DEVELOPMENT OF INSTRUCTIONAL DESIGN GUIDELINES FOR STRESS EXPOSURE TRAINING

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ABSTRACT

Training interventions should be designed to promote performance management under stressful conditions. The success of the Stress Exposure Training method in positively affecting cognitive and psychomotor performance merited developing instructional guidelines for training tactical decision making performance. Stress Exposure Training research articles were systematically reviewed for guidelines that could be applied to a Combat Information Center environment. Guidelines were categorized according to specific aspects of training design: (a) needs analysis, (b) fidelity, (c) sequencing of training, and (d) evaluation and feedback. Overall, this information provides practical advice for creating effective training for stressful conditions.

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INTRODUCTION

For many years military researchers have recognized the need for developing training strategies for maintaining combat performance under stress (Driskell & Salas, 1991; Kern, 1966; Kreager, 1984; Milgram, 1986; Schoeppner, 1987; Siegel, Kopstein, Federman, Ozkaptan, Slifer, Hegge, & Marlowe, 1981). In recent years changes in the complexity of military technology have added to the training challenge. For example, recent military incidents such as the ones involving the USS Stark and USS Vincennes have focused attention on the need for training to enhance the tactical decision making performance of combat information center (CIC) operators (Cannon-Bowers, Salas, & Grossman, 1991). The technological complexity in the CIC environment plus the rapidly unfolding events of warfare scenarios creates such stressors as high workload, information ambiguity, severe time pressure, and sustained operations (Cannon-Bowers et al., 1991). Therefore, to perform optimally in this environment the CIC operator's tactical decision making performance must be quickly responsive and accurate. This example serves to emphasize the need to create training interventions that build skills to promote effective technical performance in the operational environment.

A number of military researchers have maintained that stress coping training is important for managing combat performance (Kern, 1966; Kreager, 1986; Larsson, 1987; Milgram, 1986; Novaco, 1988; Schoeppner, 1987; Siegel, Kopstein, Federman, Ozkaptan, Slifer, Hegge, & Marlowe, 1981). However, there is little guidance on how to design training for ameliorating stress effects. The purpose of this paper is to propose empirically-based instructional guidelines that may be used in the design and development of stress coping training.

LITERATURE BASE

Conceptual Foundations

For our purposes the "cognitive/behavioral" approach to stress coping is seen as an effective strategy for ameliorating combat stress reactions, including having a positive effect on cognitive and psychomotor performance (Kreager, 1984; Meichenbaum, in press; Milgram, 1986; Novaco, 1988; Schoeppner, 1987).

Cognitive/behavioral stress coping training is usually taught in a series of steps and is based on basic principles of training design for skills acquisition (Meichenbaum, 1985; Smith, 1980; Suinn, 1990). The first step involves the presentation of requisite knowledge about typical reactions people have to stress. The goal is to help the individual understand that he or she will be able to learn how to change negative thoughts and behaviors in order to cope with stress. The second phase focuses on learning specific stress coping skills through practice and feedback. The coping skills training depends on the needs of the individual and the task situation. Typically, coping skills training includes: (a) thought restructuring: restructuring negative thoughts and reactions

to stress into positive coping thoughts and reactions, (b) problem-solving, and (c) physiological control: using deep breathing methods to calm physiological reactions to stressful encounters. The last phase involves practicing these coping skills in a setting that simulates or reproduces the problem stressors. The emphasis at this stage is on developing skills to transfer what is learned in the training to the real world without relapse into counterproductive thoughts and behaviors. The simulations may employ memory recall, behavioral rehearsal, role-playing, and modeling (Meichenbaum, 1985).

Meichenbaum (in press) has proposed that the three step learning framework provides the individual with skills that should reduce the imbalance between the adaptive demands of stressful situations and the individual's coping resources. That is, an individual's ability to maintain task focus is influenced by the ability to manage counter-productive actions that would reduce attention capacity for the task (Kanfer & Ackerman, 1989).

While certain limitations of the cognitive/behavioral stress coping training exist (e.g., emphasis on a skilled facilitator, one-on-one treatment) due to the clinical approach of the literature, enough support exists based on current military programs and empirical research to provide useful information about designing stress coping training for combat (Larsson, 1987; Milgram, 1986; Novaco, 1988).

Military training objectives typically require that training be skill-focused, performance specific, and applied to teams (Swezey & Salas, 1989). Therefore, our approach in this paper was to develop Stress Exposure Training (SET) guidelines that met these requirements.

Literature Search

The first step in developing SET guidelines was to find empirical work that showed such training had a positive effect on performance under stress. Second, SET instructional guidelines were extracted from these articles.

The literature search strategy consisted of a search for key words (e.g., stress training) in the databases of Defense Technical Information Center abstracts, Social Sciences Citation Index, and PsychLit. In addition, the reference lists of key articles were scanned for relevant citations. Searches of the relevant sources on SET research yielded a total of 240 review and empirical articles. Twenty-six empirical articles were found that met the following three inclusion criteria: (a) the study had to be an empirical test of hypotheses regarding the effects of SET, (b) the three phase training strategy was one of the independent variables, and (c) performance measures had to be included in the study. Seventeen of the studies demonstrated that SET had a positive effect on cognitive or psychomotor performance. A section at the end of this paper lists the guideline references.

Next, we extracted viable guidelines from each of the 17 studies based on the knowledge that the training procedures had the potential for a positive effect on performance. We followed the method developed by Swezey and Salas (1989) to format the guideline. The findings listed below address specific issues that should be considered regarding the design of SET: (a) needs analysis (b) fidelity, (c) sequencing of training, and (d) evaluation and feedback.

Following each guideline is a comment section that provides an example of how it could be applied to the CIC environment. No claim is made as to the comprehensiveness of the guideline list or to the limits of the comments. The inclusion criteria could be made less restrictive, and numerous additional guidelines and comments could be developed.

FINDINGS

Needs Analysis

The primary purpose of SET is to prepare the individual or team to function in the combat environment. Therefore, a needs analysis is required to identify the types of stressors encountered and the people who will be exposed to them. Secondly, the performance objectives developed as a function of the needs analysis are necessary to ensure program goals are met.

1. Conduct a step-by-step stressor analysis, similar to a task analysis, to identify: (a) typical stressors encountered, (b) performance deficiencies due to stressors in terms of psychomotor and cognitive processes, (c) knowledge, skills, and abilities (KSAs) required to promote technical performance while exposed to the stressors, and (d) specific cues in the environment that trigger use of effective stress coping skills.

Comments: For example, typical CIC stressors were identified as extreme time pressure, heavy workload, and information ambiguity. Narrowed attention focus, increased errors, and slowed responses are typical performance deficiencies in the face of these types of stressors. Presence of these stressors would cue the operator to begin using, in combination, time management, thought restructuring, and physiological control strategies to maintain accurate correlations of target information, timely identification of targets, timely reports of information, and quick motor skill performance on the variable action buttons at CIC consoles.

2. Discuss SET program goals and procedures with trainees in order to foster a mental model of performance expectations.

Comments: The reduced attention capacity and potential for performance decrements under stress can lower performance expectations and reduce motivation. Therefore, to ensure learning and to gain acceptance, an explanation of how SET will enhance task performance is required. For example, a CIC team could be shown how time management would help them manage target prioritization.

Fidelity

Fidelity refers to the degree to which characteristics of the training environment are similar to those of the actual setting. To enhance training transfer, SET is designed to be embedded in other training systems.

3. SET should be embedded in Navy training systems.

Comments: SET should be designed so that it can be administered in a variety of locations (e.g., onboard, pierside, schoolhouse) and in a variety of situations such as combat team training. For example, SET could be introduced during schoolhouse training, but continued throughout the training cycle (e.g., CIC combat team training on board ship).

4. SET should be administered in a team setting.

Comments: Since many combat situations involve teams that share similar stressors, SET should be designed to address team stressors. Secondly, group discussion can enhance the learning process. Immediate feedback of performance can be supplied by the instructor and the other trainees.

Sequencing

Phased training in which gradual exposure to stressors occurs ensures that stressors do not interfere with skills acquisition. Exposure to stressors should be gradual so that coping skills acquisition is maximized prior to full exposure to real stressors.

5. SET should be administered in three steps.

(a) First, lecture, discussion, and example should be used to explain how operational stressors can be addressed with stress coping skills.

Comments: For example, CIC operators could be shown how CIC stressors typically produce such reactions as inability to control negative thoughts and slowness in responding to requests for target information. Second, the operators can be shown how time management, thought restructuring, and physiological control training can improve performance under stress.

(b) The second step is to teach coping skills such as the ones described above, using modeling, practice, and feedback.

Comments: Videotaped and/or live demonstrations of how CIC operator performance deficiencies can develop from losing control of attention due to stressors can be followed by demonstrations of how operator

performance can be enhanced by using coping skills. Then, trainees can practice these skills with feedback from the instructor and team members.

(c) Last, coping skills should be practiced under gradual increases in simulated and/or real stressful conditions.

Comments: At this point, trainees should be able to apply coping skills in realistic situations. For example, a CIC scenario could include typical CIC stressors (e.g., large number of targets on radar screens, lack of information available about the targets) to which trainees must respond while practicing coping skills. Scenarios could be prepared for learning and practice on-board ship.

Evaluation and Feedback

Training evaluation is useful in assessing trainee reactions and performance, to assess achievement of training objectives, and to provide immediate feedback to trainees.

6. Measures of trainee attitudes and performance should be taken in order to determine SET effects; multiple measures of performance and attitudes over time should be attempted.

Comments: Technical and coping skills measures should be developed to provide feedback to trainees on how their coping skills performance enhances effective technical performance. For example, CIC operator technical performance (e.g., teamwork skills, target identification, target engagement) should be enhanced by time management, physiological control, and thought restructuring.

7. SET instructors should be provided with standard outlines of SET and observe and/or participate in demonstrations of SET procedures in order to provide accurate and timely feedback to trainees.

Comments: Since stressors typically induce negative thought patterns and actions, trainees should have as many opportunities as possible to demonstrate successful performance under stressful conditions. Therefore, instructor training is critical to trainee understanding and acceptance of SET procedures. Instructors should be skilled in providing immediate feedback to trainees in order to develop positive performance expectations. For example, CIC scenarios could be designed with typical stressors (workload and ambiguity) so that immediate performance feedback regarding both coping skills and technical skills is provided by the instructor.

CONCLUSIONS

This paper is an initial effort to develop instructional guidelines for combat stress. These guidelines provide a prescriptive application of SET research.

It is recommended that these guidelines be applied in the following way:

(a) The guidelines can be incorporated into current stress coping training programs. For example, a guideline checklist could be used by training program developers to evaluate whether their programs included these factors.

(b) The guidelines could be used to promote the development of new stress coping training programs starting with an analysis of typical stressors.

Overall, this information can provide the people involved in the design and development of training programs with practical advice for creating effective training for stressful combat conditions.

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