demand, time-pressured conditions, there is little time to gather all available information and evaluate each alternative solution. Payne et al. (1988) emphasized the contingent nature of decision making, arguing that under certain task conditions such as increased time pressure, use of a less analytic decision strategy may be adaptive. Klein and colleagues examined decision making in real-world operational environments such as in the command center of naval ships (Kaempf, Klein, Thordsen, & Wolf, 1996), among airline crews (Orasanu, 1993), and among firefighters (Klein, 1989). Klein (1996) argued that increased time pressure may prevent the use of analytic decision strategies, but that this is little cause for concern because analytic strategies are rarely used in these settings. In naturalistic task settings (in which decisions are made under time pressure and data are ambiguous or conflicting) decision makers do not have the luxury to search painstakingly for information, weigh all available alternatives, and eliminate each systematically to arrive at a

solution. Within this context, what has been termed *hypervigilant decision making* (Janis & Mann, 1977, p. 11)—the consideration of limited alternatives, nonsystematic information search, accelerated evaluation of data, and rapid closure—may not represent a defect in the decision-making process but instead may represent an adaptive and effective response given the nature of the decision-making task. In brief, it may be easy to go through a stepwise procedure to generate options for decision making during training in which conditions are relatively relaxed, but this strategy may be inefficient in more complex, real-world settings. Decision-making processes that are effective in less stressful or less time-limited task situations may be inefficient in high-demand stress environments.

Johnston, Driskell, and Salas (1997) tested this hypothesis, arguing that in a naturalistic task environment, the use of a hypervigilant decision strategy would lead to more effective decision making than the use of a more analytic or vigilant strategy. The results of this study indicated that those who were trained to use a hypervigilant decision strategy did indeed exhibit the characteristics of nonanalytic decision making: (a) consideration of limited alternatives, (b) nonsystematic information search, (c) rapid evaluation of data, and (d) limited review of alternatives before making a decision. However, the results further indicated that, on a naturalistic task, this type of decision-making pattern led to better performance than did a more analytic strategy. The results of this study do not imply that a disorganized pattern of decision making is superior to an organized pattern; they demonstrate that a hypervigilant pattern of decision making, which has been described by others as disorganized and simplistic, can under some conditions be an effective decision strategy. Moreover, these conditions (e.g., time pressure, ambiguous data) characterize many applied, real-world tasks.

The results of this study have clear implications for training. Orasanu (1993) warned that the tendency to impose a normative model as a standard basis for decision-making training is seductive. Encouraging the decision maker to approximate a normative model could undermine behavior that may more adequately fit the requirements of the task situation. Johnston et al. (1997) concurred and suggested that training should not encourage the adoption of a complex analytic strategy under the conditions that characterize many naturalistic task environments. Thus, one goal of decision-making training for stressful environments is to emphasize the use of simplifying heuristics to manage effort and accuracy, and to improve the capability of the decision maker to adapt decision-making strategies to high-demand conditions.

Training team skills. Real-world incidents provide anecdotal but distinct illustrations of how team performance may falter under stress. United Airlines Flight 173 crashed near Portland, Oregon, in December, 1978, as it ran out of fuel while the crew attempted to deal with a landing gear malfunction. The National Transportation Safety Board (1979) report cited a breakdown in teamwork as a primary cause of this accident. The report indicated that the captain was preoccupied with an individual task,

that "the first officer's main responsibility is to monitor the captain" and this was not done, and that "the flight engineer's responsibility is to monitor the captain's and first officer's actions" and that this was not done (p. A-5). In a review of crew performance in aviation, Foushee (1984) noted that a majority of accidents are related to breakdowns in crew or team coordination.

Why does group coordination become more problematic under stress or emergency conditions? Research at the *individual* level of analysis has suggested that individuals' focus of attention shifts from the broad to the narrow when under stress, and we believe this phenomenon may have significant implications for group interaction. One of the better established findings in the stress literature is that as stress or arousal increases, the individual's breadth of attention narrows (Combs & Taylor, 1952; Easterbrook, 1959). Perhaps the earliest statement of this phenomenon was by William James (1890) who believed that the individual's field of view varied, from a broader perspective under normal conditions to a more narrow, restricted focus under stress. Pennebaker, Czajka, Cropanzano, & Richards (1990) provided an empirical test of the hypothesis that normal thought processes and attentional focus are restricted under stress; they found that individuals confronted with uncontrollable noise tended to move from higher to lower levels of thought—from a broad to a narrow perspective—when under stress. Other researchers have shown that stress may increase individual self-focus; for example, Wegner and Giuliano (1980) found that increased arousal led to greater self-focused attention.

Driskell, Salas, and Johnston (1997) extended this research to the group level of analysis by arguing that group members under stress may become less *group* focused. They held that the narrowing of attention, or "tunnel vision," that occurs under stress may include a restriction of social stimuli as well, and that under stress, group members may adopt a narrower, more individual perspective of task activity. With this narrowing of perspective, team members' cognitions shift from a broader, team perspective to a narrower, individualistic focus.

Driskell, Salas, and Johnston (1997) conducted a study in which three-person teams performed a decision-making task under normal or high-stress conditions. Results indicated that stress causes a narrowing of team perspective. Team members in the stress condition were less likely to develop a strong team identity and to adopt a team-level task perspective. Furthermore, team perspective was found to be a significant predictor of task performance. These results suggest that, under stress, team members may lose the collective representation of group activity that characterizes interdependent team behavior.

To learn how to counter the effect of stress on the narrowing of team perspective, a follow-up study was conducted on the effects of enhancing or strengthening team perspective. In this study, Driskell, Salas, and Johnson (1997) implemented a SET-type intervention to train and reinforce teamwork skills. This intervention consisted of (a) information on the importance of teamwork skills and how they can be affected by stress,

(b) training in team skills such as providing feedback to other team members, and (c) practice of these skills in a realistic task simulation. Teams that received this training maintained a broader team perspective and performed better under stress than teams without training. For team tasks that must be performed under stress or emergency conditions, therefore, results suggest that it may be useful to implement training to reinforce teamwork skills.

Phase 3: Application and Practice

> It is immensely important that no soldier ... should wait for war to expose him to those aspects of active service that amaze and confuse him when he first comes across them. If he has met them even once before, they will begin to be familiar to him. (Clausewitz, 1976)

As part of the classic American Soldier studies conducted during World War II, military researchers asked combat veterans who served in the Italy and the North African campaign this question: "What type of training did you lack?" The most frequent response from these soldiers was that they lacked training under realistic battle conditions (Janis, 1949, p. 229).

Training generally occurs in a calm and relatively benign environment. This type of environment is designed to be conducive to learning, and it allows trainees to acquire initial skills in an efficient manner. Yet, actual task conditions are often quite unlike those found in the training setting. In fact, the extreme time restrictions, novelty, ambiguity, and confusion that occur under stress conditions often create a substantially different task environment than that experienced in a normal training setting. Thus, the novelty of performing even a well-learned task in a high-stress environment can cause severe degradation in performance.

One crucial aspect of maintaining effective performance in a stressful environment is providing practice and exercise of critical tasks under operational conditions similar to those likely to be encountered in the real-world setting. Training that allows some degree of preexposure to the stress operational environment should reduce the extent of performance decrement encountered in the operational setting. This strategy has been successful in a number of military applications, including water-survival training, flight emergency training, and fire-fighting training.

The primary goal of Phase 3 of SET, therefore, is to provide for the application and practice of task skills in a simulated stress environment. This strategy has several benefits. First, it allows trainees to perform tasks in the simulated stress environment and to experience the type of performance problems encountered in this setting. Furthermore, use of the skills taught in Phase 2 and now practiced in Phase 3 should allow trainees to adapt performance to this environment. Second, preexposure to criterion-like stressors reduces uncertainty and anxiety regarding these events and increases confidence in the ability to perform in this setting.

Third, events that have been experienced during training will be less distracting when faced in the operational environment.

In the SET model, the third phase of training requires the practice of skills in a simulated stress environment. However, one issue that has been deliberated by researchers is the timing and manner in which realistic stressors should be introduced in training. High-fidelity stressors are those that are "just like" those encountered in the operational environment. Some researchers have argued for high-fidelity simulation of stress in training (Terris & Rahhal, 1969; West, 1958; Willis, 1967). Others have argued that the high demand, ambiguity, and complexity of the stress environment is not conducive to the early stages of learning and that exposure to stressors too early in training may interfere with initial skill acquisition (Lazarus, 1966).

Reigeluth and Schwartz (1989) noted that: "the design of the instructional overlay for any simulation begins with making sure not to overload the learner. The real situation is usually quite complex ... to begin with so many variables in the underlying model will clearly impede learning and motivation" (p. 4). Elaborating this point, Regian, Shebilske, and Monk (1992) claimed that it is not necessarily true that higher fidelity always leads to better training and that many training strategies reduce fidelity early in training to reduce complexity. Friedland and Keinan (1986) found evidence to support the effectiveness of *phased training* as an approach to manage training for complex environments. On the basis of the assumption that a high degree of complexity in the training environment may interfere with initial skill acquisition, phased training was used to maximize training effectiveness by partitioning training into separate phases: During initial training, trainees learned basic skills in a relatively low-fidelity, or low-complexity, environment, and later stages of training incorporated greater degrees of complexity, or realism. Keinan and Friedland (1996) noted that allowing skills practice in a graduated manner across increasing levels of stressors (from moderate stress exercises to higher stress exercises) satisfies three important requirements: It allows the individual to become more familiar with relevant stressors without being overwhelmed; it enhances a sense of individual control and builds confidence; and it is less likely to interfere with the acquisition and practice of task skills than is exposure to intense stress. The SET model incorporates this aspect of phased training in the overall three-phase training approach.

One question that has substantial applied consequences as well as theoretical implications is the extent to which stress training is generalizable, from stressor to stressor and from task to task. First, consider the question of generalization from stressor to stressor. In a SET training intervention, trainees receive (a) specific stress information, (b) skills training, and (c) practice of the task under simulated stress conditions. Will the positive effects of training that addresses one type of stress (e.g., time pressure) generalize to a task situation involving a novel stress (e.g., noise)? Will the skills learned in the stress training (e.g., how to focus attention under time pressure) generalize to a novel stress setting? In

other words, do trainees learn a specific skill in training (how to focus attention under time pressure), or do they learn a more generalizable stress adaptive skill (how to focus attention under stress conditions)?

A related question is whether stress training generalizes from task to task. Again, consider a stress training intervention in which trainees receive (a) specific stress information, (b) skills training, and (c) practice of the task under simulated stress conditions. Will the benefits gained in stress training generalize when the trainees face not Task A (the training task), but a novel task, Task B? In other words, do trainees learn specific stress skills that are applicable only to the particular task that is practiced in training, or do they learn generalizable skills that would transfer to novel tasks?

Driskell, Johnston, and Salas (1997) conducted a study to demonstrate the efficacy of a brief SET intervention in decreasing self-reported stress and enhancing performance under stress. However, the primary focus of the study was to determine whether stress generalized from stressor to stressor (Experiment 1) and whether the effects of training generalized from task to task (Experiment 2).

In Experiment 1, there were three performance trials for each participant: (a) Performance was assessed pretraining, when participants performed the task under either time pressure or noise conditions; (b) performance was assessed posttraining, when participants who received "noise stress" training performed under noise stress, and those who received "time pressure" training performed under time pressure; and (c) performance was assessed under novel stressor conditions, when participants who received noise stress training now performed under time pressure and those who received time pressure training now performed under noise stress. The design of Experiment 2, which assessed generalization of training from task to task was similar: (a) Performance was assessed pretraining, when participants performed either Task A or Task B under stress; (b) performance was assessed posttraining, when participants who received stress training and practice for Task A then performed Task A under stress and those who received stress training and practice for Task B then performed Task B under stress; and (c) performance was assessed under novel task conditions, when participants who received stress training for Task A now performed Task B under stress and those who received stress training for Task B now performed Task A under stress.

Overall results indicated that (a) the SET intervention resulted in decreased subjective stress and improved performance and (b) the beneficial effects of stress training were maintained when participants performed in the presence of a novel stressor and performed a novel task. This study has significant consequences for the design of stress training in that the exact types of stress inherent in many real-world task environments (e.g., the threat, noise, and time pressure present in a flight emergency) are often difficult to create or anticipate fully during training. These findings suggest that the skills learned from stress training are generalizable to novel task and stressor settings.

Lessons Learned: Guidelines for Implementing Stress-Exposure Training

Lesson 1: High-Demand, High-Stress Conditions Often Lead to Disrupted Performance

We state this truism because it clarifies our interest in stress and performance. Stress affects physiological, cognitive, emotional, and social processes, and these effects may have a direct impact on task performance. Stressors such as time pressure, task load, information complexity, and ambiguity occur in many applied settings, such as aviation; military operations; nuclear, chemical, and other industrial settings; and everyday work situations. When individuals face stressors that disrupt goal-oriented behavior, performance effects may include increased errors, slowed response, and greater variability in performance.

Lesson 2: Technical Skill Is a Necessary but Not a Sufficient Condition to Support Effective Performance in the Stress Environment

Some tasks must be performed under conditions quite unlike those encountered in the training classroom. For example, high-stress environments include specific task conditions (such as time pressure, ambiguity, increased task load, distractions) and require specific responses (such as the flexibility to adapt to novel and often changing environmental contingencies) that differ from those required in the normal performance environment. Preparing personnel to perform under high-stress conditions requires that the task performer be highly skilled, be familiar with the stress environment, and possess the special knowledge and skills necessary to overcome the deficits imposed by high-stress or high-demand conditions.

Lesson 3: The Three-Phase SET Training Format Is an Effective Approach for Enhancing Performance Under Stress

The SET approach is defined by a three-stage training intervention: (a) an initial stage in which information is provided regarding stress and stress effects; (b) a skills training phase, in which specific cognitive and behavioral skills are acquired; and (c) the final stage of application and practice of skills learned under conditions that increasingly approximate the criterion environment. Research has shown that this three-stage stress training intervention is an effective approach for reducing anxiety and enhancing performance under stress (Saunders et al., 1996). It is likely that each phase of training contributes to overall training effectiveness.

Lesson 4: Preparatory Information Regarding the Nature of the Stress Environment Can Lessen Negative Stress Effects and Enhance Performance in the Operational Environment

One objective of the first phase of SET is to provide information on the nature of the stress environment and individual reactions to stress. Research showed that those given preparatory information before performing in a stressful environment made fewer errors, were less likely to feel stressed, and were more confident in their ability to perform the task (Inzana et al., 1996). A comprehensive preparatory information intervention should include sensory, procedural, and instrumental information.

Lesson 5: Stress Training Should Focus on Developing the Cognitive and Behavioral Skills Required to Maintain Effective Performance Under Stress

During the second phase of SET, trainees acquire and practice stress-management skills to enhance the capability to respond effectively in the stress environment. The type of skills training implemented varies according to the specific training requirements but may include cognitive control techniques that train the individual to regulate negative emotions and distracting thoughts, as well as training to enhance physiological control (i.e., awareness and control of muscle tension and breathing). Other training strategies that have been shown to be effective in enhancing performance include overlearning (Driskell et al., 1992), mental practice (Driskell et al., 1994), and training in decision making-skills (Johnston et al., 1997).

Lesson 6: One Crucial Aspect of Maintaining Effective Performance in a Stressful Environment Is Providing Practice and Exercise of Tasks Under Operational Conditions Similar to Those Likely to Be Encountered in the Real-World Setting

The final phase of training provides the opportunity to apply and practice task skills in a setting that approximates the real-world stress environment. Providing skills practice in a graduated manner across increasing levels of stress (from moderate stress exercises to higher stress exercises) enhances a sense of control and confidence and is less likely to interfere with the acquisition and practice of task skills than does initial exposure to more intense stress.

Lesson 7: Stress-Exposure Training May Be Presented as a Component of Initial Technical Training or as a Part of Recurrent or Refresher Training

If SET is presented as a component of initial technical training, it should be introduced after basic technical skills are developed. The introduction

of SET too early in the training curriculum may interfere with initial skill acquisition. If SET is presented as a component of refresher training, the trainer should ensure that trainees have the opportunity to practice basic skills before stress training exercises are presented.

Lesson 8: Absolute Fidelity in Training Is Not Possible nor Necessarily Desirable

Fidelity refers to the degree to which characteristics of the training environment are similar to those of the criterion setting. Many bemoan the fact that training will never approach or capture the "life-threatening" feel of the real-world setting (such as an aircrew emergency when lives are on the line). This is true; trainees are generally aware that they are in a "safe" training environment. However, a well-designed training simulation can be quite involving and can "feel" like the real thing without imposing extreme or dangerous levels of stress. Moreover, absolute fidelity in stress training is not often desirable. If stress is too high in training (e.g., if time pressure is too high), there may be little chance of successful task performance, and trainees may receive a negative training experience. Research has suggested that stressors introduced at a moderate level of fidelity during training can provide an effective and realistic representation of the stress environment.

Conclusion

Spettell and Liebert (1986) described the high task demands and pressures under which personnel perform in high-stress settings such as in the nuclear power and aviation industries, and they proposed that "well-established psychological training techniques [such as] stress inoculation may help to avoid or neutralize these threats" (p. 545). However, other researchers have cautioned that the stress-management literature has suffered from a lack of rigorous evaluation and that proof of the effectiveness of these programs is difficult to obtain (Newman & Beehr, 1979; Wexley & Latham, 1991). This chapter has presented a model of stress-exposure training, described the empirical research that supports this approach, and derived some guidelines for implementing stress-exposure training. A reasonable interpretation of the results is that the stress-exposure training model is an effective method for reducing anxiety and enhancing performance in stressful environments. The results of this analysis should clearly encourage further application and research.

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