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# TECHNICAL R E P O R T

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## Stress and Performance

### A Review of the Literature and Its Applicability to the Military

Jennifer Kavanagh

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## SUMMARY

The literature on the relationship between stress and performance is extensive and diverse. The question of how stress affects performance is a relevant one given the nature of today's security environment and the challenges faced by military personnel on frequent and long deployments. As a tool for military planners and trainers to better prepare and support personnel, this review examines and summarizes existing studies on how stress affects performance and how these effects can be controlled and applied to the military context. The studies reviewed are representative and include those relevant to the military context, but the review itself is not comprehensive.

Stress is defined as a nonspecific response of the body to a stimulus or event (stressor). Under a general model of the stress response, when an individual experiences a stressor, the stressor will lead to a physiological response, one that can be measured by several indicators, such as elevated heart rate. In related literature, the term "stress" is used to refer to this physiological response. Stressors vary in form and can include extreme temperature or lighting, time pressure, lack of sleep, and exposure to threat or danger, among others. All stressors, however, tend to produce similar physiological responses within the body (Selye, 1956). In a military context, we are particularly interested in deployment-related stressors, including those related to peacekeeping operations and hostile fire missions as well as those associated with extended family separation. Stressors involved in peacekeeping and combat operations overlap, but they are also somewhat distinct. Some of the most significant stressors associated with both types of deployments are uncertainty, long work hours, risk of death or disease, boredom, and separation from family (Halverson et al., 1995; Campbell et al., 1998). However, in combat operations, the risk of death or personal injury and the threat of receiving hostile fire are much higher than in traditional peacekeeping missions. Importantly, there are also significant stressors involved in military life on home base, for example, high operations tempo or long work hours. This is especially

true during times of high deployment during which service members at home are expected to make sacrifices to support the mission. As a result of the many stressors faced by military personnel, it makes sense to look more closely at how stressors affect individual functioning and performance.

Although several authors posit a negative linear relationship between stress and performance, other evidence suggests that this relationship is actually an inverted-U shape. This hypothesis suggests that individual performance on a given task will be lower at high and low levels of stress and optimal at moderate levels of stress. At moderate levels of stress, performance is likely to be improved by the presence of enough stimulation to keep the individual vigilant and alert, but not enough to divert or absorb his energy and focus. At low levels of stress, in contrast, activation and alertness may be too low to foster effective performance, while at high levels of stress, arousal is too high to be conducive to task performance. For military planners and policymakers, the fact that performance may be optimal at moderate levels of stress may be important. This observation suggests that certain types of operations may benefit from the presence of moderate stressors and highlights the danger of boredom to the successful completion of military tasks.

Research findings suggest that when an individual comes under stress, his cognitive performance and decisionmaking may be adversely affected. Notably, under conditions of stress, individuals are likely to

- Screen out peripheral stimuli (Easterbrook, 1959; Janis and Mann, 1977; Staw, Sandelands, and Dutton, 1981)
- Make decisions based on heuristics (rules of thumb or guidelines) (Shaham, Singer, and Schaeffer, 1992; Klein, 1996)
- Suffer from performance rigidity or narrow thinking (Friedman and Mann, 1993; Keinan, 1987)
- Lose their ability to analyze complicated situations and manipulate information (Larsen, 2001).

Also, researchers have found that task completion time may be increased and accuracy reduced by stress (Idzikowski and Baddeley, 1983; McLeod, 1977).

In addition to effects on the individual, stress has also been shown to negatively affect group functioning. When stressed, individuals are likely to yield control to their superiors and to allow authority to become more concentrated in the upper levels of the hierarchy. Communication effectiveness may also be reduced (Driskell, Carson, and Moskal, 1988). Stress can also lead to "groupthink," in which members of the group ignore important cues, force all members to adhere to a consensus decision – even an incorrect one – and rationalize poor decisions (Janis and Mann, 1977).

Even if some level of stress may have a positive effect on performance as suggested by the U-hypothesis, extended exposure to stress or a single exposure to an extreme stressor can have severe negative consequences on non-task performance dimensions. For example, high levels of stress can lead to emotional exhaustion, lower organizational commitment, and increased turnover intentions (Cropanzano, Rapp, and Bryne, 2003). In extreme cases, stress can lead to post-traumatic stress disorder (PTSD), a psychiatric illness that can interfere with life functioning. PTSD has a variety of symptoms, including flashbacks, difficulty sleeping, and social isolation. Deployment and traumas experienced while on deployment are potential causes of PTSD. In fact, PTSD has been found at varying levels in all veteran populations studied, including peacekeeping operations and the recent conflicts in Afghanistan and Iraq (Litz et al., 1997a, 1997b; Adler, Vaitkus, and Martin, 1996; Schlenger et al., 1992; Hoge et al., 2004).

The report also discusses moderators, variables that intervene in the stressor-stress relationship or the stress-performance relationship, in most cases reducing the effect of stress on the individual. Moderators are important because they intervene in the stressor-stress-performance relationship and reduce negative effects of stressors and stress on the individual. There are many possible types of moderators – for example, an individual's predisposition to anxiety acts as a

moderator between the stressor and the physiological stress response. Individuals classified as "high anxiety" tend to experience more dramatic physiological responses to stressors than do those who are classified as "low anxiety" (Pearson and Thackray, 1970). Additional information can act as a moderator between stress and performance by helping reduce uncertainty associated with stress and improving the accuracy of individual expectations and performance of certain tasks (Glass and Singer, 1973). Moderators can also act to reduce the effects of stress on group performance. For example, group cohesion is said to improve unit morale and efficiency and reduce negative stress reactions among group members (Milgram, Orenstein, and Zafrir, 1989; Griffith, 1989).

The most important moderator in the military context, for individuals and groups, is training. Stress exposure training, in which individuals are exposed to simulated stressors and forced to perform target skills under them, can build familiarity with potential stressors, teach individuals strategies to maintain performance under stress, and contribute to overlearning, task mastery, and increased self-confidence (Driskell and Johnston, 1998; Saunders et al., 1996; Deikis, 1982). Stress exposure training can also be effective in improving group performance under stress by teaching groups how to adapt their performance strategies to external stressors and alerting them to how other team members will be affected by stress. Groups that undergo training tend to have better communication, teamwork, and feedback strategies that help them to work together under stress (Serfaty, Entin, and Johnston, 1998). Importantly for policymakers, military training is controllable by military planners, trainers, and decisionmakers. Increased and more effectively structured training represents a direct way that the negative effects of stress on military personnel and their performance on important missions can be reduced. Research on the moderating effects of training suggests that military leaders should focus on developing training that realistically represents the environment in which the soldier will be expected to perform, is targeted on particular skills, builds the soldier's ability to adapt, and includes adequate instructor feedback.

The research discussed in this report is applicable to the military context and suggests that although stressors may have both positive and negative effects on individual and group performance, application of appropriate moderators, particularly training, can reduce the negative effects of stress. It is even possible that structured training could augment the positive effects of stress on performance. The information in this report is relevant to military planners, trainers, and decisionmakers in several ways. First, the report provides insight into the types of stressors faced by military personnel on various types of deployments, and how these stressors affect individual functioning and performance. Some of these stressors (poor communication home) can be dealt with and improved directly, while others (death of a friend, boredom) can be addressed through expanded counseling and support programs at home base and while on deployment. In both cases, action by military planners to address the source of stress could improve quality of life of deployed personnel. Second, military planners can use the discussion of training as a moderator to construct training programs targeted specifically at reducing the negative effects of stress on performance. Such training programs would better prepare service members for the challenges of deployments and allow military units to perform effectively under conditions of very high and very low stress.