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United States Army Health Care Studies



and

Clinical Investigation Activity

AD-A170 784

PROCEEDINGS
FIFTH USERS' WORKSHOP ON COMBAT STRESS

A. David Mangelsdorff, Ph.D., M.P.H.
Major James M. King, Ph.D.
Major Donald E. O'Brien, Ph.D.

Consultation Report #86-003

July 1986

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**US ARMY
HEALTH SERVICES COMMAND
FORT SAM HOUSTON, TEXAS 78234**

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FIFTH USERS' WORKSHOP
ON COMBAT STRESS

9 - 13 December 1985

Fort Sam Houston, Texas

SPONSORED BY:

Health Care Studies and Clinical Investigation Activity
Headquarters, U.S. Army Health Services Command
Fort Sam Houston, Texas

AND

Directorate for Soldier Advocacy
U.S. Army Soldier Support Center
Fort Benjamin Harrison, Indiana

AND

Office of The Surgeon General
Department of the Army
Washington, D.C.

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PREFACE

This proceedings documents the presentations made at the Fifth Users' Workshop on Combat Stress held at Fort Sam Houston, Texas in December 1985. The dedication of the participants contributed to the excellent discussion and exchanges. It is hoped that future workshops will build on the knowledge learned from this one.

A. David Mangelsdorff, Ph.D., M.P.H.
James M. King, Ph.D.
Donald E. O'Brien, Ph.D.

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DEPARTMENT OF THE ARMY
US ARMY HEALTH CARE STUDIES AND CLINICAL INVESTIGATION ACTIVITY
FORT SAM HOUSTON, TEXAS 78234

November 7, 1985

Technical Division

The Fifth Users' Workshop on Combat Stress is scheduled for December 9 - 13, 1985. The sessions will be held in the auditorium at Headquarters, U.S. Army Health Services Command, Ft Sam Houston, Texas. A proposed agenda and information sheet are enclosed.

This conference will bring together individuals investigating stress and its effects in a variety of settings. The two main foci are: (a) protecting the health service providers during and after disasters and emergency situations and (b) determining performance measurement and operational readiness indicators. Attendees will have the opportunity to exchange ideas and make contact with other professionals. By having multiple sponsors for the conference, we hope to enhance communication and cooperation in ongoing stress efforts.

Any questions concerning this workshop should be addressed to Dr. David Mangelsdorff at commercial (512) 221-5671/4541/2511 or AUTOVON 471-5671.

A handwritten signature in cursive script, reading "Fred A. Cecere".

Fred A. Cecere
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Enclosure

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FIFTH USERS' WORKSHOP ON COMBAT STRESS

Where: Headquarters, Health Services Command (Building 2792)
auditorium rooms 219 and 221 at Fort Sam Houston, Texas

Monday 9 December:

- 0700-0800 Registration
0800-0815 MG Floyd Baker, CG, Health Services Command, Ft. Sam Houston, TX:
Opening remarks
0815-0830 Administrative announcements
0830-0900 Dr. Bonnie Green, University of Cincinnati, Cincinnati, OH:
Stressful experiences in civilian and veteran populations:
conceptualization and research findings
0900-0930 Dr. Christine Dunning, University of Wisconsin, Madison, WI:
The burden of duty and psychosocial trauma resulting from life
threatening and extinguishing events
0930-1000 Dr. Don Hartsough, Purdue University, West Lafayette, IN:
Coping with stress as a military health service provider
1000-1015 Break
1015-1130 Discussion
1130-1300 Lunch
1300-1430 Bruce Marshall, National Emergency Training Center/
Federal Emergency Management Agency, Emmitsburg, MD
1430-1445 Break
1445-1630 COL Ed Koenigsberg, Office of US Foreign Disaster Assistance,
Agency for International Development, Washington, D.C.:
Emotional impact of disasters on international relief workers
1700-1930 Social activity at Audry's Mexican restaurant (601 Camden and
McCullough)

Tuesday 10 December:

- 0800-0815 Opening remarks
0815-0845 COL Rich Watson, Combat Casualty Care Task Force, Academy of Health Sciences,
Ft. Sam Houston, TX: Lessons learned in psychiatric health care
preparedness: the C4-A perspective
0845-0915 CPT(P) Bob Stretch, Natick R&D Cen, Natick, MA:
PTSD among Army nurses
0915-0945 Dr. Bob McFarland, VA North Chicago, IL:
PTSD treatment program VAMC North Chicago
0945-1015 Dr. Gary Palmer, VA Tomah, WI:
VA PTSD treatment program
1015-1030 Break
1030-1130 Discussion
1130-1300 Lunch
1300-1345 Don Azevedo, Psychiatric Institute, Fort Worth, TX:
The Critical Incident Stress Debriefing Technique
1345-1430 Dr. Al Somodevilla, Dallas Police Department, Dallas, TX:
The Delta 191 Crash: helping the helpers
1430-1515 Dr. Jim Atkins, University Texas HSC, Dallas, TX:
Delta 191: crash scene and libidinal cocoon
1515-1530 Break
1530-1600 Discussion

1600-1700 MAJ(P) Dennis Kowal, INSCOM, Arlington, VA
Health promotion and stress management: two sides of the same coin

Wednesday 11 December:

0700-0800 Registration
0800-0815 Opening remarks
0815-1015 COL Robert Mitchell, Soldier Support Center, Ft. Benjamin Harrison:
Directorate of Soldier Advocacy initiatives
Adie V. McRae, Soldier Support Center, Ft. Benjamin Harrison:
Management of soldier performance in continuous operations
1015-1030 Break
1030-1130 MAJ Carolyn Randle, Health Fitness Center, Hawley Army Community
Hospital, Ft. Benjamin Harrison:
The Fitness Training Unit: development of entry and exit criteria
and the mental fitness program of instruction
1130-1300 Lunch
1300-1430 CPT Tony DeWitt, HQ, TRADOC, Ft. Munroe, VA:
Combat Stress Training Initiatives
1430-1445 Break
1445-1600 COL Jim Stokes, Academy of Health Sciences, Ft. Sam Houston, TX:
Standardization of Army-wide training packages for stress casualty
management
1600-1630 Coordination of organizational efforts

Thursday 12 December:

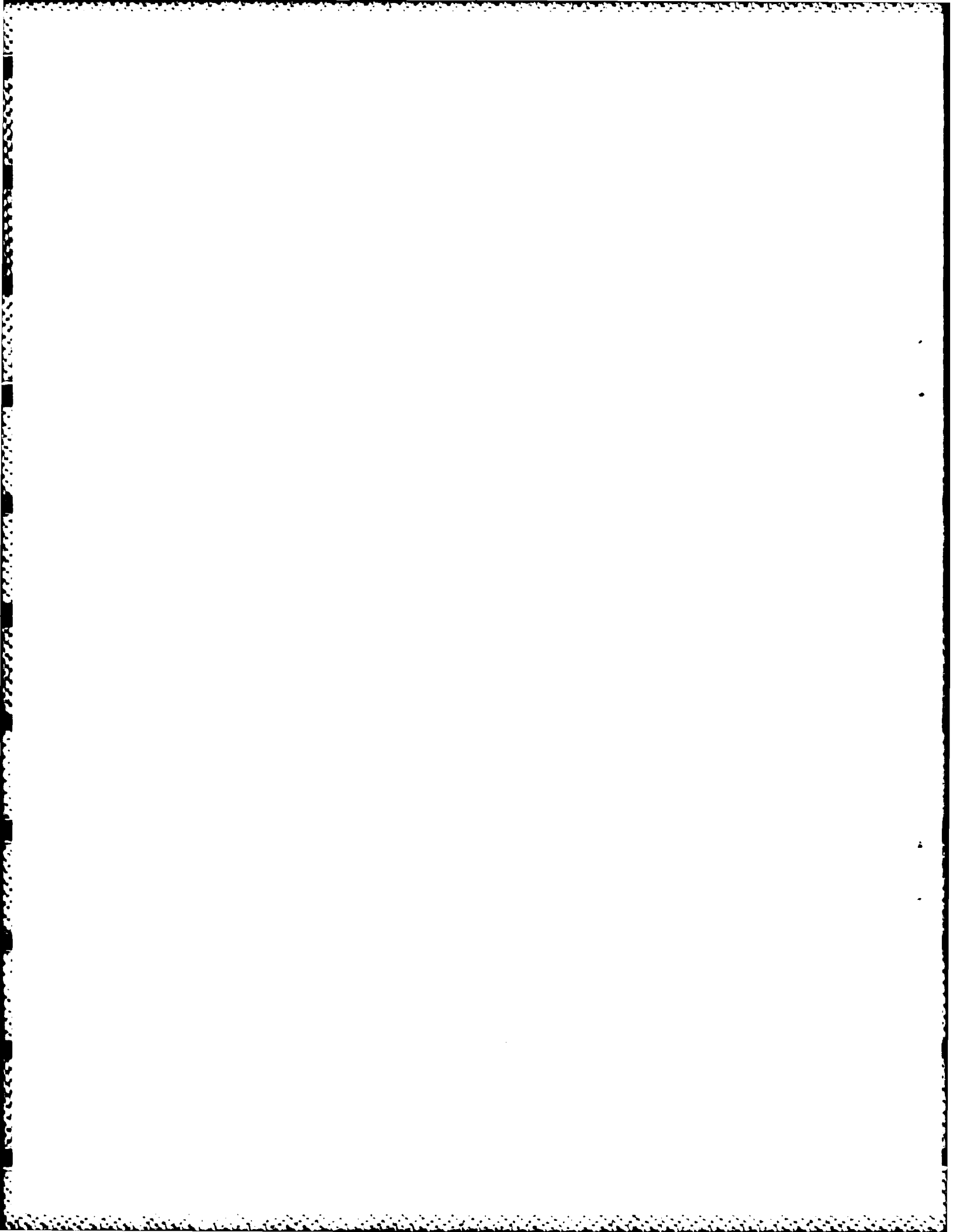
0800-0815 Opening remarks
0815-1015 LTC Rick Manning, WRAIR, Washington, D.C.:
WRAIR research efforts
CPT Jim Griffith, WRAIR, Washington, D.C.:
The measurement of "soldier will" and its relationship to life
adjustment, personal distress, and Army satisfaction
1015-1030 Break
1030-1130 MAJ Sam Rock, Soldier Support Center, Ft. Ben Harrison, IN:
Stress and soldier expectations in Europe
MAJ Jim Garrigan & MAJ Stan Holgate, WRAIR Field Unit, Ft Bragg, NC:
WRAIR research
1130-1300 Lunch
1300-1445 Ralph Jarboe, Ft Knox, KY:
Psychological and Physiological Effects of NBC and Extended
Operations on Crews (P2NBC2)
Dr. Jan Brecht & Dr. Don Headley, Army Research Institute, Alexandria, VA:
P2NBC2 and performance degradation
Ilse Munro, USARIEM, Natick, MA:
Factors limiting endurance of tank crews under simulated NBC
conditions
1445-1500 Break
1500-1600 LTC Gerald Krueger, WRAIR, Washington, D.C.:
Applications of laboratory methodologies to the field study of
sustained operations
Dr. Karl Englund, Navy Health Research Center, San Diego, CA:
The stresses and strains of sustained operations as a function of
time of day

Where: auditorium (building 1026) behind the Brooke Army Medical Center

Friday 13 December:

- 0800-0815 Opening remarks
- 0815-0845 Ron Simmons, Ft. Rucker, AL:
The Central Nervous System Connection
- 0845-0915 Dr. Jay Miller, SAM Brooks AFB, TX:
Crew Performance Assessment
- 0915-0945 CW04 Dick Bell, Texas National Guard:
Training for the integrated battlefield
- 0945-1000 Discussion
- 1000-1015 Break
- 1015-1200 Dr. Gerald Hudgens, Human Engineering Lab, Aberdeen Proving Ground, MD:
The development of procedures for obtaining performance data under
conditions approximating combat stress
- 1200-1215 Administrative closure

CME/CHE credits are available for those who register and request the credits for the sessions attended.



OPENING REMARKS

MG Floyd Baker
Commanding General, Health Services Command
Fort Sam Houston, Texas

It is my pleasure to welcome you to the Fifth Users' Workshop on Combat Stress which is being co-sponsored by the US Army Health Care Studies and Clinical Investigation Activity, the US Army Soldier Support Center, and the US Army Office of the Surgeon General.

The Army Medical Department has the mission of conserving the Army's fighting strength. There are a number of ways in which this mission can be accomplished. These include: providing realistic training opportunities to develop skills, having knowledgeable health care providers and leaders, keeping all personnel informed, and using the best available supplies and equipment. Realistic training develops realistic expectations for how personnel may behave; combat troops need to be aware of what they need to do to survive on the battlefield. Health care providers need to engage in realistic training exercises, and practice the use of their skills during disaster and emergency situations. These types of experiences will prepare the health care provider for his or her role in combat.

Disaster situations affect more than those who are identifiable as victims; the trauma can affect the rescue workers and health service providers who become involved in the crisis situation. Until the 1970s, disaster researchers generally were not trained in mental health methods. Systematic efforts to provide organized mental health services after disasters began in the 1970s. Less attention has been paid to the providers of health services during disasters and emergency situations. The same is true about health service providers during and after combat. These personnel are at risk; some traumatic effects may be short term in duration, other factors will manifest long term effects. It is only recently that the dangers to health service providers have been recognized.

One of the objectives of this workshop is to sensitize AMEDD personnel and other Army organizations to their vulnerability during and after disasters. This will be done by examining the techniques available to protect them. With limited resources available, the Army Medical Department needs to protect its personnel assets and use them effectively. A second objective of the workshop is to examine outcome measures of performance in aviation, continuous and sustained operations, and laboratory settings, as they relate to stress management. A final objective is to discuss various options for organizing what Department of the Army elements are doing, and how these efforts might be better coordinated.

STRESSFUL EXPERIENCES IN CIVILIAN AND VETERAN POPULATIONS:
CONCEPTUALIZATION AND RESEARCH FINDINGS

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Today, I will use the time I have been allotted to focus on research findings from studies by my own group and by others that address the types of events and situations that have been shown to be stressful to veteran and civilian samples. I hope my own talk will serve as a helpful backdrop to the next two presentors, Doctors Dunning and Hartsough. Since they will be focusing on emergency workers and service providers, I will try to make a link between the work our group has done on veterans and survivors to implications for types of experiences that would be stressful to emergency workers.

My own training is in experimental psychology and my specialty area is clinical research. My interest in traumatic events and their psychological impact was somewhat serendipitous. It began with the University of Cincinnati Department of Psychiatry's involvement in a lawsuit on behalf of survivors of the Buffalo Creek, West Virginia, dam collapse and flood in 1972. The suit was in part for psychological damage in an event where 125 people died and the community was completely disrupted. Since that time I have been involved in four major research projects in this area and have served as principal investigator of the two most recent ones. The work I will report on is carried out under the auspices of the Traumatic Stress Study Center at the University of Cincinnati, of which I am Co-Director. My principal colleagues there are Dr. Jacob Lindy and Ms. Mary Grace. The most recent study is just underway: in previous studies we have interviewed 728 adult veterans or survivors, and reinterviewed (from six months to five years later) 238. Three studies were funded by the National Institute of Mental Health and one by the State of Ohio. The studies include three events: the Buffalo Creek flood just mentioned (our most recent grant is for a 14 year follow up), the Beverly Hills Supper Club fire, and the Vietnam war.

Our goals in the research have been to understand long-term reactions and responses to highly stressful events. Our major work has been done in the area of collective events (disaster, war) but we have also been involved in work with survivors of individual catastrophies (rape, mugging, individual accidents) and find the general assumptions, as well as some of the specific findings of our work on collective events to generalize to these situations as well.

Our work has been guided by a conceptive model of individual differences in the recovery process and in outcome in response to catastrophic events. In this model the stressor experience is the primary focus. Consonant with the DSM III diagnosis of post traumatic stress disorder, the stress symptoms are seen to be both an attempt to cope with an overwhelming stimulus or stressor, as well as, in the long-term, the adaptation to that stressor. That is, the intrusion, avoidance, and numbing phenomena observed following these events reflect attempts to process and understand or make sense of the event. Sometimes the survivor may be able to do this on his or her own and the

symptoms abate. Sometimes that may not be possible and the symptoms become chronic. They may also become more complicated over time. In our most recent study, we have shown a large overlap of chronic post traumatic stress disorder with other formal diagnoses, most particularly, in the Vietnam veterans, with major depression, phobic and panic disorders, and at times with substance abuse disorders. Before I go on to my main topic, I would like to make an important point. Our work has focused heavily on delineating stressor experiences that put people at high risk for long-term psychological problems, and on delineating the nature of the long-term response. However, we also view a variety of additional factors as having an impact on how an event is appraised, how it is processed, and on the long-term outcome. The recovery process itself is an individual matter. Survivors have some common issues and difficulties in "working through" a traumatic event, and certain events are more likely to need "working through." Those of you who work with veterans and survivors know what these commonalities are. On the other hand, the meaning that gets assigned to a particular event by an individual, the way he or she integrates the experience into their life, the time it takes to do that, and the exact nature of the long-term adaptation are very personal and are dependent upon the person's history, ongoing circumstances, and probably their developmental level at the time of the event, in addition to their experience of the event.

We have identified a number of factors that influence this recovery process and have attempted, more and more as we go along, to measure these variables and examine empirically the role they play in long-term adaptation. In general, they can be seen as falling into two major categories--aspects of the individual, and aspects of the recovery environment. Individual characteristics include vulnerability based on prior traumatic experiences, pre-trauma personality, coping and defensive style, and ability to draw upon personal and environmental resources to help in the recovery process. Environmental characteristics include available social and personal support systems, including family attitudes and functioning disruption of day-to-day life caused by the event, additional environmental stressors that occur subsequently, social and cultural attitudes about the event itself (e.g., how the Vietnam war was viewed) and social and cultural attitudes about the role of the person experiencing the event (e.g., "emergency workers are weak if they have stress reactions").

While all of these factors likely have an impact, we have not been able to take all of them into account in the context of our research on individuals. For example, societal attitudes about the Vietnam war undoubtedly influenced Vietnam veterans' recovery both in terms of available support and in their impact on how the veteran was able to understand, integrate and assign personal meaning to the event (e.g., views about personal responsibility for actions).

However, this general recovery environment is one that affected all veterans to some extent, and while it may have played quite an important role in recovery, we are unable to determine its individual impact since it doesn't differ much from one veteran to another.

For those factors and variables we have been able to measure, our findings are quite consistent with those of other investigators:

1) The stressor experiences themselves are the primary determinants of long-term (1-15 years) stress-related symptoms and diagnoses.

2) Other variables such as pre-trauma adjustment, events or personality play a small but detectable role in long-term outcome. Some studies have found significant predictions from these variables while others have not, probably indicating only a modest role of such factors in the development of the stress response.

3) Social support variables consistently contribute to more positive outcomes within different levels of stress, so that for people who have had equivalent stressors, those with more support do better than those with less support.

To reiterate, we presently view the stressors themselves as the primary determinants of long-term outcome, with other individual and environmental factors influencing how these stressors are viewed and the recovery process itself. We continue to focus more on these mediating variables, since once a person has experienced a highly stressful event, we as mental health professionals, can only have an impact on the recovery phase. Thus, it is important to continue to explore, for example, what kinds of coping strategies are most effective at what points in time, and how people who have recovered used their support systems in that process. Findings in these areas should help us develop both intervention strategies and educational efforts. Reductions of stressors in the first place should also be explored. It is possible that we may be able to influence what people are exposed to in certain cases.

I would now like to turn, for the remainder of the talk, to the types of experiences that individuals seem to find most troublesome to deal with psychologically, i.e., those that put them at greatest risk for long-term problems. Not everyone in a disaster or traumatic experience develops long-term problems. Not even a majority of people necessarily do; it depends upon the nature of the event. However, our research group and a number of others have consistently shown that the risk for long-term problems increases with exposure to certain types of events.

In thinking about what we call disasters or traumatic events, a general conceptual question that arises is "what makes an event stressful or catastrophic?" Such events are quite different, one from another. When faced with the task of describing the stressor event, each one seems to be idiosyncratic, a particular combination of circumstances that came together in a particular way to constitute what we later call a disaster or a traumatic event. However, there are certain common elements to these events that can be considered generic and that may be present across a variety of circumstances. For the individual survivor, these elements combine to make up the entire experience for that person. In a collective event, these elements vary a great deal from person to person. At the Beverly Hills Supper Club fire, for example, some people had plenty of warning about the fire because of their geographic location in the building. Thus, some people left the building; went back in and retrieved something and got out safely again. At the other extreme, we had one person who was literally thrown over a pile of bodies by a

spouse who died in the fire along with 164 others, and another person who was dragged out and temporarily left for dead with a stack of bodies. Not surprisingly, the long-term adjustment of these individuals was quite different, and easily linked to the differences in their experiences.

Even before we had studied more than one event, we were looking for aspects of events that might describe individual experiences and also might generalize across events. We have continued to examine these aspects across events for their impact. The first variable is loss. At Buffalo Creek, loss was scaled and included possessions, pets, friends and family members. At Beverly Hills loss was defined in terms of the closeness of the relationship to the lost person. In the Vietnam study, soldiers indicated whether they had lost a buddy in combat. In all cases, more loss was significantly associated with more stress-related symptoms at the time of the interview (1-15 years post trauma). Life threat has also been consistently associated with outcome. Life threat at Buffalo Creek and Beverly Hills was defined as degree of warning combined with extent of contact with the water/fire in the context of escape. In Vietnam, it was defined in terms of level of exposure to general combat conditions (e.g., firing weapons, seeing dead and wounded, living in danger of being killed). Again, exposure to these experiences was associated with stress symptoms and/or a PTSD diagnosis. Extent of injury during the course of the experience has also been consistently associated with outcome. Needless to say, these aspects of events tended to be related to each other. People who have had high life threat are more likely to have lost someone, or to have been injured. Knowing about all three dimensions, however, has allowed better prediction of long-term functioning than any one of them alone.

While we were not looking for it initially, we were struck by a certain type of experience that we later labeled exposure to the grotesque. At Buffalo Creek this was exposure to the swollen, blackened bodies of the dead flood victims. At Beverly Hills it was exposure to people who had suffocated to death or to charred remains. In the Vietnam study, exposure to mutilated bodies of fellow soldiers or the enemy defined this variable. Again, we found that those who had these kinds of experiences were psychologically more impaired at follow up than those who didn't. Interestingly, in the Beverly Hills study, while loss and life threat became less predictive over time (i.e., at two years there was a weaker association to outcome than at one year), exposure to the grotesque predicted problems later rather than earlier. Specifically, it predicted increased substance abuse at two years, but none of the symptoms at one year. In the Vietnam Study, the association of exposure to the grotesque with later functioning also was evidenced in increased substance abuse. It was the only stressor variable in that study to predict a diagnosis of alcohol abuse to any significant extent. Thus, differential impact, and perhaps, delayed impact of certain experiences are suggested by these findings.

Although not an aspect of every catastrophic event, the extent of disruption of one's surroundings or day-to-day activities also play a role in long-term outcome. At Buffalo Creek, extent of displacement from the original homesite predicted two year impairment for women and young adults, although not for men and children. In Vietnam, unit turnover, lack of command, and number of units served in added to the outcome prediction.

In Vietnam, of course, the war for any given soldier was not really an event that could be easily categorized along a few dimensions. It was a series of events that had a whole variety of dimensions. While much of what happened to soldiers was beyond their control, there sometimes was a choice about what activities a person would engage in. Experiences happened on the job in the line of duty. People were trained, and at some level prepared for some of the experiences they had, although it is clear there are some experiences that are impossible to prepare for. Most veterans enlisted in the service, although some only when they were sure they would be drafted. This series of conditions made the Vietnam war a quite different situation than the disasters we had previously studied. Precisely for that reason the similarities to our earlier studies were quite striking. However, there were some additional experiences, like causing the death of others, that weren't really present in the other situations. We felt we needed to address these as well.

As we examined our findings on the war experiences in the Vietnam study we wondered whether there were some experiences that were associated with continued presence of symptoms of PTSD, as opposed to having recovered or as opposed to never having such symptoms. Our earlier work showed differential impact of certain experiences over time, i.e., loss and life threat were more associated with one year stress symptoms, while exposure to the grotesque was more predictive of symptoms (particularly substance abuse) at two years. We decided to examine which experiences differentiated those veterans in our sample who never developed PTSD (N = 112) from those who did develop it but had recovered in previous years (N = 28) and those who continued to have a current diagnosis (N = 60). The percentages of the sample in these three groups were: never had (56%), recovered (14%), and current PTSD (30%). The sample was recruited from a wide variety of referral sources including Vet centers, industry, police and fire departments, National Guard, and the university. There were, indeed differences among these three groups by type of experience. In summary, the significant findings in our study showed that the person who developed PTSD, compared to the person who didn't, saw more combat, was more likely to have been injured, to have lost a buddy in combat, was exposed directly or indirectly to more hurting and killing of Vietnamese and reported less military support in terms of things such as inadequate briefings, being endangered by our own side, and being in situations where no one was clearly in command.

Within the PTSD group, those soldiers who continued to have PTSD, compared to those who recovered, reported even higher levels of combat, less military support, were more likely to have participated in special assignment activities behind enemy lines where threat of capture was high, and to have had more exposure to grotesque death. These associations are relatively strong, i.e., considered in correlation form, correlations range in the .30s and .40s for the experiences separately, with multiple Rs in the .50s, explaining over a quarter of the present PTSD symptom picture, a notable accomplishment for experiences which happened 10-15 years earlier.

These findings, by the way, are quite consistent with those from other study groups. Specifically, Foy and his colleagues in Los Angeles showed the highest role of PTSD diagnosis for people who had been responsible for the death of enemy, both civilians and military, and who were wounded in combat.

Special assignment and exposure to the grotesque were not measured in that study. Laufer and his colleagues in New York have shown increased risk for PTSD and also for alcohol abuse with exposure to or participation in "abusive violence." In his samples, participation was more highly associated with numbing and depression symptoms.

These types of findings tell us about risk for PTSD, but may also point to aspects of traumatic events that will need to be addressed in therapy or counselling. People who have continuing symptoms long after an event are likely to have had the types of experiences described above, or similar ones, whether those experiences are reported initially or not.

Although we have not done research on emergency workers in any formal way, we felt that our work with survivors and particularly with veterans, who had a more active role in their experience, received their stress in the line of duty and who had continued exposure over time, would suggest some experiences that were likely to be stressful for emergency workers, as well. I will go over these briefly because it would seem to provide a nice bridge to the two talks coming up next, which focus more on stress in the line of duty, and the particular problems of different types of emergency workers. I will only address what we would consider traumatic stressors, as I have been describing, or what Don Hartsough would call "event stressors." There are also a group of stressors that arise as part of the job one is performing that can be considered organizational stressors. They are less extraordinary but can also be problematic, both independently and as an aspect of a recovery environment for the worker. I believe Dr. Hartsough intends to cover those in his presentation.

Going back to some of the aspects of events shown to be predictive of long-term outcome in survivors and veterans, the following experiences are proposed as potential sources of stress for emergency workers.

In the area of loss/death, unexpected deaths that occur during the course of duty are likely to be a source of stress. These could take the form of:

- a) Loss of a victim during a rescue operation
- b) Causing the death of another in the line of duty
- c) Loss of a co-worker, especially in the line of duty, and most particularly, a teammate or partner
- d) Loss of civilians or spectators during an emergency operation
- e) Multiple losses of victims

In the area of life threat there is:

- a) Unexpected threats and close brushes with death, including capture or threat of capture
- b) Injury

c) Exposure to toxic substances or nuclear materials--while I haven't discussed this because we haven't studied a disaster like Times Beach or Three Mile Island, the research in this area, for example, that by Bawn and his colleagues, is showing some long-term psychological and physiological effects of the uncertainty associated with such exposure.

Exposure to the grotesque, unfortunately, is not an uncommon aspect of emergency work in many occupations. Mass disasters such as Jonestown, Guyana, the Kansas City Skywalk collapse, and mid-air collisions provide such exposure on a large scale. Personnel exposed on a more individual level, however, such as ambulance drivers, police on the scene at auto accidents, and medical personnel in emergency rooms, are also at risk.

I would also like to make explicit a point that has been implicit throughout this talk, the notion of additive or cumulative aspects of stressful experiences. I have focused primarily on the different types of stressors that predict long-term functioning. But I have also noted that experiences tend to be interrelated and they are, to some extent additive, i.e., the response to the combined aspects of an event as experienced by the individual is more than the response to the worst aspect. More is worse, i.e., losing someone close is worse than losing someone not so close; frequent exposure to certain stressors is worse than infrequent exposure. This implies that repeated exposure to certain types of events is probably more problematic than one time exposure. Thus, in intervention programs, we need to keep in mind not only the types of experiences people have, but how many different ones they have had together and how often these have occurred.

There are still a lot of questions to be answered in this area. Some of them are difficult to address in samples of survivors and veterans who are so removed in time from the original traumatic event(s). The recovery process begins probably while the person is experiencing the event. More studies are needed that examine survivors relatively early in the response to such events and follow them over extended periods of time. Reconstructing some variables retrospectively, particularly with some of the individual and environmental characteristics I mentioned earlier, is problematic, yet these are some of the factors that may prove to be most helpful in our understanding of the recovery process and thus in designing effective interventions. We would urge more longitudinal research of this type on varieties of populations. We would also urge more attempts to pull together and integrate findings on various groups, such as war veterans, disaster victims, emergency workers, crime victims, since there are a lot of similarities. The similarities and differences among these groups should help us develop a more complex and subtle understanding of responses to traumatic events.

THE BURDEN OF DUTY AND PSYCHOSOCIAL TRAUMA RESULTING FROM LIFE THREATENING AND EXTINGUISHING EVENTS

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The nature of protective service work and its inherent responsibilities places a variety of physical and psychological demands on those whose occupation requires a response to traumatic situations based on duty. Occupational stress research, which has sought to explain the high incidence of mental and physical illness as well as maladaptive changes in lifestyle among those whose employment duty places them in catastrophic, sometimes life threatening situations, has indicated that manifestations have come to be an accepted, even desirable condition of employment. The acceptance of the negative aspects of trauma-induced reactions with a corresponding assumption of employer accountability for their occurrence is a recent phenomena. Greater understanding of the deleterious consequences of duty-related stress and occupationally-accepted coping techniques has led to questioning the responsibility of the employer to intervene and prevent such trauma reaction.

The acceptance of employment generally brings, with the benefits that are derived, the obligation to perform certain tasks as assigned. These work demands, encompassing not only tasks but the circumstances in which they are carried out, are binding upon the employee to the extent to which they choose to accept the dictates of the employer. Given the manner in which employer-employee relations have historically developed, such obligations are open to negotiation and compromise. The employee may question and challenge directives and circumstances surrounding the task to be done. The ultimate rejection of task assignment could be resignation from employment. There are occupations, however, in which assigned tasks are referred to and perceived as a duty.

The word duty, as opposed to responsibility, brings with it the implication that what is being requested is not open for discussion due to the unique difference of the obligation of the employee to perform. We refer to most occupational tasks as job requirements or as being in the job description. Certain occupations, however, have traditionally used the word duty to describe the types of assignments that the worker is expected to perform. "Duty" refers to an obligation, task, or line of action or conduct, that is seen as being imposed by law, custom, morality, and conscience. The task is generally attached to a post or office and is perceived as bound to be performed by the holder. Most occupations would state that it is the "job" of the employee to do a related task. Certain occupations refer to the "duty" to perform. Examples of such "duty"-driven employees would be nurses, doctors, police officers, fire fighters, and soldiers. The subtle difference in perception of duty vs. job brings with it the understanding that the demands of the job do not allow negotiation, compromise, question, or rejection of task on the part of the employee. Duty-driven employees accept tasks (orders) as given, without challenge or avoidance. Such occupations that appear to rely on duty for compliance usually involve the performance of tasks which are seen to be substantially different from the ordinary demands of work in that they involve

tasks and situations that are difficult and unpleasant.

The one unpleasant task that duty-driven employment seems to have in common is the risk of, and exposure to, death. (Lidz, 1946; Krystal, 1968) While such risk is variable between and within each of these occupations, it is identified as an integral part of the occupational experience. Certainly death is one life experience that most people tend to avoid. Our discomfort with contact with death is further confounded with great fear of death of ourselves. The acceptance of occupational tasks that expose the employee not only to the observation of death, but actual risk of personal safety, requires greater commitment on the part of that employee than in those who accept other employment. What seems to set occupations apart in relation to just being a "job" to that of assuming a "duty" are work demands involving life threatening and life extinguishing events. Since such events are over and above normal human experience one might assume that those who place themselves, by virtue of employment, in situations that risk contact with death either suffer trauma as a consequence or possess certain characteristics not normally found in others, that protect them from any negative impact that might result.

Considering the significance of death to the work demands of duty employment, it is surprising how little attention has been afforded it in the research literature. In most instances, its occurrence has been treated as if the event of death happens by chance, "out of the blue." Shootings, mass casualty events such as disasters, and violence imposing threat of death are seen as unusual and unique situations with no carryover between each circumstance. The research on the confrontation of death itself is controversial. Little empirical data exists that links death experience with occupational duty. Of concern are the level of potential threat, the immediacy of the event, the perception and sensitivity of the employee, and their level of commitment to life.

Research in police stress in the recent decade indicates that police work is a high-stress occupation which may have long-term consequences for the individual police officer (Richard and Fell, 1975; Dash and Reiser, 1978; Kroes and Hurrell, 1974) and the police department (Dunning, 1982). The nature of police work and its inherent responsibilities places a variety of physical and psychological demands on the law enforcement officer. As a result, rates of cardiovascular disease, gastrointestinal disorders, metabolic imbalance, alcoholism, misuse of prescription drugs, divorce, and suicide have been found to be higher in those performing the occupation of police officer than in the general population. It has been pointed out in studies conducted by the National Institute of Occupational Safety and Health that the occupation of police officer is a definite risk population for these diseases of adaptation (Kroes, 1976). Blackmore (1978) reported that the NIOSH study of 20,000 officers in 29 police departments found that 36% of the respondents reported serious health problems, 23% had serious alcohol problems, 37% reported serious marital problems, and 10% problems with drugs. In addition, police divorce rates are nearly twice as high as other occupation groups and preliminary findings indicate that their suicide rates are an estimated two to six times the national average (Kroes, 1976; Lester, 1978; Dash and Reiser, 1978; Blackmore, 1978).

There is a need for more research that focuses upon the law enforcement officer and the high incidence of mental and physical

illness found among police officers from among a variety of potential sources. The cultural demands of the profession (including late shift work, erratic work schedules, eating practices, drinking and smoking habits), work demands (lifting, running, inactivity), and societal pressure (alienation, rejection, ridicule, abuse) have all been examined. Authors such as Eisenberg (1975) have suggested that components of the organization itself and the environment it projects adds to the stress police officers experience. Police work appears to be stressful, leading to symptoms of unspecified origin. No one stressor has been identified as being unique to law enforcement, which would account for the high levels of maladaptation. What is known, however, is that police officers, by virtue of their occupation, are vulnerable to, if not injured by, stress as the result of their employ. Whether the symptoms of stress surface early or late in the career of the police officer, whether they can be linked to a particular situation or set of circumstances, or whether they can be predicted has not been determined by the research. It would seem difficult to substantiate a direct link between any given stressful event or set of stressors and a specific stress response in the individual. Short of constantly monitoring the physiological response to stressors in the police officer, the researcher could not hope to quantify the incidence of stress or its harmful impact. One can only depend on the qualitative measure of stress - that of the election of events or factors identified by the person suffering the experience. Stress characteristically generally remains unidentified by the sufferer until some manifestation results. Only then might the police officer attempt to link its occurrence with what is currently happening. Many times, however, given the pervasive and constant nature of police occupational stress, no one obvious trigger may be identified.

One aspect of the police occupation as reported by the officers, though, does seem to be common - that of fear of physical violence, injury, and death (Singleton and Teahan, 1978) occasioned by the law enforcement aspect of the police task. That condition does seem to limit itself only to that which is experienced personally by the officer. While fear and danger are often mentioned as contributing to levels of stress in police officers, the impact of the experience of death that an officer encounters in the course of carrying out occupational duties has been largely unexamined. Generally, an individual experiences the development of characteristic symptoms in reaction to stress following a psychologically traumatic event that is outside the range of usual human experience. It is possible that the traumatic syndrome is due to different conditions or factors which limit or burden beyond endurance the capacity of the individual for adjustment, thus provoking mobilization of defensive functions. The traumatic syndrome is not a disease entity in of itself, according to Warnes (1972), but may be superimposed on a previously existing personality problem or illness. Such a situation could occur in the police officer when faced with death. Warnes (1972) states that conditions which threaten survival vary in degree with a threat to life and self-esteem being the most severe. Despite the belief of the television-educated public, the average police officer's experience with death is limited. The prevailing attitude of the public is that the police officer as a professional is trained to deal with death. Such an attitude disregards the fact that no training can prepare someone for its experience, except the event itself. The research that does exist suggests that the police, among other professions, do not become immune to the negative or distasteful responsibilities of their occupation (Reiser, 1974).

That a shooting event might produce trauma in an individual would seem plausible. Officers are routinely trained in the use of firearms in anticipation of circumstances in which they would be required to use deadly force. Though officers are trained to explore every alternative possible before using their firearms, the number of officer-involved shootings appears to be on the rise. Yet the emphasis placed on the decision to shoot and the mechanics of the action far outweigh the necessity for the skill in the performance of police duties. Each year approximately 100 law enforcement officers are killed in the line of duty. In 1981, police officers killed 383 suspects. Fewer than 5,000 ever draw their service weapon in that time. In fact, the majority of police officers will never unholster their weapon in their entire career. While other occupations share the same risk as police officers of injury or death on the job (such as that of equipment injury to a foundry worker or traffic accident to a truck driver), no other method of risk involves the participation of the worker in the dangerous event or is based on the willful act of another. The experience of soldiers in combat is somewhat comparable. However, such factors as the proximity of the assailant (difference in battle techniques as combat soldier in World War II, the Korean War, and Vietnam), the ability to characterize the opponent (the ability of sniper to see face), and the singular intent (directed at that one officer) of the suspect to injure or kill the officer differ from that of the relative distance and anonymity of the war experience. While an assailant's history and desperation may bolster the decision to shoot, a host of constraints are likely to influence the police officer that do not inhibit the decision of the soldier. An officer is usually influenced by more compelling psychological considerations that inhibit instant, impulsive action. To shoot in law enforcement is not necessarily honorable. In combat, shooting is honorable as it is in defense of country against a "worthy opponent", one who has already been labeled "the enemy." The officer must evaluate whether the circumstances legally justify the use of deadly force and whether innocent bystanders might be harmed. Concern that the decision to shoot conforms to departmental policy on the use of deadly force, the judgment of a shooting review board, or will result in civil or criminal suit also influences the officer. Frequently, officers report feeling that the suspect involved in a shooting incident is at the disadvantage, having inferior weaponry and training.

Typically, weapons training focuses upon the mechanics of the shooting situation, usually placing the officer twenty-five yards away from a full-torso silhouette in which thirty seconds are allowed to fire twelve rounds. Yet most police shootings occur within two to five feet of the opponent (with the shooting encounter lasting only 2 to 3 seconds) in which the two or more participants together are only likely to fire a total of 3 rounds. Training not only does not begin to mimic real-life situations, it also does not prepare the officer psychologically for the impact of the shooting incident.

The study of individuals who have endured acute threat to survival has received attention for several decades. Consistent with normal operating procedure, law enforcement generally has not translated what is known in other fields to similar situations in policing. Such is the case with the experience of trauma. It has been suggested that in a shooting incident, the stress experienced by the police officer is internalized to avoid the immediate pain. It is this internalization of stress that has led some to suggest that a delayed stress reaction known as Post-shooting trauma disorder commonly results

(Roberts, 1975; Carson, 1982; Adams, et. al., 1979). According to the Diagnostic and Statistical Manual of Mental Disorder III (1983), post traumatic stress disorder can result in the development of characteristic symptoms following a psychologically traumatic event such as a shooting that is generally outside the range of usual human experience. Anecdotal reports by practitioners providing psychological support services to police officers have supported the finding of these symptoms subsequent to a shooting event.

1. Recurrent and intrusive recollection of the event.

Referred to as the "afterburn" of shooting (Adams, et. al., 1979), officers report a tendency to dwell on the unpleasant emotion-charged events in the wake of their shooting experience. Officers report reliving and reenacting the event, dwelling on what the officer and others did or should have done differently. Nielson (1981), in a study of 63 officers who had shot a suspect found that 58.7% reported thought intrusion in the week following the shooting. Adams, et. al. (1979) reports that a common reaction to a shooting incident is the experience of nightmares or repeated awakenings in inexplicable panic. Carson (1982) found that flashbacks were frequent, prompted by calls with similar cues to the shooting or were set off by television programming. Typically, these intrusive thoughts focused on the police officer attempting to second-guess the shooting, dwelling on a string of "if only's." Nowhere has this phenomenon been more graphically portrayed than in Joseph Wambaush's THE UNION FIELD (1973) in which Karl Hettinger is described as being unable to escape obsessive ideas about the death of his partner. This ruminative behavior and compulsive need to retell the events of the shooting appear to be a common reaction among police officers. The killing experience seems to haunt and hold what has been characterized as a strange and obscene fascination.

In addition, symptoms of trauma, especially PTSD, are seen as desirable, even valued as a skill necessary to perform the police task. Recurrent or intrusive recollections are valued as "war stories" and are frequently elicited. They are seen as a training aid - ("I can learn from experiences of others and maybe save my hide"). Recollections are viewed as a mechanism for keeping the officer "on his toes" - to never let the guard down as look what may happen again. Flashbacks are seen as a mechanism to "prompt" the officer to greater attention to what is happening, to give current events or situations more importance or greater scrutiny. There is an encouragement of "what ifs" as a training aid, almost a planning exercise. Unlike the military who act in groups, officers generally are on their own - they are their own boss, support, decision maker, and initiator and are therefore personally responsible for the event.

2. Numbing of responsiveness to or reduced involvement with the external world.

The information that is available regarding this criterion is often reported by the spouse or significant others in the officer's life. The officer does not come home at the end of a shift, preferring to be alone or as noted above, be with someone talking, discussing, or remembering the events of the shooting. The family experiences the absence or withdrawal of the spouse and parent. They report that the officer is less demonstrative, less interested in family activities or personal hobbies. Things from which they

used to derive a great deal of pleasure are no longer appealing to them.

It is not unusual for the officer involved in a shooting episode to want to be by themselves a great deal of the time. Sometimes they explain that they do not want to "burden others with their problems". They also report feeling that those who have not lived through similar experiences cannot in reality understand what is all about. Because they feel no one understands them, they want to spend time by themselves walking, fishing, or just being in a room or car alone. Their children often complain of parental coldness and disinterest.

It is not uncommon for a police officer to report reduced libido after a shooting incident (Roberts, 1975). They may not want to hold or embrace a spouse, loved one, or child. They develop a sense of emotional detachment from significant people, behaviors, or situations because they believe that if they place a great deal of importance on them and they were to be taken away, then they would experience a greater pain and sense of loss. They try to prepare their family for the possibility of their loss through withdrawal.

Singleton and Teahan (1978) in their study of officers' stress levels and the experience of recent physically threatening encounters on the job found significant manifestation of stress. The findings indicated that officers involved in either shootings or physical encounters with citizens differed from officers who had a relatively uneventful previous year on scales of hostility, paranoia, interpersonal sensitivity, and the self-report of conflict at home with spouses and friends. Interpersonal sensitivity, according to the researchers, was reflected in statements dealing with self-consciousness, discomfort, and negative expectations in social interactions. The officers who experienced at least one job-related injury in the past year expressed critical feelings toward others as unfriendly. Lippert and Ferrara (1981) reported that police officers who take a human life in the performance of their duty experience strong feelings of guilt, anger, immobilization, and denial.

Police officers are by virtue of their occupation the "walking injured." They have generally been involved in previous traumatic incidents. Because of this it is not always possible to recognize one particular discernible incident as the identifiable or recognizable stressor that precipitates trauma (PTSD) as required for diagnosis in DSM-III. Occupationally, there is a denial of shootings and other life threatening and extinguishing events as being traumatic. In addition, traumatic events are likely to reoccur (traffic accident, suicide, murder, other shootings). Unlike the veteran who has left combat and the military, the police officer faces the likelihood of experiencing the same precipitating event the next day or year. To admit to the traumatic nature of the event and its consequences jeopardizes the officer. Any indication of affected functioning or reaction that is negative affects the officer's reputation in that his or her ability for back-up protection is brought into question. Expressions of fear or adverse effect can result in exclusion from promotion or choice assignment or potentially even loss of job. There is a perception of trauma as being a normal part of the job. Officers and the public feel that "if you can't take the heat, get out of the kitchen." Officers are viewed as voluntary victims, not innocent, who chose the risk involved. The perception of both is that the officer has already received compensation up front for future trauma, in the form of high salary (\$24,010).

There is also support and encouragement for being detached, "cool", and unemotional in contact with people. There is reinforcement of the "reserve" attitude, the Joe Friday demeanor. Officers are admonished against sharing information (hence feelings) about department happenings. Peer support requires withdrawal from all but fellow officers, through language (jargon), planned or acceptable leisure activities, and contact (acceptable locations such as cop bars). Officers generally accept the breakdown of close personal relationships. Divorce recruitment is common in police departments. There is a discouragement from developing friendships outside the circle of blue. Officers emphasize that the only other person you can trust is another cop. Withdrawal from social contact is seen as the norm ("I am with people with problems making insoluble demands on me all day").

A common complaint of citizenry is the depersonalization often found in police officers. The use of derogatory terms to classify people, objectification of humans (relating to people as objects), and insulting humor are common. Officers become increasingly more emotionally detached and hardened in their values during the first 18 months of the job. The development of this emotional insulation is seen as being part of the "coming of age" of recruit officers.

3. Physical Symptoms.

Shooting incidents involving police officers have led to reports of hyperalertness or exaggerated startle response which is seen as desirable to being attentive to demands of duty. Officers frequently report episodes of perceptual distortion occurring during the traumatic event, generally experiencing the event in slow motion. Tunnel vision, auditory blocking, and extreme agitation or anxiety are frequently reported as being experienced during and subsequent to the shooting incident. Sleep disturbances are the usual condition of law enforcement due to shift work, demands of overtime, special assignments, court appearances, etc. Nielson (1981) found that 27% of officers in a shooting incident report subsequent sleep disturbance. The guilt officers experience is also seen as a required behavior for survival. It is that drop of humanity/sensitivity that the public wants to see in its police officers. "Yes, we want you to pull the trigger and comfort the dead's family." Officers report imploring "Don't die, Don't die", attending the funeral of the slain suspect, and frantically requesting to serve as a pallbearer for other slain officers. Memory impairment and trouble concentrating are obviously not desirable, but in an occupation with a high reliance on a notebook -even if the note is your partner's name - it is not seen as unusual, but rather indicative of a highly active officer. Nielsen (1981) reported that 22.2% of the officers in his sample reported inability to focus their thoughts. Avoidance of activities that arouse recollection of the event is generally evidenced in hanging back on calls that are similar to the original trauma. Confrontational behavior is more common, where the officer seeks out similar circumstances although he or she may not function appropriately or effectively in the situation.

As in PTSD, there is often an intensification of physical symptoms, especially those that are viewed as manly, such as back pain, gastro-intestinal upsets, and cardio-vascular disorders. General irritability is seen as part of the police personality, the irascible street cop who endures the privations of

the job (cold, hunger, heat, exhaustion, etc.). Displaced aggression against noninvolved persons is seen as somewhat unacceptable but understandable. All these conditions have been anecdotally reported to occur to police officers after they were involved in a shooting incident.

CONCLUSION

The nature of police work and its inherent responsibilities including the duty to participate in activities that threaten death places a variety of physical and psychological demands on the officer. The acceptance of the negative aspects of job-related trauma is a relatively new phenomenon, especially among employers who have viewed the required tasks associated with those in their employ as a duty. The corresponding assumption of greater employer accountability through the vehicle of disability pensions claims and affected job performance that places the organization in a position of liability requires more than the determination of the response of police officers to job-related traumatic events. This suggests the need to examine the characteristics of events that occur prior to the manifestation of Post-traumatic stress disorder in order to intervene in the process in which the traumatic event affects the worker. An understanding of the nature of the traumatic incident, specifically an event involving death, will assist in determining the precipitation of physical, psychological, and behavioral changes in police officers. The symptoms of Post-traumatic stress disorder which involve a variety of autonomic, dysphonic, and/or cognitive manifestations has not been systematically examined in police officers. Existing immediate observation of the link between the occurrence of stress-related symptoms and a shooting event points to the need to develop empirical data to document this reaction, measure its severity, and determine its debilitating consequences.

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COPING WITH STRESS AS A MILITARY HEALTH SERVICE PROVIDER

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For many years the experiences of combat survivors have enriched the literature on civilian disasters. It was through treatment of World War II and Korean veterans that we began to discover the major situational component of traumatic reactions, and to abandon the notion that they represented pretrauma personality problems. The official designation of a Post-Traumatic Stress Disorder has been the culmination of this progress. This conference represents an opportunity to reverse the process--to contribute information and experience from the civilian experience toward solving problems in military service.

This presentation is divided into two parts. The first is an examination of three sources of stress in disaster workers, such as firefighters, police, emergency medical and nursing personnel, morticians, divers, clergy, and the professional and volunteer staff of disaster rescue and relief agencies. The second part looks at ways that stress in disaster workers can be prevented or coped with. My hope is that what we are learning about stress that originates in civilian disasters can be useful to military health service providers.

SOURCES OF STRESS IN CIVILIAN DISASTER WORKERS

In a study that I conducted for the Center for Mental Health Studies of Emergencies of NIMH, I identified three general types of stressors that have an impact on disaster workers--those related to their occupation, those related to the events they encounter, and those originating in the organizations that hire and sponsor them (Hartsough & Myers, 1985).

Occupational stressors

Any occupation with a hazardous working environment, deadlines and time pressures, or heavy work loads is inherently stressful. Disaster work at times combines all three, as in the Hyatt Skywalk collapse in Kansas City in 1981. Providing medical and mental health support services to combat soldiers would seem to contain these same stressors, especially at or near the front, or in a hostile country where one may never really feel safe. Occupational stressors are those that are inherently part of the job (although not usually part of the job description!).

One of the most prevalent stressors that I found in civilian disaster workers was not imposed on them by their jobs, but was one they imposed on themselves in relation to their work. Many disaster workers are highly invested in experiencing successful missions, especially the saving of lives, and this is a powerful motivation for engaging in their professions. They invest time, energy and intellect into preparing for these situations. The result is a highly motivated, competent worker with very high expectations for success, and little tolerance for human error or what we called "mission failure." When things go wrong, when even their best effort falls short,

these workers tend to become very frustrated and stressed. I think this is the type of stress we can reduce. Put simply, the error here is not in wanting to do a good job, the error is in not making the distinction between a successful effort and a successful outcome. Successful efforts are what disaster workers prepare themselves for, but they come to expect successful outcomes, and of course, these don't always happen. The result is unnecessary occupational stress.

Event stressors

Event stressors refer to the qualities of the incidents involving workers that are associated with different types of stress or different levels of stress. For example, springtime riverine flooding usually produces lower levels of traumatic stress than a jet airlines crash, such as the Delta 191 crash in Dallas. This seems intuitively correct, but why is this so? One of the obviously potent event stressors has to do with the number of casualties and the condition of bodies, in short, "guts and gore." The higher the death toll, the more gruesome the disaster scene, the greater the potential for stress in workers. This is especially true if the worker has extended duty without relief in body recovery, in the morgue, or in a rescue attempt that is not successful. Thus, a major event stressor is confrontation with evidence of destruction and trauma and death.

A second event stressor is personal loss or injury to the worker himself or herself. For example, firefighters in the Kansas City Skywalk collapse remember being acutely disturbed when they learned that one of the hotel's victims was one of their off-duty commanders who was attending the "tea dance" that Friday afternoon. Such a loss leaves personnel feeling vulnerable, a dangerous emotion when trying to cope with disaster.

A third type of event stress is related to the so-called "just world" hypothesis. The just world hypothesis says that people basically believe that we get what we deserve in life, and we deserve what we get. That is, to oversimplify, bad things happen to bad people and good things happen to good people. If you are victimized by some tragedy, this belief says, then you must have done something to deserve your fate. I think that workers use the idea that the world is just as one means of coping with the tragedy they witness. For example, I've heard a firefighter say he couldn't get too upset over the death of someone who got drunk and set fire to his sofa from smoking cigarettes. The stress occurs when it is difficult or impossible to use the "just world" defense, such as when the innocence of the victim is apparent by circumstances or the victim's age. It is stressful for disaster workers to participate in an incident where children have died, for example. I'm not sure how this translates to a military setting. Perhaps it is more stressful to cope with serious injuries and deaths of young soldiers who were drafted than others. I should emphasize that all this is speculative, and that we are just now beginning research on this type of event stressor.

Organizational stressors

It may seem paradoxical to describe the worker's own organization as a significant source of stress in disasters. Indeed, the organization ought to be (and often is) a most important source of support! In times of the stress

of disaster--or combat--the usual tolerance for miscommunication and misperception is markedly diminished, and even a trivial problem in worker-organization relationships can be very successful. What kinds of organizational problems produce worker stress? I'm sure there are many, but in the monograph I did for NIMH, I identified five: organizational conflict, low rewards, role conflict, role ambiguity and role discomfort. I will comment on each briefly. Before I do, however, let me emphasize the importance of organizational stressors--these can be very debilitating to an already fatigued and traumatized person. The feeling sometimes expressed is, "Even my own outfit is against me!" and that's very demoralizing.

Organizational conflict is a natural consequence of change and growth within organizations, and also occurs when different units who must work together have different goals, procedures or priorities. Unfortunately, the pressures of working in a disaster will often heighten organizational conflicts. For example, when the Internal Affairs Division of a major metropolitan Police Department was assigned to a salvage and recovery operation, this was resented by frontline policemen. They thought this unusual assignment showed a lack of trust in their professionalism by the commanding officers.

Low rewards refer to prestige and respect in addition to pay. I have found disaster workers more sensitive to the lack of respect, for example, by the media, than to their characteristically low pay.

Role conflict occurs when the same person finds that two or more roles are making competing demands. For example, disaster workers who have homes and families seriously disrupted by the disaster agent will feel a tremendous pressure to care for their loved ones. At one time it was thought that role conflict in disaster workers (nurses, physicians, utility linemen) would seriously hamper rescue and relief efforts. Fortunately, this has proved to be untrue--workers with designated responsibilities are very faithful to their duties. However, it is true that the concern about families is stressful. The bottom line is that serious and continuing role conflict is debilitating and can seriously undermine performance.

Role ambiguity refers to confusion and uncertainty about the nature of one's job, its purpose, or its responsibilities. In short, the worker doesn't get a sufficient amount of clear information about the job in order to perform it adequately. Since there are high expectations for job performance, this deficit is stressful.

Role discomfort can happen when a worker is required to perform tasks that fall outside of his or her usual roles. Examples: delivering a baby on the back seat of the squad car, or the EMT who gets caught too close to a hostage situation and is forced into a hostage negotiator role.

Organizational stressors are important for stress prevention because, in contrast to event stressors, we may have some direct control over them. Keeping them to a minimum is a major step toward reducing the psychological damage that comes from other sources.

PREVENTION AND COPING WITH STRESS IN DISASTER WORKERS

Methods of coping with stress or of preventing it altogether relate to the sources of stress described above. Some of the more important ones are listed here.

One of the best ways to prevent occupational stress is to have a highly trained worker who recognizes the limits of what he or she can do. Realistic expectations about outcomes and an understanding that human nature is fallible can prevent stress when things go wrong, as they inevitably will.

It's also important for those in stressful occupations and professions to recognize the fact that they are likely to become stressed. Being sensitized to your own stress (e.g., the somatic tension, the unusual irritability with others) is the first step in being able to cope with it. Each person should have two or three ways to relax that work for them and aren't, in turn, going to cause more problems. Having a drink with a friend can be stress reducing, but getting drunk is a poor way to reduce tension. Exercise, meditation, proper diet, close relationships, and recreational pursuits are productive stress reducers.

I believe we will see more and more use of specific debriefing procedures that deal with the psychologically stressful aspects of many occupations. Jeffrey Mitchell has developed, for example, a procedure called the Critical Incident Stress Debriefing (CISD) for emergency and disaster personnel (Mitchell, 1983).

A second set of methods for preventing or coping with stress deals with event stressors. In disaster or in war, how do we minimize the inevitable stressors that come with death, fatigue, injury, and loss? In disaster work, a principal one is time away from task. Ideally body recovery workers, for example, should work only 1 to 2 hours at a time, with a short break in between. Sometimes workers are so motivated that they will only respond to direct orders to rest; if this is so, it should be ordered. This goes for health service providers also because they may be in contact with very distressed people for long periods of time. The Red Cross in its flood relief program, for example, gives workers from emergency relief centers Sunday morning off to prevent burnout.

A related principle is to separate the command post from the carnage. Decision making and planning are much more difficult under pressure of the sounds, sights, and smells of the front line. In crisis, one's perspective is narrowed and this diminishes intellectual capacity. To use the Kansas City disaster as an example again, the command area was in a room off the lobby, away from the tragedy.

Another coping strategy related to event stressors is the use of cognitive behavioral techniques to distance psychologically the worker from the stressor. Body recovery workers in Antarctica used these, as have many others. For example, they thought of the bodies as only "cargo" or "frozen meat." Workers often use these strategies as a natural coping device. Perhaps our role as professionals is to give permission to workers for doing this, letting them know it is not abnormal, and does not convey any less

respect for the dead. We also need to know and convey to others the keen sensitivities of traumatized workers to reminders of their experiences. For example, you don't serve grilled hamburgers to a crew that has just spent the day cleaning up after an airliner crash.

* * * *

As I mentioned earlier, one of the most important stresses for us to understand are those related to the organization, because we can do something about those before the disaster happens. If we know that units are likely to work together under stressful conditions, then prior agreements as to who does what are necessary to reduce stress, much less to accomplish a successful mission. Yet, in one community after another, we have found that various emergency units have lacked such agreements. When community disasters occurred, there was confusion, over-response and frustration. In communities where response was well coordinated, such as Kansas City in the skywalk disaster, there was much less worker stress than might have been, and more citizens' lives were saved.

Role clarity is an important ingredient for stress prevention, that is, being clear of what one's task is, how to accomplish it, and how it fits in with the overall effort. In this regard, it is also important to reduce role conflict, if possible. Disaster work requires extreme physical and mental concentration, and a worker who has his or her mind on a family crisis may be a danger to himself and to others.

Perhaps the most important organizational variable for combatting stress is social support. A strong supportive network of colleagues is often taken for granted in professions that engender development of closer relationships, such as emergency and disaster occupations. It is important to watch for social isolates, because they will be especially vulnerable to stress from other sources. On the positive side, therapeutic encounters, both spontaneous and planned (as in debriefings) should be encouraged.

In terms of the stresses of disaster workers or military health service providers, we are really concerned with stress management and coping, rather than prevention of all stress. It is inherent in the job to be stressed in these occupations. Yet I believe we are probably overlooking any number of means by which stress could be significantly reduced and performance enhanced.

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FEDERAL EMERGENCY MANAGEMENT AGENCY

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The ability of the Federal Emergency Management Agency to respond to major disaster incidents in a quick and effective fashion, alleviate human suffering and return a community to a sense of normalcy depends directly upon the capability of Federal, State, and local government agencies and jurisdictions to act in concert with the response, recovery, and reconstruction efforts. The success of disaster response and recovery is highly dependent upon the communication, understanding, and cooperation of a Federal, State, and local partnership.

State and local counterparts and their staffs need: to be cognizant of the respective roles of those providing the Federal response; to have a general understanding of the Disaster Relief Act of 1974 (PL 93-288); to have a specific and detailed understanding of the State and local government roles and responsibilities in a major disaster environment; and to understand that Federal assistance and leadership supplements those roles and responsibilities.

The Federal Emergency Management Agency, through its Emergency Management Training Program (EMTP), provides an opportunity to build skills, competencies and capacities at National, State, and local levels. It attempts to broaden the awareness of its multi-agency audiences to all hazards. The public policy perspective is to raise emergency management public policy making and awareness to the highest level of elected and appointed officials. The Emergency Management System consists of a Federal - State - Local continuum of skilled managers, and identified Emergency Program decision makers. The Emergency Management Training Program is performance based: it works through student evaluation, reasonably realistic scenario-based, high stress, practical, real-time, on-line community exercise programs. In order to qualify experienced professionals as state trainers, the EMTP expands its delivery capability by training the trainers. Through plan maintenance, training, exercises, and systems approaches, it teaches managers to manage emergencies. Through programs in the development of records, evaluation, course management, and delivery, it trains management. The goal of the Emergency Management Training Program is to provide every community and citizen a predictable professional, coordinated, effective, and acceptable multi-agency response to natural and man-made disasters and technological uncertainties.

The goal of the Emergency Management Institute (EMI) is to improve emergency management practices throughout the United States. It serves the emergency training needs of local, State, and Federal officials, managers in the private economic sector, professional and volunteer organizations, and the general public.

Training activities, which consist of courses, workshops, seminars, and conferences are conducted throughout the United States. EMI develops courses and administers resident and non-resident training programs. A majority of the training is conducted by State emergency management agencies under

cooperative agreements that offer both financial and technical assistance, as well as instructional materials.

Furthermore, EMI responds to training interests of non-profit organizations by providing instructional materials and student allocations in selected course offerings. Included in this outreach program are public and private schools, colleges, and universities, volunteer agencies, and professional associations.

EMI provides training of sound educational value to enhance emergency management practices throughout the United States. It administers both resident and non-resident training programs. Annually, more than 4,000 students participate in resident courses on the Emmitsburg, Maryland campus. Another 100,000 students participate in non-resident courses sponsored by the Institute and conducted by State emergency management agencies.

The mix of students who attend the Institute reflects the nature of emergency management - students represent local, State, and Federal agencies, the private sector, and professional and volunteer organizations. Otherwise, the meaning of emergency management would be lost. The many responsibilities and functions comprising emergency management cannot be viewed in isolation of each other. With this concept in mind, the Institute has structured its curricula so that the integration of functions and responsibilities is demonstrated whatever the subject matter of the course may be.

THE EMOTIONAL IMPACT OF DISASTERS ON RELIEF WORKERS

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By way of introduction, let me clarify the role of OFDA and my own position within the organization. The Office of U.S. Foreign Disaster Assistance (OFDA) is part of the Agency for International Development (AID) and serves to coordinate all U.S. government disaster assistance to foreign countries. Obviously, this means third world countries for the most part. In this role, we work with international agencies, other donor countries, and private and voluntary organizations. In addition to the relief side of our mission, we are also tasked with promoting the development of programs for the warning, mitigation and preparedness to cope with disasters. In the 21 years of its existence, OFDA has provided relief for over 800 disasters and funded many other endeavors, including satellite observation of weather and crops, and the training of personnel in the health and fire fighting fields. Groups funded by OFDA analyze information and warn of storms, tsunamies, earthquakes, and volcanic eruptions, as well as famine and drought. Still another aspect of our charter, is the rehabilitation during the immediate post-disaster period which serves as a bridge to the long term projects of our parent organization, AID.

As to my function within the Office of Foreign Disaster Assistance, I am an Air Force Flight Surgeon, Pediatrician, and ex-hospital commander, who after completing last year at the National War College in D.C., was given on loan to OFDA for 2 years to coordinate the health aspects of disaster preparedness and to serve as a bridge with DOD health care resources. In addition to these functions, I also serve on the operational staff which is activated as soon as a disaster has been declared.

It would be appropriate at this point to take a few minutes to explain the mechanism of disaster response by the U.S. government and to give you a little bit about the general needs in different types of disasters. OFDA cannot take any action to respond until the U.S. ambassador to the disaster stricken country makes a specific request that aid be given, this in itself becomes very frustrating at times. Once requested, the response of OFDA varies according to the urgency and the extent of the disaster. In many cases, only money or supplies are dispatched, with no U.S. personnel being involved. In these instances, we give immediate authorization to the ambassador to spend \$25,000, which usually goes directly to the foreign government. This is quickly followed by additional funding and supplies that come from our 5 warehouses scattered throughout the world. Additional supplies are purchased from DOD, other federal agencies and from the private sector. We also share and exchange supplies with private voluntary organizations.

In many other situations, we might have an additional request and then fund a military or civilian team to go to the disaster site to assess the damage, and to coordinate the U.S. relief effort with the local embassy and government. From these teams, we would be given further requests for specific supplies and personnel to meet the requirements of the situation. If DOD personnel and equipment are to be used, then the direction and the funding comes from OFDA directly to the Joint Chiefs of Staff, or the Office

of the Secretary of Defense, which then tasks the units to respond. Any changes in the DOD response must first be coordinated with OFDA since it is this office which will have to do the funding. DOD does not have the funds or the mandate to respond to humanitarian efforts, except in very limited and specific instances.

#1- As you are well aware, the effects of different types of disasters are quite variable as it pertains to the loss of life and the extent of support needed.

#2- Earthquakes and tidal waves both cause many deaths, but vary significantly in the number of severely injured they leave behind. Situations with high winds can produce a massive logistic problem with much damage and many casualties.

#3- First we'll look at some examples of earthquakes.

#4- Peru

#5- The morbidity and mortality vary with the type of construction of the buildings and the type of sub-soil on which they are located. In Mexico City, the whole town was built on top of a lake bed partially filled in with loose alluvian soil that served to magnify the effects of the motion of the earthquake. It was interesting that in older parts of the city, where very heavy structures existed, the sub-soil had become compacted enough that very little damage was experienced.

#6- The time of day that the earthquake occurs is also a big factor. Those that produce the greatest loss of life occur during the night when people are in their homes and sleeping, or those that might occur in a metropolitan area during the morning or evening rush hours.

#7- Italy earthquake in May, 1976.

#8 #9 #10

#11- Lebanon, 1977

#12 #13 #14

#15 Hurricanes cause major damage, but fewer casualties except in the case of associated severe flooding.

#16- Dominica

1979 Hurricane David. The damage to hospitals offered another complicating factor.

#17- Darwin, Australia - the 1974 cyclone.

#18- Honduras, 1974 - Hurricane Fifi

#19- The beautiful Dominican Republic in 1979.

#20- Hurricane David

#21 #22 #23 #24 #25

#26- Floods - the victims are usually washed away, or the ones that remain are not severely injured.

#27- But this may vary with the population density involved and the amount of warning received.

#28- Bangladesh 1971 - A sea surge secondary to a cyclone killed 250,000 people. A similar situation occurred again in May, 1985, but at this time the number killed was reduced to 10,000 mainly because of a warning system that had been partly funded by our office. Many more people would have been saved, had they heeded the warning and been able to leave their small islands in the delta area. They could not, because they were squatters and would have lost their land permanently if they moved away- in the end they did lose their land permanently anyway.

#29- The vast majority of those living through floods suffer from minor injuries only.

#30- Nutritional emergencies can be severe after flooding in many of the countries with which we deal.

#31- Health maintenance problems may certainly be increased with flooding, but there have been occurrences in Latin America where floods have served to temporarily reduce the incidence of malaria and endemic typhoid fever.

#32- We should note however, that in general we do not see major outbreaks of disease after any kind of disaster. This brief over-view should then give you some idea of which disasters might cause the greatest problems with relief workers being exposed to death and human suffering, and those in which disaster workers would mainly be exposed to long hours under adverse conditions with much frustration. Although the outcome might be the same, the mechanism and prevention offer different challenges.

#33- Before leaving this area, let me say a few words about mass casualties as we have seen them from our office.

#34- Not all disasters produce mass casualties as we have already noted.

#35- In the instance where mass casualties do occur, usually the search and rescue work is carried out by the local survivors and the emotional impact of their work is significantly colored by the fact that they are survivors. For the most part, the relief people we provide have not become a part of this operation.

#36- The goal of OFDA has been to make people more self-sufficient in this area of relief. Now we can take a look at the specifics. Until the Mexico City earthquake in September, 1985, our office had never been involved in Search and Rescue operations. The main emphasis from our office can be appreciated by looking at what has been done recently. In the past two years, we have responded to about 65 incidents where we were tasked to provide personnel. A significant number of the incidents were related to famine and drought relief efforts in Africa.

#37 Africa

#38 #39 #40 #41

#42 Many of the people we sent were frequently from international relief agencies, or the Department of State's Refugee Program or Food for Peace Program, where they had been involved in similar situations for many years. Other workers came from CDC, where they had backgrounds in health care and presumably came equipped with their own internal methods of coping with these types of stressful situations. On the other hand, one of the seasoned disaster workers from CDC informed me that physicians have often not done as well in this type of situation as one might expect.

Many of the other people working in African relief had backgrounds as Peace Corps volunteers, or had spent some time in the Foreign Service representing the U.S. Another unusual aspect of this operation was that because personnel did not have to be assigned on an urgent basis, there was enough time for technical briefings before going into the disaster area. This is highly unusual for our type of operation, since our relief people usually have to be sent out the same day or the next day at the latest, with virtually no chance for any type of pre-briefing. In speaking to the various agencies with which we dealt on this operation, it is apparent that no real effort has been given to slant the pre-briefing of personnel towards any of the emotional stresses that would be encountered. Material was entirely geared

to covering the technical aspects of the job, and the customs and sensitivities of the host country. Each of the agencies contacted felt that these briefings were very beneficial for their workers. De-briefings were held in the same fashion with the main orientation being given to the people at home obtaining the most information that they could. Although these meetings were not established for the purpose of meeting the emotional needs of the workers, they did apparently serve as a good means of catharsis for the individuals involved. They also served as a means for supervisors to observe if there were some indications of emotional instability apparent in the worker.

As far as I was able to ascertain, there was only an occasional case in the African operation where an individual worker showed significant signs of stress to warrant intervention. In each case, the individual was sent home without any further attempt being made to have professional follow-up. The African famine obviously had a tremendous emotional impact on all of those who served in the relief effort; more of an impact than the sudden disasters we usually handle. With our present system however, we have no idea of the number of individuals who may now be suffering from the residuals of a Post Traumatic Disorder, and therefore cannot evaluate accurately the real need to improve our programs.

In the Chile earthquake that occurred in March, 1985, OFDA expended significant funds, but only sent two individuals to the site to do an assessment and coordinate our relief efforts. These were technicians dealing with technical matters for the most part. The pace of their activities was well controlled because of the experience of the individuals and because there was nowhere near the pressures which were generated by the earthquake in Mexico City. Technical pre and post briefings were done, but no attempt was made to do any psychologically oriented interviews. No problems were incurred and this encounter would be more typical of our experiences.

The Mexico City earthquake in September, 1985, was an entirely different experience for our office. It was the first time in 5 years that our command post was activated around the clock to coordinate a disaster response. Because of the close proximity, the involvement of an urban center, and the urgency of the relief needed, we were more involved than usual. Search and Rescue became a significant part of our assistance and this meant dealing with an entirely different type of relief worker. We found that we were not familiar with the points of contact, the requirement to consider pre and post briefings, or even with recognizing how these people would fit into the overall rescue picture. Some of the individuals did come from groups with which we had established relations like the Dade County Metropolitan Fire and Rescue Service and the U.S. Forest Service. Both groups deal with disasters on a regular basis and theoretically have their own methods of supplying emotional support. What I found out was, their mechanisms were not formal, but were geared more to peer support and review. In both organizations, the Mexico rescue work was felt to be 99% routine and thus required no additional support program.

Another group of relief workers, the Rescue Dog Teams, does use the support of a psychologist for de-briefing on many occasions, and even uses

techniques to deal with the stress problems found in their animals. In between, we had the larger group of workers such as the people from the Bureau of Mines, the controlled demolition people, the surface mine safety program people, and our own overhead team. No prior provisions were made for, or even considered for this large group.

What problems did we experience with this operation? First, since we had not convened a 24 hour OFDA operations center in five years, there was a tremendous amount of initial enthusiasm and not enough planning for how our human resources could be best conserved. As you can imagine, the situation led to long hours and early signs of burn out on the part of our staff in Washington. Gradually, we began to bring in additional support personnel and develop a more reasonable scheduling of shifts. In Mexico City, a similar situation was occurring. We sent in an overhead team of eight people, each of whom had a specific expertise needed for the disaster. The team leader was an individual who was well qualified, as a Chief of one of the branches in AID, but he had no experience in responding to disasters in the field. As soon as the team arrived in Mexico City, they were inundated with requests from the local government, the American Embassy, and our office.

Without the experience to pace themselves, they set a work schedule which very quickly led to fatigue and problems of the team members getting along with each other. It was also very apparent that there were people on the team, who, although very competent in their area of expertise, did not function as well under the stresses in the field as they did in their office. In addition to our overhead team, similar situations were occurring with the search and rescue workers themselves. Frustration and fatigue was evident in people who were faced with massive death and destruction, the urgency to extract people from the rubble before they died, the language barriers, the different techniques used by relief workers from different countries, and the problem of getting just the right piece of equipment that they needed. It was evident also, that adaptability soon took over and as time went on many of the differences were worked out. Cooperation, comradery, and improved techniques were much more evident, but problems still existed. The newspapers played up one of the differences that occurred over whether it was time to terminate rescue efforts at the Juarez Hospital. One of our people from the Dade County Fire Department was very vocal about his objection to the initial decision of the Mexican government to terminate their efforts.

As the time came to wind down the relief effort, we received a call from the embassy that their psychiatric consultant suggested we obtain psychologically oriented debriefings for the handlers of the rescue dog teams. These were mostly women who were highly competent but the majority had not been exposed to disaster on such a large scale, and neither had their dogs. After consultation with the team leader, we did make arrangements to follow through on the suggestion for those members from the west coast; however, on their way back to the U.S., the team members had a change of mind and decided that they would rather return to their homes directly and not take the time for the debriefings. We did learn later that the four handlers from the east coast subsequently did request a Critical Incident Stress Debriefing from the consultant with whom we had originally contracted. One other individual in the Mexico City operation who did show signs of significant stress was also

offered the opportunity for a professional debriefing and he refused. Follow-up on this case showed that after a short period of rest and relaxation, this individual was apparently back to normal. Technical debriefings of this individual were accomplished and may have had some positive effect on the outcome.

I would like to throw in a couple of comments that I have picked up that should serve to stimulate your interest and discussion. One individual, who has written extensively on this subject and who is often in the middle of controversy, told me that he did not feel that psychologists and psychiatrists were the preferred people to do the debriefings or prebriefings. He felt strongly that what was needed were people who had actually been to disasters and could speak and listen from a position of experience. Another figure, significant in the Latin American health field stated that the best way for American relief workers to handle their stress was to stay at home. On the surface this certainly sounds very negative, but when you take an objective look at the situation, you realize that in Mexico City as well as many other situations, we do tend to over-respond with supplies and people who are not necessarily needed. We can certainly be proud of this tendency of the American people, but it does present additional problems for workers at the site. What we are left with is additional people with language problems requiring interpreters, additional logistic problems for food, lodging, transportation and sanitary services, and additional people who probably need more debriefing than that required by the professionals sent in. Maybe at another seminar we need to consider the problem of handling this basic need on the part of those offering assistance.

Finally, let me throw out to you some of the points that have crystallized in my thinking about the problem of international disaster relief:

1. Preparedness is the key factor. Preparedness of the local system to respond to its own disasters, and the preparedness in the U.S. of groups which would be available to respond on the international scene. To accomplish this, we would also need a better method of cataloging our resources.
2. We need to use people during disasters who do the same type of work in their normal day to day activities. This increases the likelihood of better coordination and decreases the levels of stress and frustration.
3. Use professional people and those previously trained by established organizations.
4. Give as much technical pre-briefing as possible, with the time constraints imposed by the disaster, and assign specific tasks to the relief workers.
5. Have a specifically structured organization set up at the disaster that would be similar to the Incident Command System now being used by the U.S. Forest Service and others.
6. Have groups like this resolve the questions of how, when and by whom should Critical Incident Stress Debriefing be done. Where do peers and professionals fit into this picture; and where does the responsibility of our agency end and the responsibility of the agencies we contract with, begin.

LESSONS LEARNED IN PSYCHIATRIC ASPECTS OF COMBAT MEDICAL READINESS:
THE C4-A PERSPECTIVE

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C4-A - The Combat Casualty Management Course - is a seven day, field training course for senior officers in the medical departments of all three services. This course is programmed to develop insights and skills regarding leadership and management in the rear echelons of the combat zone (e.g., corps area hospitals, air transportable hospitals). A key goal of this training program is to convey important lessons learned from prior combat regarding the steps necessary and appropriate for preparation.

If America must ever again go to war, it is imperative that those of us who will be in health-care leadership roles (e.g., CO of a field hospital, Chief of Professional Services, Chief of Surgery, or Chief of Nursing, etc.) be fully prepared to meet the unique challenges of battlefield medicine. "The time to get ready is now."

In no area is the need for preparation more acute (and yet resistance against preparation more determined) than in dealing with the psychological needs of our troops, our medical staff, and ourselves. Evidence clearly indicates that psychological stress can be significantly offset by "psychotherapy of anticipation" - a detailed, insightful briefing regarding anticipated occasions of psychological stress and expected emotional reactions, with a view to the potential pitfalls and effective options. Yet, many physicians (surgical specialists, in particular) who are destined to take on leadership roles, while quite willing to discuss clinical or managerial considerations, can be highly reluctant to deal in advance with the emotional and psychological aspects of their task. At most, they may willingly review psychological needs of combat troops under their care. However, they tend to be less willing to discuss the emotional needs of their medical staff; and often seem determined to avoid any discussion whatsoever of their personal emotional reactions and needs. ("I'll worry about it when I get there.")

Training related to Critical Incident Stress Syndrome would provide helpful insights. However, there are qualitative and quantitative differences which make training for combat medical readiness unique. C4-A provides an opportunity, in the context of overall preparation for combat medical readiness, to deal with these crucial issues. The following three conditions serve as examples of unique problems that may be encountered.

FATIGUE: Combat medicine is, in effect, a "chronic mass-casualty," and an "on-going disaster." The enthusiasm and commitment of inexperienced medical staff gives little room for long-term planning. A seasoned leader understands that pacing is necessary, with scheduled rest and scheduled shifts -- even in the face of mass casualties -- to avoid the pitfalls of exhaustion and burn-out for medical leadership and staff.

BOREDOM: Because we have a vision of combat medicine as a relentless barrage of critical-care cases, as leaders we may find ourselves ill-prepared for the long hours (occasionally days or even weeks) of relative inactivity that are sometimes encountered. Without a plan, boredom and inactivity can wreak havoc. Depression, drug and alcohol abuse, promiscuity, desertion and suicide are the price that is paid when this lesson is learned "the hard way."

PERSONAL INVOLVEMENT: In dealing with civilian mass casualties and disaster medicine, for the most part, we rarely encounter friends and colleagues as victims. For brief one-time nature of these events, and the fact that the injured are strangers, give us health-care workers the courage to maintain our reserve and emotional disinterest. In combat, the dead and injured may often be young men whom we have come to know personally, sometimes even our colleagues and close friends. As a case in point, Major General Strevey, MC, (now Commanding Officer of Tripler Army Medical Center), who served as a commander in a combat hospital in Vietnam, warns of the extreme emotional stress that attends the daily requirement of identifying the body of each young soldier killed in action. LTC McGooker, NC, recounts the pain of caring for an 18-year old boy she had come to know personally who returned to their surgical unit with both of his legs traumatically amputated in combat. Stress such as this would be difficult enough to handle on a one-time basis. Combat demands that we and our staff face this trauma day after day. To fool ourselves that we can ignore these challenges until we are actually faced with them is a program for disaster.

We of the military medical departments are committed to serve with competence, confidence, commitment and compassion. And surely, the time to get ready is now.

POST-TRAUMATIC STRESS DISORDER AMONG ARMY NURSES

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I first became interested in the readjustment problems of Vietnam veterans about six years ago when I was involved in a project at Purdue University in which I helped develop a research instrument called the Vietnam Veterans Questionnaire as part of a small VA contract. I came into the Army shortly after it was finished and decided to do some additional research on veterans. While at Walter Reed Army Institute of Research (WRAIR), I developed a protocol dealing with Delayed Stress Response Syndrome which has since become known as Post-Traumatic Stress Disorder (PTSD).

I'm sure most of you are familiar with this disorder but for those of you who may not be, these first two viewgraphs will help. As you can see in this first viewgraph PTSD is characterized by a number of symptoms which develop after exposure to a psychologically traumatic event which is beyond the range of normal human experience and which would evoke a significant symptoms of distress in most people. This would include such events as combat experience, rape, natural disasters such as floods, earthquakes or tornadoes, or auto accidents, plane crashes, etc. It would not include such things as bereavement, sickness, or divorce.

The second viewgraph identifies the diagnostic criteria for assessing PTSD. The first requirement is that the person has experienced some type of traumatic stressor. There must also be evidence of a reexperiencing of the traumatic event through such symptoms as intrusive recollections, recurrent dreams, or flashbacks. In addition, there is a reduced involvement with the external world as evidenced by lack of interest in important activities, inability to get close emotionally to other people, and an inability to feel and express emotions (psychic numbness). Finally, sleeping, survivor guilt, trouble concentrating or remembering, or avoidance of activities that arouse recollection of the traumatic event. There are also some additional symptoms that often accompany PTSD but are not required to make a diagnosis.

Project Objective

What I decided to do in my research was take an epidemiologic approach to determine the prevalence of PTSD among the veteran population by looking at psychosocial health problems as perceived by the veterans themselves. Almost all past research on PTSD among Vietnam veterans has consisted of clinical observations which have produced estimates that anywhere from 18% to 54% of Vietnam veterans in the civilian community are currently in need of psychiatric help for war-related problems. I was interested in looking at PTSD among non-civilian veterans as well since these groups have not been studied systematically. I decided to focus on Vietnam-era veterans still on active duty in the US Army, in US Army Reserve Troop Units, as well as prior service civilians.

An additional group of veterans which has not been studied consists of the estimated 8,000 to 10,000 women who served in Vietnam primarily as nurses. In 1983 there were some newspaper reports starting to appear which indicated

that PTSD might be a problem among former nurses who had served in Vietnam. The Chief of the Army Nurse Corps (ANC) at that time, BG Johnson, as well as the current Chief, BG Slewitzke, were both interested in finding out if PTSD was a problem among nurses still on active duty who had served in Vietnam. I was asked if I would be willing to extend my project to include active duty nurses. I found that this would be an excellent opportunity to gather some important data. One reason is that since both males and females served as nurses it would provide an opportunity to examine any sex differences for which DSM-III has no information. It would also provide an opportunity to examine the nature of war zone trauma since most research has focused on combat as the traumatic stressor. Since most nurses did not actively engage in direct combat activities, I thought it would be interesting to look at differences in prevalence rates among nurses and other Vietnam veterans. Together with COL Jim Vail and COL Joe Maloney of the Nursing Research Service at Walter Reed Army Medical Center we studied the prevalence and etiology of PTSD among Army nurses. It is this phase of my research that I would like to talk mostly about today.

Major Hypotheses

The overall project was in large part exploratory since it deals with groups of veterans that have not been studied in the past, but I did have some specific hypotheses that I wanted to test. I hypothesized that PTSD is the result of several different factors which include war zone experiences, social support system validation of these experiences both during Vietnam duty and during the reentry process (primarily the first year back), and the time period the veteran served in Vietnam (whether it was before or after the Tet Offensive of 1968). I considered the time period important because of several changes in the nature of the war which appeared to make it more stressful to serve after Tet of 1968. These changes included lowered morale, increased anti-war sentiment at home, problems with drug abuse, and sharp increases in the neuropsychiatric casualty rate. This last comment about an increased neuropsychiatric casualty rate may surprise some of you since one of the most widely quoted findings about Vietnam was Peter Bourne's which stated that the neuropsychiatric casualty rate was one of the lowest in modern history. As you can see from this next viewgraph, that is true but only up to 1968. The rate increased sharply after that and remained high until the bulk of American troops left Vietnam in mid 1972. The last hypothesis I made was that there would be a significant positive relationship between perceived physical and psychosocial health over time such that individuals with high levels of PTSD symptoms would also report the most physical health problems.

Instrument

The data we collected consisted of responses to the Vietnam-Era Nurses Adjustment Survey (VENAS) which is an extension of the initial instrument, the Vietnam Veterans Questionnaire. The instrument provides information on demographics, attitudes and opinions about the war, war zone experiences, physical and psychosocial health problems both during and after service in Vietnam, and social support system validation of experiences both during and after service in Vietnam. The instrument was found to possess high subscale reliabilities in the $r=.90$ range for most subscales.

Procedure

A sample of all nurses on active duty in the US Army who had served in Vietnam was identified through personnel data files maintained by the Army Nurse Corps in the Spring of 1983. A total of 518 active duty Vietnam veteran nurses was identified. A letter explaining the project along with the questionnaire was mailed to each subject requesting his or her voluntary participation in the study. To ensure anonymity of subject responses, we obtained a Certificate of Confidentiality from the National Institute of Mental Health. We received completed questionnaires from 387 nurses for a 75% return. We ended up with 361 subjects for the data analysis due to a few veterans who had been misidentified as having served in Vietnam and others who had served in a non-nursing capacity in Vietnam as enlisted soldiers.

In order to determine whether any resulting problems with PTSD were indeed related to Vietnam service or simply to service in the military we obtained a control group consisting of all nurses on active duty in the Army who had not served in Vietnam but who had been on active duty during the Vietnam-era (1963-1973). A total of 487 Vietnam-era nurses was identified and sent the same letter and questionnaire. We received completed questionnaires from 345 nurses for a 71% return. Together with 6 nurses that had been dropped from the Vietnam veteran sample because they had not served in Vietnam, we had data from 351 Vietnam-era nurses available for analysis.

Demographic Data

As you can see from this next viewgraph the Vietnam veteran nurses are significantly older than the Vietnam-era nurses and there are also more males in the Vietnam sample. Both samples are predominantly white, well-educated (over half currently have a Master's degree), and the majority of both groups are married. The Vietnam veteran nurses have been on active duty significantly longer (17 years versus 15 years), and were older when they entered the Army. They were also more likely to have received a direct appointment rather than come from a school program. The Vietnam nurses served in a wide variety of assignments while in Vietnam with most assigned to evacuation hospitals. The biggest shift in SSI (Specialty Skill Identifier) since Vietnam has been into administration which is a result of increased rank. Less than 5% of the nurses changed their SSI because of Vietnam. Most nurses were either First Lieutenants or Captains in Vietnam. The majority of nurses served in Vietnam between the years 1968 and 1971.

Attitudinal Data

In this next viewgraph you can see that about half of both samples had supported the war upon entry into the Army. This support increased for both groups after they had joined, more so for the Vietnam nurses. Support stayed about the same for the Vietnam nurses while they served in Vietnam. About two-thirds of both groups indicate they would be willing to serve in a similar war. Around 85% of both groups feel that their military service has helped them personally with over 75% of the Vietnam nurses indicating that their service in Vietnam has helped them personally.

PTSD Symptoms

Using the definition and diagnostic criteria for assessing PTSD from the first two viewgraphs we examined the nurses' responses to six key items in the questionnaire. These items assess past and current difficulties in the following areas: 1) dealing with bad memories about Vietnam experiences; 2) sleep disturbances such as bad dreams or nightmares; 3) trouble expressing feelings to others; 4) trouble feeling and expressing emotions in general (psychic numbing); 5) trouble concentrating; and 6) trouble dealing with feelings of guilt about having survived Vietnam.

The nurses responded to these items in terms of frequency with which they were bothered by them. The response categories were never, rarely, occasionally, often, or very often. We found 12 Vietnam veteran nurses whose response patterns indicated they were experiencing symptoms of PTSD at least occasionally. This represents 3.3% of the sample. Breaking this figure down according to sex we found 5 males and 7 females representing 3.5% and 3.2% respectively, which are not significantly different. Among the Vietnam-era nurses we found 3 nurses (less than 1%) whose responses indicated the presence of PTSD symptoms. This is most likely an overestimate of the actual rate since the procedure for assessing PTSD among the Vietnam-era nurses is less precise due to lack of information on non-Vietnam service stressors. Even so, the PTSD rate is still significantly higher for the Vietnam veteran nurses which indicates that the PTSD symptoms are related to service in Vietnam and not military service in general. It should be noted that we did not make any clinical diagnosis of PTSD, we simply noted how many nurses reported symptoms which suggest the diagnosis of PTSD.

Since the nurses were also asked to respond to the same PTSD items in the questionnaire in terms of how they felt while in Vietnam, it was possible to estimate the prevalence of PTSD during Vietnam service. We found 33 nurses who reported experiencing symptoms of PTSD during their service in Vietnam. This represents 9.1% of the Vietnam veteran sample. According to DSM-III, if symptoms begin within six months of the trauma and do not last more than six months, the PTSD is acute. If the symptoms develop more than six months after the trauma or last six months or more, the PTSD is chronic or delayed. We used the current and past PTSD estimates to get a picture of the disorder over time. We found that 7.2% of the Vietnam nurses reported symptoms of PTSD during Vietnam service but did not report current symptoms. We labelled this Acute PTSD. Of the Vietnam nurses who reported symptoms of PTSD during Vietnam duty, 1.9% also reported current PTSD symptoms. We labelled this Chronic PTSD. There were 1.4% of the Vietnam nurses who did not report symptoms of PTSD while in Vietnam but indicate they are currently bothered. We labelled this Delayed PTSD. To put these figures in perspective the next viewgraph shows data on PTSD prevalence rates from other phases of the study. As you can see the past PTSD rate is about the same for both active duty samples and the Reservists but much higher for the civilians. The current PTSD rates are the same for the active duty samples but are significantly higher for both the Reservists and civilians. The rate for civilians has actually increased since Vietnam. The Acute PTSD rates are the same for all groups. The biggest differences are for Chronic and Delayed PTSD among the civilians and to a lesser degree the Reservists. The overall PTSD rates are

also the same for both active duty samples with those for the Reservists and civilians being significantly higher.

Regression Analysis

We also conducted a stepwise multiple regression analysis on current PTSD symptoms. We found highly significant effects for social support received during Vietnam, social support received upon return from Vietnam, and perceived danger and exposure to violence while in Vietnam. Nurses who indicated that they had experienced high levels of perceived danger and exposure to the violent aftermath of combat had significantly higher levels of current PTSD symptomatology. Nurses who indicated that they had received positive social support while in Vietnam had significantly lower levels of PTSD than did nurses who experienced negative or hostile reactions from others while in Vietnam. Similarly, nurses who reported receiving primarily negative or hostile reactions upon return from Vietnam had significantly higher levels of PTSD symptoms than did nurses who reported positive reactions from others. The effect for the time period was not significant, but was in the predicted direction of higher levels of PTSD symptomatology among nurses who served in the late part of the war.

Physical Health

The physical health data we gathered consist of responses to an 80 item symptom checklist based on the Cornell Medical Index. These symptoms of both past and current health represent gynecologic problems, respiratory problems, cardiovascular problems, gastrointestinal problems, skin disorders, nervous system problems, general health, and overall health. A comparison between the Vietnam and Vietnam-era nurses revealed that the Vietnam nurses had significantly more current cardiovascular, nervous system, and overall health problems than the Vietnam-era nurses. In terms of past health, the Vietnam nurses had significantly more cardiovascular, nervous system, and overall health problems as well as more skin disorders than the Vietnam-era nurses. We controlled for age differences in all these comparisons.

We then broke the Vietnam nurse sample down into those who have reported symptoms of PTSD at any time and those who have not and again looked at health score differences. We found that the nurses with PTSD symptoms reported significantly more current cardiovascular, gastrointestinal, and overall health problems. In the past they have had significantly more cardiovascular, nervous system, general health, and overall health problems than the Vietnam nurses without PTSD symptoms. We also computed Pearson Product-Moment Correlations between current PTSD symptoms and current health indices for the Vietnam nurses. We found highly significant correlations for cardiovascular ($r=.28$), nervous system ($r=.23$), general health ($r=.21$), gynecologic ($r=.23$), and overall health indices ($r=.37$).

Discussion

The results of this study on Army nurses and other veterans in the project indicate that the prevalence of PTSD is quite different among veterans who have maintained a military affiliation. Veterans who have remained on

active duty and even those in the US Army Reserve have much lower PTSD prevalence rates than veterans in the civilian community. Some of this I'm sure is due to a self-selection process in which those veterans who returned from Vietnam with readjustment problems are less likely to have remained affiliated with the military. However, the importance of societal reaction was consistent across all groups of veterans. Social support experiences accounted for just as much variance in PTSD symptoms as combat or war zone experiences did. Veterans who remained affiliated with the military are less likely to have experienced the negativism and hostility related to service in Vietnam from fellow veterans and families than were veterans who returned directly to civilian life.

Besides the importance of social support, the results of this study on nurses points out that one does not have to be a combatant to be traumatized by war. The nurses sampled did not engage in firefights or go out on patrols, yet the prevalence of PTSD among them is identical to that of other active duty veterans who did engage in direct combat. Thus, it appears that when one speaks of combat, it is necessary to view it in terms of various components such as direct participation, perceived danger, and exposure to the violent aftermath of combat, any one aspect of which may be sufficiently traumatic to produce PTSD. This notion is confirmed by reports from World War II which found that traumatic war neuroses were common among certain groups of noncombatants such as soldiers in grave registration units and members of Air Corps emergency fire squad units. Other commonly affected veterans were medical first-aid men who were often in combat situations but did not carry weapons and were unable to defend themselves or take aggressive action against the enemy. An inadequate appreciation for the nature and consequences of service in a war zone on the part of mental health professionals may help to explain why problems of PTSD among female Vietnam veterans and other noncombatants have not received much attention.

Hopefully, greater efforts will be made in the future to reach out to these veterans to ensure that their medical evaluations include their military history to assist in accurately diagnosing their condition. In this way they may receive the necessary treatment for the successful resolution of war-related traumatic reactions such as PTSD.

The results of the physical health data confirm the hypothesized relationship between physical and psychic manifestations of war zone trauma among Vietnam veterans. Those veterans reporting the greatest amounts of PTSD symptoms also reported the greatest number of physical health problems. While it is possible that veterans in poor physical health simply report more psychological difficulties, it is also possible that these physical health problems are the result of the veteran's inability to handle the stress produced by his or her war-related traumatic experiences. In light of the stigma often associated with seeking psychological help, physicians should be aware that Vietnam veterans who present with physical health problems particularly respiratory, gastrointestinal, and cardiovascular, may have some type of underlying stress-related problem such as PTSD. Perhaps treatment programs designed to improve psychological health among Vietnam veterans may also result in improved physical health as well.

Viewgraph 1

POST-TRAUMATIC STRESS DISORDER (PTSD)

ESSENTIAL FEATURE: development of characteristic symptoms following a psychologically traumatic event that is generally outside the range of normal human experience and which would evoke significant symptoms of distress in most people.

TYPES OF STRESSORS:

- 1) Those experienced alone (rape or assault)
- 2) Those experienced in groups (military combat)
- 3) Natural disasters (flood, earthquake, tornado)
- 4) Accidental man-made disasters (auto accident, plane crash, fire)
- 5) Deliberate man-made disasters (bombing, torture, death camp)

ONSET: some stressors such as torture frequently produce the disorder while others such as a car accident produce it less often. The disorder is apparently more severe and longer lasting when the stressor is of human design. (DSM-III)

Viewgraph 2

DIAGNOSTIC CRITERIA FOR POST-TRAUMATIC STRESS DISORDER

A. Existence of a recognizable stressor that would evoke significant symptoms of distress in almost everyone.

B. Reexperiencing of the trauma as evidenced by at least one of the following:

- (1) recurrent and intrusive recollections of the event
- (2) recurrent dreams of the event
- (3) sudden acting or feeling as if the traumatic event were reoccurring, because of an association with an environmental or ideational stimulus

C. Numbing of responsiveness to or reduced involvement with the external world, beginning some time after the trauma, as shown by at least one of the following:

- (1) markedly diminished interest in one or more significant activities
- (2) feeling of detachment or estrangement from others
- (3) constricted affect

D. At least two of the following symptoms that were not present before the trauma:

- (1) hyperalertness or exaggerated startle response
- (2) sleep disturbance
- (3) guilt about surviving when others have not, or about behavior required for survival
- (4) memory impairment or trouble concentrating
- (5) avoidance of activities that arouse recollection of the traumatic event
- (6) intensification of symptoms by exposure to events that symbolize or resemble the traumatic event

ASSOCIATED FEATURES OF PTSD

1. Depression
2. Anxiety
3. Irritability
4. Sporadic and unpredictable explosions of aggressive behavior
5. Impulsive behavior
6. Emotional lability
8. Substance abuse

Viewgraph 3

NEUROPSYCHIATRIC CASUALTY RATES (ACTIVE DUTY ARMY)

	WORLDWIDE	RVN	
1965	9.05	6.98	
1966	10.26	11.80	
1967	9.63	9.80	
1968	10.29	12.70	
1969	11.39	15.40	
1970	15.64	25.20	
1971	17.01	31.30	
1972	17.91	10.40	
1972.5	19.90	24.20	

These figures represent
hospital diagnoses
per 1000 per year

Source: Dattel, W.E. (1976). A Summary of Source Data in Military
Psychiatric Epidemiology. Alexandria, VA: Defense
Documentation Center. Document AD No. A 021 265.

Viewgraph 4

TABLE 1. DEMOGRAPHIC DATA ON ANC PERSONNEL (VIETNAM & VIETNAM-ERA)

	Vietnam N=361		Vietnam-Era N=351
Age:	X=41.5	**	X=38.7
Sex:			
Male:	39.2%	**	29.9%
Female:	60.8%		70.1%
Race/Ethnicity:			
White:	94.7%		90.9%
Black:	3.3%		5.7%
Hispanic:	0.8%		1.1%
Education Level (Highest):			
Diploma in Nursing:	5.8%		4.6%
AD or AA:	0.6%		0.0%
Baccalaureate:	37.8%		35.0%
Masters:	53.3%		59.0%
Doctorate:	2.2%		1.1%
Current Marital Status:			
Married:	51.7%		54.1%
Remarried:	6.9%		7.7%
Separated:	0.0%		0.9%
Divorced (single):	6.1%		9.4%
Widowed (single):	0.6%		1.1%
Widowed (remarried):	0.0%		0.3%
Single (never married):	34.7%		26.2%
Marital Status During Vietnam:			
Married:	33.9%		
Remarried:	0.8%		
Separated:	0.6%		
Divorced (single):	2.2%		
Single (never married):	62.5%		
Number of Children:	X=1.6		X=1.4
Duty Status While in Vietnam:			
RA:	26.9%		
USAR:	73.1%		
Total Months on Active Duty:	X=207.0	**	X=187.0
Age at Entry into Army:	X=23.6	**	X=22.7

Viewgraph 5

TABLE 1 (Continued)

	Vietnam N=361		Vietnam-Era N=351
Entry into ANC:			
Direct Appointment:	50.6%	**	34.2%
School Program:	44.4%		55.3%
Activated from USAR:	1.7%		0.3%
Drafted:	1.7%		1.7%
WRAIN:	1.4%		8.6%
Primary Vietnam Assignment:			
Administrative:	6.4%		
Anesthetist:	10.6%		
OR Nurse:	18.3%		
ER Nurse:	10.8%		
Ward Nurse:	22.8%		
ICU Nurse:	19.7%		
Type of Unit/Hospital Assigned:			
Field:	21.4%		
Surgical:	10.6%		
Evacuation:	53.9%		
MUST:	5.6%		
Convalescent Center:	2.2%		
Primary SSI in Vietnam:			
Nurse Administrator:	1.1%		
Psychiatric Nurse:	4.7%		
Pediatric Nurse:	1.7%		
OR Nurse:	17.3%		
Nurse Anesthetist:	10.3%		
OB/GYN Nurse:	1.9%		
Medical/Surgical Nurse:	56.4%		
Clinical Nurse:	5.3%		
Current SSI:			
Nurse Administrator:	13.9%		
Community Health Nurse:	1.4%		
Psychiatric Nurse:	2.5%		
Pediatric Nurse:	2.5%		
OR Nurse:	14.2%		
Nurse Anesthetist:	14.4%		
OB/GYN Nurse:	5.0%		
Medical/Surgical Nurse:	45.6%		
SSI Changed Due to Vietnam:			
Yes:	4.7%		
No:	95.3%		

Viewgraph 6

TABLE 1 (Continued)

	Vietnam	Vietnam-Era
	N=361	N=351
Rank in Vietnam:		
O1:	3.9%	
O2:	25.6%	
O3:	57.5%	
O4:	11.4%	
O5:	1.7%	
Year Left Vietnam:		
1963:	0.3%	
1965:	0.3%	
1966:	4.7%	
1967:	5.6%	
1968:	16.7%	
1969:	21.7%	
1970:	18.9%	
1971:	18.3%	
1972:	9.7%	
1973:	3.9%	
Total Months Served in Vietnam:	X=12.5	

Viewgraph 7

ATTITUDINAL DATA ON ACTIVE DUTY VIETNAM AND VIETNAM-ERA ANC VETERANS

ITEM	VIETNAM VETS		VIETNAM-ERA VETS
Feelings about the Vietnam war upon entry into the Army:			
Supported it	52%		49%
No opinion	37%		38%
Opposed it	10%		13%
Feelings about the Vietnam war after entering the Army:			
Supported it	68%	**	58%
No opinion	11%		19%
Opposed it	18%		21%
Feelings about the Vietnam war while in Vietnam:			
Supported it	66%		
No opinion	11%		
Opposed it	21%		
Willingness to serve in a similar war:			
Willing	66%		63%
Uncertain	22%		28%
Unwilling	7%		5%
Has military service (other than in Vietnam) helped you become a better person?			
Yes	85%		86%
Uncertain	6%		6%
No	4%		4%
Has your service in Vietnam helped you become a better person?			
Yes	76%		
Uncertain	13%		
No	7%		

Viewgraph 8

PTSD COMPARISONS AMONG VIETNAM VETERANS BY TYPE (ACUTE, CHRONIC, DELAYED)

	NURSES N=361	FT MEADE N=238	USAR N=670	CIVILIANS N=499
PTSD RATE DURING VIETNAM	9.1%	10.5%	12.0%	25.5%
CURRENT PTSD RATE	3.3%	5.1%	10.9%	32.1%
ACUTE PTSD ¹	7.2%	7.1%	6.5%	8.2%
CHRONIC PTSD ²	1.9%	3.4%	5.3%	17.2%
DELAYED PTSD ³	1.4%	1.7%	5.4%	14.8%
OVERALL PTSD RATE ⁴	10.5%	12.2%	17.4%	40.2%

¹ACUTE PTSD IS INDICATED FOR VETERANS WHO REPORTED SYMPTOMS DURING VIETNAM BUT DO NOT HAVE SYMPTOMS CURRENTLY

²CHRONIC PTSD IS INDICATED FOR VETERANS WHO REPORTED SYMPTOMS DURING VIETNAM AND ALSO HAVE SYMPTOMS CURRENTLY

³DELAYED PTSD IS INDICATED FOR VETERANS WHO DID NOT REPORT SYMPTOMS DURING VIETNAM BUT DO REPORT SYMPTOMS CURRENTLY

⁴OVERALL PTSD RATE CONSISTS OF CHRONIC + ACUTE + DELAYED RATES

AN OVERVIEW OF THE STRESS DISORDER TREATMENT UNIT (SDTU):
HISTORY, PHILOSOPHY, TREATMENT AND RESEARCH

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BRIEF HISTORY OF SDTU

What follows will be a discussion of the history, philosophies, treatment procedures and research of the Stress Disorder Treatment Unit (SDTU). The SDTU was the third dedicated bed inpatient treatment unit in the VA system. There are now at least 13 and perhaps as many as 15 approximately similar inpatient treatment units. They account for a total of between three and four hundred beds nationwide. All but one of the units represent local initiative for funding and staffing resources. Such treatment units are unique within the VA system due to the nature of the staffing patterns, diagnosis of interest, demand for treatment bed space, higher probability for favorable long-term treatment outcomes, and, the nature and etiology of the veteran's presenting problem. In the present discussion all references to diagnosis will have an implied reference to DSMIII unless otherwise stated.

Initial discussions regarding the growing and apparent need for an inpatient treatment environment began informally in June of 1981. Between June and October a census generated an awareness of the numbers of Viet Nam combat veterans throughout the medical center (that is, in either medicine or psychiatry). Personal visits by senior psychology staff were effective in identifying the prevalence of PTSD symptoms in that sample population and provided estimates of severity and chronicity. At this time, in October, 1981, the Committee for Improved Services to Viet Nam Veterans was formed. The committee's overall charge was to identify and recommend additional treatment needs of the combat veteran. A formal survey of all medical center admissions was conducted between August and October to identify the prevalence of combat experience in the total patient population. It was also demonstrated that at this time there were sharp increases in psychiatry admissions for Vietnam Veterans. There were several contemporary events (e.g., Iranian hostage crisis and return, planning for the Memorial in Washington, D.C.) which may have served to increase the rate of new admissions. All combat veterans located on either acute or intermediate psychiatry were given brief diagnostic interviews including combat histories to establish the frequency and incidence of combat experience and to differentiate between the incidence of major psychiatric disorder and PTSD present in those various treatment environments. Also at about this time the veteran's representative organizations requested outpatient treatment assistance for their Vietnam combat veteran members who could not conveniently travel to Chicago or Milwaukee for visits to Operation Outreach vet centers and still hold down jobs and family responsibilities. The consensus of group members expressed a strong desire not to hold sessions at the medical center. Two psychologists (Drs. McFarland and Shelton) began outpatient groups in the community in homes or city facilities. From August to October the group grew and then split into two groups of eight to ten each by December. From this experience and similar reports from vet centers came

an awareness that for some number of the patient population, outpatient treatment was not a treatment of first choice.

Some of the members exhibited low thresholds for aggressions or violence when relating their combat episodes. Their behavior would escalate within the session (usually two to four hours) and could not be "turned-off" within a reasonable amount of time (e.g., before 3 A.M.). The group members were employed, as was the facilitator, and experienced great problems with reporting to work the next morning. Another pattern emerged which was countertherapeutic for a working thru philosophy. A hysteroid pattern of family and vocational life disruption started to form with a fulcrum on the night of group. For two days following group the veteran was withdrawn and reported diminished interaction and pleasure both at work and home. The members reported increases in irritability and free floating anxiety for several days before the group. In addition, both preceding and following the group all reported sharp increases in combat-related nightmares and combat-related intrusive thoughts. Over time the cumulative iatrogenic events erode the ability of some of the individuals to carry on a "normal" existence as experienced prior to beginning outpatient treatment. One member experienced acute suicidal feelings which required that this author perform a hazardous, early A.M., emergency intervention (a happy note, this man is still married, in outpatient treatment and is well into college studies leading to computer analyst. At intake he was an odd-job man on a horse farm, drinking heavily, recently fired and near divorce). These early experiences lead to an awareness that a more structured environment was necessary to facilitate treatment in some portion of these men. The Committee proposed an inpatient unit in October 1981. The first admissions to the unit were on April 12, 1985. Within the first four weeks, 32 beds were filled--ten short of the projected 40 beds mandated by management. The suspension of admissions was due to clinical decision making regarding practical ward management issues. In December 1982, management approved a bed census of 26 to accommodate a more realistic ability to deliver consistent service and to allow for centrally mandated medical center renovations. So far, the more dire scenario as projected by the Committee has not come to pass. The Committee assessed the available literature and projected up to 10% mortality during treatment or one year following discharge. The mortality rate to date has been less than 2% with none of the deaths occurring on the ward or medical center grounds and only one while on weekend pass from treatment. It remains a truism that personnel treating this patient population should expect nonzero mortality levels.

UNDERLYING PHILOSOPHY OF TREATMENT

A primary assumption is that survival of significant catastrophe has both immediate and long-term sequeli in any individual's life and outlook. Further, while training prior to catastrophe may assist one in the process of survival during the event's occurrence it cannot prevent in all the survivors an eventual development of a psychological need to understand fully and incorporate the survived catastrophe into an overall view of life and being. And finally, it is theorized that during the conduct of the catastrophe the person is confronted by a massive sensory assault which can only be immediately managed by retreat to varying levels of dissociation from the uncontrollable and assaulting reality. Within this context the survivors'

behavior may be viewed as adaptive during the time of assault but of reduced, or in the case of Vietnam combat veterans combat-related behaviors, highly problematic, to nonassaultive typical reality. Frankel has stated that "crazy behavior in crazy situations is normal." Within the contest of typical daily life catastrophe such as combat, tornado, earthquake, volcanic eruption or air disaster presents the "crazy situations" expected to breed such dissociations. This view point casts PTSD into an arena which can be addressed by an enhanced vision of learning theory. Specifically, one may abandon notions of the centrality of predisposition to be mentally ill as a necessary etiological element. Additionally, though either acute or delayed presentations of the PTSD may well appear to be something like a major thought or affect disorder, it is qualitatively different. Specifically, the literature is ripe with references to the therapeutic failure of major and minor tranquilizers as a preferred treatment for PTSD. Hence, the SDTU determined to use psychotherapy as the treatment of first choice and psychoactive medications a last resort. Our VA local management has endorsed this portion of the treatment philosophy and support the outcome--longer lengths of treatment stay than the phenothiazine-and-a-cloud-of-dust approach.

Another decision to be made was of the extent of the catchment area from which patients are drawn. The VA already has a prioritized care system. The priority system is:

1. Prisoner of war--entitled to immediate treatment for any medical and/or psychiatric health care need.
2. Service Connected (SC)--entitled to immediate treatment for the service connected disability.
3. Nonservice Connected (NSC)--entitled to treatment for physical or mental conditions at the discretion of congress and after the first two categories of priority have been exhausted.

These categories are "givens" in the system and SDTU complies. However, SDTU considers that many veterans suffering from PTSD will not be SC and hence we have a stratified admission policy and draw from priority lists but maintain a balance of SC/NSC/POW and admission from local and national referral resources within the therapeutic community. An additional decision was that combat veterans fought not for Illinois or any other individual state. Hence, we are ideologically bound to admit veterans from all states irrespective of their medical district of record. Additionally, as stated above, the SDTU is one of 15 and it follows therefore that most states do not have a specialized treatment facility for combat veterans.

SDTU currently has an admission applicant waiting list of over 145 individuals. The average length of stay is 95 days and includes the mandatory 30 day no-pass orientation period immediately after admission. We have had admissions from 38 states and Puerto Rico.

STAFFING

Current staffing for the 26 bed unit to operate a therapeutic program 7 days a week 13 hours each day include:

- 1.0 FTE Unit Director (currently a Ph.D. psychologist)
- 2.0 FTE Staff Psychologists
- 2.0 FTE Staff Social Workers (ACSW)
- 1.0 FTE Psychiatrist
- 1.0 FTE Occupational Therapist
- 5.0 FTE RN (includes the head nurse and a clinical nurse specialist)
- 3.0 FTE LPN
- 9.0 FTE Nursing Assistants
- 0.2 FTE Dietician
- 0.1 FTE Chaplain (they really spend more time than that though and are included in Vietnam I group to assist with combat related issues of morality.)
- 1.0 FTE Ward Clerk
- 0.75 FTE Ward Secretary (trying to get 1.0 due to the heavy volume of correspondence and research papers)
- 1.0 FTE Housekeeper

In addition to these assigned staff we are heavy users of the Biofeedback Lab, Central Testing Unit, Counseling Psychology Section and Speech/Audiology Service due to the number of patients who have hearing loss (most notably from artillery, tracked vehicles and door gunner/crew chief MOS).

SCREENING FOR ADMISSION

Criteria:

- documented wartime stress exposure
- symptoms per PTSD (DSMIII 309.81)
- no current AODA (will be referred to inpatient AODA as needed prior to admission to SDTU)
- Voluntary and Competent; that is, no court ordered treatment, no pending felony counts, no sign or underlying psychotic processes nor uncontrolled affective disorder. The demands of treatment are too much for those with subclinical psychosis and they may experience acute psychotic episodes as a result of being on the unit.
- gives evidence of high motivation to change his combat-bound way of civilian life
- will agree to abide by unit and medical center rules and policy
- absence of acute severe medical disorders

Screening is performed weekly by a screening team composed of staff and residents. Three staff (psychology, social work and nursing) and three veterans are assigned to assess the above listed admission criteria for presence, veracity and comprehension for each person applying to treatment at SDTU. The residents are to assist in identifying the veracity of the combat stories and to discover if the applicant can abide in the community life. Individuals who do not meet the criteria are referred to appropriate treatments elsewhere.

TREATMENT GROUPS

It is a part of the treatment philosophy of the SDTU to carefully evaluate the veterans' manifest symptoms and provide specific interventions for those symptoms.

The following treatment activities respond directly to symptoms of PTSD:

1. Community meeting - Each weekday morning there is a "family" meeting to discuss issues of the coming day, to defuse potentially problematic issues, answer questions for the community in a forum where all can hear and to provide immediate redress to pressing issues. In addition, any member of the community may call a special session to provide proximate address to special problems at the discretion of the unit director.

2. Relaxation Therapy - This group provides practical, physiologically based methods for coping with stress and increases the ability to relax when awake. A variety of techniques are taught including muscle stretches based on yoga, progressive muscle relaxation, breath control technique, and cue words and imagery. This group is a prerequisite to Desensitization Group, and Biofeedback methods may be used to assist individuals who experience learning problems. This group meets daily right after Community Group.

3. Psychotherapy Group - This is a "contract group" where the veteran identifies a major aspect of his combat or post-combat "failure" in life and devises short- and long-term corrective actions.

4. Assertion Training Group - This group is structured to train the veteran in the non-verbal and verbal aspects of assertive behavior. The group attempts to develop contrasts between assertive, aggressive and submissive behavioral responses in all living environments.

5. Substance Abuse Group - A group focusing on issues of substance abuse/use in all aspects of life. Substance abuse diagnoses are the highest concurrent diagnostic category for this group of veterans.

6. Vietnam I - A group structured to develop an environment in which specific combat trauma may be discussed and re-affected in detail. It provides an exchange forum for veterans of differing services, MOSs and times in country.

7. Vietnam II - A group structured to develop an environment in which specific combat trauma may be re-vivified, re-affected, re-ordered and reframed.

8. Gray Group - A group designed to focus on the differing cultural, racial, religious, and service-related positions (e.g., officer vs EM). It attempts to dissolve the artificial barriers between persons and increase levels of tolerance for persons-different-from-self.

9. Goals Group - The purpose of this group is to assist in developing goal setting skills for both long- and short-term living.

10. Systematic Desensitization Group - A group for the application of learning theory based psychotherapeutic techniques to specific combat trauma.

11. Thinking Straight Group - A group to assist the veterans in developing new ways of thought, attitude, and value in everyday living situations. Modeling, psychodrama and gestalt techniques are drawn upon.

12. Human Sexuality Group - A group to explore sexually oriented belief and expectation systems. An additional intent is to help the veteran develop normal sexual beliefs after their overseas sexual encounters.

13. Gestalt Group - The community of residents and staff on duty meet with the Community Chairman and the Unit Director to provide a forum to express feelings of either a positive or negative nature. This group meets once a week in the evening and often is a highly charged experience.

14. Dream Group - A psychodynamic group which seeks to involve traumatic nightmares (e.g., messages from the unconscious) in the overall process of treatment and to provide the conscious framing which dreams attempt to provide.

15. "Journalling" - Introduction to the process and mechanics of keeping a therapeutic journal.

16. Medics Group - Provides a relatively specialized group treatment format for medics and corpsmen to discuss issues common to those in field medical positions. Found to be necessary due to 1) avoid having to help nonmedics "rediscover the wheel" each time 2) to allow the medics to use their own language without gross misinterpretations by "grunts," and 3) allow discussion of extraordinarily sensitive issues of provider trauma out of the public eye of the whole community.

17. Vocational group - A group to facilitate long-term vocational and educational planning and assessment.

18. Pass Group - A group wherein community members may apply for therapeutic passes and where medical/legal compliance policy and procedure are assured.

Other treatment events in addition are:

1) Individual psychotherapy - by arrangement of therapeutic contract between provider and patient.

2) Marital/Family/Significant Other - by arrangement of therapeutic contract between provider(s) and patient.

3) And the following: Incentive therapies, a complete outpatient mental health clinic including specific outpatient groups and individual follow-up care treatment for those discharged from SDTU, educational therapy, corrective therapy, night hospital, sexual dysfunction counseling, habit control clinic, voluntary service's experiences with profoundly disabled veterans, AA and other drug abuse groups, religious counseling, benefits counseling, and off

ward therapeutic outings once a month to foster social reintegration.

MINIRESIDENCY PROGRAM

The Miniresidency Program is designed to provide qualified professionals with concentrated and advanced exposure to treatment issues. The applicants must be licensed by their respective state professional registration boards. The training is by contract and individualized depending upon the applicant's expressed interests and needs for such training. The program has been reviewed by the North Central REMEC by a site visitation and approved to provide such advanced training.

RESEARCH AND RENOWN

It is the responsibility of the practitioner to provide the professional public with information which may forward the science. Because of the press of clinical service delivery, we have not performed as much research as we would like, nor as much as would be of further benefit to the profession. We have managed to produce an average of two articles in professional journals and three major presentations each year since 1982. References of work performed under the aegis of the SDTU are listed below. Interested parties are invited to directly locate the articles in the literature or to inquire directly to this author. The latter recourse may entail a lag in response, but there will be a response.

Research

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Renown

Since the unit opened the staff and residents have been very active in community educational workshops, media presentations, and written documents to those who so request. Presentations have been made to each service at the medical center more than once to assist with internal hospital relations with the unit and the veterans thereon treated. Staff and veterans have been on radio call-in talk shows on three occasions--two of them all night which resulted in so many calls to the station that the switchboard overloaded. There are several video tape presentations of the veterans and the treatment unit which have been made by and shown in both Chicago and Milwaukee television stations. Print media articles have appeared in the Milwaukee Journal, the L.A. Times and the newsletters of the Vietnam Veterans Leadership Program and all of the major veterans organizations. Academic papers/symposia have been presented at the Illinois Psychological Association, American Psychological Association, Wisconsin College Health Association, the University of Missouri-Columbia, Northwestern University, Northern Illinois University, University of Wisconsin-Milwaukee, University of Health Sciences/Chicago Medical School, and Medical College of Wisconsin. Staff, on some occasions accompanied by veterans, have made presentations at the local and/or state conventions of the DAV, VFW, AM Vets, and AM Legion. Staff has also provided congressional testimony both in person and by written response.

TOMAH VA MEDICAL CENTER
POST-TRAUMATIC STRESS TREATMENT PROGRAM
Gary Palmer, Ph.D.
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Tomah, Wisconsin

1. History: The post-Traumatic Treatment Program (PTSD) was established at this medical center July 1, 1980. It was an outgrowth of experiences of the medical center in treating combat veterans from World War II, Korea and Vietnam during the 1970s. Experience with these veterans began to demonstrate the need for a specialized approach in dealing with the trauma of combat which was defined as Post-Traumatic Stress Disorder in the Diagnostic and Statistical Manual of the American Psychiatric Association published in February of 1980.

2. Program Philosophy and Goals: Individual responsibility for ones own actions is a corner stone of the democratic state. This is the philosophy of the Tomah program. The program was designed to provide an opportunity for the veterans to learn how to change their maladaptive behavior resulting from the traumatic experience to more adaptive pattern. The program provides an opportunity for the veteran to learn to relate to a group of peer and supportive staff; this results in his becoming able to recall, analyze and express his feelings about these experiences. From this he is then able to learn to modify and adapt his behavior to meet his needs in the society in which he lives. The goals of the treatment program are: (1) to reduce feelings of detachment from others; (2) to restore real self respect in a clear personal identity; (3) to reduce fear of mental illness; (4) to provide an opportunity to learn new coping styles and relate to others; (5) to learn to handle anger, express love and other emotions in an acceptable manner; (6) to provide a community - a sense of not being alone or the only person with similar feelings and problems; (7) to provide a form to clarify values, ideology and develop a historical personal and social political perspective of experiences; (8) to develop a more integrated long range life plan.

3. Selection Procedure:

a. Individuals selected for treatment in the PTSD Program are veterans who have verifiable stressors in their military history which reasonably can be expected to have resulted in their symptoms which must meet the diagnostic classification of Post-Traumatic Stress Disorder as outlined in the APA Diagnostic Statistical Manual III.

b. Individuals requesting help for possible Post-Traumatic Stress Disorder are given a thorough evaluation on the general psychiatric unit which includes physical examination, psychiatric examination, psychological examination and the development of a comprehensive and verifiable military history. Final selection is made by the PTSD treatment staff.

4. Patient Population:

a. In the past 5 years an excess of 300 veterans have been treated in the PTSD Program at this medical center. The overwhelming majority are from

service in the Vietnam Conflict. The type of service duties are listed in order of significance below.

- (1) Infantry and Air Mobile Infantry, Marine and Army
- (2) Medical Service Personnel - predominantly Medical Corps Men and Army Medics service in the field with the Infantry
- (3) Helicopter Door Gunners and Crew Chiefs
- (4) Marine and Army Transportation personnel on convoy duty
- (5) Personnel serving in the Marine and Army Artillery Units
- (6) A small number from Specialized Forces for example, i.e., Army Special Forces, Marine Force Rangers, Army Long Range Recon, Navy Seals

b. The military units that stand out in order of number of cases are, 1st, 3rd and 7th Marine Divisions, 1st Cavalry Division, 101st Airborne Division, 173rd Airborne Division, 25th Infantry, 199th Light Infantry, 11th Armored Cavalry.

5. Program Description:

a. Staffing: The program is staffed with 15 individuals as listed below.

- (1) Psychologist/Coordinator
- (2) Psychiatrist/Physician
- (3) Social Workers/Group Leaders - 3
- (4) Clinical Psychologist - 1
- (5) PTSD Technicians - 3
- (6) Nursing - 3 R.N.s and 3 N.A.s

b. Physical Facilities: A three story treatment and office building. Approximately 8500 feet of space is allocated for living area, treatment area and office space on the third floor of a three story treatment and office building.

6. Program Content: The program is organized as a total rehabilitation program including the following.

- a. Individual Psychotherapy
- b. Group Psychotherapy
- c. Transactional Analysis - Feelings Group

- d. Vocational Rehabilitation Counseling
- e. Stress Management and Biofeedback
- f. Chaplains Group
- g. Patient Education Group
- h. Occupational Therapy
- i. Vocational Rehabilitation Training and Experience
- j. Family Groups
- k. Dietetic Counseling
- l. Recreation

7. General Operating Procedures and Boundaries: The program is rigidly structured, each veteran signing a contracting agreement with the medical center to abide by the rules of the program. Particular emphasis is placed on abstinence from alcohol and drugs and violation of rules results in immediate discharge from the program. The veterans so discharged are given the opportunity to return at a later date but the same rules apply. Passes are limited during the first four weeks of stay and are granted thereafter with the provision that the veteran does not engage in any illegal activities, use of alcohol or use of drugs, while on excused absence from the hospital. The absences are in general limited to two days on the weekends.

8. Followup: Each patient completing the program is assigned to the outpatient rolls and followed up by the medical center as frequently as needed in the individual case and at least monthly initially. Discharged veterans are referred to appropriate treating facilities and followup is sought in their home areas in lieu of followup by the hospital where distance precludes return for followup here.

THE CRITICAL INCIDENT STRESS DEBRIEFING PROCESS

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Dr. Jeff Mitchell, a psychologist with the University of Maryland Baltimore County, has described a process to assist in alleviating acute stress responses: the technique is the Critical Incident Stress Debriefing Process. A critical incident is any situation that causes an individual to experience unusually strong emotional responses which may interfere with the ability to function normally. Stress induced reactions may cause emergency workers (like firemen, police, emergency medical technicians) to be unable to do their work. Examples of critical incidents include: serious injury or death of an emergency worker in the line of duty, sudden death of a child during a rescue, or shooting of a civilian by a police officer. Critical incidents can produce characteristic reactions and symptoms; these may include: restlessness, irritability, excessive fatigue, sleep disturbances, anxiety, startle reaction, moodiness, or diarrhea. These stress reactions are normal responses to the situation.

There are a number of methods to deal with stress reactions; the Critical Incident Stress Debriefing (CISD) process is one intervention. The CISD is an organized approach to managing stress reactions in emergency services workers. The CISD process involves an individual or group meeting between the emergency services workers and a facilitator who assists them in talking about feelings and reactions to the critical incident. The stages include:

1. Ventilation of feelings by the rescuer and assessment by the facilitator of the intensity of the stress response;
2. Detailed discussion of signs and symptoms of stress responses with support and reassurance from the facilitator;
3. Closure where resources are mobilized, information provided, and subsequent options are discussed.

The CISD process should be conducted within 24 to 48 hours of the incident. The longer the delay, the more likely the individual will become vulnerable to emotional responses.

There are four types of Critical Incident Stress Debriefings, each with its own purposes and procedures. These include:

1. On-Scene or Near-Scene Debriefing. It is the briefest form. The facilitator functions as an observer and watches for the development of acute reactions. The facilitator offers support and encouragement, recommends those in need of breaks, and assists in ventilation of workers' feelings and reactions.

2. Initial Defusing. May be spontaneous or conducted by a leader. Individuals talk about their feelings and reactions to the incident. A supportive, positive atmosphere should be established. This is not the time for criticism or critiquing the incident.

3. Formal CISD. Typically led by a qualified mental health professional 24 to 48 hours after incident. Attendance is mandatory for all personnel involved in the incident. No criticism of others.

Introductory phase: Introductions, rules described, absolute confidentiality, open discussion of feelings.

Fact phase: Individuals state who they are and what they did; all participants are included.

Feeling phase: Feelings-oriented questions; all participants are included.

Symptom phase: What unusual things experienced? Has life changed since the incident? What is going on now?

Teaching phase: Description of normal stress response symptoms and emotional reactions to incidents.

Re-entry phase: wraps up loose ends, answers questions, provides final reassurances, makes plan of action.

4. Follow-up CISD. Purpose is to resolve issues or problems which may have arisen. May require more than one session.

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THE DELTA 191 CRASH: HELPING THE HELPERS

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On August 2, 1985 at approximately 6:05 p.m., Delta Flight 191, in route from Fort Lauderdale to Los Angeles, was making a scheduled stop in Dallas-Fort Worth. For reasons attributed to "wind shear" the Lockheed L-1011 crashed short of the runway. Over one hundred and thirty passengers and crew members were killed as well as a motorist whose car was hit by the landing gear before the plane finally crashed.

Within minutes public safety personnel responded to the scene. Almost immediately the Dallas-Fort Worth Metroplex began providing a full range of services to the survivors and family members of the victims. As it happens all too often, the rescue workers became the "forgotten victims."

My paper will deal with the attempts of the Office of Psychological Services of the Dallas Police Department to provide assistance to the rescue personnel. The individual emotional reactions to the trauma will be explored as well as the logistics involved in providing this assistance. Some of the pitfalls encountered will also be explored.

Ninety-two police officers, paramedics, firefighters, ambulance workers, and civilian volunteers were seen at Psychological Services in small groups as well as individually in order to assist them in dealing with the trauma.

PROBLEMS IN DISASTER MANAGEMENT
DELTA 191

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- I. The crash
 - A. Location and weather
 - 1. Near freeway - in the preplanned staging area
 - 2. Intense thunderstorm at crash site
 - B. Impact
 - 1. Location of victims
 - 2. Types of injuries
 - 3. Fire
 - C. Initial response
 - 1. Fire apparatus
 - 2. EMS
 - 3. Police

- II. Major problems
 - A. Rush hour
 - 1. Crash occurred on a major freeway at rush hour and closed the freeway
 - 2. People ran to crash site
 - 3. Poor visibility further hampered traffic
 - 4. Police were able to control one lane of traffic
 - B. Weather problems
 - 1. Poor visibility
 - 2. Triage tags were blown away
 - 3. Control points delayed
 - 4. Delayed calls for help
 - 5. High winds - flying metal, hail and debris
 - C. Communication problems
 - 1. Multiple responders
 - 2. No common radio channel
 - 3. Initial messages garbled due to too short a tone
 - 4. Some of the initial messages given on the wrong channel
 - 5. Inability to communicate adequately with the tower
 - D. Uncontrolled response
 - 1. Many agencies responded who were not called
 - 2. Staging area police were in unmarked cars and street clothes
 - 3. Weather hampered visibility
 - 4. Lack of appropriate information
 - 5. News media had better information
 - E. Psychological problems
 - 1. Groups
 - a. Rescue workers
 - b. Survivors
 - c. Relatives of deceased
 - d. News media

2. Types of problems
 - a. Anger
 - b. Guilt
 - c. Third person, never "I"
 - d. Inability to talk with family or friends

III. Libidinal cocoon

- A. Location and description
 1. Rural setting
 2. Controlled access
 3. Relaxed atmosphere
 4. Walking trails
 5. Families free to leave
- B. Workers
 1. Delta representative
 2. Ministers
 3. Psychiatrist
 4. Internist
 5. Nurses
 6. Social workers
 7. Drivers
 8. Managers
- C. Problems
 1. Minor medical problems
 2. Grief reactions
 3. Sedation of family members
 4. Need to be near body or crash site
 5. Cannot accept family member was on plane
 6. Psychotic individuals

IV. The Vultures

- A. A few news media
- B. A few lawyers
- C. A few insurance adjustors
- D. A few morticians

V. Unanticipated problems

- A. Traffic control for blood donor centers
- B. Police control around hospitals blocking patient arrival
- C. Communication problems
- D. Telephone calls

VI. Recommendations

- A. Operate as close to normal as possible - special radios and procedures usually not properly used
- B. Use brightly colored vests to identify who is in charge
- C. Plan to debrief immediately after and frequently - personnel need to discuss the situation
- D. Plan to give adequate psychological support long term
- E. Figure out how to communicate

THE STRESS MANAGEMENT AND HEALTH PROMOTION: TWO SIDES OF THE SAME COIN

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INSCOM

A program designed to modify health habits, needs to be developed within an organizational as well as a personal context. The program should also recognize that the health promotion effort should involve interventions that members of the community can focus on themselves. But will anyone out there listen? Most people now recognize the extent to which they can influence their own health and well being. But they often do not act upon that recognition, and here is where the organization must exert its influence to insure compliance with a healthy life-style. The following discussion attempts to link the two concepts, stress management and health promotion, into a cohesive fabric of organizational-personal intervention to insure a healthy military population.

WHAT IS STRESS?

Stress is an everyday fact of life. You can't avoid it. Stress is any change that you must adjust to. Stress is an adjustive demand that requires coping behavior. Stress resides neither in the person nor in the situation alone but depends on how the person's perception of himself (his self-esteem) in relation to his situation and his cognitive response to that situation (his self-talk). Challenges and changes in our daily routines can actually be stimulating and lead to growth. While we usually think of stressful events as being negative, such as the injury, illness or death of a loved one, they also can be positive. For instance, getting a new home or a promotion brings with it the stress of change of status and new responsibilities. Falling in love can, for some people, be as stressful as falling out of love. To a great extent, whether novelty is stressful or not stressful for a person depends on how it is perceived and experienced. A certain amount of stress is essential to our well being although individual tolerance levels will vary. The trick is to find the level of stress that suits us best.

WHERE DOES IT COME FROM?

We experience stress from three basic sources: our environment, our bodies, and our thoughts. Our environment, families, and jobs bombard us with demands to adjust. We must endure weather, noise, crowding, interpersonal and family demands, time pressures, performance standards and various threats to our security and self esteem. Common job stressors are: confusing requests from supervisors, unrealistic suspense dates (excessive time pressure) or expectations, lack of challenging goals, underutilization, little recognition, lack of a sense of belonging, little feeling of control, lack of perceived options for advancement, lack of proper equipment, little or not feedback regarding job performance, work overloads with no priorities, role conflicts, role overloads, and discrimination.

The second source of stress is our own physiological makeup. The rapid growth of adolescence, aging, illness, accidents, poor diet and sleep disturbances all tax the body. External threats also produce body changes which are themselves stressful. Our reaction to problems, demands and dangers

is very much influenced by an innate "fight or flight" response which we inherited from our primitive ancestors. Our predecessors tended to pass on to their children, through natural selection, any physical traits which gave them an advantage over their enemies in a hostile, competitive world. As a result, we have as part of our biochemical makeup the innate tendency to prepare to fight or flee whenever we feel threatened. Whether these threats are real or imagined.

In simple terms, our body undergoes the following changes when you experience the "fight or flight" response: when the stimuli or event is interpreted as threatening, the regulating centers give the body information to speed up in preparation to confront or escape the threat. Our pupils become larger so we can see better and our hearing becomes acute. Our muscles tense to deal with the challenge. Blood pulsates through our heads so that more oxygen reaches our brain cells, stimulating our thought processes. Our heart and respiratory rates increase. Blood drains from our extremities and is pooled in our trunk and head, while our hands and feet feel cold and sweaty. If the body is not given relief from the biochemical changes that occur during the "fight or flight" response, chronic stress may result. When you are stressed and more stress is added, the regulatory centers of the brain will tend to overreact. This results in what is considered wear and tear on our body and result in eventual breakdown and death. This process is known as the General Adaptation Syndrome which includes: Alarm (events perceived as threatening followed by individual undergoing physiological changes), Resistance (individual strives to cope), Exhaustion (fatigue, wear and tear on individual, and eventual death).

The chronic arousal of the "fight or flight" response can turn transient high blood pressure, or hypertension, into permanent high blood pressure and high risk for stroke. Stress has been found to be related to many other physical ailments such as headaches, peptic ulcers, arthritis, colitis, diarrhea, asthma, cardiac arrhythmias, sexual problems, circulatory problems (cold hands and feet), muscle tension and even cancer. One of the major reasons for this is that the great majority of us do not practice preventive medicine. That is, we do not make an effort to reduce the stresses in our lives. We have not learned that we do not need to remain totally at the mercy of our involuntary "fight or flight" responses.

The third source of stress derives from our own thoughts or self-talk. How we interpret and label our experience, what we predict for the future can serve either to relax or stress us. Interpreting a sour look from our boss to mean that we are not doing a satisfactory job is likely to be very anxiety provoking. Interpreting the same look as tiredness or preoccupation with personal problems will not produce nearly the same anxiety and self-doubt. Dwelling on our negative thoughts produces tension in our body, which in turn creates the subjective feeling of uneasiness and leads to more anxious thoughts. We could call this vicious cycle, "anticipatory anxiety" - that which we generate ourselves. This has its effect on our ability to perform through self-talk. The fears and uncertainties that we generate and end up expecting. This self-talk is what programs us for failure or leads to paralysis.

WHAT DOES IT DO TO US?

There are positive effects of stress. An individual develops an increased awareness of his environment, he/she becomes more sensitive to events in the world around him. Second, there is an increase in energy and vitality. Third, an individual engages in more productive behavior. Stress actually prepares us for performing the daily activities of living.

The negative effects of stress are inefficiency, decreased ability to cope, increased susceptibility to illness (especially heart attack), interpersonal difficulties at work, home and with friends, irritability, inability to relax, feelings of guilt and alienation, chronic sense of time urgency, reduced ability to make decisions, poor self-image, and reduced feelings of self-esteem.

WHAT CAN WE DO ABOUT IT?

We can't escape all of the stresses of life or completely turn off our innate "fight or flight" response to threat, but we can learn to counteract our habitual reaction to stress by learning how to talk to ourselves and relax. The very centers of the brain that speed up our biochemical processes when we are alarmed can be called upon to slow these processes down. The relaxation response is the opposite of the alarm response and it returns our body to its natural balanced state. Your pupils, hearing, blood pressure, heartbeat, respiration and circulation return to normal and your muscles relax. The relaxation response has a recuperative effect in that it allows you a respite from external stress. It keeps you from using up all your vital energy at once as you react, then overreact, and are finally overwhelmed by the stresses in your life. It normalizes your physical, mental and emotional processes.

WHAT SHOULD BE THE ORGANIZATION'S RESPONSIBILITY?

The steps that we can take to reduce our own risk of disease or injury are, in or of themselves, not a comprehensive health promotion program. The equation is not that simple. We know that health habits and life styles are important factors in modifying our risk for disease or death, but the implementation of such changes on a large scale are an organization responsibility as well as an individual one. This organization responsibility has been outlined in The Surgeon General's 1979 Report, Healthy People. This report recommended that an integrated comprehensive program be developed to provide preventive as well as rehabilitative services to members of the Armed Forces and their families (See Figure 1).

However, in order to be successful the active participation of the health profession must be achieved. We still cling to the belief that wellness is the sole responsibility of the individual and that the health profession is to be judged only on the basis of cure rates and repair rates as their sole criteria for success.

The health community has little experience in changing lifestyles, however, other than through the traditional means of providing information and education. But, changing lifestyles require much more than imparting factual

knowledge. Most adults know that smoking is unhealthy; they know that proper nutrition and exercise are necessary for good health. Knowledge does not always translate into changes in behavior. Such behavior is deeply rooted in the habits and sociocultural foundations of the community in which people live. Thus an Army health promotion effort should be systematic and should include activities to impact on both individual habits as well as those social and environmental factors which relate to healthy lifestyles.

As a first step in this process of promoting health OASD (HA) held a four-day conference in 1983 to bring together military personnel actively working in the arena of health promotion to formulate recommendations on the direction such a program should take within the Army.

The conference was organized into working groups and members were tasked to present recommendations under the following headings: (1) individual wellness, i.e., the individual measures and programs that include behaviors largely under volitional control; (2) community wellness, i.e., social and cultural issues facilitating health promotion; (3) community development and the development of a "model program," i.e., the issues and approaches to mobilizing a community to support health promotion; (4) data gathering and program evaluation (See Figure 2).

WHERE DO WE GO FROM HERE?

The need to change lifestyles, which is the basic requirement for a health promotion program, is a very complex and long-term undertaking involving broad sociocultural processes. The Army has had little experience in this area, especially on a large scale. Therefore, the effort should be deliberate, with careful evaluation of specific efforts before launching into a massive program that tries to do everything at once. We must avoid raising unrealistic expectations of quick and dramatic results that can be subjected to economic cost-benefit analysis.

In spite of the foregoing caveats, the emphasis on promoting health in a systematic way is long overdue. The Army community represents an ideal environment for such an effort for many reasons. There was a general consensus that if such an effort can succeed anywhere, it will be in the military community. Our mission requires healthy people, it is part of the value system of the military we are organized to go about such a task in an integrated, comprehensive fashion. This does not imply coercion by any means; on the contrary, we believe the effort will succeed to the extent that there is voluntary personal commitment and involvement by individual members and groups of the community.

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**MAJOR GOALS OF THE DOD
HEALTH PROMOTION PROGRAM**

- **TO DEVELOP A COHESIVE MILITARY COMMUNITY WITH
VALUES AND NORMS THAT PROMOTE:**
 - **INDIVIDUAL MENTAL AND PHYSICAL WELLNESS**
 - **HIGH UNIT PERFORMANCE**
 - **HEALTHY FAMILY ENVIRONMENT**
 - **TOTAL COMMUNITY INVOLVEMENT**

- **TO BUILD ON THE HEALTH AND WELLNESS RESOURCES
AND PROGRAMS AVAILABLE IN THE COMMUNITY**

MODEL FOR THE MODIFICATION OF ORGANIZATIONAL HEALTH NORMS

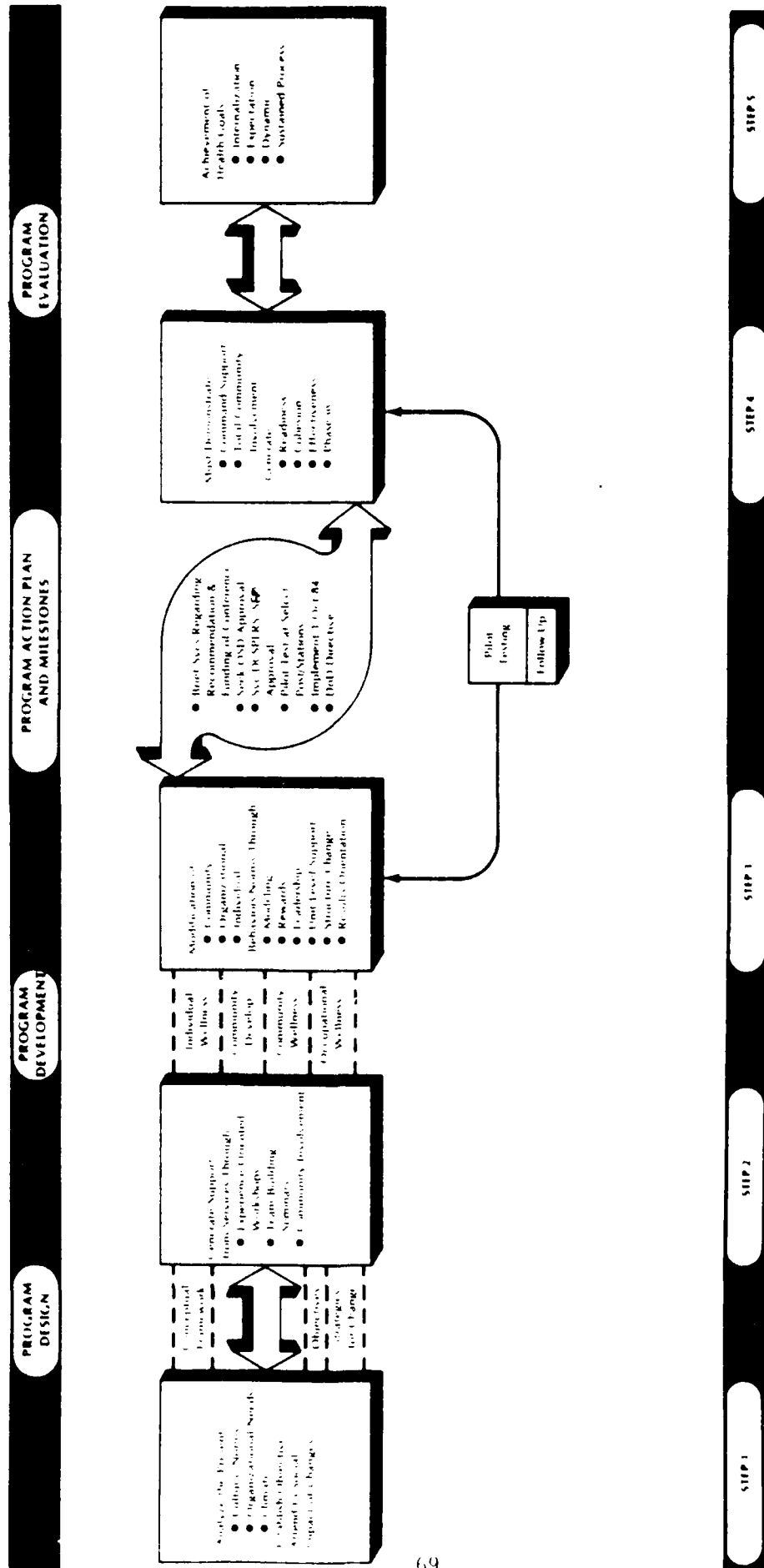


Figure 2

THE MANAGEMENT OF SOLDIER PERFORMANCE IN CONTINUOUS OPERATIONS

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The Soldier Support Center published two Field Manuals (FM) in December 1983: FM 26-2, Management of Stress in Army Operations (FM 26-2) and Soldier Performance in Continuous Operations (FM 22-9). Both of these FMs were somewhat outline in format -- a necessity due to the formidable breadth of the subject matter. Since that date, the Directorate for Soldier Advocacy has been attempting to fill in the empty spaces and put some meat on the bones of stress management doctrine, and training. I will briefly provide you with an overview of our current efforts in this area.

1. In line with comments from the field, we are now revising FM 26-2, Stress Management. Our main objective on this project is to provide more valid particulars and details to the FM, make it more green, provide more prevention, and proactive measures to leadership's efforts to cope with stress in themselves and their soldiers.

2. In line with guidance from the Vice Chief of Staff, we are developing a number of Training Support Packages (TSP) on Stress Management. (Each of these would probably fit into separate cells of COL Stokes' matrix.) Most of these TSPs are being developed jointly with the Academy of Health Sciences.

- a. A four-hour block of instruction (TSP) has been developed for the Sergeants' Major Academy for their inclusion in the ANCOC common core for all Army schools. The Terminal Learning Objective (TLO) for this TSP is to describe the concept of maintaining effective soldier performance during the extreme stress of continuous operations.

- b. Two part TSP for Unit Stress Training for company level officers and NCOs for Army wide implementation. The objective is to provide instruction that will enable soldiers to recognize and cope with combat stress during continuous operations.

- c. We are also supporting C&GS College in their development of two TSPs, one for OAC, and one for the PCC.

THE FITNESS TRAINING UNIT (FTU): DEVELOPMENT OF ENTRY AND
EXIT CRITERIA AND METNAL FITNESS PROGRAM OF INSTRUCTION

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In response to a TRADOC study group Review and Analysis of the Trainee Discharge Program, the Soldier Physical Fitness School (SPFS) and Directorate of Soldier Advocacy (DSA) were tasked by the CG, TRADOC to develop: 1) a means of identifying at Reception Stations recruits who might have physical or motivational difficulties completing Basic Training (BT); and 2) a program of instruction (POI), operating procedures, resource requirements, and exit criteria for a special Fitness Training Unit (FTU) designed to, within one to three weeks, prepare these individuals to succeed in BT. The Health Fitness Center (HFC) jointly with Directorate of Soldier Advocacy (DSA) developed six one-hour lesson plans for the FTU, most of which are being incorporated into a revised BT fitness POI, in the areas of self evaluation of stress, self control/relaxation techniques, problem solving and soldier values. A variety of psychological, health opinion, physical and performance characteristics and capacities, and graduation/discharge outcomes were collected at Fort Dix, NJ, in two phases to develop, refine and validate entry and exit criteria for the FTU and to assess the effectiveness of the POI. Operational, logistical and resource constraints superimposed on statistical analyses dictated that the entry criteria consist of the push-up (PU) for males and the PU (primary) and flexed-arm hang (FAH) time (secondary) for females. The sole exit criteria for both sexes will be the PU. Although initial standards have been established as: entry (males, less than 13 PU; females, 0 PU and less than 20 sec FAH); exit (males, 20 PU; females 6 PU), both entry and exit criteria should be adjusted to achieve the highest overall initial entry training graduation rates. These entry standards, identified 13 percent of all soldiers sampled and captured 33 and 41 percent of male and female failures, while mispredicting 10 and 6 percent of passes for males and females, respectively. The POI proved successful both objectively and subjectively in enabling soldiers in the FTU to meet the physical and other requirements of BT and to graduate. Of particular significance are: 1) the commitment demonstrated by this initiative to the value of the individual soldier, and the recognition of the potential value of mental fitness and its inclusion in the very earliest phases of Army training.

Attrition and retention of personnel in the Armed Forces have been reviewed by several investigators (Hand, Griffeth, and Mobley, 1977). However, the early research in this area has emphasized the nature and assessment of reenlistment rather than attrition data, demographic rather than task performance variables, and cross sectional rather than longitudinal study designs. Unfortunately, there is a general scarcity of meaningful data or models for prediction of attrition and retention in the civilian workforce as well (Mobley, Hand, Baker, and Meguno, 1979). Furthermore, the advent of the All Volunteer Army in 1973 precludes applicability of much of the previously reported military data.

The need for further research into the factors involved in attrition and the identification of these factors as soon as or before a trainee enters service becomes increasingly important as the available draft-age manpower pool declines and/or recruiting, training, and retention costs increase. One recent report stated that approximately nine percent of recruits were being quickly discharged from the Armed Forces for a variety of reasons ranging from physical inability to perform military duties to a lack of aptitude for service (Kowal, Vogel, Sharp and Knapik, 1982). The cost of this rapid attrition of recruits was estimated to exceed 190 million dollars a year at that time. Even these calculations do not reflect the total loss as they fail to take into account the intangible costs of discipline problems, administrative and legal complications.

The implementation of the Military Enlistment Physical Strength Capacity Test (MEPSCAT), and the research leading up to it (Ayoub et al., 1982; McDaniels, Skandes and Madole, 1983; Myers et al., 1984; Sharp et al., 1980; Teves, Wright and Vogel, 1985), apparently failed to effectively reduce attrition at least during the initial phases of Army training. Concern over this situation prompted the tasking by the Commanding General (CG) of the Training and Doctrine Command (TRADOC) of a study group review and analysis of the Trainee Discharge Program (TDP).

The TDP study group report (1984) strongly endorsed the continuing need for a TDP-type program to facilitate early separation of selected personnel. However, the report also recommended that leadership techniques and all current policies be returned to favor a more positive and supportive approach directed toward the individual soldier.

One of the principal areas in which major revisions were recommended was physical training. The TDP study reported that physical fitness training lacked standardization and contributed significantly, both directly and indirectly, to TDP losses. The report noted that after exposure to continued physical rigors many trainees attrit because they cannot keep up with their peers and become motivational failures.

The TDP study group report resulted in the CG, TRADOC, tasking the U.S. Army Soldier Physical Fitness School with assistance from the Directorate of Soldier Advocacy, to develop a program to save as many as possible of the 8000 plus soldiers being discharged annually under TDP (now called Entry Level Separation) programs. Specifically, these organizations were directed to: 1) revise Initial Entry Fitness Training in general, and 2) develop a means to predict in reception stations a recruit's potential for achieving initial

entry Army Physical Fitness Test (APFT) standards and for successful completion of initial entry training. The Health Fitness Center, Hawley Army Community Hospital, Fort Harrison, constituted in January 1985, provided a major source of design, data collection and analytical support, as well as in instruction and lesson plan development, over the course of this project. The system developed, which has been implemented at the eight Army Training Centers since 1 November 1985, is executed as follows.

Individuals identified at the reception station as potential failures are placed in a special unit called the Fitness Training Unit (FTU) where they receive from one to three weeks of total fitness and general military skills training. Individuals assigned to an FTU are tested weekly and once they meet the established exit criterion, they are released to enter a regular Basic Training company. Soldiers who fail to achieve the exit criterion by the end of the third week are evaluated for possible discharge using the "whole soldier" concept. A commander in the grade of lieutenant colonel must interview the soldier before determining whether the soldier should be separated or retained for further training (LOI, TRADOC, ATTG-I, 21 Oct 85).

The overall goal and general study plan are depicted in Figure 2. Major efforts were directed into thoroughly revising the concepts and execution of fitness training. The importance of psychological factors such as motivation, attitude, and expectancy in soldier performance was underscored in the TDP report and taken to heart in constructing the new Program of Instruction (POI). The opportunity was taken at this time to introduce fundamental behavioral technologies into enhance level training under the concept of "mental fitness." Incorporation of the "mental fitness" concept resulted in the following interim fitness formulation:

MENTAL FITNESS + PHYSICAL FITNESS = TOTAL FITNESS

The ultimate goal is to integrate behavioral/life style aspects of physical fitness into all fitness training.

The component topics of the new POI include: APFT improvement, cardiovascular risk and prevention, diet and nutrition, smoking cessation, for a total of ten hours of classroom instruction, and six hours of instruction in mental fitness. The mental fitness lesson package contains well-accepted psychological techniques of self-management adapted to the understanding level of the Basic Trainee.

With regard to the mental fitness instruction, the first hour is intended to introduce the concept and emphasize the "skill" nature of mental fitness training. The skill involves learning ways to stay in a frame of mind that permits reaching maximum performance potential. It also includes adopting a healthy life style and maintaining a success orientation. The crux of the concept revolves around the personal qualities that can help individuals succeed. The acronym S-O-L-D-I-E-R is used as a device to help soldiers remember these components of mental fitness.

- S - self direction or motivation. It is being clear about the goals you wish to achieve and going after them.
- O - optimism. Optimism is a positive attitude about yourself. Concentrating on your success leads to self confidence. Being optimistic about your abilities gives you the confidence you need for future success.
- L - loyalty. Mentally fit soldiers are loyal to groups to which they belong. They feel a bond with and they care about their country, their fellow soldiers and their unit. True success can only be reached when everyone is recognized as having value. A mentally fit soldier always strives to be better and helps others to be better too.
- D - discipline. Discipline means practicing and living what we say we are. A disciplined soldier takes good care of himself, and avoids doing things which are harmful or unhealthy. Even when the task seems difficult the disciplined soldier can give himself that extra boost needed to accomplish the mission.
- I - insight. Insight means being ready to see things as they really are. Sometimes this means putting yourself in the other person's place. Sometimes this means keeping a clear picture in your mind of what the objective is and going ahead even if you feel like you can't. Being insightful means being willing to keep an open mind, look at the alternatives, and not jump to conclusions about yourself, other people or the situation. Being insightful leads to understanding of yourself and your situation.
- E - enthusiasm. We show enthusiasm by actively participating in what is going on around us. An enthusiastic soldier joins in and is a part of the group's activities. Enthusiasm is easy to develop. Just let yourself join in and once it starts, it will keep going and continue to grow.
- R - risk taking. This does not mean being foolhardy or taking unnecessary chances. It means being ready and willing to give yourself a chance to succeed. This is courage -- the courage to try new things, to be creative. A soldier with courage is not afraid to take a chance with him/herself.

The second period of instruction is devoted to self control and relaxation training. The first portion briefly reviews the concept of stress and describes seven major warning signs of ineffective coping to include: alcohol and drug abuse, denial, impulsive behavior, aggression, anxiety, isolation, and eating aberrations. The second part addressed coping techniques. Soldiers were taught to use paced breathing and an abridged version of Progressive Relaxation Training. The following coping procedures were also discussed: time limited thinking, distractibility operations, positive reframing, self talk, ventilation, and not taking things as personal.

The next topic - self assessment of stressors and individual tension levels - is designed to help soldiers identify stressors in the training environment and help make more concrete their current coping abilities. The soldiers complete two instruments: The Soldier Adaptation Index (SAI-CMX-1) and the test for gauging stress and tension levels.

The fourth hour introduces the standard Army seven step problem solving procedure. Throughout this class soldiers are encouraged to participate by volunteering problems and solutions. Emphasis is placed on: 1) self-reliance/self responsibility, 2) giving and accepting feedback, and 3) the wisdom of knowing when and how to ask for assistance.

The fifth class on Soldier Values introduces the concept of values and presents practical exercises to demonstrate how values are revealed through examining likes/dislikes and the way soldiers describe people, things, and events. Individual differences among soldiers are used to illustrate how people may approach problems and choose different courses of action because of values. Following this, values which are important for soldiers are presented and defined. The same procedure used to illustrate the influence of individual values on behavior is used to show how adoption of "soldier values" can help in succeeding in IET.

The sixth and final hour is a review of the preceding five hours followed by several scenarios typical of the challenges faced in the training environment. The overall 3 week POI provided for 169 hours of training including the 16 hours of classroom total fitness training previously described, 58 hours of physical training, 32 hours of general military skills training, 7 hours of administrative time, and 55 hours for other miscellaneous requirements.

Data collection to develop the entry screening system began in January 1985 with the administration of physical and psychological assessments to 400 male and 300 female recruits in the Fort Dix reception station (Table 1). The conformity scale has been shown to reliably predict drug use among college students. The achievement scale is correlated with supervisory ratings of utility workers. The locus of control scale has been found to distinguish between police and utility personnel receiving high versus low supervisory ratings and also between Marines who pass and fail basic training. In all instances, those with an internal locus of control fare better than those who have an external locus of control and do not feel in control of their own life. The stress scale has been found to correlate with superior's ratings of performance for US Army Reservists. Concerning the mood scale, Marine Corps studies showed that those who failed to complete basic training more frequently rated themselves as depressed, anxious, or angry during the first week of basic training. The success scale is similar to an Israeli instrument which predicted first tour performance of soldiers.

A preliminary screening of the 21 physical, psychological, and performance variables resulted in the selection of the five part test shown in Table 2. Table 3 illustrates the extent to which "qualifying" in any two or more of these five categories was linked to ultimate APFT failure or discharge for the reasons shown.

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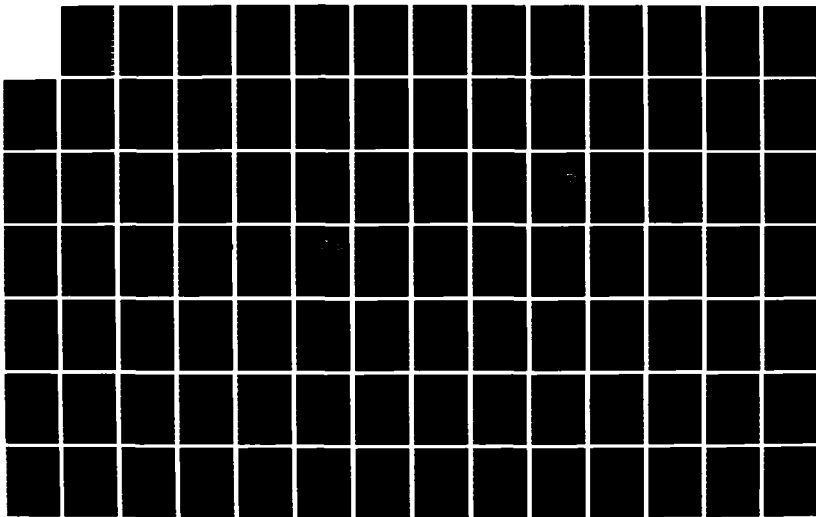
USERS' WORKSHOP ON COMBAT STRESS (5TH) HELD AT FORT SAM 2/3
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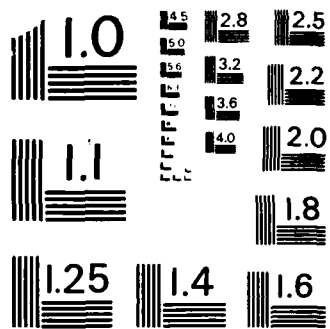
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In this sample, this assessment would potentially have identified 46 and 67 percent of male and female non-medical discharges and 47 and 83 percent of male and female the BT record APFT failures, respectively. However, 21 and 43 percent of the total sample of males and females, respectively, would have been identified as potential failures with this system - unacceptable high levels given the exiting resource constraints.

The next phase of the project utilized this 5 item assessment while adding the Health Opinion Survey, capturing the MEPSCAT score from the recruit duty packet, and calculating lean body mass to provide three additional items for post-hoc analyses in the design indicated in Figure 3. All soldiers processing through the Fort Dix reception station from 12 April to 3 May 1985 were tested on the previously mentioned items. Half those who "qualified" in two or more of the five categories were placed into the experimental fitness training platoons, the other half (control group *) proceeded directly to regular BT training companies along with all other individuals (normals) who did not "qualify" for the FTU. Reserve Component soldiers who would have gone to the FTU were sent directly to BT due to enlistment and active duty training contract limitations. Table 4 shows some of the characteristics of the females and males that fell into the three groups. A second control (II) group was identified from among those soldiers inprocessing from 2 to 23 May 1985. These soldiers were placed into the same BT companies as the FTU graduates in order to provide as close as possible a comparison between the FTU graduates and other potential failures undergoing identical training conditions. If the FTU was effective, we expected to see substantial differences between the FTU graduates and their counterpart controls (from both groups I & II) in graduation rates and APFT scores.

Separation and APFT outcome data, shown in Tables 5 and 6 for females and males, respectively, demonstrate the efficiency of the POI. The graduation rates and record APFT pass rates of FTU graduates were comparable to those of the "normal" group while the controls fared more poorly in those and other categories. We conclude that both the concept and POI, although not refined, were indeed achieving the stated objective. Subjective statements made by the FTU graduates themselves confirmed on-the-ground observations by Soldier Physical Fitness School and Health Fitness Center staff as to the beneficial individual effects of the total fitness training package.

The relationship of the five item FTU entry assessment performance to success and failure was similar to what it has been in Phase I (Table 7). The two category qualification/five part assessment identified 21 and 18 percent of all female and male soldiers, respectively - considerably less than in the Phase I sample but still in excess of the 7.4 percent of recruits for which the FTU had been resourced.

Further analyses were conducted to determine the item or items which would predict the highest percentage of failures while minimizing misprediction of soldiers who actually passed. In both the male and female samples, the push-up turned out to be the best predictor of the group that met APFT standards and graduated. Use of certain additional items, both physical and motivational, did in many instances permit better identification of failures but at unacceptable misprediction costs. The push-up was, therefore, established as the sole entry criterion for males. The percentages of soldiers in the sample

correctly and incorrectly identified by various scores on this item are depicted in Table 8.

An entry criterion score of less than 13 push-ups identifies approximately 13% of incoming male recruits and captures about a third of those who fail. Thirteen percent turns out to be the percentage of recruit flow that can be channelled into a unit resourced to handle seven and a half percent of the total receptee population for the three week period, based on experiences at Forts Dix, Knox and Jackson, indicating that approximately one-half of each group of FTU soldiers meet the exit criteria each week. For females, it was necessary to use a second item to further separate the 28 percent who were unable to perform one push-up. The flexed-arm hang turned out to be the most effective discriminator. Table 8 shows how this combination of items correctly and incorrectly predicted failure in our sample. Based on initial observations at several training centers the thirteen percent level of average recruit flow/performance was selected as the initial female entry standard for the FTU.

It is not surprising that the push-up was the best predictor of failure in general since it was responsible for 96 and 91 percent of male and female failures on the Record APFT in BT. Regression analyses, unfortunately, were minimally helpful in establishing exit levels due to the variation in performance on this event in the reception station, the high percentage of initial APFT passes, and the resulting large standard errors of estimate. We, therefore, focused primarily on the scores of those individuals who either failed to meet the final push-up standards or were discharged. Given an average increase of 14 for male push-ups over the course of BT, and the fact that only 30 percent of the males who failed to meet BT push-up standards (which currently equal 30 for the 17-25 year old age group) performed 16 or more push-ups in the reception station, 16 was initially selected as the exit level. This relatively low exit standard would facilitate movement out of the FTU allowing more soldiers to be trained, reducing FTU entry standards (making it more difficult to avoid), capturing more borderline recruits and thus having the maximal impact on overall IET graduation rates. However, in the interest of ensuring the success of the FTU graduates, and thus presumably the program, policy makers raised the exit level to 20.

The average change in push-up scores over BT for females is 10. Thirteen is the number required for a 17-25 year old to pass the APFT in BT. Our original recommendation for the exit level was four push-ups. Only 16 percent of that 10 percent who failed the push-up portion of the APFT did four or more in the reception station. Again, however, policy makers raised the FTU exit level to six to better ensure the success of the FTU.

Although the entry and exit criteria have been established for the commencement of the FTU program, either or both will likely require periodic local adjustments to meet the stated goal of higher overall (percentage) IET graduation rates. This sliding scale approach to entry and exit levels allows for changes in recruit characteristics, APFT and other graduation standards, climate and resource variations.

In summary, the soldier Physical Fitness School was tasked to revise the fitness POI for Initial Entry Training. At the same time, SPFS, with assistance from DSA, and HFC, was directed to develop a system to reduce IET

attrition. This system included development of a mechanism for identifying potential drop-outs, a pre-IET POU, and criteria for soldiers release from the remedial program (FTU) into a regular BT unit.

Two aspects of this project are of particular significance:

1. The concrete commitments and movements away from the replacement mentality towards one which, even if primarily for financial reasons, focuses on the value of the individual soldier; and,
2. The recognition of the potential value of "mental" fitness--as the foundation for total fitness and success in the Army--and the consequent inclusion of mental fitness training in the very earliest phases of Army training.

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HOW IT WILL ALL WORK

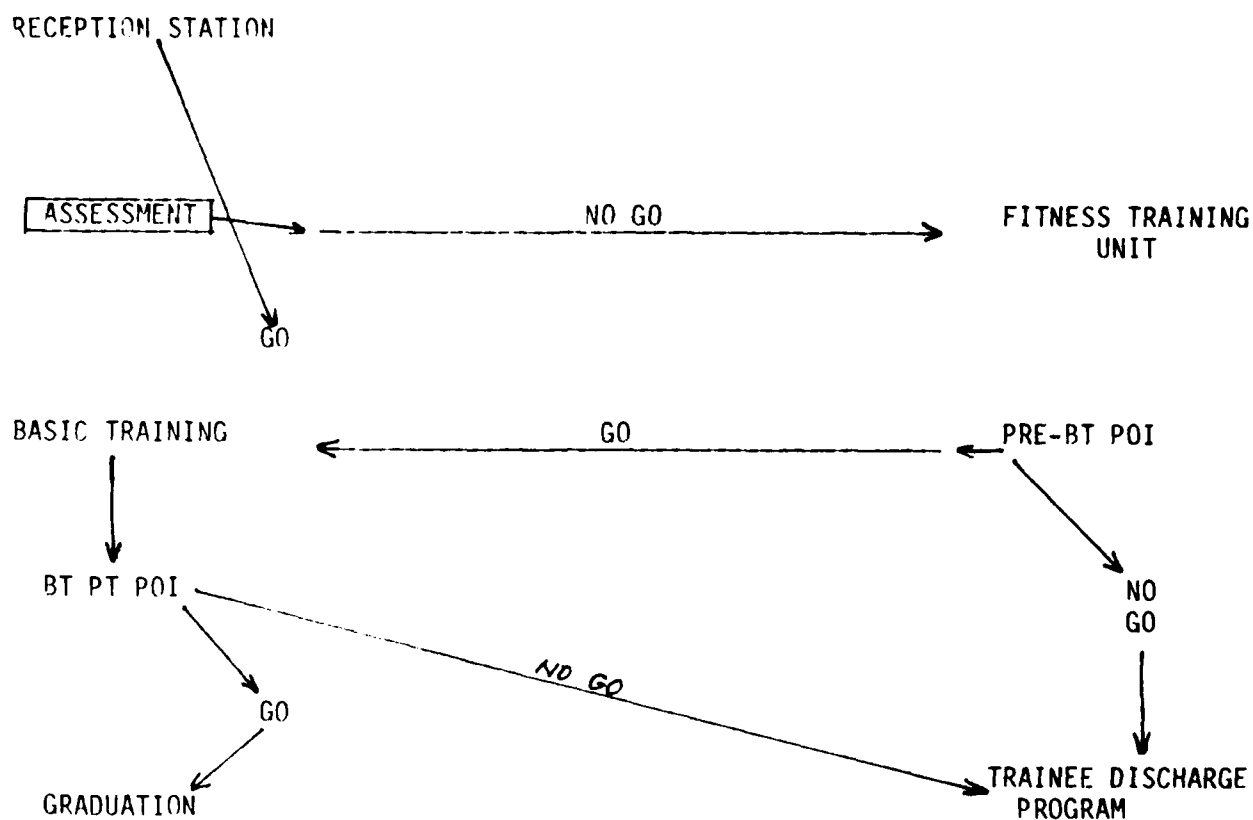


Figure 1. How It Will All Work

FITNESS TRAINING UNIT (FTU) GOAL AND METHODS

FTU PROGRAM

Improve the "unfit" soldiers' ability to meet IET graduation requirements and thereby achieve a higher IET graduation rate, saving both soldiers and recruiting costs (\$5000 each).

METHODOLOGY

- Establish an FTU training program, including POIS for physical and mental training, operating procedures and resourcing requirements.
- Determine the psychological, physical and performance characteristics of soldiers who fail to meet IET graduation requirements.
- Evaluate the efficiency of the FTU POI and establish appropriate criteria that determine when a soldier should exit the FTU.
- Set the entry criteria at a level that will keep the FTU at its optimum fill (resourced for 7.4 percent of incoming recruits).
- Adjust the exit criteria, and the corresponding entry criteria, as necessary to achieve the highest IET graduation rate possible.

Figure 2. FTU Goal and Methods.

THREE FITNESS TRAINING UNIT (FTU) PLATOONS

3 FTU PLATOONS

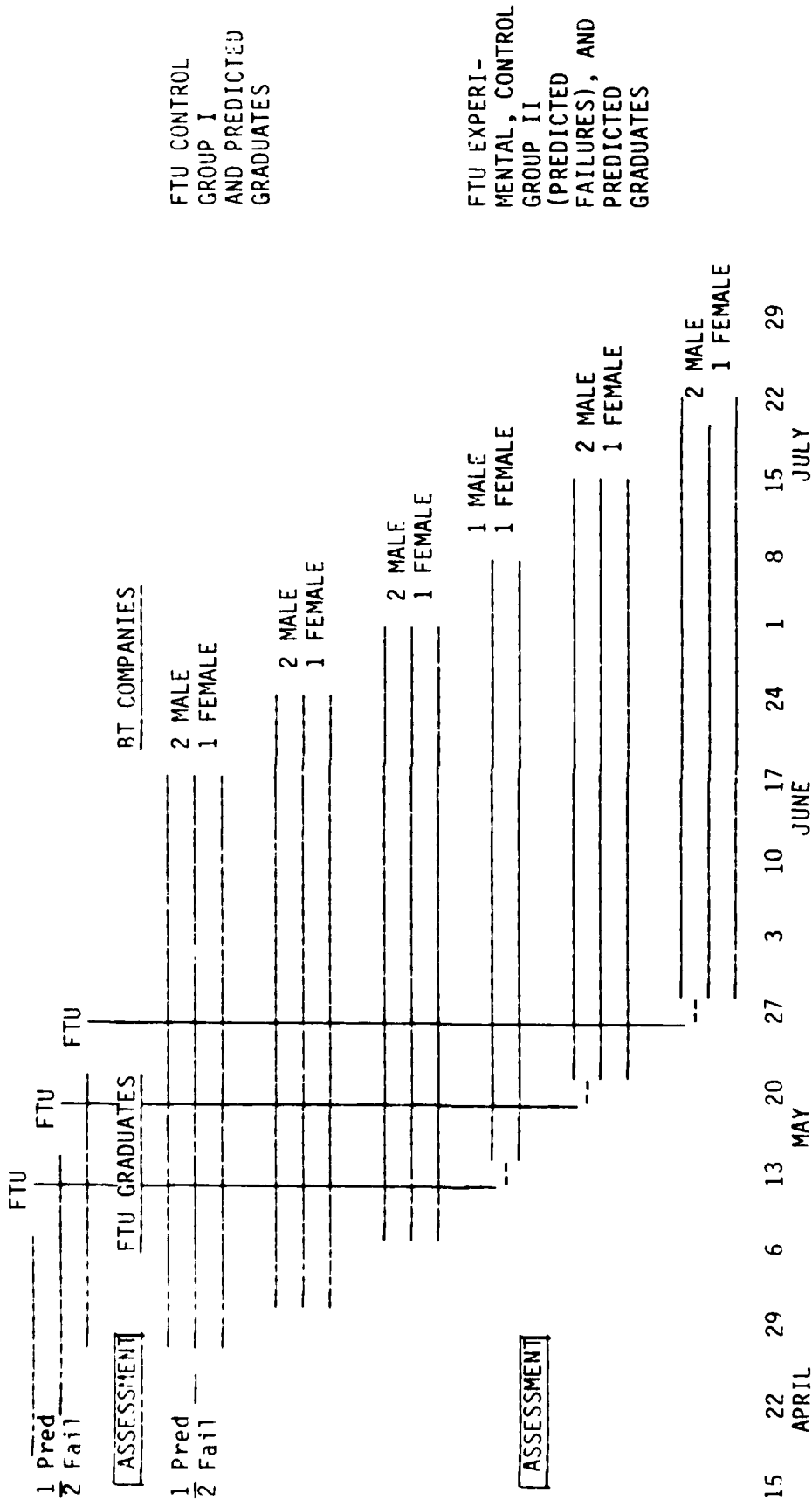


Figure 3. FTU Test Strategy

FORT DIX RECEPTION STATION DATA AND POST BASIC TRAINING

PHASE I RECSTA DATA

Motivational Subtest Items

Conformity
Achievement
Stress Scale
Motivation
Acute Mood Scale
Total Motivational Score
(sum of all the above)
Success Expectancy Scale

Physical Measurement

Flexibility
Push-ups
Height
Weight
% Body Fat
Sit-ups
Pull-ups (Male)
Flexed Army Hang (Female)
Resting Heart Rate
Grip Strength
(Left and Right)
coordination
2-Mile Run*

*2-mile run times were obtained from data collected by the BT unit cadre during the initial, diagnostic Army Physical Fitness Test (APFT).

PHASE I POST-BT DATA

All Motivation Items
All Physical Performance Measurements
Reason for Entry Level
Separation (ELS) or
Discharge

Basic Rifle Marksmanship
(BRM) Score
End of Cycle Test (EOCT)
Score
Record APFT 2-Mile Run Time

Table 1.

Five-Part Test Assessment Instrument

		PHYSICAL		MOTIVATIONAL		TOTAL SCORE	
		% BF	PUSH-UP	PULL-UP/ FLEXED-ARM HANG	SUCCESS EXP		
MALES	GE	28%	LE 10	LE 3	LE 7	GE	95
FEMALES	GE	36%	LE 1	LE 19 SEC	LE 7	GE	95

GE = Greater than or equal to

LE = Less than or equal to

Table 2.

Five-Part Assessment Instrument (Post-HOC) "Predictive" Capability

	MALE		FEMALE		TOTAL	
Graduate	86%	319 of 371	61%	151 of 249	76%	470 of 620
MEDD ELS	29%	4 of 14	64%	7 of 11	44%	11 of 25
SOC & EMOT ELS	20%	1 of 5	100%	2 of 2	43%	3 of 7
MOTV ELS	56%	5 of 9	60%	6 of 10	58%	11 of 19
NEWSTART	--	-- --	50%	1 of 2	50%	1 of 2
<hr/>						
TOTAL	82%	329 of 399	61%	167 of 274	74%	496 of 673
<hr/>						
Record APFT Failures	47%	9 of 19	83%	10 of 12	61%	19 of 31

NOTE: MEDD = Medical Discharge
 SOC & EMOT = Sociological and Emotional Separation
 MOTV = Motivational Separation

Table 3.

PHASE II TEST SAMPLE
FEMALES

	<u>NORMAL</u> (N=777)	<u>CONTROL</u> (N=42)	<u>FTU</u> (N=69)
AGE	21.6	22.0	21.8
COMPONENT (%)			
RA	69%	60%	100%
NG	10%	16%	--
USAR	21%	24%	--
H.S. GRAD (%)	97.5%	97%	97%
	<u>RECSTA</u>	<u>POST BT</u>	<u>RECSTA</u> <u>POST BT</u>
WEIGHT (LBS)	124.9	127.8	131.2 133.4
FAH (SEC)	33.7	40.6	20.3 24.3
BODY FAT (%)	28.2		31.1 30.2
MEPSCAT (MODE)	60		60 50
SUCCESS EXP (1-10)			
MEAN	8.9		7.7 7.2
MODE	10		7 7
	<u>1ST DIAG</u>	<u>RECORD</u>	<u>QST DIAG</u> <u>RECORD</u>
	<u>APFT</u>	<u>APFT</u>	<u>APFT</u> <u>APFT</u>
SIT-UP	36.6	52.4	30.1 48.8
PUSH-UP	11.3	21.1	4.0 14.2
2-MILE RUN (MIN)	21.8	18.6	22.6 19.7
	<u>1ST DIAG</u>	<u>RECORD</u>	<u>1ST DIAG</u> <u>RECORD</u>
	<u>APFT</u>	<u>APFT</u>	<u>APFT</u> <u>APFT</u>
SIT-UP	36.6	52.4	30.1 48.8
PUSH-UP	11.3	21.1	4.0 14.2
2-MILE RUN (MIN)	21.8	18.6	22.6 19.7
	<u>1ST DIAG</u>	<u>RECORD</u>	<u>1ST DIAG</u> <u>RECORD</u>
	<u>APFT</u>	<u>APFT</u>	<u>APFT</u> <u>APFT</u>
SIT-UP	36.6	52.4	30.1 48.8
PUSH-UP	11.3	21.1	4.0 14.2
2-MILE RUN (MIN)	21.8	18.6	22.6 19.7

	<u>NORMAL</u> (N=1524)	<u>CONTROL</u> (N=229)	<u>FTU</u> (N=75)
AGE	20.8	21.6	20.8
COMPONENT (%)			
RA	68%	67%	100%
NG	17%	20%	--
USAR	15%	13%	--
H.S. GRAD (%)	83.0%	83%	92%
	<u>RECSTA</u>	<u>POST BT</u>	<u>RECSTA</u> <u>POST BT</u>
WEIGHT (LBS)	157.6	159.4	131.2 173.6
BODY FAT (%)	7.8	8.8	3.2 5.0
PULL-UP (MAX)	19.0		26.1 27.7
MEPSCAT (MODE)	110		110 110
SUCCESS EXP (1-10)			
MEAN	9.0		7.5 7.4
MODE	10		7 7
	<u>1ST DIAG</u>	<u>RECORD</u>	<u>1ST DIAG</u> <u>RECORD</u>
	<u>APFT</u>	<u>APFT</u>	<u>APFT</u> <u>APFT</u>
SIT-UP	33.9	56.6	35.9 52.1
PUSH-UP	22.1	46.0	21.2 36.6
2-MILE RUN (MIN)	16.6	14.6	18.9 15.8
	<u>1ST DIAG</u>	<u>RECORD</u>	<u>1ST DIAG</u> <u>RECORD</u>
	<u>APFT</u>	<u>APFT</u>	<u>APFT</u> <u>APFT</u>
SIT-UP	33.9	56.6	35.9 52.1
PUSH-UP	22.1	46.0	21.2 36.6
2-MILE RUN (MIN)	16.6	14.6	18.9 15.8

Table 4

SEPARATION AND ARMY PHYSICAL FITNESS TEST (APFT) OUTCOMES

SEPARATION AND APFT OUTCOMES

FEMALES

	<u>NORMAL</u>	<u>CONTROL</u>	<u>FTU</u>
GRADUATES	96.8%	2.9%	93.8%
DISCHARGES			
MEDICAL	2.2%	7.8%	1.5%
SOCIAL & EMOTIONAL	.6%	2.3%	
MOTIVATION	.3%	1.6%	3.0%
APFT		2.3%	
PREGNANCY	.1%	.8%	
OTHER		2.3%	
TOTAL	3.2%	17.1%	6.2%

APFT			
1ST TIME PASSES	91%	66%	87%
1ST TIME FAILURES	9%	34%	13%
PASSED WITHIN CYCLE	(7%)	(20%)	(8%)
FAILED LAST APFT	(2%)	(14%)	(5%)
WITHIN CYCLE			

Table 5.

SEPARATION AND APFT OUTCOMES

MALES

	<u>NORMAL</u>	<u>CONTROL</u>	<u>FTU</u>
GRADUATES	96.0%	84.0%	96.0%
DISCHARGES			
MEDICAL	2.8%	10.8%	4.0%
SOCIAL & EMOTIONAL	.3%	1.3%	
MOTIVATION	.2%	1.3%	
APFT	.2%	1.7%	
OTHER	.6%	.9%	
TOTAL	4.0%	16.0%	4.0%

APFT			
1ST TIME PASSES	99%	90.5%	98.6%
1ST TIME FAILURES	1%	9.5%	1.4%
PASSED WITHIN CYCLE	(.3%)	(5.8%)	
FAILED LAST APFT	(.7%)	(3.7%)	(1.4%)
WITHIN CYCLE.			

Table 6.

FIVE ITEM TEST ASSESSMENT EFFECTIVENESS

FEMALES

<u>FAIL</u>	<u>PASS</u>
MEDICAL DISC	PASS APFT IN CYCLE
SOCIAL & EMOTIONAL DISC	GRADUATE
MOTIVATION DISC	
APFT DISC	
OTHER DISC	
FAIL LAST APFT IN CYCLE	
<hr/>	
49%	13%

21.1% of all female recruits identified by this assessment

MALES

<u>FAIL</u>	<u>PASS</u>
MEDICAL DISC	PASS APFT IN CYCLE
SOCIAL & EMOTIONAL DISC	GRADUATE
MOTIVATIONAL DISC	
APFT DISC	
OTHER DISC	
FAIL LAST APFT IN CYCLE	
<hr/>	
42%	12%

18.2% of all males identified by this assessment

Table 7.

EFFECTS OF VARIOUS ENTRY CRITERIA LEVELS

MALES

<u># PUSH-UPS</u>	<u>% OF FAILURES IDENTIFIED</u>	<u>"MIS" IDENTIFIED</u>	<u>% OF GRADS IDENTIFIED</u>	<u>% OF ALL MALE SOLDIERS</u>
0	2.1		0.5	.7
2 OR LESS	7.6		1.0	1.5
4 OR LESS	13.0		1.4	2.5
6 OR LESS	16.3		2.1	3.5
8 OR LESS	19.5		3.5	5.1
9 OR LESS	22.8		4.3	6.5
10 OR LESS	22.8		4.8	7.2
11 OR LESS	30.4		7.8	10.3
12 OR LESS	32.6		10.2	12.8
13 OR LESS	39.1		12.6	15.4
14 OR LESS	43.5		14.4	17.3
15 OR LESS	50.0		17.8	20.7
16 OR LESS	51.0		20.7	23.8
18 OR LESS	53.0		26.1	29.3

FEMALES

<u># PUSH-UPS</u>	<u>FHA (SEC)</u>	<u>% OF FAILURES IDENTIFIED</u>	<u>"MIS" IDENTIFIED</u>	<u>% OF GRADS IDENTIFIED</u>	<u>% OF ALL FEMALE SOLDIERS</u>
0	5 OR LESS	15		1	3
0	10 OR LESS	27		2	6.6
0	15 OR LESS	39		4	10
0	19 OR LESS	41		6	13
0	24 OR LESS	47		9	17
0	30 OR LESS	52		13	19
0	-	61		21	28
1 OR LESS	-	69		26	34
2 OR LESS	-	77		35	43

Table 8

THE FUTURE BATTLEFIELD

Tony DeWitt
HQ, TRADOC
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A major source of soldier performance degradation and battle casualties in modern warfare has been combat stress. During World War II, up to 55% of the U.S. battle casualties in some battles was attributed to combat stress.

Combat stress training in the U.S. Army is based on expectations of the demands of the future battlefield. We anticipate that the battlefield of the future will be the most stressful one to which the U.S. soldier has ever been exposed. Predictions from computer simulations indicate significant soldier performance degradation and high stress casualties.

These are some of the characteristics we foresee in the battlefield of the 21st century:

a. Rather than expecting attack on forward positions characteristic of past wars, attack on the future battlefield may come from any direction, thus increasing the threat to the security of soldiers.

b. High dispersion and mobility will cause a greater degree of independent decision-making on the part of junior leaders and greater isolation from other units.

c. Future warfare will not stop for nightfall. A major challenge will be proper sleep discipline and rest cycles.

d. We expect the battle pulse to be more rapid and violent and the weapons more lethal than in past warfare and thus more stressful for our soldiers.

Given these battlefield characteristics, we see the following as the principal causes of stress:

a. Separation both from the main military unit and from the familiarity of home base in contrast to a totally unfamiliar and threatening 360 degree battlefield.

b. Isolation, due to high dispersion of military personnel.

c. Fatigue and sleep loss, from the continuous and nighttime nature of the battle.

d. Fear, based on the lethality, and pace of the battlefield.

We know that battle stress cannot be avoided. The objective of combat stress training, therefore, is to manage the harmful effects of stress on soldier performance in order to preserve combat power and enhance sustained and continuous operations capability. We believe that the harmful effects of

stress can be lessened by teaching soldiers and their leaders how to recognize and cope with stress as they engage in battle.

U.S. Army Battlefield Stress Initiatives

The following is a list of some of the initiatives undertaken to understand the effects of stress and to cope with its harmful effects:

- a. Ongoing research
- b. Emphasis on "total" fitness
- c. Stress management conferences and workshops
- d. Teleconference network
- e. Post trauma stress research
- f. Formal instruction
- g. Activation of combat stress control companies

An analysis of the levels of stress and its effects on soldier performance is part of how we assess all new programs and systems in the U.S. Army. Stress research has been recently conducted or is currently underway in the following areas: Management of sleep and stress in continuous operations, cohesion in light division and new manning system units, aviation work cycles, lessons learned from Grenada, and Type A behavior in senior Army leaders. Type A behavior, also known as "hurry sickness," results from inability to handle personal stress and has been linked to hypertension, high blood pressure, and heart disease.

The U.S. Army is currently making the transition from physical fitness to an emphasis on total fitness. Total fitness includes muscular and aerobic physical fitness, mental fitness, proper diet and nutrition, smoking cessation, and the prevention of substance abuse. The goal of total fitness is to enable soldiers to withstand prolonged periods of extraordinary physical and mental demands without serious performance degradation.

Work of the Health Care Studies Group

Information on battlefield stress is shared on a regular basis among stress researchers, training developers, and instructors through semi-annual stress management conferences begun in 1984 sponsored by the Soldier Support Center, and annual combat stress management workshops begun in 1981.

A stress management teleconference network called FITNET was established in 1985 to link stress management users for the exchange of ideas on stress research and training.

We are still trying to capture the lessons learned about stress from the Vietnam experience from the continued treatment of our postwar trauma victims

at various VA hospitals around the United States.

Formal instruction on battlefield stress in the U.S. Army schools is currently under revision to incorporate the latest lessons learned on the management of battle casualties and to bring the instruction in line with the U.S. Army airland battle doctrine on how to fight and win future wars.

The vice Chief of Staff of the U.S. Army approved the concept of establishing combat stress control companies to provide more mobile, flexible, and versatile combat stress triage and first echelon treatment for combat units.

Focus of Instruction on Battlefield Stress

These are the primary learning objectives for the instruction on stress just mentioned. However, since instruction varies from one to eleven hours, all of these objectives are not covered in each course.

- a. Understanding the threat, the battlefield, and the leadership requirements of the airland battle.
- b. Characteristics of units exercising good stress prevention measures.
- c. Signs and general effects of stress on individuals and units.
- d. Effects of battlefield stress on soldier performance.
- e. Taking action to reduce fear and stress.
- f. Physical and mental conditioning in stress prevention and reduction.
- g. Prevention and treatment of stress casualties.
- h. Coping with stress to develop continuous operations capability.

In order to emphasize the need for battlefield stress protection measures, we want our leaders to know the nature of the threat, the future battlefield environment, and our airland battle doctrine.

A primary focus of instruction is on preventing the reduction of both individual and unit level performance capability through the management of stress.

We want both our soldiers and their leaders to recognize the signs and symptoms of stress and to know the negative effects of stress on soldier performance.

Next, we want our soldiers to perform under stressful conditions and to know how to take effective measures to cope with stress.

Part of our training, both inside and outside of the classroom, is the physical and mental conditioning against stress.

Last, we want to train all our leaders, both officer and noncommissioned officer, to manage battle stress casualties to maximize continuous operations capability.

We also send a strong message to our leaders through personal stress management training on the absolute necessity of leaders conserving their own resources since we view strong leadership as the key to sustained unit performance.

Battlefield Stress Instruction

Courses:

- a. Precommand Course - Personal Stress Management--3 hours
- b. Command and General Staff College - Stress Management on the Battlefield--4 hours
- c. Officer Advanced Course - Battlefield Stress--2 hours, Airland Battle Leadership--1 hour
- d. Officer Basic Course - Personal Stress Management--1 hour, Battlefield Stress--2 hours
- e. Sergeants Major Course - Stress Management--11 hours
- f. 1st Sergeants Course - Combat Stress--5 hours
- g. Advanced Noncommissioned Officers Course - Instruction developed by
Nov 85
- h. Basic Noncommissioned Officers Course - Battlefield Leadership--1
hour
- i. Unit Level Exportable Training Package - Distribution to Units by 3rd
Qtr FY 86

Battlefield Stress Instruction

The focus of instruction in the Precommand Course for Division, Brigade, and Battalion Command Designees is on how to manage their own stress levels and how to establish and maintain a healthy command climate that will keep unit-induced stress at minimum levels.

Instruction in the Command and General Staff College for Majors and Promotable Captains is aimed at the operational levels of war. In that regard, students receive four hours of instruction on stress management on the battlefield which complements the instruction they receive on airland battle doctrine. (Currently not being taught, but issue being relooked.)

Current instruction in the Office Advanced Course for Captains contains two hours on battlefield stress and one hour on airland battle leadership.

Instruction has been revised in Sept. 85 to include information on the management of battle casualties.

In the Officer Basic Course, new lieutenants are introduced to the concept of battlefield stress and are given initial instruction on how to manage their own personal stress.

Instruction for our senior noncommissioned officers focuses heavily on the management of their own stress levels including the reduction of Type A behavior as a stress prevention measure for males age 40 and over.

First sergeants receive five hours of instruction in combat stress: How to recognize and manage it.

Battlefield stress instruction for staff sergeants in the Advanced Noncommissioned Officers Course was recently developed.

Our new sergeants receive a one hour introduction to battlefield stress in the Basic Noncommissioned Officers Course.

An exportable training package in battlefield stress has been developed for use by company and below sized light infantry units. The package was fielded in October 1985. Information on the management of battlefield stress casualties is now being added to the package for distribution of this training to all units by the third quarter of FY 86.

Lessons Learned From Lebanon, Grenada, and the Falklands

The following steps have been initiated in regard to lessons learned from recent battle experiences:

- a. Develop prevention rather than reaction-oriented programs.
- b. Conduct pre-mobilization preparation.
- c. Educate commanders on anticipated effects of stress on combat operations.
- d. Coordinate with mental health professionals for assistance.
- e. Prepare family members.
- f. Assess the stress status of individuals and units.
- g. Develop family support systems.
- h. Conduct post-operations debriefs.

A 1984 project of the Health Care Studies & Clinical Investigation Activity was to compile information concerning lessons learned from the Israeli, British, and American operations in Lebanon, the Falklands, and Grenada respectively. One lesson learned confirmed the primary focus of U.S. Army instruction on battle stress which was the need for good preventive

measures. This involves:

- a. Pre-mobilization preparation of soldiers through classes and alert exercises.
- b. Education of commanders on expected effects of stress.
- c. Prior coordination with and assistance from mental health professionals.
- d. Briefings for family members on what to expect in terms of quick departure, the area of operations, and communication with families on the welfare of the soldiers.

A survey instrument has been devised for leaders to assess the "stress status" of their units. The instrument is a checklist that contains questions on physical fitness, levels of training, morale, unit cohesion, communication, etc. We have also found that we can predict some of the potential victims of stress by administering a battery of tests.

Also found to be important is the pre-establishment of a family support system, such as the "chain of concern" at Fort Bragg. Systems include wives appointed to key leadership positions to handle emergency medical, transportation, and emotional support problems and to maintain regular communication between wives for the purpose of morale support and the relay of important information on the status of the military unit after departure. The key link between the support system and the unit after departure is the rear detachment commander. Data gathered from these and previous combat operations has confirmed the importance of a family support system by showing that the less a soldier has to worry about the welfare of his family, the more he can concentrate on his combat duties.

Finally, post-operations debriefs to soldiers and family members help solidify the family-military unit team by winning and keeping the support of family members for the unpredictable and sometimes classified operations of some of our highly mobile units. These debriefs also help prevent post combat trauma reactions of the part of our soldiers.

Unit Factors in the Prevention of Stress Casualties

Research has revealed that certain factors aid in the prevention of stress casualties.

Confidence in the leader has been found to be the keystone for sustained unit performance. It occurs when leaders are technically and tactically competent, are mentally agile and able to make decisions, are able to communicate their intent, are an inspiration to their subordinates, and are flexible and resourceful.

Following close behind the leader factor is the presence of a strong sense of cohesion. There must be a powerful bond among soldiers and between soldiers and their leaders to reduce the effects of fear and stress in combat.

High morale and motivation are based on sound leadership and cohesion, but add to that a positive sense of mental preparedness for battle. Morale and motivation are closely related to the sense of commitment to the unit and to the goals of the operation in particular and to the nation in general.

Warrior spirit is the special attribute of the traditional soldier/warrior predator embodied in the historical examples of the Spartan of ancient Greece, the fearless Viking, and the medieval knight. It is the special commitment and call to duty that seems to give the soldier extra endurance on the battlefield and a special coat of armor to protect him from stress.

Research has shown conclusively that a soldier who is physically fit is not only more capable of enduring the physical demands of battle, but also has more confidence in himself and therefore more protection from the debilitating effects of stress.

Rigorous training that approaches the realism of the battlefield improves both the individual's and the unit's confidence and ability to cope with stress and maintains continuous operations capability. Good training is a core preparatory stress prevention strategy.

Well established unit standards for both individual behavior and unit performance increases the soldier's confidence both in himself and in his unit. He knows what is expected of him, what he can expect from his leaders and his peers, and what his unit is capable of doing. This gives the soldier a sense of security that also serves as a buffer against battlefield stress.

Finally, good communication throughout the unit is an essential stress prevention measure. The extent to which our American POWs in Vietnam risked severe punishment to communicate with each other as a primary means of maintaining their mental strength is now well known. The battlefield of the future, characterized by high dispersion of individuals and units as well as fighting during periods of darkness, will also make it imperative for our soldiers to communicate regularly with each other to avoid the stress that comes from isolation under adverse conditions.

All of these unit factors in the prevention of stress casualties come from lessons learned from past combat engagements. These lessons learned are built into the U.S. Army instruction on battlefield stress.

STANDARDIZATION OF TRAINING PACKAGES
FOR ARMY-WIDE TRAINING ABOUT BATTLE FATIGUE

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During the Medical System Program Review In-Process Review (July 85), General Maxwell Thurman, Vice Chief of Staff, Army, tasked the Academy of Health Sciences and TRADOC to develop training packages to bring all Army NCOs E7 and above, lieutenants and captains up to speed on what they need to know to identify, treat, return to duty and prevent battle fatigue casualties. General Thurman directed a two pronged attack. Service school curricula, especially at the Officer and NCO Advanced Courses, must be given the necessary core material to teach. However, we cannot wait years for students to matriculate through the schools. Therefore, the main attack must take place in the units. LG Wagner (DCSRADA and leader of the U.S. Army team for record to review the lessons learned by the Israeli Defense Force in Lebanon) emphasized that this training is just as important for combat service support unit leaders as for the combat arms. General Thurman set "D-Day", the date by which the necessary training packages must be ready to go to the field, as 31 March 1986. Students in all Pre-Command Courses are to be alerted to the importance of this topic and the need to teach it at unit level.

This mandate for Army-wide training about battle fatigue provides a unique opportunity to compose an orchestrated program, in which the concepts, definitions and recommended actions are all on the same "sheet of music", in harmony rather than discordance. The objective is to make combat stress and battle fatigue management an integral, self-reinforcing part of the Be Know Do self-concept of all Army leaders, not just a one-shot event. It is essential that what is being taught in the units not contradict what was just learned (or will be learned) in the school houses. We must avoid even the appearance of contradiction which arises from the use of different terms for the same things, or the same term in very different ways, in other Army training. For this reason, it is important to clearly define such terms as "stressors", "Combat Stress", "Combat Stress Reaction" and "Battle Fatigue", and to use them consistently. These are not synonyms, and each has important, legitimate uses. (We, the researchers and clinicians, may also need to use additional terms for special clarity when talking among ourselves, but must forego confusing the Line with them. Remember the K.I.S.S. principal: "Keep It Simple, Stupid!".)

A further requirement, if this knowledge is to become integral with leadership training, is to make it "sequential" and "progressive". The junior leader (crew, section or squad leader) needs to know everything the troops do, and be able to teach it to them. He/she needs to know many things the junior troops do not, and some which may even be harmful for everyone to know. For example, everyone in the Army needs to know the "normal common" signs of battle fatigue, so as not to overreact to them, but the junior soldier does not need to be taught the signs that will make his leader nervous. The soldier who has demonstrated sufficient responsibility and maturity to become a junior leader needs to know the "more serious" (or warning) signs which alert a leader to pay special attention and take some immediate action in a given case. The platoon and company-level leaders need to be able to decide whether the "more serious" signs can still be taken care of by rest and

reassurance within the small unit, or whether to send the soldier for brief rest in a more secure, non-medical support unit, or for immediate medical evaluation at a medical support element. The company-level leaders also have more control over the measures which can be taken to prevent stress casualties.

Ultimately, we must get the training out of the classroom or garrison training center and into the field, being taught by the leaders themselves to their subordinates and practiced routinely in training exercises. To support this, we have prepared the "foundation" of the Army-wide training package in the form of three Graphical Training Aids (GTA). These are cards (printed on laminated, tan paper and "camouflaged" for tactical field situations) which fold into 5 1/2 by 3 1/2 inches to fit into the BDU jacket pocket. They are intended for leaders to use as aids in training their subordinates during lulls in field training exercises as well as in garrison. ("OK, team. Take out your Battle Fatigue GTAs and we'll talk about the second 'bullet' on page 3. Jones, what do you think that means.") The GTAs will also serve as reminders ("check lists") in mobilization and combat. The three GTAs will be available at all U.S. Training and Audiovisual Support Centers. Copies are included at the end of this paper as Handouts 1, 2 and 3..

GTA 21-3-4, "BATTLE FATIGUE; Normal, Common Signs; What to do for self and buddy", is intended for all soldiers, especially the junior enlisted.

GTA 21-3-5, "BATTLE FATIGUE; More Serious Signs; Leader Actions" is intended for all leaders, especially those at crew, squad, section and platoon level.

GTA 21-3-6, "BATTLE FATIGUE; Company Leader Actions & Prevention" is intended for First Sergeants, Company Commander and XO's (and above) to teach to the platoon-level leaders.

This same material has been made the outline (with appropriate sequential/progressive leveling) for the Core Leadership training blocks in the Officer and NCO Advanced Courses in all Army branch schools. In compliance with General Thurman's tasking to send training packages to the units as well as to the schools, a Training Support Package was developed jointly by the Academy of Health Sciences and Soldier Support Center, Fort Benjamin Harrison. This has been sent to all corps, division, and brigade headquarters for dissemination to their units. We at AHS have also sent supporting materials to the Division Mental Health Sections so that they can step in to see that the program gets off to a good start. This supporting material includes a 12.5 minute videotape, edited from the original December '84 MSPR briefing and the July '85 IPR, which shows very graphically how important the Vice Chief and other senior Army leaders consider this effort. In order to facilitate spread of this training to the National Guard and Army Reserve, we also provided these materials to the medical advisors to the Readiness Groups around the country.

The following is the Academy (Medical Department) portion of the Training Support Package which has gone out to the field. It is intended for officers, warrant officers and non-commissioned officers at battalion, company and platoon level of all divisional and non-divisional, active duty, Reserve and National Guard units. The lesson plan introduces the three GTAs, and hopefully answers some of the Line's questions about what is in them.

DRAFT LESSON PLAN B of Joint SSC/AHS TRAINING SUPPORT PACKAGE

IDENTIFY, TREAT AND PREVENT BATTLE FATIGUE

1. ATTENTION: Tell the class why they should be interested in this instruction. For example, you might say that, during heavy fighting in past wars, the Army has usually had one battle fatigue casualty for every three to five soldiers evacuated with wounds. In the recent Lebanon Crisis, one Israeli armor unit had one case for every one wounded in a desperate night action (reported in Military Review, June 1985). Point out that Israeli combat service support soldiers (truck drivers, ordnance technicians, etc.) became stress casualties when seeing what modern weapons do to human bodies, even though not themselves under attack. However, in elite units (such as the Airborne and Rangers in WWII), there are usually less than one battle fatigue casualty for every ten wounded, even in very intense or prolonged fighting.

2. MOTIVATION: This instruction applies specifically to their unit, in their missions, in any level of combat intensity, whether they are Combat Arms, Combat Support or Combat Service Support. History shows that most battle fatigued soldiers can be restored to duty quickly, provided they are rested close to their units and are treated positively, as soldiers, not weaklings, cowards or sick patients. This requires planning and coordination. If these casualties are evacuated too far, many never recover. In continuous AirLand battle, even the short-term loss of such numbers of trained, combat experienced soldiers could be disastrous. The Army initiated this program to ensure that all senior NCOs and company-grade officers know what they need to do about battle fatigue (how to identify it, how to treat it and how to prevent it). Tell the class that they have the responsibility to teach their subordinates what they need to know in order to control battle fatigue and accomplish the mission.

3. OBJECTIVES. Tell the class that by the end of this instruction, they should be able to instruct their subordinates and carry out their responsibilities. They will be able to:

- a. Define battle fatigue.
- b. Identify the normal, common signs and the more serious warning signs of battle fatigue.
- c. Identify the leader's treatment of normal, common and more serious warning signs of battle fatigue.
- d. Define mild, moderate and severe battle fatigue in terms of where they are treated and why. (Officers and E 7 and above only)
- e. Identify the basic principles of preventing battle fatigue. (Officers and E 7 and above only)

4. DEFINITION OF BATTLE FATIGUE

a. Battle fatigue is a broad group of physical, mental and emotional signs which are a natural result of the heavy mental and emotional work involved in facing danger under difficult conditions. The signs have in common that they

- (1) feel unpleasant and/or
- (2) may interfere with mission performance, but
- (3) get better with rest and reassurance.

b. "Battle fatigue" is the U.S. Army's official, doctrinal term, in accordance with AR 4-18, for those combat stress reactions which fit the definition given above.

NOTE TO INSTRUCTOR: The term "battle fatigue" is to be used whether the signs occur in a new soldier or in a veteran after months of combat, and whether they come on before any actual shooting starts, during the period of action, or in a let down period before further action. It can occur in headquarters and combat service support soldiers who are not themselves under fire, but are performing demanding mission duties under the threat of attack.

c. There are differences among the terms "battle fatigue", "stressors", "combat stress" and other "combat stress reactions".

(1) "Stressors" are the causes of "combat stress". They are events or situations which require a change, create internal conflict or pose a threat. "Combat stressors" are any stressors which occur in the context of performing one's combat mission (whether under fire or not). Examples: a 155mm round exploding 100 m away, or your platoon leader being wounded, or receiving a letter from your girlfriend which says she is leaving you for Jodie, or a wind chill factor of -10 degrees F. A stressor plus the soldier's perception of that stressor causes "stress".

(2) "Combat Stress" is the internal psychological and physiological process, within the individual soldier, of reacting to and dealing with the combat stressors. Stress depends very much on the individual's perception of the stressor and its context. Make up examples for those stressors listed above which would greatly change the resulting stress. For example, if that 155mm round was an enemy one catching you in the open or the first round of friendly Final Protective Fires just as the enemy is about to overrun you. Combat stress at any given time is the net result of many stressors: the fear of death, fear of failure, other intense painful emotions like grief and guilt, uncertainty, boredom, worries about what is happening back home, and physical and mental demands of combat duties. "Combat stress" is the cause of "battle fatigue".

(3) "Combat stress reactions" are the observable behaviors which the soldier shows as the result of the internal stress (either to overcome the stress, to escape it, or simply as a side effect of it). "Battle Fatigue" is one group of "combat stress reactions". There are also other combat stress reactions. Some are good (like heroism, alertness and loyalty to comrades). Some are bad (like malingering, self-inflicted wounds, committing atrocities, abusing drugs, going AWOL or refusing to obey orders). These others are not called "battle fatigue", although battle fatigue may be present along with them (if they really are reactions to combat stress). These bad actions require different treatment than just rest and reassurance.

(4) The difficult combat conditions ("stressors") which cause battle fatigue may, but do not necessarily, include sleep loss, muscular fatigue and physical environmental factors like heat, cold and noise.

(5) Like physical fatigue, battle fatigue can develop at either a slow or fast rate. It depends on the intensity and duration of the stressors and also on the prior training, experience and fitness of the soldier.

(6) Battle Fatigue usually gets better when the individual can rest and replenish himself or herself with food, water and sleep. It is also just as important to restore the soldier's self confidence.

(7) "Battle Fatigue" is a simple common sense name for a natural and common condition which is not a medical or psychiatric illness.

NOTE TO INSTRUCTOR: You can explain to the class that experience in WWI and WWII shows that soldiers tend to develop more signs which are harder to manage if you use dramatic words like "Psychoneurosis" or "Battle Shock". "Fatigue" is a better word than "exhaustion" because it applies to the mild as well as the severe cases, and implies it gets better quickly.

d. The term "stress fatigue" can be used for the same signs occurring under stressful mission conditions where no actual combat is involved. For example, stress fatigue is common among officers and NCOs at the National Training center. All of what is being taught here can and should be applied at the NTC, and also in garrison.

5. "NORMAL COMMON" SIGNS AND "MORE SERIOUS" WARNING SIGNS OF BATTLE FATIGUE.

a. The following are facts about the normal, common signs:

(1) Most soldiers have some of these signs some of the time (before, during and after combat or danger).

(2) Some soldiers have many of these signs often, yet still fight well and perform all essential duties.

(3) All soldiers (and especially leaders) need to know that these are normal and common so they don't worry about them too much.

(4) They are so "normal" that you should look closer at someone who never shows any. Maybe he doesn't realize the danger. Or maybe his lack of normal response is a more serious sign of battle fatigue.

(5) These normal common signs include some physical and some mental/emotional signs. Company and platoon leaders need to ensure that the squad/section leaders teach these to every soldier.

NOTE TO INSTRUCTOR: Direct the class to look at page 2 of HANDOUT 1 to see what are the normal, common signs.

Alternatively, you can make transparencies. If time permits, stimulate discussion. Draw on the experience of any combat veterans, or those who have taken part in highly competitive or dangerous sports or training such as parachuting, or rappelling. Make the following key points.

(6) Most of the physical signs are the result of having a lot of adrenalin in your bloodstream. They are likely to be worst when you can't be physically active, or when you stay keyed up for a long time without chance to rest.

(7) The mental signs are natural in situations where high stress, fear or fatigue temporarily overload the brain's ability to process information. The emotional signs are likely because bad things do happen in combat to cause normal grief, guilt, resentment and doubt.

b. The following are facts about the "more serious" signs:

(1) "More serious" means that these signs are warning signs which deserve special attention and leadership action.

(2) "More serious" does not necessarily mean that the soldier needs to be relieved of duty or be evacuated as a casualty. Immediate action by the leader, buddies or the soldier him or herself may be all that is required.

(3) Even the normal, common signs become "more serious" if they interfere with essential performance even after the soldier, his buddy or leader have taken actions to help them.

(4) Normal, common signs should be considered "more serious" if they do not improve somewhat with good rest. Tell the class that the normal, common signs may not go away completely while combat lasts. The soldier may have to learn to live with them. Some will even continue for a time after returning home from combat.

(5) Signs must be considered in the perspective of how the individual soldier usually acts. Take them more seriously if they come as a big change from how that soldier usually reacts to danger or interacts with other people.

NOTE TO INSTRUCTOR: Give examples, such as: New troops being startled at the loud sound of friendly "outgoing" artillery is normal and common. It is "more serious" in experienced veterans. It is "more serious" when the soldier who is usually quiet turns rowdy and complains. It is "more serious" when the unit complainer turns quiet.

(6) The "more serious" signs also include both physical and mental/emotional signs. All leaders need to know these. The junior enlisted soldiers do not need to receive this training.

NOTE TO INSTRUCTOR: Direct the class to page 3 of HANDOUT 2 to review briefly what are on these lists. Alternatively, you can reproduce them as transparencies. Be sure that the class understands that some of the "more serious" signs differ from the "normal common" signs only as a matter of degree or the situation in which they occur. Give examples, such as that fidgeting and trembling are normal and common, while constantly moving around or obvious shaking are "more serious". They are called "more serious" rather than just "serious" signs to emphasize that this is in relation to the normal, common signs. Some of the signs, such as seeing or hearing things which aren't there, are always "more serious", in the sense of requiring some immediate leader action. It may be a sign of dangerous physical or mental illness. However, seeing things which aren't there does occur often, in otherwise perfectly normal people, when they go a long time without sleep. They may not need to be evacuated to medical care or even have to leave the unit. All they may need to recover is sleep.

6. LEADER'S TREATMENT OF NORMAL, COMMON AND MORE SERIOUS WARNING SIGNS OF BATTLE FATIGUE

NOTE TO INSTRUCTOR: This section of the lesson plan concerns what should be taught to the team, section, squad and platoon leaders about treating battle fatigue. These actions by the junior leader will bring those soldiers whose signs may require them to leave the small unit to where the more senior officer, NCO or medic must make the decision. Company-level leaders need to be familiar with those actions to teach and supervise them and to practice them in their own immediate area.

a. What soldiers should do for themselves and their buddies when showing signs of battle fatigue are outlined in Handout 1. If time permits, familiarize the class with page 3 and 4 of HANDOUT 1 or use a transparency made from that section to show what is covered. Senior leaders should ensure that junior leaders review these with their soldiers and have them practice them routinely.

b. LEADER ACTIONS FOR NORMAL, COMMON SIGNS (which also should be used for more serious signs, too) are outlined in HANDOUT 2. Senior leaders should review the material with junior leaders and ensure they practice it routinely.

NOTE TO INSTRUCTOR: Direct the class to page 4 and 5 of Handout 2 or use a transparency. Make the following points:

(1) These actions are simply good, basic leadership techniques. Most are already familiar. Stimulate discussion about any which may be unfamiliar, such as having soldiers use "rapid relaxation techniques to unwind". These are discussed more in Section A of this training package and in FM 26-2.

(2) These treatment actions are also preventive actions; they both reduce the combat stress that causes battle fatigue and help the soldier cope with the normal, common signs so they are less likely to become "more serious".

b. The LEADER ACTIONS FOR "MORE SERIOUS" SIGNS are also outlined in HANDOUT 2, page 5, and should be reviewed with the junior leaders.

(1) These step by step actions safeguard the unit's mission and its members, get the battle fatigued soldier to a safer place, and begin the process of restoring the soldier's confidence (or at least do not undermine it further).

(2) One recommended action is NOT to take the soldier's weapon(s) away unless seriously concerned that the soldier is so unreliable that he or she will use it dangerously. Stimulate discussion on why this is done. Make the point that the soldier's self-identity as a soldier who is trusted and needed by his or her comrades is the strongest factor pulling the soldier back from battle fatigue to effective duty. Taking the weapon away will give the message "we don't trust you" or "you're not a good soldier" unless this is counteracted by what is said when the weapon is taken.

NOTE TO INSTRUCTOR: If time permits, stimulate discussion about what might be involved to "do whatever must be done to control the soldier" in order to protect the mission and the unit. Consider different types of situations. Point out that "crazy", dangerous, and violent behavior is unusual in pure "battle fatigue", but may occur more often in other types of combat stress reactions, especially those involving drug abuse.

(3) What the leader and buddies do and say right on the spot has a very important effect on how quickly the soldier recovers, and even on whether he ever recovers. The right words may make very serious signs get better in minutes or even seconds. Even if they do not work immediately, they will help him recover over the next hours and days.

c. Junior leader actions bring the soldier who does not improve to the point where the more senior officer, NCO and/or medic must make the decision whether the soldier stays in the platoon or company or must be sent elsewhere. This requires the classification of battle fatigue cases into "mild", "moderate" and "severe".

NOTE TO INSTRUCTOR: Explain that the section/squad leader does not need to know this classification. The First Sergeant, Company Commander and company medic must know it. They should teach it to the platoon leaders, platoon sergeants and platoon medics.

7. MILD, MODERATE AND SEVERE BATTLE FATIGUE

NOTE TO INSTRUCTOR: Direct the class to page 2 of Handout 3 or use transparencies made from that page.

a. Battle fatigue cases are rated or classified in terms of where they can be managed. The three types are:

(1) MILD, where the soldier remains in his or her unit to rest and be restored to full duty.

(2) MODERATE, where the soldier cannot remain in his/her unit and must be sent to another supporting unit for temporary rest and replenishment, but not necessarily to a medical unit.

(3) SEVERE, where the soldier must be sent to a physician, Physician Assistant or Mental Health Officer for evaluation and treatment.

NOTE TO INSTRUCTOR: Say that the labels "Mild, Moderate, Severe" should be thought of as nothing more than "tickets" which say where the soldier should go right now. The following points (or criteria) are used to decide where the soldier can be treated.

b. "MILD" applies to any soldier who is:

(1) Showing normal, common signs, feels uncomfortable, but is 100% effective.

(2) Showing "more serious" signs and may be partially or even completely ineffective, BUT

(3) is NOT an unacceptable risk or burden to the unit in the tactical situation, and does not need urgent medical evaluation.

c. "MODERATE" applies to a soldier who must be sent to another nonmedical unit because:

(1) he or she IS too much of a risk or burden to stay with his or her own unit at this time, given its tactical mission.

(2) Or, perhaps, the soldier's own unit CANNOT provide a sufficiently safe stable environment for rest and replenishment at this time.

(3) However, the soldier is NOT too disruptive or potentially dangerous for a unit with a less demanding mission, at this time, AND

(4) does NOT need urgent medical evaluation to rule out some possible serious physical cause or illness for the signs he is showing.

NOTE TO INSTRUCTOR: Point out that whether a case of battle fatigue is called "mild" or "moderate" depends more on the tactical situation, mission and resources of the small unit than it does on the signs the soldier is showing.

A unit which is just being pulled back into reserve can keep a soldier who might have to be "left behind" if the unit were just leaving for action behind enemy lines. Use examples from your type of unit.

d. "SEVERE" applies to any soldier with "more serious" signs who fits within one or both of the following categories:

(1) too burdensome, disruptive, or possibly dangerous to keep in his own unit, or in any available nonmedical support unit, at this time.

(2) the soldier's symptoms COULD be due to a physical cause which may need urgent medical/surgical treatment (for example, head or spine injury, drug abuse).

NOTE TO INSTRUCTOR: The difference between "moderate" and "severe" is influenced more by the kind of signs the soldier is showing, although the availability of other Combat Service Support units can still play a role.

e. There is no easy rule for deciding whether a "more serious" warning sign makes the soldier a case of "mild", "moderate" or "severe" battle fatigue. That will require judgment based on what the leader (and the medic) knows about the individual soldier, what has happened to him, how he responds to helping actions, what is likely to happen to the unit next, and what resources are available to the unit. Making that kind of judgment is what leaders are for. Any "more serious" sign that can be listed may be "mild" battle fatigue in one case, be "moderate" in another, and be "severe" in a third situation.

f. Signs which would usually cause the case to be classes as "severe" include:

(1) Dangerous threatening behavior which is not simply a disciplinary problem.

(2) Hallucinations and delusions not explained by sleep loss.

(3) Serious memory loss.

(4) Extreme pain.

(5) Loss of a major physical function (like vision or the ability to move an arm).

(6) Complete unresponsiveness (not moving or answering at all).

However, the case might still be classed as "moderate" or even as "mild" if the signs occur in response to extreme stress and clear up quickly.

g. The "severe" label does NOT necessarily mean that the soldier is less likely to recover, or will take longer to recover, than "moderate" or "mild".

h. COMPANY LEADERS ACTIONS FOR MODERATELY BATTLE FATIGUED SOLDIERS are outlined in Handout 3. Company Commanders, First Sergeants, and company medics should know and practice them, and teach them to platoon-level leaders and medics.

NOTE TO INSTRUCTOR: Direct the class to Handout 3, page 2, or use transparencies made from pages 2 and 3, or briefly discuss the list. You may have to adapt these recommendations to your type of unit. Stimulate discussion on how it needs to be adapted. For example, the supporting units where soldiers can be rested will be different for maneuver companies in an armor or a light infantry battalion; for an artillery battery; for a dispersed corps-level signal company; for a maintenance or a transportation company. Some small detachments may not have First Sergeants or platoon/company/battalion organization. They may be attached to other units for support. Work out how to make this work in your situation. Be sure to cover the following key points.

(1) Someone (the First Sergeant? the NCOIC?) has to take this soldier and find him another safer, quieter place to rest and work for a day or two. Note that instructions for the leader of the support unit who receives the soldier temporarily are included in Handout 2, page 6.

(2) If the soldier's small unit cannot wait for the First Sergeant/NCOIC to take the soldier, it may be necessary to evacuate him to the first echelon supporting medical element. If so, every effort should be made there to get him out of medical channels to rest in a nonmedical unit.

(3) If the First Sergeant/NCOIC can't find a suitable support unit, he or she can try to arrange a place to sleep at a medical unit which has cots that aren't needed now for sick or injured patients. This is not preferred, and the soldier must understand he is not a patient, just a tired soldier.

(4) The soldier must remain accounted for, and not get "lost in the shuffle".

(5) Every reasonable effort should be made to maintain personal contact between the soldier and his original unit.

i. LEADER ACTIONS FOR A SEVERELY BATTLE FATIGUED SOLDIER are the same as for the moderately battle fatigued except that the soldier is evacuated medically as soon as possible, to be examined by the physician or PA.

(1) He may be successfully treated and released within hours, or may be held there for rest and treatment for a day or two, or may be evacuated further, depending on his signs and the medical unit's situation.

(2) If treated close to their units, 65-85% (average 75%) of battle fatigue casualties return to duty within 1-3 days. 15-20% more may return to other duty (usually in other units) in 1-2 weeks. Only 5-10% have to be evacuated home, and they usually had other problems.

(3) However, if evacuated too far, too fast, few battle fatigue casualties return to duty and many stay permanently disabled.

j. Recovered battle fatigue casualties who return to their units and are welcomed there do not have a higher rate of battle fatigue than other soldiers. They are less likely to "break" again (or to be killed or wounded) than a new replacement who is a stranger in the unit.

NOTE TO INSTRUCTOR: Emphasize to the class that a good soldier will be good again. A new soldier who becomes a battle fatigue casualty deserves another chance. Being new to combat and a stranger in the unit are high-stress/high-risk factors which have partially been passed if that soldier returns to the same unit and is welcomed there. But also emphasize the following point, and stimulate discussion on how it should be handled.

k. Someone who has always been a poor soldier is not going to be made into a good one by getting treated for battle fatigue. This soldier may need to be reassigned to some other job or unit (or be discharged as unsuitable).

8. BASIC PRINCIPLES OF PREVENTING BATTLE FATIGUE

a. While the average ratio of battle fatigue casualties to wounded in action is one for every three to five, elite units consistently have less than one for ten wounded. Clearly, while we cannot prevent battle fatigue in highly stressful combat, we can to a great extent prevent battle fatigue casualties who have to be treated in the medical system.

b. Factors which increase battle fatigue casualties and leader actions to prevent them are outlined in Handout 3. These should be taught by battalion and company-level leaders to their platoon-leaders.

c. The following are key principles for reducing the stress of combat and preventing battle fatigue casualties:

(1) Encourage Unit Cohesion by integrating new replacements quickly, assigning buddies, and other team-building techniques. Unit cohesion is the personal trust and loyalty of soldiers who have worked together to overcome hardship and danger to achieve a common objective.

(2) Stabilize the "Home Front" by helping soldiers resolve their home front problems. An Israeli study found that having a lot of uncertainties at home was the strongest factor which distinguished soldiers who became stress casualties from those who became decorated heroes. Unit cohesion was the second strongest.

(3) Impart Unit Pride by honoring historical examples of initiative, endurance and resilience, of overcoming heavy odds, and of self-sacrifice which led to triumph of the cause. This is needed to give direction and hope to the cohesive team, so that it does not become preoccupied only with its own members' survival and comfort.

(4) Assure Physical Fitness (endurance, strength, and agility) through a regular training program. Not being physically fit almost guarantees battle fatigue when the going gets rough.

(5) Conduct Tough, Realistic Training with as much like the combat mission and environment as possible (sights, sounds, pace, confusion, feedback). First exposure to combat, to surprise enemy weapons and tactics, and to a strange, hostile climate, tend to produce a lot of battle fatigue.

(6) Practice Casualty Care and Evacuation routinely. Have everyone know lifesaving for self and buddy. Talk about possible loss of leaders and comrades. Prepare juniors (and yourself) to take over. This way soldiers know that they will get immediate care and the chain of command will not break.

(7) Plan and Practice "Sleep Logistics": This is another word for "sleep discipline". Sleep must be "supplied" to soldiers just as beans, bullets and fuel must be. Plan ahead to make sure everyone gets enough sleep, especially leaders and those with critical tasks.

9. CONCLUSION: In combat, you the leader must try to conserve the troops' strength and well-being (with food, water, shelter, hygiene, medical care, rest, etc.). Unlike the training situation, don't deliberately seek hardship; there will be enough without looking for it. When you must accept hardship (due to circumstances or to better accomplish the mission), be sure to explain the reasons to the troops in positive terms. And because you will have trained hard together, you can remind the troops of that time at Camp Swampy when you all suffered in training (and still accomplished the mission!), just to prepare for this kind of combat situation.

BATTLE FATIGUE

NORMAL, COMMON SIGNS

WHAT TO DO

for self & buddy



WAR IS MORE STRESSFUL THAN ANY TRAINING CAN BE

The enemy wants to break you -- to stress you until you can no longer do your combat job. To break the enemy's will, you may have to push to your limit. This is true for every soldier - for Combat Service Support as well as for the Combat Arms. All of you may have to do or see things that make you feel badly.

Mental and physical fitness help you to endure that stress, but you will still have fear and other unpleasant feelings before, during and after combat. These symptoms are called "battle fatigue" because they are a natural result of the hard work of facing danger under tough conditions.

Recognize the signs of battle fatigue. Most of you will have some of these signs now and then. Some of you may have many of them often. All of you can still be effective soldiers, make the extra effort and win. Learn these practical ways to pace yourself and your buddies so that you can stand the strain.

HANDOUT 1

NORMAL, COMMON SIGNS OF BATTLE FATIGUE

* PHYSICAL SIGNS

- o Tension: aches, pains; tremble, fidget, fumble things.
- o Jumpiness: startle at sudden sounds or movement.
- o Cold sweat; dry mouth; pale skin; eyes hard to focus.
- o Pounding heart; may feel dizzy or light-headed.
- o Feel out of breath; may breathe too much until fingers and toes start to tingle, cramp and go numb.
- o Upset stomach; may throw up.
- o Diarrhea or constipation; frequent urination.
- o Emptying bowels and bladder at instant of danger.
- o Fatigue: feel tired, drained; takes an effort to move.
- o Distant, haunted ("1000 yard") stare.

* MENTAL & EMOTIONAL SIGNS

- o Anxiety: keyed up, worrying, expecting the worst.
 - o Irritability: swearing, complaining, easily bothered.
 - o Difficulty paying attention, remembering details.
 - o Difficulty thinking, speaking, communicating.
 - o Trouble sleeping; awakened by bad dreams.
 - o Grief: tearful, crying for dead or wounded buddies.
 - o Feeling badly about mistakes or what had to be done.
 - o Anger: feeling let down by leaders or others in unit.
 - o Beginning to lose confidence in self and unit.
- * Many soldiers have these signs, yet still fight well and do all their essential duties.

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WHAT TO DO FOR BATTLE FATIGUE IN YOURSELF OR YOUR BUDDY

- o Make yourself look calm and in control.
- o Focus on the team's immediate mission.
- o Expect to continue duties; focus on a well-learned task or drill; follow the SOP.
- o Think of yourselves succeeding; talk about it.
- o Take a deep breath; shrug shoulders to reduce tension.
- o Remember that battle fatigue is normal and others have it, too; it helps to joke about it.
- o Stay in touch with the rest of the team; keep talking.
- o Get the facts; don't jump to conclusions or believe rumors.
- o When the tactical mission and safety permit:
 - Drink plenty and share it (but save any alcohol for when it's really safe).
 - Prepare food and share it.
 - Dry off, cool off or warm up, if necessary.
 - Clean up (wash, shave, change; clean weapons).
 - Use quick relaxation techniques to "unwind".
 - Arrange to sleep (4+ hrs if possible) or catnap.
 - Talk about what happened; put into perspective; clear up misunderstandings and lessons learned.
 - Share grief; talk out personal worries; consider talking with the Chaplain.
 - Keep busy when not resting (do recreational activities, equipment maintenance, etc.).
- o If battle fatigue signs don't begin to get better with good rest, tell your leader or medic.

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PROTECT YOURSELF AND YOUR BUDDY FROM BATTLE FATIGUE

- o Welcome new members into your team; get to know them quickly. If you are new, be active in making friends.
- o Be physically fit (strength, endurance and agility).
- o Know and practice life-saving self aid and buddy aid.
- o Practice rapid relaxation techniques (see FM 26-2).
- o Help each other out when things are tough at home or in the unit.
- o Keep informed; ask your leader questions; ignore rumors.
- o Work together to give everyone enough food, water, shelter, hygiene and sanitation.
- o Sleep when the mission and safety permit; let everyone get time to sleep:
 - Sleep only in safe places and by SOP.
 - If possible, sleep 6 to 9 hours per day.
 - Try to get at least 4 hours sleep per day.
 - Get good sleep before going on sustained operations.
 - Catnap when you can, but allow time to wake up fully.
 - Catch up on sleep after going without.

RECOVERY FROM BATTLE FATIGUE

- o There are so many stresses in combat that even the most fit can get so battle fatigued that they temporarily become a problem to the team.
- o Although this can take different forms, it is still only battle fatigue. It gets better quickly with rest. Sometimes your buddies or you may have to go to the rear or to a medical unit to get that rest.
- o If this happens, let those buddies know that the team counts on them to come back quickly. Welcome them back and expect them to do their full share again.
- o Don't be surprised or worried if some battle fatigue signs (like jumpiness and bad dreams) continue awhile after you come home from combat. That's normal, too.

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BATTLE FATIGUE

'MORE SERIOUS' SIGNS;

**LEADER
ACTIONS**



CONTROLLING BATTLE FATIGUE IS BASIC GOOD LEADERSHIP

To accomplish your team's mission in combat, in either low or high intensity conflict, you must help your soldiers to withstand the extreme stresses of war. Tough, realistic training will help a lot, but in war, real enemies will be trying to kill you or stress you until you break. Winning may require your team to push continuously, under terrible conditions, to limits far beyond those you've ever reached before. At other times you may face only tension, waiting, loneliness and boredom.

Whether your unit has a combat, combat support or combat service support mission, your soldiers (and you) may still have battle fatigue. This can happen even when not under direct attack. Physical and mental signs of normal, common battle fatigue and how to live with them are outlined in HANDOUT 1 (Battle Fatigue; Normal, Common Signs; what To Do for self & buddy). You, as leader, need to teach that. You also need to know the "more serious" signs and leader actions outlined here.

HANDOUT 1

WHY YOU SHOULD CALL IT "BATTLE FATIGUE"

- o A natural result of heavy mental/emotional work, facing danger in tough conditions. Like physical fatigue:
 - It depends on level of fitness, experience, training.
 - It can come on quickly or slowly, depending on pace.
 - It gets better with rest and replenishment.
- o Sleep loss, discomfort, physical wear and fatigue are often also involved, but don't have to be.
- o We need to use a simple, common sense name for this natural, common condition, to remind us that it is not a medical or psychiatric illness.
- o We can use the name "Stress Fatigue" for the same signs in situations with high stress but no actual combat.

NORMAL, COMMON SIGNS OF BATTLE FATIGUE (Review)

* Physical Signs

- Tension head and back ache, trembling, fumbling, jumpy.
- Pain in old, healed wounds before combat.
- Pounding heart; may breathe too rapidly.
- Upset stomach (may vomit); diarrhea; frequent urination.
- Emptying bowels and bladder at instant of danger.
- Fatigue, weariness; distant, haunted ("1,000 yard") stare.

* Mental & Emotional Signs

- Anxiety, worrying; irritability, swearing, complaining.
- Difficulty concentrating, remembering, communicating.
- Awakened by bad dreams; grieving; feeling guilty.
- Anger at own team; losing confidence in self and unit.

- * Many soldiers have these signs, yet still fight well and perform all essential duties.

"MORE SERIOUS" BATTLE FATIGUE SIGNS

- o Warning signs which deserve special action, but do NOT necessarily mean a "casualty" who must be evacuated.
- o Even the normal, common signs become "more serious" if:
 - They still disrupt the mission after you take action.
 - They don't improve somewhat after good rest.
 - The soldier is acting very differently from the way he or she usually does.

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MORE SERIOUS PHYSICAL SIGNS

- o Can't keep still; constantly moving around.
- o Flinching or ducking at most sudden sounds and movement.
- o Shaking (of arms or whole body); cowering in terror.
- o Part of body won't work right, with no physical reason:
 - Can't use hand, or arm, or legs.
 - Can't see (or hear, or feel), partially or at all.
- o Freezing under fire, or prolonged, total immobility.
- o Physical exhaustion; slowed down, just stands or sits.
- o Vacant stare, "spaced out"; staggers, sways when stands.

"MORE SERIOUS" MENTAL AND EMOTIONAL SIGNS

- o Rapid talking; constantly making suggestions.
- o Arguing, starting fights; deliberately reckless action.
- o Inattention to self-care, hygiene; indifference to danger.
- o Memory loss:
 - For orders; for military skills; for a bad event;
 - For time, place, what's going on; or for everything.
- o Severe stuttering, mumbling, can't speak at all.
- o Afraid to fall asleep for fear of terror dreams, danger; unable to stay asleep even in a safe area.
- o Seeing or hearing things which aren't really there.
- o Rapid emotional shifts; crying spells; wishing was dead.
- o Social withdrawal; silent or sulking; prolonged sadness.
- o Apathetic; no interest in food or anything else.
- o "Hysterical" outburst, frantic or strange behavior.
- o Panic running under fire.

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LEADER ACTIONS FOR COMMON (& MORE SERIOUS) BATTLE FATIGUE

- o Set the example of calmness while feeling normal fear.
- o Know your job well; keep team focused on the mission; get everyone to think and talk about succeeding.
- o Assign an easy task to a soldier showing battle fatigue.
- o Remind tense soldiers to use quick relaxing techniques.
- o Remind everyone that battle fatigue is normal:
 - Others have it, too (even you).
 - Encourage friendly joking about it.
- o Stay in touch with every team member (roll call); keep them talking; stay in contact with leader & other teams.
- o Keep everyone informed:
 - Explain the situation and objectives.
 - Don't hide unpleasant possibilities, but put them in the perspective of how the team will handle them.
 - Tell what supports are expected, but prepare team for the unexpected.
 - Explain reversals and delays in support positively.
 - Control rumors; get true facts from your leaders.
- o Rotate soldiers' jobs, when you can, to share hardship and danger fairly; this may require prior cross-training.
- o Assure best possible buddy/lifesaver/medic aid and rapid evacuation of your wounded (and respect for your dead).
- o When tactical mission and safety permit, have team:
 - Drink from canteens; prepare hot or cool drinks.
 - Pass around snacks; prepare food and share it.
 - Dry off, cool down or warm up (if needed).
 - Clean up (wash, shave, change; clean weapons).
 - Use rapid relaxation techniques to "unwind".
 - Stay away from alcohol overuse or drug use.
 - Keep busy (maintenance, recreation) if not resting.
- o Never waste a chance for sleep (all in turn including you)
 - By SOP: safe from accidents, vehicles, enemy attack.
 - 4+ hours if at all possible (6 to 10+ hours ideally).
 - Even 15-30 minute catnaps help, but the soldier may be temporarily groggy on awakening.

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- o "Debrief" the unit after a hard action to
 - Have everyone tell what they saw and did
 - Reconstruct and agree on what really happened
 - Resolve any misunderstandings and mistrust.
 - Let feelings be expressed and accepted as normal.
 - Focus positively on lessons learned.
- o Get soldier with home front problems to talk them out; watch reactions after mail call & give emotional support.

LEADER ACTIONS FOR "MORE SERIOUS" BATTLE FATIGUE SIGNS

- o If soldier's behavior endangers the mission, self or others, do whatever you must to control him or her.
- o If soldier is upset, calmly try to talk him or her into cooperating; if unsuccessful, use superior numbers.
- o If concerned about soldier's reliability:
 - Unload soldier's weapon.
 - Take weapon only if seriously concerned
 - Physically restrain soldier only when necessary for safety or transportation
- o Reassure everyone that the signs are probably just battle fatigue and will get better quickly

NOTE: Even seemingly very serious battle fatigue signs can improve in minutes if handled correctly on the spot

- o If "more serious" signs continue
 - Get soldier to a safer place.
 - Don't leave alone; keep him with someone he knows
 - Tell your senior NCO or officer.
 - Have soldier examined by medic, especially if there could be a physical cause for the symptoms
- o If your leader and medic decide the soldier doesn't need to be sent away for rest or medical exam (or can't be)
 - Treat same as for normal, common signs (if possible)
 - Be sure to warm soldier up if weather is cold (or cool and wet), or cool soldier off if overheated
 - Make sure soldier eats, drinks, sleeps (4 to 12+ hr).
 - Encourage him to talk in team debrief; give support.
 - Assign to group tasks which he or she can do well.
 - Reassign to full duty and responsibility when able.
 - Have leader or medic check again if doesn't improve.

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IF YOUR LEADER OR MEDIC DECIDE TO SEND THE SOLDIER FOR REST
IN A SUPPORTING UNIT OR TO BE CHECKED BY A PHYSICIAN:

- o Tell soldier you are counting on him or her to get rested and come back quickly.
- o Encourage teammates to express trust and confidence.

LEADER ACTIONS FOR A MODERATELY BATTLE FATIGUED SOLDIER
SENT TO YOUR UNIT FOR REST (AS A TEMPORARY ADDITION)

- o Integrate into your unit as a newcomer:
 - Evaluate, give orientation, introduce to everyone.
 - Assign buddies (pick good listeners).
 - Get necessary gear, or share what the team has.
- o Treat same as for common Battle Fatigue in your team:
 - Reassurance, food, sleep; have soldier clean self up.
 - Expect normal discipline and rank distinctions.
 - Send to sick call with other soldiers, if needed.
 - Assign to work details and include in recreation.
 - Get soldier to talk about his or her experiences.
- o Maintain expectation of return to own unit (if possible).
- o If soldier doesn't improve, or shows more serious signs, tell senior officer or NCO & send for medical evaluation.

LEADER ACTIONS TO ENSURE SUCCESSFUL RETURN TO DUTY

- o Visit the soldier in the rest area, if you can.
- o Welcome the soldier back and put him or her to work:
 - Assign increasingly responsible duties.
 - Talk openly about what happened before.
 - Convey confidence in the soldier and your unit.

OTHER LEADER ACTIONS TO PREVENT BATTLE FATIGUE CASUALTIES

- o Integrate new replacements quickly; assign buddies; get to know each personally (and make sure team does, too).
- o Assure physical fitness (strength, endurance & agility).
- o Lead tough, combat-realistic training; impart unit pride.
- o Your "Leader Actions for Battle Fatigue" reduce losses!

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BATTLE FATIGUE

COMPANY LEADER ACTIONS & PREVENTION



LEADERSHIP PREVENTS BATTLE FATIGUE CASUALTIES

In combat, battle fatigue (BF) is inevitable, but battle fatigue casualties (BFC) are not. In heavy fighting, there has usually been one BFC for every three to five wounded in action (WIA). Company-sized units in battle under high risk conditions have, at times, had one BFC for every one WIA. Combat Service Support units usually have more BFCs relative to their WIA than do Combat Arms units. HQ staff and other troops can become BFCs even when not themselves under fire. However, highly trained and cohesive units have had fewer than one BFC for every ten WIA, even in very heavy fighting.

BFCs can be restored to duty quickly if rested close to their units and treated positively. This requires planning and coordination. If evacuated too far, many BFCs never recover. In continuous AirLand battle, even the short-term loss of such numbers of trained, experienced soldiers could be disastrous. Leadership plays the key role in preventing battle fatigued soldiers from becoming casualties, and also in returning those who do become casualties quickly to duty.

This handout (third in a series) outlines company-grade leader actions for treatment and prevention. You should also know HANDOUT 1 (normal, common BF signs & what to do) and HANDOUT 2 ("more serious" signs & leader actions). The series is designed to use as aids in training your subordinates in peacetime, and as reminders ("checklists") in war.

HANDOUT 3

BATTLE FATIGUE IS RATED IN TERMS OF WHERE IT CAN BE MANAGED

- o "MILD" Battle Fatigue is any amount or kind of BF symptoms which CAN be rested and restored to duty in the small unit as outlined in HANDOUT 1. Mild BF includes:
 - Common, normal, uncomfortable, but 100% effective.
 - "More serious" signs & may be partially ineffective.
 - "More serious" and completely ineffective, but NOT an unacceptable risk or burden in the tactical situation.

- o "MODERATE" Battle Fatigue has "more serious" signs AND:
 - The soldier IS too much of a risk or burden to stay with own unit at this time, given its tactical mission,
 - AND/OR own unit CANNOT provide a sufficiently safe, stable environment for rest and replenishment,
 - AND the soldier is NOT too disruptive or potentially dangerous for a unit with a less demanding mission,
 - AND soldier does NOT need urgent medical evaluation.

- o "SEVERE" Battle Fatigue is any "more serious" BF symptoms which need urgent evaluation by a Physician, Physician Assistant or Mental Health Officer because:
 - The soldier IS too burdensome, disruptive, or possibly dangerous to keep in your unit, or in any available nonmedical support unit, at this time, AND/OR
 - The soldier's symptoms COULD be due to a physical cause which may need urgent medical/surgical treatment (for example, head or spine injury, drug abuse).

NOTE: Drug use, malingering, self-wounding, atrocities, AWOL, etc, may be "combat stress reactions", but are not "BF".

LEADER ACTIONS FOR A "MODERATELY" BATTLE FATIGUED SOLDIER

- o Treat until 1SG or NCOIC can take over (see HANDOUT 2).

- o Or send soldier back to Bn Aid Station (as "moderate" BF).
 - They will pass him to the 1SG (or NCOIC) from there,
 - or find him a place to rest in the Bn's Combat Trains.

- o First Sergeant (or NCOIC) finds soldier a temporary place to rest, recover and work for 1 to 3 days:
 - in the Bn HQ Spt Co or Field Trains (or wherever the soldier's unit gets rations and supplies), for example in the mess, maintenance, POL or ammunition sections,
 - or in another unit in the same battalion which has less dangerous or mobile missions for the next few days.

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-- or in the Medical Clearing Company which supports the unit, if it is not too busy with patients.

- o 1SG coordinates the temporary placement with the Bn S1.
- o 1SG returns and takes soldier back to unit when better; if not better, get medical exam or reassignment (thru Bn S1).

LEADER ACTIONS FOR SEVERE BATTLE FATIGUE

- o Take the actions for "more serious" signs in HANDOUT 2.
- o Evacuate to the Battalion Aid Station (or to the Medical Clearing Company or dispensary which supports your area):
 - "Severe BF" may still improve in hours, or
 - Soldier may need to be held (or evacuated further) for brief medical or mental health treatment,
 - But he is still likely to recover quickly and fully.
- o 1SG (NCOIC), leader and buddies visit soldier if possible.

BATTLE FATIGUE CASUALTIES DO RETURN TO DUTY

- o 65-85% return to their original units in 1-3 days;
15-20% more return to own or other units in 1-2 weeks.
- o After recovery:
 - A good soldier will be good again.
 - A new soldier deserves another chance.
 - A poor soldier probably won't be made into a good one by treatment for BF, and may need reassignment.

FACTORS WHICH CONTRIBUTE TO BATTLE FATIGUE CASUALTIES

NOTE: Individual personality make-up does NOT predict who may get battle fatigue. Anyone can become a temporary BFC if too many of the following high risk factors occur:

- o Problems and Uncertainties on the "Home Front":
 - Negative ("Dear John") or positive ("Just married").
 - Rapid mobilization and/or family in combat zone.
 - Lack of popular support for the war.
- o New in Unit (hasn't yet established trust, buddies):
 - New replacement with no combat experience.
 - Combat veteran (recovered from wound, or "survivor").
 - New job responsibility (e.g. promoted acting NCO).

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- o First Exposure:
 - To combat conditions (noise, confusion, death).
 - To surprise enemy weapon, tactic or attack.
 - To strange, hostile terrain or climate (desert, etc).
- o Casualties in Unit (especially if many, in short time):
 - Maybe lost a trusted leader or buddies (how close?).
 - May feel left alone, or guilt, anger, mistrust.
 - May feel casualties weren't given best practical care.
 - These shake confidence in own chance of survival.
- o Under Attack and Can't Strike Back (or not trained to):
 - Artillery, Air, Armor (with blast, mass destruction).
 - Hidden snipers, booby traps, civilian partisans.
 - Enemy weapons seen as far better than own.
 - Losses to friendly fire or accident.
- o Lack of Mobility:
 - Pinned down in bunkers, ruins, trenches.
 - Fighting at close quarters, day after day.
 - Inside armor deployed on restrictive terrain.
- o Lack of Information; Failure of Expected Support:
 - Feel isolated, forgotten, tend to fear worst.
 - Lose perspective of the larger mission.
- o High Threat of (or Actual Use of) NBC Weapons:
 - Invisible, pervasive danger; false alarms; rumors.
 - Fear for future, homeland, world survival.
- o Sleep Loss (a major contributor):
 - Makes soldier easily confused, overly suggestible.
 - Can by itself cause misperceptions and hallucinations.
- o Run-Down Physical Condition; * Lack of Physical Fitness:
 - Not drinking enough water (dehydration).
 - Poor diet and hygiene; environmental illnesses.
 - Easily become exhausted, demoralized.
 - * Sudden overuse causes days of aching and stiffness.

TWO COMMON THEMES IN BATTLE FATIGUE

- o THEME 1: Loss of Confidence:
 - In self, training, equipment, comrades, or support.
 - In leader's competence, caring, candor, courage.
 - In the chance of surviving and winning.
 - In whether the Cause is worth suffering and dying for.

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- o THEME 2: Conflict Between Motives (a 4-way interaction):
 - 1. Sense of duty; fear of failure.
 - 2. Personal loyalty and friendship for buddies.
 - 3. Ideal self image; ethical/religious upbringing.
 - 4. Self preservation, comfort; love of home, family.
- o Leader actions must raise confidence and help resolve soldier's internal conflict in favor of Sense of Duty.

LEADER ACTIONS TO PREVENT BATTLE FATIGUE CASUALTIES

- o Encourage Unit Cohesion:
 - Integrate new replacements quickly; assign buddies; give time to adapt to environment before action.
 - Use work details, drills, PT, sports to gain mutual reliance in teams & healthy competition among teams.
 - Bring whole unit together for awards, ceremonies.
 - Encourage unit-centered social activities off duty (but supervise to prevent alcohol or drug abuse, improper fraternization, or divisive subgroups).
- o Help Soldiers Stabilize the "Home Front":
 - Involve soldiers' families in unit social activities; encourage a "support network" and keep them informed.
 - Know each soldier's personal background; chat informally with him or her (keep notes if helpful).
 - Do all you can to get troops their mail, pay, etc.
 - Let soldier talk out home front worries; help to get community support services; make the bureaucracy work.
 - Involve unit Chaplain and Mental Health Team to help.
 - Weigh personal factors along with other factors when assigning tasks and missions, in order to share the load, hardships and risks fairly.
- o Impart Unit Pride:
 - Educate soldiers in the history and tradition of the small unit, parent unit, branch and Army.
 - Honor historical examples of initiative, endurance and bouncing back, of overcoming heavy odds, and of self-sacrifice which led to triumph of the Cause.
- o Assure Physical Fitness (endurance, strength & agility).
- o Conduct Tough, Realistic Training:
 - Hard, continuous operations in unpleasant weather.
 - As much like combat mission & environment as possible (sights, sounds, smells, pace, confusion, feedback).

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- Share discomforts and risks; seek out challenges to increase unit's skills and confidence.
 - Not "learning to suffer", but to accomplish the mission together and suffer as little as possible.
 - Educate soldiers to maintain themselves, each other, and the equipment as matters of professional pride and personal caring, not just discipline.
 - Essential that final result is success, not failure!
- o Through Tough, Realistic Training:
 - Learn each soldier's strengths, weaknesses.
 - Identify key, combat-essential tasks.
 - Identify truly qualified soldiers for those tasks.
 - Cross-train backup soldiers on key tasks.
 - Sustain cross-training in field practice.
 - Talk about possible loss of leaders & comrades.
 - Prepare juniors (and yourself) to take over.
 - Practice unit debriefings; keep information flowing.
 - o Practice Casualty Care and Evacuation routinely:
 - Have everyone know lifesaving self aid/buddy aid.
 - Pick best qualified soldiers for "combat lifesavers".
 - Know your medical support personally; include them in planning; ensure they know what your unit does.
 - o Plan and practice Sleep Logistics:
 - Don't allow sleep in unsafe places; SOP specifies sleep areas, ground guides, protection vs attack.
 - If mission permits, allow everyone 6-10 hours per 24 (preferably but not necessarily in one block).
 - If that's impossible, try to give everyone a minimum 4 hours per 24 (and those with key tasks 6 hours).
 - "Stockpile sleep" before sustained operations.
 - Everyone catnaps during sustained ops (but plan for slow awakening of those with key mental tasks, especially if nap is between 0000 and 0600 hrs).
 - Everyone catches up on sleep after going without.
 - Teach rapid relaxation techniques (and when to use and not use them in combat).
 - o In combat, Conserve the Troops' Well-Being (with food, water, shelter, hygiene, medical care, etc.):
 - Unlike training, don't deliberately seek hardship.
 - When you must accept hardship (due to circumstances or to better accomplish the mission), explain why.
 - Remind of when you all suffered in training (and accomplished the mission!), just to prepare for this!

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AN OVERVIEW OF THE WRAIR'S DIVISION OF NEUROPSYCHIATRY

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The principal mission of the Division of Neuropsychiatry (NP) since its inception in 1952 has been to conduct research in support of the prevention and effective management of combat stress casualties, or neuropsychiatric casualties as they were called in 1952. The division also is the research element in the Medical Department's preventive medicine program concerned with the nervous system and behavioral issues, and thus investigates neurological, neurochemical, and psychological factors limiting the combat performance of healthy soldiers as well.

Consistent with this preventive medicine orientation toward protecting basically healthy individuals in dangerous environments, the division of NP's 41 civilian and military investigators have postdoctoral level expertise in a wide variety of basic science and clinical disciplines: neuroanatomy, neurophysiology, neurochemistry, neuropharmacology, biochemistry, psychology, sociology, and anthropology, social work, endocrinology, psychiatry, neurology, internal medicine, biophysics, electrical engineering, microwave engineering, and computer science. This diversity not only is critical to the conduct of successful research programs in neuropsychiatric preventive medicine, but also to technology transfer to customers as diverse as DSCPER, DCSDA, TRADOC and its many schools, FORSCOM, USAREUR, and the AMEDD, for just as with frostbite, implementation of neuropsychiatric preventive medicine often falls not to the AMEDD, but to the Army's leadership at large.

Funding for the Division's work is almost entirely out of 6.1 and 6.2 lines (basic science), so it is perhaps not surprising that the largest of the division's four departments is that of Medical Neurosciences. Nearly half of our staff of 116 is assigned to one of this department's three branches: Physiology & Behavior; Neuroendocrinology and Neurochemistry; or Neuropharmacology. Collectively, they provide a broad basic science base which we use to examine how the soldier responds to a variety of biological, environmental, and sociopsychological demands. Nearly all of this department's research utilizes laboratory animal models and careful manipulations of both internal and external milieus to investigate the interrelations among external demands, physiological processes, and performance. A substantial amount of current work involves the structural, biological, and behavioral consequences of exposure to neurotoxins and potential antidotes. Two current studies looking at human endocrine responses to stress should be of particular interest to this group however. In one, being carried out in collaboration with the Army Physical Fitness Research Institute (APFRI) at the Army War College, blood and urine levels of epinephrine and norepinephrine, cortisol, adrenocorticotrophic hormone, and beta-endorphin are being measured in a sample of students.

Senior officers attending the U.S. Army War College are evaluated at the beginning and end of their year by APFRI for muscle strength, cardiovascular fitness, personality variables, including Type A behavior traits and other parameters. They may voluntarily agree to participate in programs designed to

improve physical fitness and stress management. In a study performed two years ago at APFRI in collaboration with the Office of The Surgeon General and Dr. Meyer Friedman, there was a substantial reduction (55%) in Type A behavior as assessed by a Video Structured Interview (VSI) in subjects participating in the stress management program. Randomized control subjects not participating in the program showed only a 15% reduction on the VSI over the course of a year at the War College (American Heart Journal, in press). It is presumed that Type A individuals are at higher risk for cardiovascular pathology and that the increased coronary prone risk, in part, reflects excessive stressful arousal mediated by stress hormones. APFRI is currently interested in examining urinary and blood indices of stress such as catecholamines and cortisol to test the hypothesis that a stress management program can produce a significant decrease in stressful arousal and reactivity.

The first phase of this study, implemented this fall involved the collection of urine for several days in 12-hour samples from subjects voluntarily participating in the stress management program and randomized controls shortly after they had been evaluated by APFRI upon admission to the War College. Urines will again be collected in the spring of 1986 before the subjects leave the War College. Urine samples will be assayed in the Department of Medical Neurosciences, Div of NP for cortisol and catecholamines. In general, urine collection, which integrates hormone output over the collection period, should be useful in assessing overall levels of stressful arousal. In particular, this study will address the efficacy of stress management in altering physiological and biochemical responses related to Type A behavior.

The second phase would evaluate the reactivity of Type A individuals to several acute stressors known to elicit an immediate autonomic response. Subjects would have their heart rate monitored and blood collected through an intravenous line coupled to a blood withdrawal system before, during and after exposure to the stressor. The stressor would include mental tests designed to frustrate the subject, the cold pressor test, and treadmill exercise stress. Again, measures taken before and after the stress management program would be used to evaluate its efficacy, this time focusing on so-called "hot reactors."

A second endocrine stress study just now getting underway is worth mentioning because, unlike so much of the work we focus on at these "stress management" conferences, it involves an attempt, in the name of realistic training, to raise the level of stress experienced by Chemical Corps students undergoing training at the Corps' Ft. McClellan school. Specifically, we have been asked to evaluate the extent to which an end-of-course practical exercise involving detection and decontamination of real nerve agent (albeit at very low concentrations) stresses the students, and the associated effects on student performance, confidence, and credibility with the soldiers outside the Chemical Corps whom they support. We plan to use the same hormonal measures as at the War College, along with the School's own written and hands-on test scores and two questionnaires (one to students, another to combat arms leaders world-wide) when the exposure facility becomes operational next Spring.

The Department of Human Behavioral Biology, like Neurosciences, is concerned with the interrelationship of performance and physiology. Here, however, the emphasis is on uniquely human performance related to information

processing and decision-making, both in the laboratory and in the field. The use of human subjects of course limits both the manipulation and the measurement of the internal milieu, but nature has fortunately provided some of the systematic variation required in the way of circadian and ultradian rhythms. Because of the necessity for sustained operations in modern warfare, one major effort of the department explores cognitive function during extended periods without sleep. A microcomputer-based performance assessment battery presents up to ten separate psychomotor and cognitive tasks at intervals throughout a 72-hour period in which volunteer subjects live in the laboratory. Workload and difficulty can be adjusted to fill various proportions of the day. Future plans in this area involve: use of other stressors, e.g., atropine and possible other potential chemical protective agents; export of the requisite software to other agencies with an interest in performance testing. e.g., USAF; the possible utility and side effects of currently available anti-anxiety drugs as aids in promoting sleep in anxious, uncomfortable soldiers and leaders on long-range deployments; and finally, the analysis of the possible performance extending efficacy of various stimulant and "cognition-activating" drugs in continuous operations situations.

The second major area of research in the department involves the development of noninvasive human psychophysiological monitoring technology to support field studies. In a recent pilot study motor activity was recorded throughout a three-week field exercise by means of a wristwatch-like accelerometer interfaced to a portable 8-channel recorder. This system may ultimately provide a feasible and cost-effective alternative to the EEG as a means of monitoring sleep both in the lab and in the field.

The third of the division's Departments, that of Military Psychiatry, conducts research in both preventive psychiatry and psychiatric epidemiology. Subjects are always humans, but both topics and approaches emphasize the small unit and unit performance as much or more than individual characteristics, health, and performance. Current work is along two major axes: evaluation of the "human dimensions" in the change of the combat arms from an individual-oriented manning & personnel system to a unit-oriented one (COHORT, regimental affiliation, battalion rotations, home basing); and amelioration of stresses imposed upon military families by the military life and life-style. CPT Jim Griffith will discuss some of the "New Manning System" work in detail, but the overall notion behind implementing a unit-based system was to encourage the development of the unit cohesion (read "social support" for civilian audiences) that we know is so important in preventing combat stress casualties. In a sentence our work is designed to see how well this idea is panning out. Our data is derived from questionnaire interview and on-the-spot observation; the design calls for iterations at several places in the three-year "life cycle" of COHORT units; and we are conducting parallel studies of soldiers and spouses, on the assumption that maintaining a unit intact for an extended period provides increased opportunity for family members as well as soldiers to know and bond with each other. An aspect of this project that I feel is particularly noteworthy in an overview of the Division of Neuropsychiatry's work is that it illustrates the Division's bias toward organizational-structural "fixes" whenever possible - as opposed to the therapeutic and individualistic fixes characteristic of most "stress management" efforts. I worry in fact that the current enthusiasm of the line Army for stress management is based on a view of these programs as something that weak soldiers

can do on their own time over at the hospital. At my most cynical moments, I wonder if we in the AMEDD are not encouraging this wrongheaded view by our emphasis on therapy rather than prevention.

The WRAIR family research is part of the Army Family Action Plan, and centers on ways of promoting family wellness, again with an eye towards prevention rather than correction. Congressional inaction has delayed funding to date, but Drs. Charlene Lewis and Kathy Saczynski are standing by with an extensive and comprehensive collection of projects, a listing of which I have provided at the end of this paper (see Figure 1).

The division's fourth department is that of Microwave Research, which currently has no active behavioral research program, so I will not describe it beyond noting that its mission is to investigate the effects on biological systems of exposure to microwave radiation.

I hope this brief overview of the research activities of Division of Neuropsychiatry has provided some insight into what we are about, and how we go about it. Subsequent speakers will amplify some of the points I have touched upon, and we are always ready to provide reprints, preprints, and reports to interested parties. Please ask, for we consider dissemination of results a most important part of any researcher's job.

Figure 1

WALTER REED ARMY INSTITUTE OF RESEARCH (WRAIR) RESEARCH
OBJECTIVE 5: DETERMINE THE BEST WAYS TO PROMOTE FAMILY WELLNESS

WRAIR Research in CONUS:

- o The Role of Stress in Family Violence
- o Military Family Use and Abuse of Alcohol
- o The Effects of Military Families and Career of Severe Illness and Disabilities in Children
- o Inventory of Coping Skills of Trailer Court Based Army Wives
- o Stresses of Geographically Separated Families
- o Social Stresses Among Non-English Speaking Family Members

WRAIR Research in USAREUR:

- o Ability of Families to Cope With the Isolation of Remote Sites
- o The Stress of Extended Field Duty on Family Adjustment
- o Adjustment of Foreign Born (Non-German) Wives
- o Adjustment of Non-Command Sponsored Families
- o Special Problems of Adolescents Living in Germany
- o The Role of the Family in "Post Traumatic Stress Disorders"
- o Multi-National Comparison of:
 - oo Army Unit-Family Relationships
 - oo Army Family Life During a Foreign Tour

WRAIR Research on Service Delivery Systems:

- o Impact of Military Health Care Reputation on Its Use by Army Families
- o Service Needs of Reserve Families During Peacetime and Mobilization
- o Study of Duplication in Social and Medical

THE MEASUREMENT OF "SOLDIER WILL"
AND ITS RELATIONSHIP TO WELL-BEING, LIFE AND ARMY SATISFACTION,
DUTY STRESS, HEALTH PROBLEMS, AND UNIT ORGANIZATION

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STATEMENT OF THE PROBLEM

The U.S. Army has attempted to increase combat readiness and in turn combat effectiveness through a series of initiatives known as the New Manning System (NMS). Through profound changes in the structure, training, and deployment of combat units, the NMS attempts to significantly alter human dimensions that appear to be centrally involved in the soldier's will to fight and his ability to survive the psychological stress of combat.

Traditionally, all soldiers are assigned to units as individuals. The NMS approach (called COHORT) assigns, trains, and deploys soldiers as intact groups during their first three-year enlistment in the Army. The common experience of basic and advanced individual training, transfer of personnel in groups, and low personnel turbulence within the unit during the initial first-term enlistment afford the opportunity to build strong interpersonal relationships. Strong interpersonal relationships in turn provide support for individuals, especially during stressful military duty and stressful life circumstances. The availability and use of these support groups remediate the potentially negative psychological and physical effects of stress. The beneficial effects of social supports have strong logical as well as intuitive appeal and are empirically grounded (Griffith, 1985; Leavy, 1983).

These interpersonal relationships are also believed to have both individual and group effects pertinent to the soldier's will to fight, especially during high-intensity and sustained operations. Greater group identity, cohesiveness, esprit, and high levels of mutual caring, sharing, and providing of emotional and instrumental support should occur. As a result, the individual should experience higher morale, general well-being, satisfaction, and commitment. NMS initiatives also allow for more advanced levels of individual and group training, that provide not only better behavioral performance, but create a psychosocial climate of exuberance. Troops have greater confidence in themselves, their leaders, and their weaponry.

Special thanks are extended to Ms. Lis Hoover, Mr. Richard Oldakowski, Mr. Rick Chopper, and Dr. James Martin (all of the Department of Military Psychiatry), and Dr. Gregory Markus (Institute for Social Research, University of Michigan) for their data analytic and interpretive efforts. Thanks are also due to Ms. Denise Dickman and Ms. Doris Bitler (both of the Department of Military Psychiatry) for their diligent efforts in data cleaning and processing and other assorted tasks directly related to this paper.

A crucial element in evaluating whether NMS has these intended human

effects is defining the psychological phenomena that compose the soldier's psychological readiness to fight and his psychological sustainment in combat (collectively known as "soldier will"). The first objective of the "human dimensions" evaluation was to establish reliable and valid measures of "soldier will." The second research objective was to demonstrate the utility of these newly derived measures by comparing COHORT soldiers to nonCOHORT units on measures of "soldier will."

METHOD

Sampling of Units Participating in the NMS Field Evaluation.

The sampling frame consisted of nineteen battalions of which ten were infantry, four armor, and five field artillery. In addition, 44 "independent" COHORT companies and their matched nonCOHORT companies were included in the sampling frame. The total 137 companies under study represented 20% of the Army's total unit strength.

Selection of units for this study (called NMS "Human Dimensions" Field Evaluation) was accomplished by matching COHORT and nonCOHORT units on three criteria: type of combat arms unit (namely, infantry, armor, or field artillery), post location, and site of OCONUS rotation. Data obtained from 27 companies (one-fifth of the sampling frame) were used for analyses in this technical paper. COHORT and nonCOHORT units in this subsample were comparable in number of companies, type of combat arms unit, and post location. Units included were five battalions, two COHORT battalions (one infantry and one field artillery), three nonCOHORT (one infantry, one armor, and one field artillery). Units were matched by type of unit, COHORT/nonCOHORT status, and post location.

Sampling Questionnaire Respondents within Participating Units.

All soldiers in the five battalions under study formed the pool of potential respondents. Questionnaire administrators (BDM contractors) were asked to achieve at least an 80% response rate of personnel assigned to each company. The overall response rate was 77.3%.

"Soldier Will" Survey Instrument.

The "Soldier Will" Questionnaire (available on request) was a compilation of behavioral and psychological measures. Some of these were newly constructed, and others had been employed in previous research and have demonstrated reliability, validity, and research utility. The questionnaire instrument was comprised of six sections: (1) Introduction; (2) General Demographic Information; (3) Unit Cohesion and Morale; (4) Psychological Well-being; (5) Life and Army Satisfaction; and (6) Volunteer Agreement and Privacy Act Statement. Sections more pertinent to research objectives are described below.

Unit cohesion and morale. Three general scales were used to assess unit cohesion and morale. The first was a 19-item Unit Cohesion and Morale Scale developed by the Israeli Defense Forces (IDF) (Gal, 1983). The scale purportedly measures the soldier's perception of his(her) unit's cohesiveness

and morale. Respondents rated items on a 5-point Likert-type scale, ranging from 1 ("very high") to 5 ("very low"). Twenty-five items were included in the second scale. Items asked soldiers to rate statements about pride in and importance of oneself, the unit, and the Army in general; unit "togetherness" or cohesion; unit morale; and unit leadership. The majority of these items were taken from the "Field Forces Questionnaire" developed by Army researchers during World War II to investigate attitudes of soldiers prior to and after the Normandy invasion (Stouffer, DeVinney, Star, & Williams, 1949). Soldiers rated statements on a Likert-type scale, ranging from "strongly disagree" (scored as 1) to "strongly agree" (scored as 5). The third scale, the Company and Squad/Platoon Perceptions Scale, totaled sixty-five items. Items asked soldiers about their perceptions of the quality of relationships among soldiers; small unit interpersonal relationships; competency of officers, NCOs, and soldiers; and preparedness for combat. Items were rated on a 5-point Likert-type scale, ranging from "strongly disagree" (1) to "strongly agree" (5). This scale has been used in several previous Departmental investigations and was shown to have high internal consistency and research utility.

Mental well-being. The 18-item General Well-being (GWB) Scale was developed by Dupuy (1978) and was a measure of the respondent's general psychological well-being. Questions asked respondents about such things as being bothered by nervousness, losing control of thoughts, feelings, and behaviors, feelings of hopelessness, downheartedness, and loss of energy and vitality. Fourteen of the eighteen items were on a 6-point Likert-type scale, and the remaining four were on an 11-point Likert-type scale.

Life and Army satisfaction. Thirty-eight items made up this section. Respondents were presented with several general "life areas" (e.g., marriage, family life, health, and neighborhood) and "life areas" specific to the military (e.g., sponsorship program company's leave and pass policies, and the unit's concern for families). Respondents rated their degree of satisfaction with each life area on a 5-point Likert-type scale. Responses ranged from "strongly disagree" (1) to "strongly agree" (5).

Questionnaire administration. Representatives of the BDM Corporation, contract field data collectors for The Combined Arms Testing Agency (TCATA), administered the soldier questionnaires to soldiers of units under study in accordance with a pre-established schedule of questionnaire administration. Questionnaires were to be administered five times at six-month intervals during the three-year life cycle of a COHORT unit. Concurrently (at the same time intervals), questionnaires were to be administered to each COHORT unit's matched nonCOHORT comparison unit. Questionnaire administrations corresponded to critical phases in the life cycle of a COHORT unit, namely, six months after unit formation, prior to OCONUS deployment, shortly after OCONUS deployment, mid-life during OCONUS deployment, and right prior to unit disestablishment. Detailed written instructions were provided to contractors to assure standard questionnaire administration.

RESULTS

"Soldier Will" Measures: Scale Construction.

The first phase of analyses was aimed at clarifying the constructs of "soldier will" by conducting a series of factor and reliability analyses of all items purportedly measuring unit morale and cohesion. Data obtained from the "traditional scales" (namely, Unit Cohesion and Morale Scale, Modified Field Forces Scale, Company Perceptions Scale, and the Squad/Platoon Scale) were factor analyzed. First, each scale was factor-analyzed separately, and second, items of similar content from these "traditional scales" were pooled and factor-analyzed. The factor extraction method employed for all factor analyses was the principal components, with squared multiple correlations in the diagonals. Components were rotated orthogonally by way of the varimax rotation method. To discern the number of factors present in each analysis, two methods were employed: (1) the interpretability of items loading on factors; and (2) the scree test (Cattell, 1966, in Gorsuch, 1974, pp. 152-156). Factor analyses were again performed, specifying the number of factors to be extracted.

To determine which items comprised the factors, a relative criterion for a factor loading was used. Factor loadings for each item were examined across the extracted factors, and the highest loading for the item determined the factor on which the item was to be included. In cases where loadings of an individual item were very similar across emergent factors, the item was placed on more than one factor. The reliability analysis used was the SPSSx statistical package (SPSSx User's Guide, 1983, pp. 717-732). The package reported item means, standard deviations, inter-correlations, item-total correlations, and Cronbach's alpha coefficient.

Interpretability of emergent factors was better for factor analyses of the individual "traditional scales" than for that of pooled items of similar content from the "traditional scales." Both conceptually and in terms of item content, items that fell on some scales were very similar to those obtained on others. To reduce redundancy and to develop a manageable number of scales measuring "soldier will," items that loaded on similar factors were combined to form one scale. When item content clearly overlapped, redundant items were eliminated. Items that did not load on any of the factors of the traditional scales, yet were judged to be similar in content and to tap unique aspects of constructs measured by the newly developed scales, were added. This yielded seven measures of "soldier will:" (1) company combat confidence; (2) senior command confidence; (3) small-unit command confidence; (4) concerned leadership; (5) sense of pride; (6) unit social climate; and (7) unit teamwork. (Items comprising each scale and psychometric properties of each scale are available upon request.)

These new scales then underwent factor and reliability analyses in order to establish their unidimensionality and internal reliability. Overall, scales showed high internal consistency (respectively, for each of the seven scales, .91, .94, .87, .88, .84, .86, and .83). Scales that showed strong unidimensionality were senior command confidence, sense of pride, and unit teamwork. Company combat confidence was comprised of three factors: general combat confidence, confidence in weaponry, and in oneself. Concerned Leadership consisted of two factors: concern of soldier welfare and personal

contact with leaders. The Unit Social Climate Scale was comprised of three factors: trust and caring among soldiers, availability of instrumental support, and friendships among soldiers.

Validity of the "Soldier Will" Measures.

Two methods were used to establish the validity of the "soldier will" measures. The first approach (construct validity) intercorrelated the "soldier will" measures. The logic here was: If the "soldier will" scales tapped a broader, more unitary construct called unit esprit or group cohesion, then the scales should be highly interrelated. Table 1 displays intercorrelations among the soldier will measures, general well-being, life satisfaction, Army satisfaction, and spouse support (See Table 1).

Over one-half (12 of 21) of the intercorrelations among the "soldier will" scales had correlations of .60 or higher (highlighted in Table 1 by a triangle). Six other correlations were nearly .50 or higher. The remaining three correlations ranged from .37 to .40, and these were between the Senior Command Confidence Scale and Concerned Leadership, between Senior Command Confidence and Unit Social Climate, and between Senior Command Confidence and Unit Teamwork. Results showed that "soldier will" scales tapped a broader, more unitary psychological construct, like group cohesion or esprit.

The second approach (concurrent validity) showed relationships of "soldier will" scales to measures of positive life adjustment, such as greater life satisfaction, greater Army satisfaction, greater psychological well-being, less personal distress, fewer medical problems, and more willingness to stay in the Army. The logic of this analysis: If "soldier will" scales assessed positive unit characteristics, then soldiers who report positive unit characteristics (as measured by "soldier will" scales) should also report greater positive life adjustment, less personal distress, fewer medical problems, and more willingness to reenlist. Results supported these expectations (See rectangle in Table 1). Life and Army satisfaction, general well-being, spouse support, and sense of community were significantly and positively correlated with each of the "soldier will" measures. Army satisfaction bore the highest relationship to the "soldier will" measures; four of the seven correlations were .57 or higher. The General Well-Being Scale bore the next highest relationship with the "soldier will" scales. Measures least correlated with "soldier will" were Life Satisfaction, Spouse Support, and Sense of Community.

The "buffering effect" of unit esprit and cohesion on personal distress has a strong historical precedent. Research investigating social support and their "buffering effect" of negative consequences of stress on personal well-being (See Leavy, 1983) strongly suggests that soldiers who report more cohesiveness among its unit members are less likely to experience the deleterious effects of stress and to report lower levels of personal distress and medical problems. Given this, inverse relationships are expected between measures of "soldier will" and personal distress (See Table 2). What is striking is that all distress measures were negatively correlated with "soldier will" measures. The number of hours in a day and weekends in a month worked bore the highest relationships to small-unit command confidence, concerned leadership, and unit social climate (highlighted by circles). Of the time-spent-at-work variables, field time had lowest, and at times, no relationships

with "soldier will" (highlighted by long rectangle). Of all the distress measures, not having enough time to attend to personal, family, and recreational needs was most strongly correlated with the "soldier will" measures (highlighted by long rectangle in center of Table 2).

Seeing the doctor, taking medications for nerves, and worry interfering with work were all inversely related to "soldier will," especially to the soldier's sense of pride. Not being able to work because of worry was most strongly correlated with company combat confidence.

Wanting to stay in one's unit after first-term enlistment and wanting to reenlist were positively correlated with the "soldier will" measures (highlighted by a rectangle toward the bottom of Table 2). Wanting to get out of the Army was significantly and negatively related to all "soldier will" measures.

Differences in "Soldier Will" between COHORT and nonCOHORT Soldiers.

A series of multiple regression analyses were conducted in which "soldier will" measures served as the criterion variables and soldier and unit characteristics served as predictors. The purpose of these analyses was to ascertain the relationship of unit status--either COHORT or nonCOHORT--to the "soldier will" measures, while controlling for demographic and unit characteristics. In each analysis, demographic and unit characteristics were hierarchically entered in the regression equation in order of their historical occurrence (i.e., age, race, rank, education, marital status, type of combat arms unit, and type of residence). Unit status, either COHORT or nonCOHORT, was then entered to ascertain its contribution in variance to "soldier will" measures above and beyond personal and unit characteristics. Race, marital status, type of combat arms unit, type of residence, and unit status were "dummy coded" (Cohen & Cohen, 1975, pp. 173-176). In instances where dummy coded variables had more than two categories, one category served as the reference group and was not entered into the multiple regression equation.

Table 3 reports the results of these six separate multiple regression analyses (See Table 3).

Although the amount of variance contributed by predictors to each of the "soldier will" measures (cumulative R²s in the table) was significant, the magnitude was relatively small (ranging from 3.6% to 11.5%). However, the greatest proportion of variance accounted for in three of the six "soldier will" measures was whether the unit is COHORT (respectively for the Company Combat Confidence, Senior Command Confidence, and Concerned Leadership Scales, .035/.075 ($F(1,2452) = 92.84, p < .01$), .019/.036 ($F(1,2449) = 48.35, p < .01$), and .024/.038 ($F(1,1684) = 41.96, p < .01$). For the other three "soldier will" scales, COHORT status was the second highest contributor to the variance in "soldier will" measures after rank or age.

Consider also the standardized beta weights (b) in Table 3. A standardized beta weight represents the amount of change in terms of standard deviations expected to occur in the criterion (in our case, a "soldier will" measure) given a unit increase in the predictor of interest (in our case, COHORT). For predictors representing groups or categories (e.g., unit status is either COHORT or nonCOHORT), the beta weight shows how the mean for one

group (e.g., COHORT) on the "soldier will" measure compares to that of another group (this group is referred to as the reference group and has a value of 0 in the multiple regression equation; in our case, the reference group is nonCOHORT) while holding all other variables constant. When demographic and unit characteristics are held constant, COHORT soldiers had higher scores than those of nonCOHORT soldiers on all "soldier will" scales.

Units that differed substantially in training and performance (e.g., COHORT paratroopers vs. nonCOHORT infantry men) were compared on the "soldier will" measures. Five paratroop COHORT companies from another data base were added to the present sample for this analysis. These five companies and the 27 companies in the current sample were placed in three categories based on their training, specialization, and perceived "eliteness." These categories were: Paratroop COHORT (most highly trained, specialized, and "elite"); and nonCOHORT (least trained, specialized, and "elite"). Means on each "soldier will" measure were calculated for each company within each category. To detect differences between company means across the three categories, a one-way analysis of variance (ANOVA) was performed. The level of analysis was the company. The three categories of companies significantly differed on four of the six "soldier will" measures; these were Senior Command Confidence ($F(2,29) = 9.36, p < .001$), Small-Unit Command Confidence ($F(2,29) = 7.76, p < .01$), Concerned Leadership ($F(2,29) = 3.56, p < .05$), and Unit Social Climate ($F(2,29) = 7.18, p < .01$). Companies did not differ in their combat company confidence and sense of pride.

To discern where differences lie between categories, in addition to understanding of substantive mean differences between categories in terms of training, specialization, and "eliteness," pairwise comparisons between companies were examined. Table 4 displays means and standard deviations for each status category. Mean differences and significance levels for pairwise comparisons between status categories are also reported (See Table 4).

In summary, although mean differences were small, they reliably discriminated among units of different training, specialization, and "eliteness." Mean scale scores progressively increased from nonCOHORT to COHORT to paratroop COHORT consistently, though not always significantly. In addition, COHORT and paratroop companies were more similar in "soldier will" than were nonCOHORT and COHORT, and nonCOHORT and paratroop units. These comparisons did not control for differences in unit and demographic characteristics; therefore, differences in "soldier will" could be attributed to systematic variations in unit and demographic characteristics. However, the fact that demographic differences between the 27 COHORT and nonCOHORT companies under study were not great suggests this was not a major problem.

DISCUSSION

It has been demonstrated that "soldier will" can be reliably measured. "Soldier will" scales had high internal consistency and displayed both empirical and conceptual coherency as demonstrated by factor analytic results. Stated in simpler terms, soldier attitudes were reliably measured, and based on item content, these sets of attitudes were named as measuring specific aspects of "soldier will;" these are: Company Combat Confidence, Senior Command Confidence, Small-Unit Command Confidence, Concerned Leadership, Sense

of Pride, Unit Social Climate, and Unit Teamwork.

The validity of the "soldier will" measures was shown by their high degree of interrelationship. Although the "soldier will" scales measured different aspects of "soldier will," conceptually they are subsumed under a broader, more unitary psychological construct, perhaps called soldier morale, esprit, or will, and therefore, a high degree of interrelationship would be expected. Also, it was expected that "soldier will" measures should bear relationships to measures of life adjustment and stress. "Soldier will" was positively related to positive life adjustment (namely, life and Army satisfaction, and psychological well-being) and negatively related to personal distress, medical problems, and wanting to get out of the Army.

The "soldier will" scales discriminated between COHORT and nonCOHORT soldiers. These scales were also expected to differentiate soldiers from units that have undergone different unit assignment, training, and deployment (namely, COHORT) designed to enhance "soldier will." COHORT soldiers consistently showed higher levels of "soldier will" (in terms of the "soldier will" measures) than did nonCOHORT soldiers. Differences were greatest for first-termers (E-4s and below) and on scales measuring small-unit command confidence and unit social climate. Differences were less apparent, and in some cases, reversed direction for officers and for NCOs. These results made sense because COHORT was intended to have its greatest effect at the first-termers-level. Soldiers (E-4 and below) go through basic and advanced individual training together. Officers and NCOs do not.

Previous discussion of results has been limited to the individual soldier. COHORT, however, is not necessarily an individual-level phenomenon. COHORT is operationalized at the company-level. Soldiers in the same company go through basic and advanced individual training together, and personnel are stabilized within the company. Given this, COHORT companies were expected to have greater "soldier will" than nonCOHORT units. This was born out in analyses comparing paratroop COHORT to COHORT to nonCOHORT companies on "soldier will." Mean "soldier will" scores increased in magnitude from nonCOHORT to COHORT to paratroop COHORT companies consistently, though not always significantly.

Directions for Future Research.

Despite the apparent success in achieving reliable and valid measures of soldier will, two issues remain for future research. The first issue is the appropriate operational definition of the concept of COHORT, and the second is providing behavioral referents (e.g., training performance) for our "soldier will" measures. A direction for future research is to incorporate training performance data into the attitudinal data base. The combined data base will enable translation of "soldier will" into measurable performance. In addition, by taking measurements of attitudes and performance over time, cause-effect relationships among COHORT, "soldier will," and training performance can be specified.

The NMS Field Evaluation has been preoccupied with outcome measures, trying to develop measures on which COHORT soldiers differ most from nonCOHORT soldiers. These differences are then attributed to one unit being COHORT and the other nonCOHORT. Such conclusions have obvious methodological problems.

However, even if unit and demographic differences between units were held constant in comparisons, there are no guarantees that units under study did receive the COHORT experience (or "treatment"). To specify which aspect of the COHORT process gives what changes in "soldier will," training performance, logistics, or whatever the outcome measure, different operational definitions of COHORT must be clearly articulated and measured for each unit under study. To compare COHORT to nonCOHORT units does not tell Army leaders in the vaguest way which aspect of the COHORT process gives the most positive outcomes. Emphasis is needed on monitoring the processes of COHORT: Do COHORT units receive the COHORT "experience" and to what degree? To evaluate the processes that make a unit COHORT requires measurable aspects of the COHORT "treatment." A major aspect of the COHORT experience was to enhance the quality of interpersonal relationships (through personnel stabilization), enabling coping with stress and moderating its deleterious effects on psychological and physical well-being and job performance. WRAIR is presently assessing differences in friendships, interpersonal support, and bonding among soldiers and their relationship to personal distress, "soldier will," and psychological and physical well-being between COHORT and nonCHORT units.

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Table 1

Relationships Among "Soldier Will," General Well-Being, Life and Army Satisfaction, Spouse Support, and Psychological Sense of Community

Intercorrelations

Variable	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
"Soldier Will" Measures												
1. Comp Combat Conf	100	53	76	63	73	67	66	42	30	59	37	27
2. Sen Cmd Conf		100	48	37	46	37	40	27	27	45	20	26
3. Sm-Unit Cmd Conf			100	67	62	64	59	34	26	53	33	25
4. Concerned Leadership				100	58	68	58	38	22	57	37	28
5. Sense of Pride					100	61	63	48	33	64	33	26
6. Unit Social Climate						100	63	42	31	57	31	30
7. Unit Teamwork							100	38	28	50	29	28
8. Well-Being								100	46	55	28	28
9. Life Satisfaction									100	56	28	24
10. Army Satisfaction										100	39	42
11. Spouse Support											100	41
12. Sense of Community												100

Note. Listwise deletion was employed; N ranged from 1036 to 2804 depending on the level of analysis (e.g., company-level, squad-level, married personnel, or married personnel living with spouse) and too, some variables had missing values. In reporting correlation coefficients, decimals have been omitted. All correlations were significant at the $p < .001$ -level.

TABLE 1

Table 2

Relationship of "Soldier Will" to Measures of Personal Distress, Medical Problems, and Re-enlistment

Stress Measure	Company Cmbt Confidence	Senior Cmbt Confidence	Small-Unit Cmd Conf	Concern Leaders	Sense of Pride	Social Climate	Teamwork
How many hours do you work in a day?	-09	-06	-14	-17	-03	-19	-05
How many days do you work in a week?	-03	-06	-09	-05	-07	-06	-03
How many weekends a month do you work?	-08	-06	-13	-11	-10	-12	-08
How many days a month do you spend in the field?	-00	-01	01	-02	-04	-02	01
Do you have enough time: ^a to take care of your personal needs?	-24	-18	-23	-27	-23	-25	-19
Spend with your family and friends?	-22	-19	-20	-21	-22	-23	-19
For relaxation and entertainment?	-25	-19	-24	-28	-24	-28	-23
How many times have you seen a doctor in the past year?	-09	-06	-06	-07	-12	-08	-09
How often do you take medications for nerves? ^b	-10	-04	-06	-06	-12	-07	-08
How often can't you work because of worry? ^b	-15	-09	-12	-10	-15	-12	-11
Do you want to stay in this unit after your first-term enlistment? ^c	45	27	38	40	49	47	40
Will you re-enlist? ^c	35	26	31	30	47	29	31
If you could, would you get out of the Army? ^c	-42	-32	-39	-36	-54	-35	-36

Note. Listwise deletion was used; N ranged from 1678 to 2804, depending on the appropriate respondent pool and the number of missing cases.

^aResponse categories ranged from 1 ("need a lot less time") to 5 ("need a lot more time").

^bResponse categories ranged from 1 ("never") to 5 ("always").

^cResponse categories ranged from 1 ("definitely no") to 5 ("definitely yes").

TABLE 2

Table 3
Multiple Regression Analyses in which "Soldier VIII" Measures are Regressed on Soldier and Unit Characteristics

Predictor Variables	Company Combat Confidence		Senior Command Confidence		Small-Unit Command Confidence		Concerned Leadership		Sense of Pride		Unit Social Climate	
	b	R ² Added	b	R ² Added	b	R ² Added	b	R ² Added	b	R ² Added	b	R ² Added
Age	0.38	0.18**	0.29	0.05**	0.22	0.03*	0.35	0.00	1.02**	0.32**	-0.07	0.09**
Race ^a	0.16	0.00	0.88**	0.07**	-0.40	0.01	-0.13	0.00	0.14	0.00	-0.24	0.01
Rank	1.55**	0.09**	0.59*	0.01	-1.48**	0.42**	-0.36	0.14**	2.19**	0.20**	-1.09**	0.34**
Education	0.01	0.00	-0.24	0.00	0.02	0.00	-0.19	0.00	-0.29	0.00	-0.19	0.01
Single	0.32	0.00	0.47	0.00	-0.44	0.00	-0.46	0.00	0.42	0.00	0.17	0.06**
Divorced/sep ^c	-0.04	0.00	0.09	0.00	-0.40	0.00	-0.28	0.00	-0.19	0.02*	-0.05	0.00
Artillery	-0.78**	0.10**	-0.43*	0.02*	0.09	0.00	0.00	0.00	-0.55**	0.03**	-0.56*	0.03*
Armour	1.27**	0.02*	0.11	0.01	0.50	0.00	0.62*	0.00	0.66**	0.00	0.51	0.00
CONHORT ^d	2.03**	0.35**	1.49**	0.19**	1.66**	0.19**	1.63**	0.24**	2.08**	0.36**	1.54**	0.18**
On-post ^e	0.47	0.01	0.67*	0.00	-0.21	0.01	-0.33	0.00	0.60*	0.00	-0.03	0.00
Off-post ^f	0.25	0.00	0.66*	0.01	-0.16	0.00	-0.42	0.00	0.63*	0.02*	-0.90*	0.02*
Cum R ²	0.75**		0.36**		0.66**		0.38**		1.15**		0.74**	
F(11,2450)	17.54		F(11,2447)	8.37	F(11,1655)	10.58	F(11,1682)	6.00	F(11,2531)	29.80	F(11,1651)	11.97

Note. In reporting standardized beta weights and R² Added decimals were omitted. Race was dichotomously coded so that white = "0" and nonwhite = "1." Rank was coded so that E-1 = "1," E-2 = "2," ... O-1 = "10," O-2 = "11," etc. Marital status was trichotomized, with married serving as the reference group. Single and Divorced/Separated were dummy coded so that "1" = inclusion in a group and "0" = exclusion from a group. Unit type (Infantry, Armour, and Artillery) was trichotomized, with infantry serving as the reference group. Artillery and armour units were dummy coded so that "1" = inclusion in a group and "0" = exclusion from a group. CONHORT was dichotomously coded so that CONHORT = "1" and nonCONHORT = "0." Residence Yes was trichotomized, with Barracks serving as the reference group. On-post and Off-post were dummy coded so that "1" = inclusion in a group and "0" = exclusion from a group. *p < .05. **p < .01.

TABLE 3

Table 4

"Soldier Will" Means for Paratroop COHORT, COHORT, and nonCOHORT Companies

"Soldier Will" Scale	Paratroopers(P)		COHORT(C)		nonCOHORT(NC)		Pairwise Comparisons: Differences between Means		
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>	<u>P/C</u>	<u>C/NC</u>	<u>P/NC</u>
Company Combat Confidence	58.56	3.35	55.58	2.24	53.67	4.76	2.98**	NS	4.89**
Senior Command Confidence	19.15	1.01	18.78	0.83	17.66	0.57	NS	1.12*	1.49*
Small-Unit Command Confidence	38.87	1.39	37.77	1.95	34.65	2.60	NS	3.13**	4.22**
Concerned Leadership	24.89	1.79	25.75	1.53	23.58	2.31	NS	2.17*	NS
Sense of Pride	27.34	1.95	27.01	1.43	25.77	1.97	NS	NS	NS
Unit Social Climate	46.24	1.29	44.34	2.25	40.83	3.33	NS	3.51**	5.41**

* $p < .05$, two-tailed. ** $p < .01$, two-tailed.

TABLE 4

STRESS AND SOLDIER EXPECTATIONS IN EUROPE

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What a soldier expects to happen affects how that soldier acts. For example, when a soldier expects to "go to the field" on an FTX he gets ready by gathering and packing needed uniforms and equipment. The uniform and equipment gathered will be different than if he believes he will be going to work indoors at a desk. Stress, in the form of frustrations, anxiety, and hostility, occur when a soldier expects one thing, but something else is required. Under these conditions the soldier feels frustrated in his attempt to do his job, anxiety that he cannot do his job well, and over time develops negative attitudes towards leaders and the organization.

This report documents some of the frustrations and negative attitudes that develop among soldiers assigned to the U.S. Army Europe (USAREUR). The study began when a Command Sergeant Major asked the author what soldiers expected when they came to Europe. The CSM had been recently assigned, and had been talking with hundreds of the soldiers that came under the control of his headquarters. He reported that the soldiers with whom he had spoken seemed to have many complaints, to be dissatisfied with their assignments, and to be frustrated in their job performance. He asked if there were any data that showed what soldiers expected when they arrived in Europe, and which expectations were not being met.

Interviews and questionnaires given to soldiers upon arrival in Germany, and a follow-up questionnaire six months after their arrival, provided data that soldiers' frustrations resulted from differences between what they expected and what happened to them on the job. The purpose of this paper is to describe some of the major differences reported by the soldiers.

In order to obtain the soldier expectation data for the first phase of the study arrangements were made with the 21st Replacement Battalion, located at Rhein-Main AFB in Germany, to administer a questionnaire and to interview soldiers within a few hours after their arrival from the U.S. Participation was voluntary for the soldiers. During the data collection period 257 soldiers completed the questionnaire, and 39 soldiers were interviewed by the research team. Soldiers who participated were given the questionnaire and interviewed within 24 hours of their arrival.

The second phase of the study was conducted six months after the soldiers arrival. All the soldiers in the study group received by mail a modified questionnaire. They were asked to complete the questionnaire and return it to the research team in an attached addressed and stamped envelope. The modifications were minimal and most only changed the original questionnaire to reflect the six months the soldiers had been on the job in Germany. For example, an original question was "Medical care in Germany will be" The modified question would have read, "Medical care in Germany is" There were a few questions added to the questionnaire that were not in the original because they only made sense after the soldier had been in Germany for

some time (e.g., "I have been satisfied with my tour so far."). Of the original group, 104 soldiers returned the follow-up questionnaire (40% return).

The questionnaire responses were divided into five general categories for ease of analysis. These categories were satisfaction with the Army, attitude toward Germany and the German people, reaction to training and work, overall quality of life for soldiers in Germany, and feelings of control over their life.

SATISFACTION

The initial reactions to these questions of satisfaction with the Army, their job, or their assignment was positive, with most soldiers reporting they were reasonably satisfied with the Army and their assignment. It was interesting to note that while 66% of the sample had not volunteered for Europe, only 18% reported being unhappy with their assignment. The percent reporting they were unhappy at the end of the first six months in Europe increased to 29%. Conversely, of the initial 44% who reported being very happy or happy with their assignment only 27% still felt that way after six months.

The generally positive attitude toward the assignment to Europe upon arrival was also reflected in their plans to extend their tour. Approximately 28% of the soldiers were favorably disposed toward extending their tour when they arrived, but after six months only 17% expected to extend. Approximately 39% did not expect to extend their tour, and that increased to 63% after six months in country. This was consistent with the increase in the percentage of soldiers who said they already looked forward to going home (from 36% to 60%). Men appeared more likely to change their mind about extending than women.

ATTITUDES ABOUT GERMANY

The data showed a distinctly favorable attitude of the soldiers toward Germany and the German people. Upon arrival, most soldiers reported they expected to travel, meet Germans, and have plenty of recreational opportunities. These attitudes did not change during the first six months on the job. These attitudes remained stable, even in light of some unmet expectations. Thirty-one percent fewer soldiers had travelled as much as they expected. Twenty-three percent more disagreed that they had a good idea of what life would be like in Germany.

An interesting result in the six-month follow-up was the 49% increase of soldiers who believed that terrorists were a problem. Although soldiers reported this belief, apparently it did not change their attitudes toward the country or the people. For example, 83% reported they shopped in German stores. Apparently the language, cultural differences, and possibility of terrorism did not deter these normal behaviors, or result in negative attitudes. Less than 10% of the soldiers in the sample reported any negative reactions in this context.

TRAINING AND WORKING CONDITIONS

Upon arrival the soldiers reported looking forward to working in their units, expected the work to be challenging, and believed that more would be expected of them than if they had been assigned to a CONUS unit. Unfortunately, these areas seem to be where there were significant disappointments for the soldiers in the sample. A surprising 63% reported their units did not live up to their expectations. They reported not liking their units (a drop from 57% liking to only 27% liking), training was not as tough (54% said tough on arrival, 32% said it after 6 months) or as good (52% down to 31% after 6 months) as they expected, and 40% report that their NCOs are less professional than those in the U.S. (only 2% originally reported expecting this.). In addition, an increase of 41% reported in the follow-up that soldiers pull a lot of extra duties in Germany (26% on arrival, 67% after 6 months).

QUALITY OF LIFE

One issue in the quality of life area that was not anticipated in the questionnaires, but which came to light during the interviews, was the problem of unaccompanied tours for the junior enlisted members. Since the interview sample was smaller than the total group the percentages are less likely to be stable indicators of the population. However, both male and female service members reported distress, from mild to severe, at being separated from their spouses and children. They had not given much thought to their assignment, except in terms of how long it would be before they would be able to bring their families over. They never mentioned the difficulties posed by the lack of command sponsorship and limited housing, and may not have been aware of these.

Only 13% of the arriving soldiers expected the quality of the barracks to be either poor or terrible, but after 6 months 42% said they were poor or terrible. Only 8% expected the food in the mess halls to be worse or much worse than in the U.S., but after 6 months 29% thought it was worse or much worse. When asked on arrival if they thought they would have a normal social life and there were enough members of the opposite sex available for such only 10% disagreed. After 6 months 31% disagreed with this expectation.

A question about Germany being a good assignment for a soldier with a family drew a mixed response, which stayed stable over the 6 months. There was a small increase in the percentage of those who thought spouses had a difficult time finding jobs (23% to 33%).

Most significant were the general issues such as medical care, recreation opportunities, and the PX and commissaries quality. In general, the soldiers expected these to be as good or better than in the U.S., and all were rated worse after six months on the job. For example, on arrival 68% said the medical care would be good or excellent, but after six months only 29% gave that response. Recreation opportunities were initially rated better or much better than in the U.S. by 37% but after six months only 19% rated them better. The PX and commissary were expected to be as good as in the U.S. by 63% upon arrival, but by only 28% after six months.

CONTROL

The area of control was added with the thought that perceived lack of control over one's environment may result in feelings of helplessness and negative attitude formation toward the assignment. In response to a general question asking if they felt they had any control over what happened to them in the Army, 19% said none at all and only 11% thought they had "a lot." After six months 25% said none at all and only 3% said a lot. In general, the soldiers believed they had little or no control over their assignments and duty locations, but this did not seem to influence their attitude toward the assignment or Germany.

Two general questions were added to the six-month follow-up questionnaire, and were designed to elicit an overall response to the total experience after six months in Europe. Thirty-eight percent of the soldiers agreed they were satisfied with the tour so far, while another 38% disagreed. Fifty-six percent of the women agreed, while only 35% of the men agreed they were satisfied. When presented with a statement to the effect that the tour had turned out the way they had expected, 58% of the soldiers disagreed. Fifty-seven percent of the males disagreed, but only 37% of the females.

SUMMARY

There is little doubt, based on the data, that the expectations of the soldiers assigned to Germany are not being met. While the soldiers seem to have an initial positive attitude, this degrades over a short period (6 months). Not all areas degrade, and those that degrade do not do so equally. However, there is little question that these unmet expectations are stressors for the soldiers in Europe, and contribute directly to degradation of soldier performance over time.

Further analyses of the available data, plus the interview data, are warranted. Additionally, similar research with soldiers assigned to units in the U.S. would provide a basis for comparisons. Finally, investigation of the relationship between unmet expectations and job performance should be conducted.

UNITED STATES ARMY MEDICAL RESEARCH UNIT
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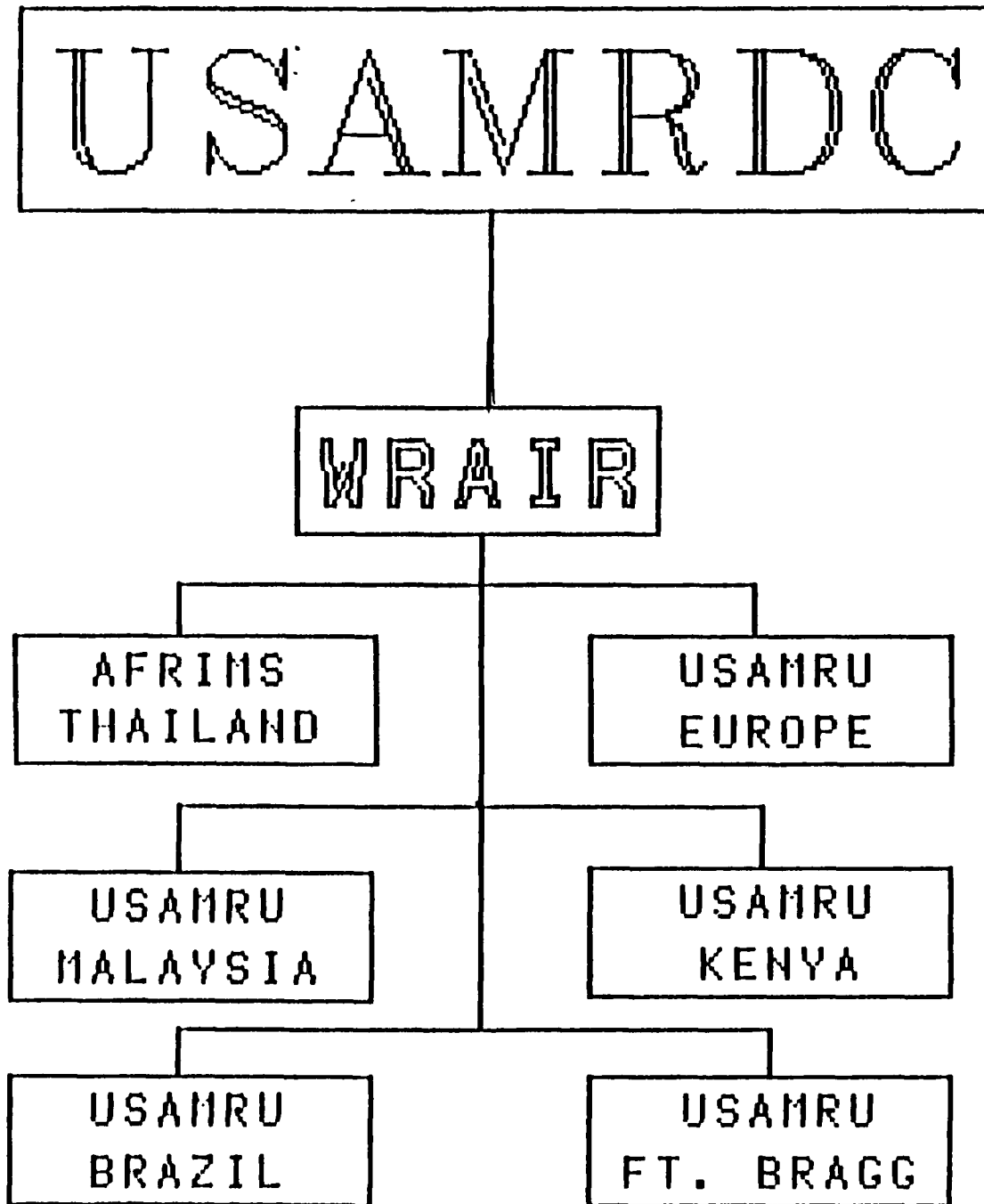
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The United States Army Medical Research Unit (USARMRU) at Fort Bragg has the mission to conduct research on psychological or behavioral issues identified by XVIII Airborne corps units or Walter Reed Army Institute of Research (WRAIR) which might impede deployment readiness. The organization of the United States Army Medical Research and Development Command is shown in Figure 1.

The USARMRU at Fort Bragg uses a variety of methods to conduct its programs and studies. The methods include: reframe command problem into research hypothesis, design project, collect and analyze data, and report the findings. The programs and studies include: pre-deployment stress, Sinai, Grenada, Gallant Eagle, chronic workload/job burnout, body fat measurement, CORFIT, weight control, interpersonal bonding, combat stress intervention/control, user's workshop, and field training for Army psychologists.

The capabilities of USARMRU at Fort Bragg include: human issues consultation (deployment readiness, training); unit cohesion assessment and analysis, stress analysis (sustained operations, workload, jetlag); combat stress control techniques, research design and analysis, deployable research teams, interview content analysis, video taping (small unit/crew operations), survey development and analysis, participant observer methods, interpersonal bonding analysis (vertical and horizontal), family support groups (organization, operation, and sustainment), gender issues, and weight control assessment.

FIGURE 1



PSYCHOLOGICAL AND PHYSIOLOGICAL EFFECTS OF NBC
AND EXTENDED OPERATIONS ON CREWS
(P²NBC²)

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The P²NBC² Program has the mission to examine, expeditiously, physiological and psychological effects of NBC and extended operations on crews. The Program objectives are: a) determine human performance limits, b) determine ways to increase fightability, habitability and sustainment of current and future fighting vehicles in: training/doctrine, organization, and material, c) acquire data/information. The Program strategy includes: concurrent/coordinated research and testing, system approach to testing, emphasize deliverables, standardized testing and analysis. The P²NBC² Program deliverables are: a) a field circular guide for commanders offering: planning factors/decision criteria, ways to extend endurance/performance, indicators of performance degradation, insights on how to fight; b) implications of test results to: doctrine training development, combat development, supportability implications/insights.

PSYCHOLOGICAL AND PHYSIOLOGICAL EFFECTS OF NBC AND
EXTENDED OPERATIONS ON COMBINED ARMS CREWS

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Yesterday, during one of the presentations, there was a view-graph on "Characteristics of the Battlefield." Some of those listed were: Continuous Operations, Night Time, 360 (surrounded), Hi Intensity, etc. We think there is one more component in the integrated battlefield, the NBC environment. This added component, while being psychologically stressful, has the added requirement of the wearing of the chemical defense ensemble or MOPP GEAR (Mission Oriented Protective Posture). The full MOPP ensemble consists of mask with hood, overgarments, overboots, and butyl rubber gloves. The ensemble is multi-layered, does not allow for heat dissipation, and gives a feeling of encapsulation. Because of the structural and functional characteristics of the suit, performance of everyday (military) functions becomes difficult. For example, consider the following activities in MOPP gear: eating/drinking, communication (command & control procedures), vision through a restricted visual field, body flexibility, speed of movement, psychomotor coordination, manual dexterity, use of tactile sense, elimination, rifle firing, breathing, physically demanding labor (heat-stress factor), and maintenance of vehicles.

THE P²NBC² PROGRAM

An important question, then, is what psychological and physiological effects the wearing of the MOPP suit has on performance, especially in an extended operations scenario (part of the Air/land Battle doctrine). Important research questions are: What kinds of performance are degraded? Is decline gradual or sudden? Are accuracy and completeness maintained through increased time to complete a task?

This past summer, we attempted to address these questions along with questions on the psychological and physiological changes/effects of weapon system crews in three field studies. The first test was a sustained operations scenario at Fort Knox with M60 and M1A1 crews. The second test, also a sustained operations scenario, was at Fort Sill with M109 howitzer crews. The final test, a continuous operations scenario, was at Fort Benning with Bradley Infantry Fighting Vehicle and M113 crews.

Participants in the three tests included representatives from the three proponent boards and schools along with several laboratories and research institutes. As stated above, ARI accepted the responsibility of examining the effects on performance. The U.S. Army Aeromedical Research Laboratory accepted the responsibility of examining physiological parameters and providing telemetry information on core temperature and heart rate for the purpose of subject safety. The U.S. Army Institute of Environmental Medicine accepted the responsibility of examining psychological parameters and providing telemetry information on core temperature and heart rate for the purpose of subject safety. The U.S. Army Institute of Research assumed the

responsibility of providing medical emergency personnel.

These three summer tests and proposed future tests are being conducted as field tests on the assumption that a war could break out today. Battle realistic tactical scenarios will provide immediate data on the effects of stressors such as MOPP-related encapsulation and heat on the ability to perform over prolonged periods of time. The goal of this pragmatic strategy is to get general results now, and later study in laboratory and simulation experiments specific components identified from the examination of field test results. Test objectives of the program are outlined in Table I. The following discussion will focus on preliminary analyses of the Forts Knox, Sill, and Benning tests.

FORT KNOX TANK TRIALS

The scenario for this test called for simulated battle engagements (See Figure 1) scattered periodically throughout the day. The protocol (Table II) involved a repeated measures design in which each of two platoons (four tanks per platoon) underwent a control condition (no MOPP gear) and three MOPP IV iterations, two of which involved various types of fixes (remedial measure to prolong endurance. See Table III). During MOPP IV runs, the hatches were closed, the crews ate "tube food" (fix iterations only) and were not expected to sleep. The ARI staff planned to collect a number of system and crew performance measures (Table IV). However, the nature of this kind of complex scenario makes the data susceptible to the intrusion of unwanted events (See Tables V & VI; in the latter Table, not that the following items varied throughout the exercise: number of friendly tanks available, number and elapsed times of battle engagements). Because of problems which resulted in collecting performance data, the discussion will concentrate on endurance data.

Figure 2 shows endurance of subject tanks within each of the iterations. All members of the two platoons in the MOPP 0 condition went the full pre-set time (approximately 11 hours). The three MOPP IV iterations lasted a varying amount of time, ranging from 5.2 hours to 17.4 hours (duration defined as start of exercise to termination of last tank). A tank was declared to be combat ineffective (& out of the exercise) when crew size was reduced to less than three because of medical casualties (either medical "pulls" or self-selects). Forty-eight percent of crew members became casualties. Average time spent in MOPP IV gear for those who became casualties was 6.3 hours. The average MOPP IV time a tank remained in the three iterations was 7.8 hours.

Clarifications must be added to the interpretation of the endurance data: (1) In the MOPP IV iteration with fixes (Platoon A), one tank dropped out of the scenario due to mechanical problems; (2) the use of the microclimate-cooling fixes were not run under adequate testing conditions: during Platoon A's run, the exercise was terminated prematurely because of faulty EKG leads, and mechanical difficulties forced shutting off the cooling system in one tank during the iteration; in Platoon B's run, the exercise was halted when the crew failed on two successive occasions to perceive and engage the opposition forces, the temperature was relatively cooler throughout the test, and

mechanical difficulties prevented one tank from entering the iteration.

Common complaints by casualties were headaches (possibly induced by the necessary tightness of the mask) and nausea. A frequent problem with functioning in MOPP IV gear was difficulty in inserting food and/or water tubes; a common reason for breaking MOPP regimen was glove removal to improve dexterity or to alleviate discomfort.

Leadership played a major role in regimen and endurance. No MOPP IV breakdowns occurred in platoon leader tanks. Platoon leader tanks remained in the iteration longer than the other tanks (av. time from MOPP IV order to termination was 10.8 vs. 6.4 hours) and in fact the platoon leaders' tanks were always the last to become combat ineffective. On only one occasion did a platoon leader become a medical casualty (pulled because of high core temperature).

Fort Sill Howitzer Test:

In August, howitzer crews were tested at Fort Sill, Oklahoma (Figure 3). The test design called for one MOPP 0 and three MOPP IV conditions (different crew for each iteration). A number of fire missions were scheduled at each firing point, then the crew was to move to another position. A howitzer crew consists of nine personnel whose duties differ in both the type of cognition and physical effort required (Table VII). The MOPP 0 crew lasted its intended duration, engaging in 66 fire missions and firing 228 rounds (Figure 4), but the three MOPP IV crews were significantly affected by extreme temperatures of around 100 degrees Fahrenheit (endurance times ranged from about two to four hours). A howitzer was declared combat ineffective (and the iteration terminated) when crew size was reduced to less than five or the chief of the section was withdrawn (the first two MOPP exercises were terminated for the former reason, and the last iteration for the latter reason). The average time to casualty in each of the three MOPP IV iterations was: 158 minutes (standard deviation of 56 minutes); 82 minutes (S.D. = 25); and 58 minutes (S.D. = 29); average time to casualty overall for the three MOPP IV iterations combined was 115 minutes (S.D. = 52).

A summary of various performance measures of round firing is presented in Table VIII for the three MOPP IV iterations; for comparison, the fire missions performed at the first firing point by the MOPP 0 crew are included. There are substantial differences in such measures as (1) time to fire the first round once the coordinates were received; (2) the inter-round intervals, and (3) time to load the howitzer (however, selecting the proper round and charge showed no decrements).

Fort Benning Bradley Study:

This study on mechanized infantry crews was conducted on a course which contained 12 tasks. The tasks ranged from maintenance checks, to tactical movements, to live fire exercises, and decontamination procedures (See Figure 5). The test was conducted in two phases. In phase 1A, two crews were in MOPP IV and two in MOPP 1; the following week, each crew reversed its MOPP status. Important aspects of the scenario included rest breaks at the end of each six

hour scenario, MOPP-suit changing, an evening meal, and a five-hour sleep break. This scenario was built around current doctrine in Field Manual 3-100 which states MOPP suit changes/exchanges are required every six hours. Phase 1B was designated to test a situation in which the luxury of breaks from MOPP IV does not exist; it was mainly an endurance test, in that breaks, food, and MOPP replacement were not part of the scenario.

The endurance data comparing MOPP IV crews with MOPP 1 crews in Phase 1A, (Figure 6) shows that the MOPP IV crews had as long a duration as the MOPP 1 counterparts (Note the comparison of iteration 2, week one with week two). The initial week one iteration 1, was terminated because of a lengthy rainstorm. Complete data is available on crews 1 and 2; crew 3's vehicle had mechanical problems, and crew 4 was removed from the study for administrative reasons. The actual durations must be viewed in conjunction with the following aspects of the scenario: breaks at the end of each cycle, energy expenditure distributed over time, sleep break, a change of MOPP gear at the end of each cycle, food each morning and evening, and relatively cooler temperatures compared to the Fort Knox and Fort Sill trials.

In Phase 1B, the BIFVs remained in the test for 33.3 and 31.4 hours and the M113 for 37.9 hours (See Figure 7). Average time to a casualty within each crew ranged from 17.5 to 25 hours. The following points should be noted concerning the longevity of the vehicles: (1) in crew 1, the fifth person leaving the exercise (and thereby making the vehicle combat ineffective) did so because of a hospitalized family member; (2) in crew 2, the fifth person who became a casualty was suffering from rectal probe irritation (probes were used to record core body temperature to insure safety); (3) crew 3 began with only eight crewmen and thus became combat ineffective with the fourth casualty. One of the four was removed for administrative reasons (breaking MOPP regimen to smoke). Thus these times are conservative.

Future P²NBC² Research:

It is evident from the endurance data (summarized in Table IX) that the chemical defense ensemble combined with heat severely limits endurance. Future MOPP IV tests will study duration and performance during cooler temperatures to ascertain non heat-related MOPP gear effects. The P²NBC² program has recently been approved for a five-year plan of study. Data from these additional field tests will serve as a point of departure for laboratory studies that will be conducted throughout the period.

Research Products:

One output of the P²NBC² effort will be a series of "how to fight" field circulars which contain guidance for tactical commanders. The first will be written this year and will provide information on the effects of MOPP IV gear and heat on soldier endurance and performance. Suggestions will be provided on how to deal with these effects on the battlefield, given current doctrine, training, and material. An example of an entry in a field circular is presented in Table X (data is fictitious).

P² NBC² Test Objectives

- 1. Assess Mission Performance Degradation**
 - A. Non-Contaminated Environment (Base Case)**
 - B. NBC Environment (MOPP IV)**
- 2. Determine Physiological Factors Affecting Performance**
- 3. Determine Psychological Factors Affecting Performance**
- 4. Determine Possible Fixes**
 - A. Training**
 - B. Doctrine**
 - C. Force Structure**
 - D. Materiel**
- 5. Identify Performance Degradation Indicators**
- 6. Identify Demographic Performance Degradation Parameters**

PROTOCOL DESIGN

<u>Scenario 1</u>	<u>Refuel/ Rearm</u>	<u>Scenario 2</u>	<u>Refuel/ Rearm</u>	<u>Scenario 3</u>
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MOPP 0 (15, 16 July)

Platoon A

Platoon B

MOPP IV (17-19 July)

Platoon A

Platoon B

MOPP IV with Fixes
(23, 25 July)

Platoon A

Platoon B

MOPP IV with Fixes
& Microclimate
Cooling (30 July,
1-2 August)

Platoon A

Platoon B

TABLE 2

FT. KNOX FIXES

- FIST system (water intake)
- Sleep modifications/hammocks for drivers
- Tube food
- Micro-climate cooling
 - Cooling vest, MOPP IV
 - Cooling vest, MOPP II (overpressure tank)
- Stress* management of SUSOPS in MOPP gear in tanks
 - Control techniques for basic life support stress
 - Water intake regimen
 - Exercise regimen
 - Work-rest cycles
 - Food intake schedule - coping with lack of food
 - Hyperventilation prevention, control
 - Control techniques for basic psychological stress
 - External: problem solving
 - Internal: arousal level modification (relaxation/activation)
- Sources of stress defined by interviews with crew members

TABLE 3

INTENDED SYSTEM & CREW PERFORMANCE DATA

System (platoon)

1. Tank driving from admin. area to battle position & return for resupply
2. Strategic tank moves at battle position
3. Time-to-first fire on OPFOR by platoon
4. Hit and near-miss rates (moving vs. stationary; flank vs. head on; range)
5. Endurance

Crew

1. Fire mission regimen
 - a. Defend battle position (spotrep)
 - b. React to indirect fire (close hatches/submit shell of mortar reports)
 - c. Acquire/identify target
 - d. Issue fire command sequence
2. Resupply point performance; loading of dummy & blank rounds & refueling
3. Motivation

Goal is to test for degradation effects due to SUSOPS &/or MOPP IV gear.

TABLE 4

FIELD TEST CONSTRAINTS

- **Number of tanks on a given iteration differed - -**
 - Available crew size
 - Mechanical problems
- **Number of engagements differed - -**
 - OPFOR not under P² NBC² test director control
- **Inconsistency of OPFOR attack strategies within and between days**
- **Long periods of time with no battles - - boredom factor**
- **Crew performance often difficult to measure:**
 - Loaders did not simulate the loading of rounds
 - Gunners inconsistent in firing behavior
- **System performance often difficult to measure:**
 - Hit, near-miss rate (mechanical and scoring problems with miles and TSV system)

FIELD TEST CONSTRAINTS (CONT'D)

- Scenario was often delayed:
 - Necessary safety-related interruptions
 - 1. Physiological-monitoring hook-up
 - 2. Tank intercom, communication problems
 - 3. Medical interventions
 - TSV mechanical interruptions
 - Tank mechanical interruptions (*friendly & OPFOR*)
- Endurance difficult to measure:
 - Tanks declared ineffective when crew size is less than 3
- Inadequate control of subjects:
 - Tank regimen breakdowns were frequent (failure to execute doctrinal training in a simulated battle environment)
 - Off-duty behavior not controlled

TABLE 5 (Continued)

LOG OF EVENTS

Date	Condition (platoon)	Max length	Actual length	N of friendly tanks	Scenario 1			Scenario 2			Scenario 3		
					N of engagements/ elapsed time range	N of maneuvers/ elapsed time range	N of engagements/ elapsed time range	N of engagements/ elapsed time range	N of maneuvers/ elapsed time range	N of engagements/ elapsed time range	N of engagements/ elapsed time range	N of maneuvers/ elapsed time range	
15 July	MOBP #1(A)	11	11	3	2/15-16	#	5/7-25	#					
16 July	MOBP #2(B)	11	11	4	1/16	#	4/11-24	#					
17-18 July	MOBP IV(A)	48	15.6	3	4/8-13	13/NA	6/9-12	2/NA					
19 July	MOBP IV(B)	48	5.2	4	4/10-12	2/2-3							
23 July	IV with fixes (A)	48	12.7	3	#	14/1-4	5/10-13	#					
25 July	IV with fixes (B)	48	7.8	4	5/11-27	#							
30 July	IV with fixes & microclimate cooling (A)	48	8.5	3	#	#							
1-2 August	IV with fixes & microclimate cooling (B)	48	17.4	3	8*/7-9	#	10*/7-12	#	3*/4-13	#			

* These OPFOR engagements consisted of 1 jeep (without MILES). Usual OPFOR consisted of 2-4 vehicles (recon + sheridans).

Notes

- 1 Elapsed time range is in minutes
- 2 Within & between iterations, the number & type of OPFOR vehicles differed
- 3 NA indicates that information not available for that day.

TABLE 6

TABLE 7

M109 HOWITZER CREW

CHIEF OF SECTION -- Commands Crew During Firing
GUNNER -- Sets 3 Levs for Direction (Deflection
of Azimuth)

ASST. GUNNER -- Sets 3 Levs for Elevation (Elev-
ment)

CRUINNERS --

#1: • Places Projectile in Loading Tray
and Rams it

• Places Propellant Charge in Chamber

• Inserts Primer

• Fires the Howitzer

#2: Rams the Projectile

#3: assists #2 & #1

#4: Preparer Propellant Charge

#5: Driver -- Preparer propellant charge; general
duties

#6: Driver -- General Duties

Source: U.S. Army Field Artillery School, Ft. Sill, Oklahoma Department, Ft. Sill, Okla. HQ WDYMS, Jun 54,
"Duties of the Personnel of the M109 Howitzer
M109 Series Self-Propelled Gun".

Comparison of Round-Firing Measures: Average Values in Seconds over Indicated Elapsed Times

Performance Measure	MOPP Ø	MOPP IV (1st)	MOPP IV (2nd)	MOPP IV (3rd)
N of Fire Missions	16	15	6	4
Elapsed Time	1 hr., 59 min.	2 hr., 3 min.	1 hr., 49 min.	1 hr., 38 min.
Coordinates-to-First Fire	29.8	79.3	145.0	123.3
Inter-Round Interval	24.7	43.1	75.0	82.5
Load Howitzer (#1 Round)	8.6	17.4	33.5	20.0
Charge Time (#1 Round)	10.3	9.6	9.8	11.3
Round Selection (#1 Round)	6.5	2.9	2.7	6.1

TABLE 8

Summary of MOPP-4 Endurance Data

Location	Vehicle	Duration (range)	Average Time to Casualty	Weather Conditions	Comments
Knox	Tanks	5.2-17.4 hrs. for platoon	6.3 hrs.	Hot & Humid	N of Tasks, Crew Size, Mech. Problems
Sill	Howitzers	2-4 hrs.	115 min.	Very Hot	Def. of a Combat Ineffective Howitzer
Benning					
IA	B1FV	59 hr.	23.4 hr.	Relat. Cooler	Breaks, food, sleep;
IB	B1FV/ M-113	31.4-37.9 hr.	22.2 hr.		No food or breaks; sleep; admin. losses.

TABLE 9

Field Circular Contents: An Example

Task: Target Acquisition

System: BFV

Conditions: Night, Ambient Temperature_____,
Humidity_____, Wind_____, etc.

Visual Aids: _____

Status: 12 Hours in MOPP IV Gear

Subtask	Performance (Ave.)	Standard
Detection Range	1000 m	2000 m
Identification Range	750 m	1500 m
Detection to Target Reporting	37 secs.	12 secs.

Baseline: 12 Hrs. Sustained Operations with MOPP IV Gear,
Expect – On the Average – about 50% Loss in
Level of Performance and a Threefold Increase in
Target Acquisition Time

Field Circular Contents: An Example (Continued)

Countermeasures:

- Doctrine:**
- Rotate Positions Every 6 Hours
 - Investigate Alternative Area Scanning Techniques

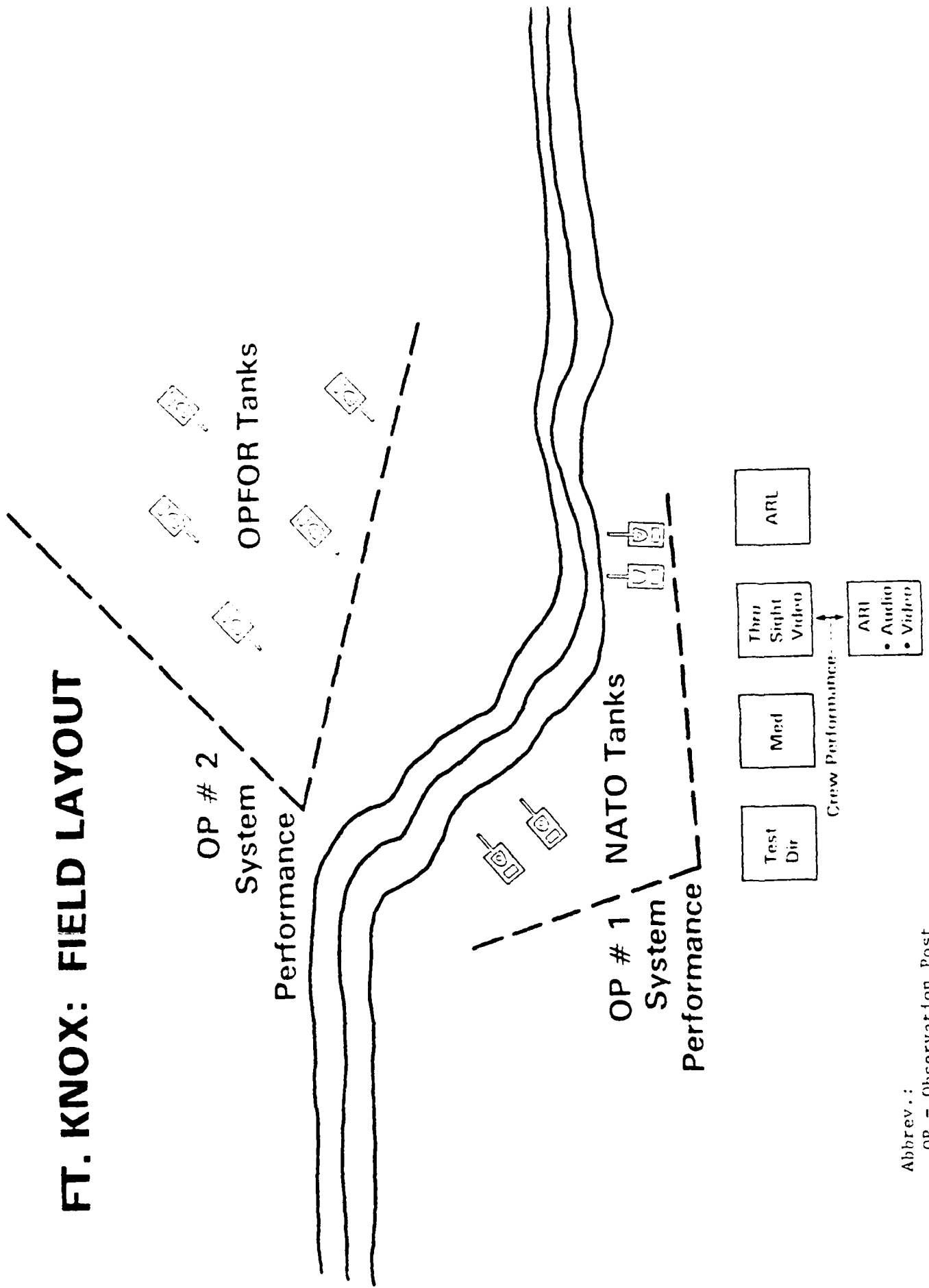
- Training:**
- Cross Train All Crew Members
 - Increase Night Target Detection and Identification Using a MTS

- Structure:**
- Add a Squad Member to Assist in the Search Subtask

- Materiel:**
- Modify MOPP IV Gear to Increase Peripheral Vision

TABLE 10 (Continued)

FT. KNOX: FIELD LAYOUT

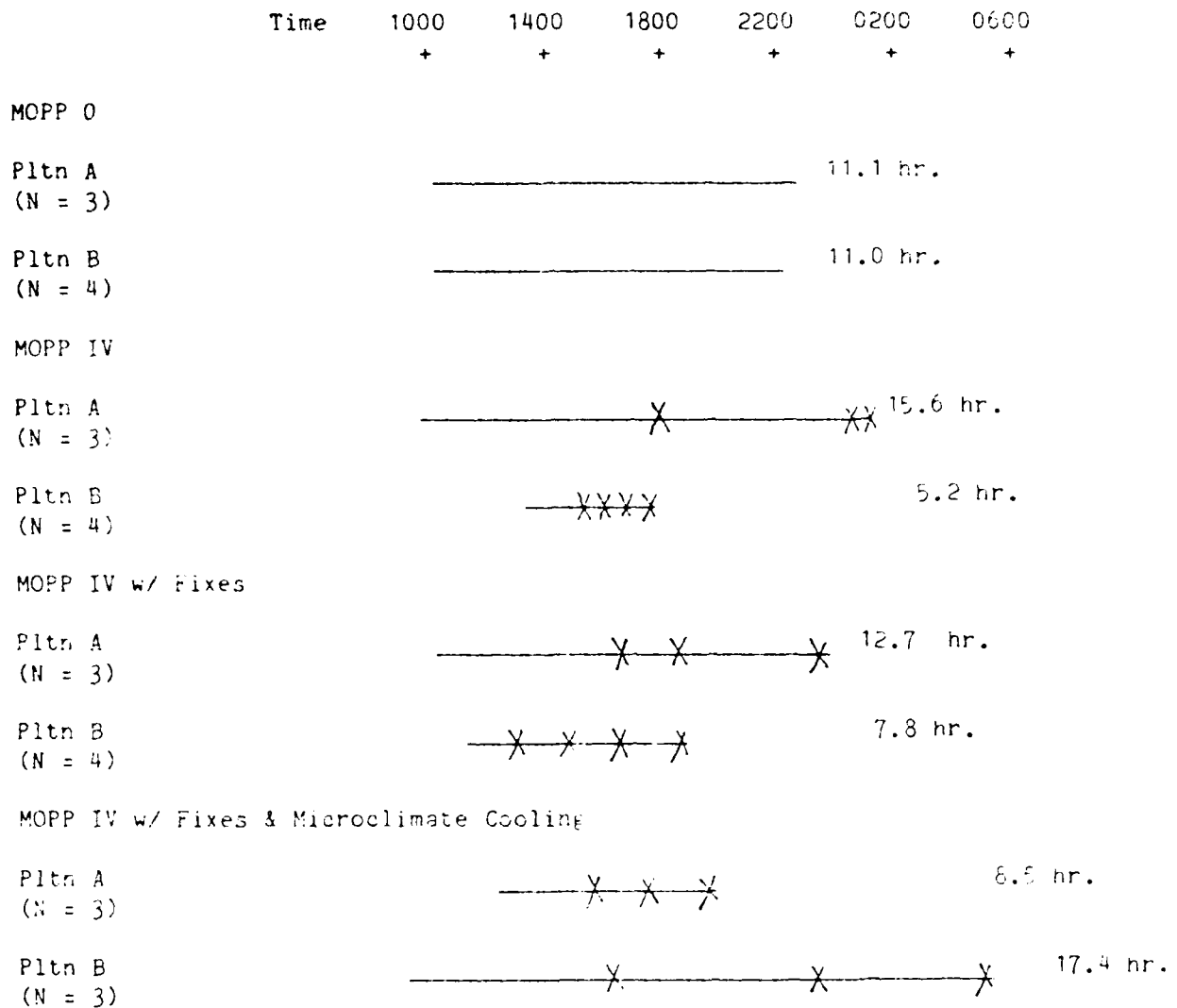


Abbrev.:
 OP = Observation Post
 OPFOR = Opposition Forces

FIGURE 1

FIGURE 2 - Ft. Knox

Platoon Endurance



N = Number of Tanks in Platoon

X = Time of Combat Ineffective Tank

FT. SILL P²NBC² FIELD TEST LAYOUT

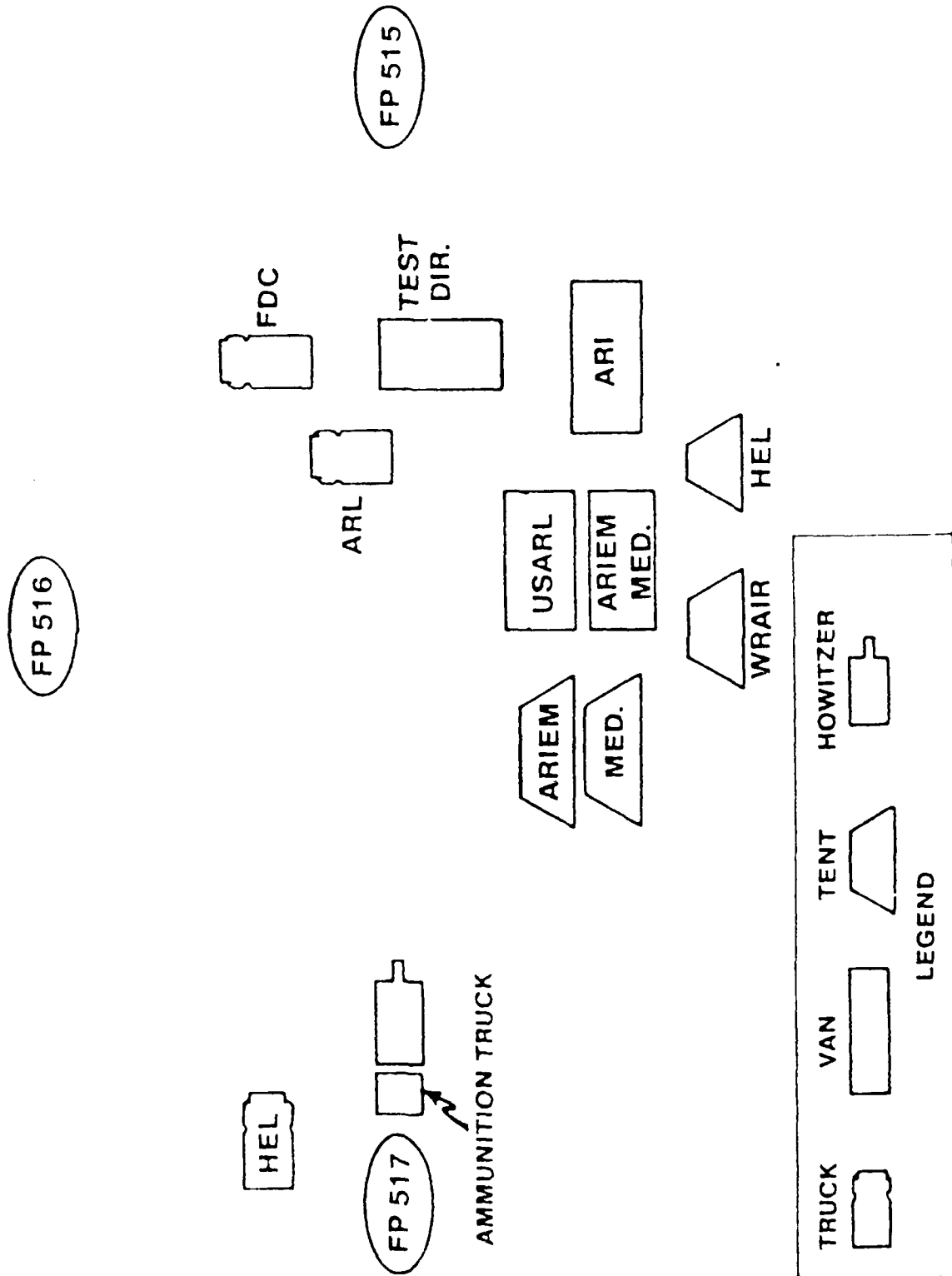


FIGURE 3

Endurance of Howitzer Crews: Ft. Sill

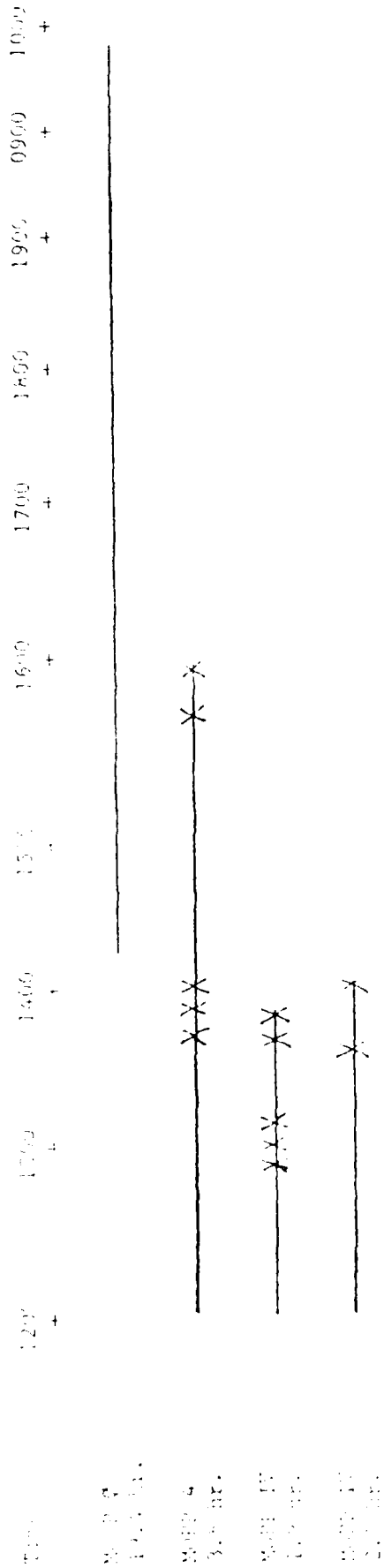


FIGURE 4. Endurance of Howitzer Crews: Ft. Sill

FIGURE 4

AD-A170 784

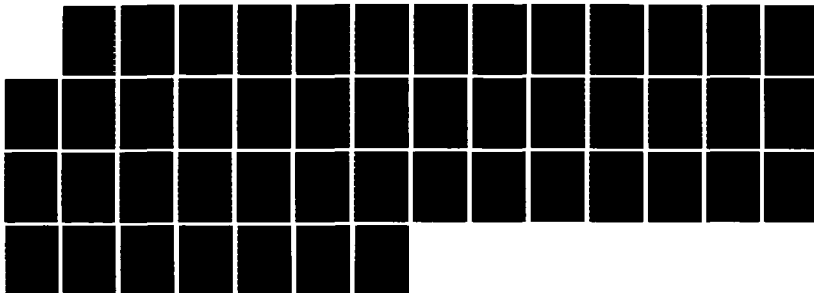
USERS' WORKSHOP ON COMBAT STRESS (5TH) HELD AT FORT SAM 3/3
HOUSTON TEXAS PRO. (U) ARMY HEALTH CARE STUDIES AND
CLINICAL INVESTIGATION ACTIVITY F..

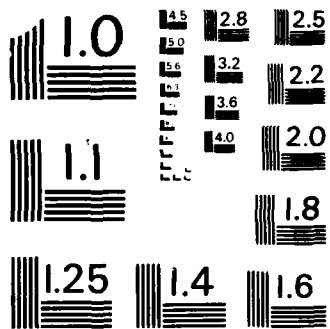
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F/G 5/10

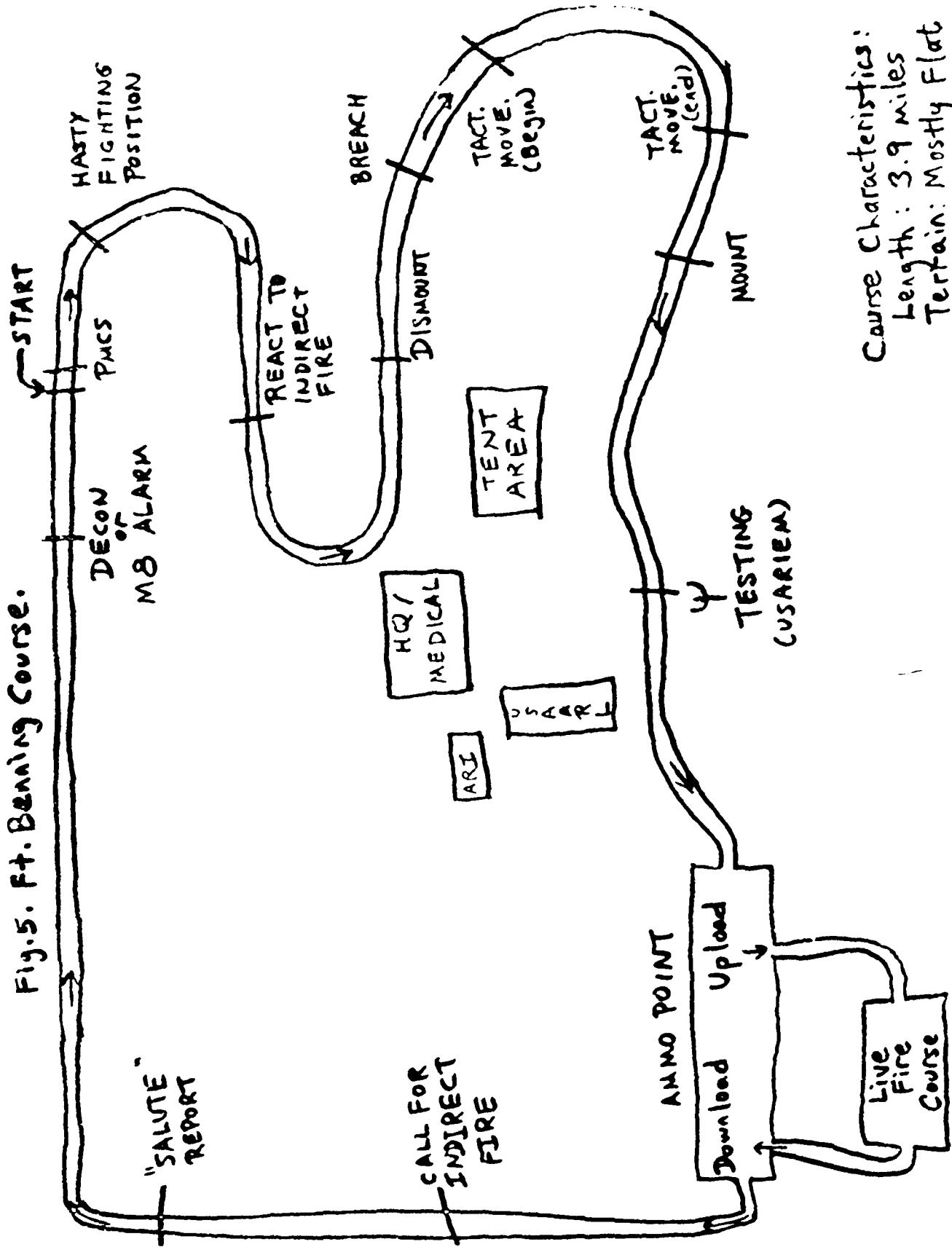
NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

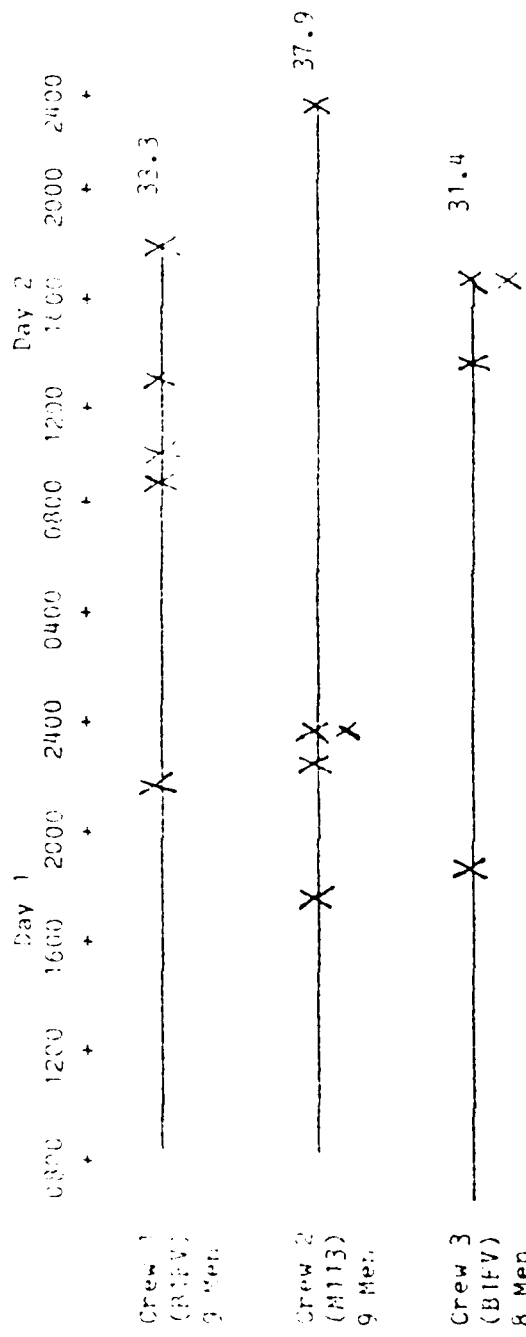
Fig. 5. Ft. Benning Course.



Course Characteristics:
 Length: 3.9 miles
 Terrain: Mostly Flat

FIGURE 5

Endurance, Phase 1B



X = Time of Crew Member Casualty

FIGURE 7

APPLICATIONS OF LABORATORY METHODOLOGIES TO THE FIELD STUDY OF SUSTAINED OPERATIONS

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The paper provides a brief description of a laboratory and field applications research program to study and predict soldier performance as it is affected by workload, various levels of activity, work/rest schedules and amounts of sleep loss during continuous and sustained military operations.

BACKGROUND

The continuing process of modernizing warfare tactics and doctrine includes adapting to technologically innovative weapon systems. For centuries, technologists developed weapons to extend and amplify the "power" of combatants (e.g. spears, rifles, artillery, tanks, bombs, rockets, missiles, battleships, aircraft etc.) to carry destruction to the enemy. Throughout all of this, weapons got bigger, faster, included longer ranges, became more lethal etc.; but, "man" the operator of these systems, remained essentially the same psychologically and physiologically.

Since World War II however, technologists have worked to extend the "senses" of combatants to allow us to see and hear at longer distances, even in darkness and adverse weather (e.g. sonar, radar, night vision, light amplification, thermal imaging, surveillance devices, satellite viewing, sensing and detection systems), and to process battlefield information faster and more efficiently (e.g. through use of computers, artificial intelligence etc.).

These new technological devices, as well as a desire for increased advantage over the adversary, bring about changes in tactics and doctrine. For example, the many sensing devices now allow combatants to carry on the battle continuously, 24 hours per day, in total darkness, in good weather and bad, for days, even weeks at a time, in what has become known as "continuous and sustained combat operations." Armies now plan to conduct continuous operations, extending or prolonging combat without interruption or cessation, for weeks at a time. The US Army Field Manual 22-9 (1983) suggests that in continuous operations one would like to have sufficient units, or individuals within units, to allow everyone to get adequate rest, in a sort of rotating-shiftwork arrangement. However, there will undoubtedly be instances of sustained operations during which the same soldiers and small units engage in continuous operations with no opportunity for the unit to stand down and very little chance for soldiers to catch more than a few minutes of sleep.

The greater cognitive skills needed to operate new weapon systems and the implementation of around-the-clock fighting places additional stress upon soldiers. Stressors include a requirement to maintain high levels of performance for sustained periods of time, sometimes upwards of 16-18 hours at a stretch; and to operate without sufficient rest and sleep, even at times when normal biological functions dictate one ought to be resting. Sleep

losses anticipated in sustained-continuous operations will decrease performance efficiency, exacerbate the stresses of combat, and increase the likelihood that the soldier will be wounded, killed or become a stress casualty.

WRAIR'S Research Program on Sustained/Continuous Operations.

The Division of Neuropsychiatry at the Walter Reed Army Institute of Research (WRAIR) conducts a research program to study and predict soldier performance as it is affected by workload, various levels of activity, work/rest schedules and amounts of sleep loss. Basic behavioral and psychophysiological research is designed to elucidate neuropsychological mechanisms; and field studies serve to identify practical problems and solutions in the conduct of sustained and continuous military operations.

Variables studied in our program include: prior rest quantity, types of work and tasks, amount of workload, times of day of performance, work/rest cycles, naps, circadian rhythms, diet, physical fitness, individual differences, environmental conditions and the use of pharmacological means to sustain performance. An extensive bibliography on previous work on many of these subjects (Krueger et. al. 1985) and two special methodological issues of the journal Behavior Research Methods, Instruments & Computers (Englund & Krueger, 1985; Krueger & Englund 1985) set the background for research on these topics.

Lab Experiments.

Our lab experiments generally focus on cognitive performance and circadian periodicity in sustained work and sleep deprivation scenarios. One recent experiment evaluated the effects of moderate workload and 72 hours of sleep deprivation on a series of perceptual and cognitive tasks (Babkoff et. al., 1985a,b). Subjects were tested hourly on computerized tasks designed to require approximately 30 min to complete, with the remainder of each hour free. Preliminary indications are that as sleep deprivation continued, the average time on task increased at an accelerating rate. The rate of increase differed among tasks, with longer tasks showing greater increases than shorter ones. Such increases confound sleep deprivation and workload effects; but in a general way the results confirm that as sleep deprivation increases, subjects usually make tradeoffs on well practiced tasks, maintaining accuracy, but taking longer to accomplish tasks and thus accomplishing less work per unit time.

Our lab research program recently turned to the study of countermeasures to sleep deprivation effects - such as strategic placement of naps, use of hypnotics to induce sleep during lulls in the battle, and stimulants to sustain or enhance performance even during sleep deprivation. In an experiment to determine motivational values of naps, Pleban et al. (1986) told some sleep deprived subjects that they would get a nap at a specified time hence, while others were not told when the work cycle would end. Those data are being analyzed now.

We are preparing an experiment on the utility of a quick acting hypnotic (e.g. triazolam) to induce sleep on long range deployment in an attempt to

ward off jet lag on flights through multiple time zones. We also plan to conduct a series of experiments on stimulants to sustain wakefulness or alertness, and therefore performance, for short periods during sustained operations.

Field Studies.

There are few data on the frequency and quality of transient sleep periods, or on performance, during sustained operations in actual training or combat. Indications of who loses sleep, how much, when, why and of what consequence, are important to establishing suitable tactics and doctrine for sustained and continuous operations. Our program therefore expanded to study soldier performance as it is affected by varying work/rest and activity levels, sleep deprivation and sleep discipline in the field, where we get a more practical view of what really happens in sustained operations. In the past two years we adapted portions of our lab based methodologies for use in the field. We piggy-backed studies onto military test and training exercises: 1) to measure endurance of armor crews while they wore chemical protective clothing; 2) to study command and control personnel in a mechanized infantry overseas deployment exercise; and 3) to study military police providing continuous security for heavy weapons storage sites.

Our efforts met with considerable success; but it became clear that much of what is done in the laboratory is not easily adapted to large field studies. All the difficulties of setting up good, well controlled studies, e.g. selection of suitable performance measurement tasks, reliability and maintenance of instrumentation, complicated scheduling, weather, many soldiers moving about in the macro-environment and scores of other uncontrolled variables are amplified in field studies that run 24-hours per day over many days.

Armor Crewmen in Chemical Protective Clothing.

Three of our early ventures into the field were to provide collaborative support to other organizations in studies of the psychological and physiological effects of the NBC environment and sustained operations on armor and artillery crews, (These were the first TRADOC/AMEDD P2NBC2 test, TRADOC's CANE II force development test, and the Human Engineering Laboratory's artillery Command Post Vehicle test). We literally inserted off-the-shelf laboratory-based methodologies into complex field studies of endurance of crewmen wearing chemical protective clothing and operating in tanks or artillery vehicles for 24-72 hours.

In two of these field trials, a 20-minute battery of standardized paper and pencil cognitive and psychological tests was administered eight times per day (about every 3 hours) to participants at crew battle stations in their vehicles. Our intention was to sample behavior and performance frequently enough to demonstrate circadian or cyclic changes as operational scenarios progressed.

Although two of the armor tests were scheduled for 72 hours, one of them lasted less than 24 hours. In the other, ample rest periods were administratively granted, and some soldiers obtained up to 6 hours of sleep per day. In a 24-hour artillery test, crew chiefs allowed soldiers to take

naps in shifts. Thus, most soldiers did not actually incur much sleep loss, and consequently some of the sustained operations aspects we wished to study were eliminated. It became questionable how valuable our measures (predominately taken from laboratory sleep loss work) were in identifying performance degradations as a function of sustained operations when these exercises were not true sustained operations. Additionally, frequent administration of the 20-minute test was too much of an intrusion on the operational scenario.

REFORGER.

Next, we designed a study to determine the activity levels, work/rest cycles and amounts of sleep of various levels of command and control personnel in a Mechanized Infantry Division as it deployed from CONUS to Europe on a winter Return of Forces to Germany (REFORGER) mission. We began the study at Ft. Carson, Colorado, followed the unit to Germany and then accompanied the soldiers throughout the state of Hessen for three weeks while they participated in a NATO training and readiness exercise. We experienced first hand the stresses associated with jet lag, the harsh conditions of cold German winters, and the natural plight of the infantryman on the move.

Data collection included near continuous recordings of the activity levels of command and control personnel at the division, brigade, battalion, and company headquarters levels. Soldiers wore pocket and wrist-worn activity recording devices, and completed mood and sleep questionnaires three times daily. Although most of the NATO maneuver forces stood-down at 2400 hours so as not to disturb the German countryside at night, the command and control personnel we chose to study continued to work around-the-clock; but their activity levels were sharply curtailed.

Preliminary results indicate that there were significant differences in the amounts and timing of activity for command and control personnel at various levels of command. We gained insights into determining appropriate personnel staffing levels for headquarters units, especially those, like communications sections, that provide support for tactical operations centers that move frequently.

Military Police in Continuous Security Operations.

The military police test had more elements of a true continuous operation. During a two-week field test, MPs were asked to guard heavy weapons at fixed sites during peacetime, to escort movement of weapons to field sites during transition to war, and to simulate a six-day continuous operations war phase. The MPs withstood attacks by terrorists, anti-war demonstrators, and elite military units intent upon stealing or destroying the heavy weapons in their custody as well as direct wartime military attacks.

We used trailer mounted microcomputers to administer a 12- min psychological task battery (Thorne et al., 1985) every 8 hours, or three times per day, to 64 soldiers for 11-12 days of the exercise. This effort demonstrated that such computerized data collection can work in the field (Morgan et al., 1985). However, we still intruded on the operational scenario by taking soldiers away from duty stations to perform our computer tests. We

had 32 soldiers wear a wrist-mounted activity monitoring and recording system (Redmond & Hegge, 1985) to obtain relatively unobtrusive objective indications of the amount of sleep obtained by soldiers in the field; and we administered self-report mood and sleep questionnaires to large numbers of soldiers three times per day.

For the first four days the MPs struggled with a 32-hour workday shift schedule imposed by the test designers, and consequently most soldiers lost considerable sleep at the very start of the test. During the last eight days of the test there was no scheduled rest or sleep; sleep discipline was left to small unit leadership initiatives. Many of the participants reported only 2 to 5 hours of sleep during each 24-hour period for much of the test, and were acutely sleep deprived. Soldiers' moods rose and fell as a function of the amount of rest and as general stress levels varied. Performance on the computerized cognitive tests were somewhat confounded by the adverse work shift schedule of the first four days and because of simultaneous improvements due to learning (Morgan et al., 1985).

We witnessed many examples of the relationship between small unit leadership, sleep discipline policies and the stresses of continuous and sustained operations. We are documenting the point that leaders need to be cognizant of the differential effects of various work/rest schedules on soldier performance and for the need of suitable sleep discipline policies. Leaders must acknowledge that they themselves are likely to need rest and sleep as much or more than the troops they lead; that soldiers' perceptions that their leaders care about them become increasingly important when they are exhausted; and that soldiers are to be encouraged to take naps during lulls in the action rather than threatened with punishment for doing so.

General Program Development.

Since the topic of continuous/sustained operations has become so important to each of the three military services and because we learn much from each other, we engage in collaborative work with our colleagues in the Air Force and the Navy and also, with our NATO allies. As examples, we 1) recently completed a collaborative project with the Canadian Armed Forces to study performance of medical personnel dressed in chemical protective clothing and providing early medical care on the sustained operations battlefield; 2) assisted in data collection on a large scale British field exercise involving troop use of diazepam as a chemical agent prophylactic drug; 3) are assisting U.S. Air Force researchers in the collection of sleep data in clinical field trials of fighter pilots using sleep-inducing drugs while off duty; and 4) have been assisting US Navy researchers in using novel techniques to analyze time series performance data.

To facilitate interactions and communication among government researchers, defense contractors, military tacticians, doctrine developers and other consumers of our research products, we recently organized a Department of Defense Technical Advisory Group on Sustained/Continuous Operations. This group meets formally twice per year to exchange information, ideas and to coordinate work on these topics.

Sustained Operations Stress Implications: General Summary.

As part of the agreement to participate in this conference on Combat Stress we were asked to provide a summary list of important points. Although there has been much laboratory research on sleep deprivation, and there are many studies of various industrial work/rest schedules, there are relatively few studies of sustained military performance and sleep loss in continuous operations; and almost no data on how these interact in actual combat, or how they affect battlefield stress. There are many facets to the relationships among these variables. We are just beginning to make progress in the field study of many of the aspects of these complicated interactions. It is therefore premature to be too definitive in a summary of important points. The following list of summary statements, formulated by Belenky, Krueger & Hegge (1985,86) in WPAIR's Department of Behavioral Biology, is therefore our prediction based upon what we know at this time, largely from laboratory work. It should serve not as a list of definitive statements but as topics for discussion and for planning more research.

Summary Statements:

Soldier Performance, Sleep Requirements, and Sustained Operations

1. Six to eight hours of sleep each night is sufficient to maintain effective individual and unit performance in combat relatively indefinitely (weeks to months). Soldiers sleeping any less than 6-8 hours each night will accumulate a sleep deficit, and eventually will be just as sleepy as if they had been totally deprived of sleep.
2. In the event of continuous 24 hour a day combat, 3-4 hours of sleep each night will sustain relatively effective individual and unit performance for short bursts of 5-6 days.
3. With regard to soldier performance during continuous 24 hour a day combat (sustained operations):
 - a. Physical and mental performance of soldiers deprived of sleep will decline over time. Mental performance will decline more rapidly than physical performance. Thus performance of command and control personnel will be more affected by sustained operations than the performance of soldiers engaged in strictly physical tasks.
 - b. Performance on well practiced tasks will be more resistant to sleep loss effects; soldiers will generally maintain accuracy while gradually performing more slowly and thus accomplish less work. Eventually even performance on practiced tasks will deteriorate with accumulated sleep loss or time on task.
 - c. During sleep deprivation the efficiency and accuracy of thinking will decline, and lapses in attention will occur. Tactical grasp (the ability to see the battle) will be impaired. Motivation to perform will be affected most. This will manifest itself as deterioration in self-paced activities (including preplanning activities (situation maps are not kept up, etc.), self-care and self-maintenance (hanging socks, staying dry, etc.).

d. The decline in mental ability will be progressive over days with limited or no sleep, and maximal during each 24 hour period from between 1500-1800 and especially between 0300-0600 hrs.

e. As a general rule, 4 hours sleep in each 24 hours will be the minimum necessary to sustain mental and physical performance of soldiers during several days of sustained operations. Even after several days of total sleep deprivation, 4 hours of sleep will produce a substantial recovery in performance; and successive 4 hour sleeps over consecutive 24 hour periods will lead to recovery of performance to near baseline levels.

f. Stimulant drugs (in order of decreasing potency: e.g. amphetamine, methylphenidate, magnesium pemoline, nicotine and caffeine) might temporarily attenuate the decline in mental and physical performance. The benefits of amphetamine and methylphenidate will be short-lived, a few days at best, require successively higher doses to sustain performance, and lead to a rebound collapse when they are discontinued. While restoring alertness and motivation, in some individuals these compounds will impair judgment.

g. Nicotine and caffeine remain effective over time but their effects are mild to begin with and so will only slightly attenuate the effects of limited or no sleep.

h. Thus, there are no known pharmacological agents that will safely eliminate or markedly reduce the need for sleep over an extended period of time. More research must be done on the performance implications of pharmacological intervention.

i. The best recommendation at present is that soldiers, in particular those in command and control positions, be allowed at least 4 hours sleep in each 24 hours of sustained operations.

j. Sleep discipline policies must be developed and implemented by small unit leaders for effective sustained operations performance.

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THE STRESSES AND STRAINS OF SUSTAINED OPERATIONS
AS A FUNCTION OF TIME-OF-DAY

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Fully comprehending the human cost of modern global warfare is beyond the grasp of most of us. Current predictions indicate that the intensity and duration of such a holocaust will exceed human endurance. Undoubtedly sustained engagements (planned or unplanned, goal-directed, nonstop continuous performance/operations without rest or sleep) will be the modus operandi of military planners and combatants.

Several factors influence the quality of sustained operations/continuous performance when work requirements include both physical and mental components: The major endogenous factors delimiting optimum extended human performance have been identified as health, physical fitness and fatigue, training/skill level, esprit de corps, information processing ability, rest quality, and biological rhythms. External factors are workload, work-rest cycles, number and duration of sustained operations and environmental hazards. The extent to which an individual can endure intensive high-tech sustained warfare is not fully understood. What secondary effects are produced by the interaction of influencing factors? Additionally, what prophylactic or enhancement procedures/methods/means are effective under these work conditions? These problems require study to describe, explain, predict and plan for the human factor in situations where a military solution is selected.

This summary reports the findings of a series of continuous work studies simulating an extended reconnaissance patrol. The focus was upon task performance with physical demands and sleep loss. Typically, in these repeated measures studies, eleven pairs of Marines (one exercising and one non-exercising) (N=22) experienced one 12-hour baseline and two 20-hour continuous work episodes (CWE) (see figure 1). The 20-hour CWEs were separated by five hours which included a 3-hour nap from 0400-0700. Each hour of CWE was split into two half-hour sessions. During the first half-hour, subjects performed alphanumeric (A-N) visual vigilance tasks. The exercising member of each pair spent this first 30 minutes also walking on a treadmill in full combat gear (25 kg) at 31 percent max V044255 heart rate for a total distance of approximately 114 km. The non-exercising subject performed the A-N task sitting quietly at a video terminal. During the second half-hour, all subjects completed mood and fatigue scales, measured oral temperature, blood pressure and grip strength, and performed a simple reaction time task. Also during this second half-hour, both Marines performed selected combinations of tasks, such as rapid alternating response, logical reasoning, word memory, four-choice serial reaction time, reading, rifle assembly, Naval Anti-Air Warfare task and Educational Testing Service Visual Memory. Continuous heart rate measurements were obtained for both Marines while performing the A-N task. During sleep periods (baseline, nap, and recovery), electroencephalograph, electrocardiograph, and electrooculograph recordings were obtained on both subjects. Changes in the protocol over the series of

studies included different start times, workloads and nap duration.

Three-way analysis of variance (groups by days by sessions) with repeated measures were computed for the various performance tasks, mood and physiological measures. To test the nap effect, t-tests were used to compare average performance scores from the first test administration of each continuous work day (1 and 2). Previously, the author found reliable circadian rhythms in mood and performance measured autorhythmometrically by subjects living and working in typical environments. These findings field-validated the results of several laboratory studies around the globe. What happens to these fundamental rhythmic behaviors when the intensity and duration of work are increased was explored by cosinor analysis.

Brief Summary of Results:

1. Day Start Time with 3-hr Nap (Refer to Tables 1, 2 and 3):

Treadmill walking did not accentuate or attenuate sleep-loss effects on performance but increased physical complaints. Sleep loss alone did degrade visual vigilance and memory for words. Visual vigilance for non-exercising subjects degraded sooner on the second CW day than it did for exercising subjects. Most variables showed significant circadian rhythms during the first CW episode; however, rhythmicity was undetectable during the second CW episode for several factors. No significant sleep stage changes were found. A 3-h nap at 0400 h after one 17-h CW day was not immediately recuperative. Subjects expressed significantly more negative effect, fatigue, and less vigor and more physical complaints during the evening, early morning hours, and second CWE. The combination of sleep loss and circadian fluctuations produced decrements in mood and performance and increased symptoms. A wide range of individual response was noted and human reliability from one CWE to another was questionable.

2. Alternate Start Times with 0-4 hour Naps:

Combat start time made a critical difference in maintaining performance effectiveness, positive mood and less fatigue. The 30% V044255 Max work-loads or less did not affect in process vigilance but did degrade later performance. Workloads greater than 30% V044255 Max produced significantly more rapid degradations in performance particularly during a second CW day which may not be completed. Thus, overall, a second back-to-back 20h SUSOPS is degraded by the first no matter what the workload. Three hour naps between 20h SUSOPS will not maintain continuous optimum (like baseline) performance. At least 4 hours of sleep in 24 are required for some restoration. Significant performance degradation begins after 12h in SUSOPS. Circadian nap phasing is less critical than nap duration; however, after prolonged SUSOPS, naps are detrimental when taken between 0300-0600 hours.

3. Cosinor Analysis (Refer to remaining figures):

All variables showed significant circadian rhythms during the first continuous work episode except negative mood for the exercise group. The oral temperature rhythm remained intact and strong for both groups over both CW days, decreasing slightly in amplitude and, possibly, phase shifting

from 1-2 hours on the second day. Sleep deprivation and continuous work seem to decrease rhythm strength, and in most cases, decreases rhythm amplitude. All variables (rhythms) shifted in time-of-peak during the second day. Peak times for the two groups differed across the variables on each day.

VIGOR - declined over the day never regaining the previous high or strength; the rhythm was not detectable during CW2 for the non-exercise group. Exercise may aid the maintenance of vitality during continuous work with minimal sleep.

POSITIVE MOOD - Also declined over the first CW day, remaining low during the second CW day. The rhythm was undetectable for the non-exercisers during CW2.

PHYSICAL SYMPTOMS - Complaints increased over the first CW day, continuing high over the second CW. Rhythms remained strong for both groups over both days.

FATIGUE - Fatigue increased dramatically over the first CW and remained high over the second day. The rhythms were undetected for both groups on the second day.

NEGATIVE MOOD - Also increased over both days; however, the rhythm for the exercise group was undetectable on the second day.

SIMPLE REACTION TIME - Strong rhythms for both groups during the first day; however, not detectable for both groups on the second day. Reaction time continues to increase (take longer) as the experiment proceeded.

VISUAL VIGILANCE - A weak, if any, rhythm over the first CW day; undetected on the second day.

ON-GOING AND PROJECTED RESEARCH:

Work Unit: The Impact of Chemical Defense Measures on Sustained Military Operations

Objectives: To determine physiologic cost of wearing MOPP4 gear during sustained operations

To determine effects of heat, sleep deprivation, continuous work and physical fitness on cognitive performance

To determine chemical defense drug effects on MOPP4 SUSOPS tasks performance

To identify and evaluate physiologic and psychologic countermeasures to MOPP4 SUSOPS performance degradation

Table 1

Demographic, Physical and Physiological Characteristics of Subjects (N=22)

Variable	Group	Mean	S.D.	Variable	Group	Mean	S.D.
Age	E	20.6	1.7	CW1 HR * (20 hr workday)	E	89.7	6.4
	C	20.5	1.9		C	65.2	6.8
Reading Grade Level	E	10.7	2.6	CW2 HR * (20 hr workday)	E	87.7	7.1
	C	11.7	2.3		C	65.3	7.3
Chronotype	E	60.1 ^x	8.1	Overall working HR (3 workdays)	E	89.2	6.5
	C	54.2 ^x	7.6		C	65.4	7.1
Previous Sleep Loss (hrs)	E	51.5	27.4	Resting Systolic BP (mm Hg)	E	116.0	5.9
	C	42.4	17.0		C	116.9	8.4
Height (cm)	E	177.3	9.0	Resting Diastolic BP	E	75.2	5.4
	C	180.6	6.1		C	72.0	7.7
Body weight (Ks)	E	71.8 ⁺	10.8	Baseline Systolic BP	E	117.1	13.3
	C	80.4	8.3		C	114.4	8.7
% Body Fat	E	10.9 ⁺	2.4	Baseline Diastolic BP	E	64.7	10.7
	C	13.7	2.5		C	64.8	7.8
VO ₂ Max	E	55.5	7.2	CW1 Systolic BP	E	112.7	10.1
	C	51.6	4.6		C	114.0	12.2
HR at VO ₂ Max	E	191.1	9.0	CW1 Diastolic BP	E	64.2	9.6
	C	196.2	11.3		C	65.6	9.8
HR at 30% Max VO ₂ (target HR)	E	87.6	13.5	CW2 Systolic BP	E	113.7	11.7
	C	92.5	6.6		C	116.0	13.0
Resting HR (bpm)	E	62.5	12.1	CW2 Diastolic BP	E	66.0	11.2
	C	64.3	8.1		C	66.6	8.7
Baseline HR * (12 hr workday)	E	90.3	6.1				
	C	65.6	6.8				

* NOTE: Values given for the groups during the alpha-numeric task. E-group was walking on the treadmill during this task. C = Control group; E = Experimental group. Continuous Work (CW).

x = Morning chronotype (Horne and Ostberg, 1976)

+ = E and C groups significantly different (p<.05).

Table 2

Summary of Actual, Percentage, Direction and Time of Change Due to Continuous Work and Sleep Loss for Variables Indicating Significant Day Differences

Task/Measure	CW1-CW2 Actual Change	% of CW1 Mean Value	Direction of Change	Time of Day When Change Occurred *
Alpha-Numeric Omissions	-1.96	55.0	More omissions CW2	Early morn-late eve
No. correct	1.5	9.0	Fewer correct CW2	Early morn-late eve
MRT	-.41 secs	25.1	Slower RT CW2	Early morn-afternoon
SRT				
10% Fast	-.02 secs	10.4	Slower CW2	Mid morn-early eve
10% Slow	-.20 secs	32.7	Slower CW2	Early evening
MRT	-.07 secs	21.9	Slower CW2	Early morn-late eve
Positive Mood	5.15	15.2	Less pos. mood CW2	Mid morn-early eve
Negative Mood	-2.46	59.5	More neg. mood CW2	Mid morn-afternoon
POMS Vigor	3.38	23.9	Less vigor CW2	Mid morn-early eve
POMS Fatigue	-1.93	92.6	More fatigue CW2	Mid morn-afternoon
SAM Fatigue	-2.40	59.5	More fatigue CW2	Early morn-late eve
Physical Symptoms	-1.89	54.0	More symptoms CW2	Early morn-afternoon
RH Strength	1.43 kg	2.7	Weaker CW2	NS
LH Strength	1.15	2.5	Weaker CW2	Early morn
Oral Temperature	-.18	6.2	Lower temp CW1	Early morn-afternoon

* Statistically significant quadrant differences (CW1 vs. CW2); $p < .05$.

Sessions 1-4(1024) = Mid-morn; Sessions 5-8(1435) = Afternoon;
Sessions 9-12(1950) = Early evening; Sessions 13-17(0020) = Late eve-early morn.

TABLE 3

Frequency of Physical Complaints
from KOGI Checklist

Item	Physical Symptom	Frequency		Difference
		CW1	CW2	
1	Head feeling heavy	23	53	30
2	Whole body getting tired	74	115	41
3	Legs feel heavy	37	64	27
4	Yawning	125	145	20
5	Muddled brain	32	53	21
6	Becoming drowsy	67	116	49
7	Eye strain	84	127	43
8	Rigid or clumsy in motion	15	25	10
9	Unsteady in standing	20	26	6
10	Want to lie down	77	132	55
11	Difficulty in thinking	17	41	24
12	Weary of talking	11	20	9
13	Becoming irritable	40	54	14
14	Unable to concentrate/attend	27	45	18
15	Unable to have interest	14	56	42
16	Apt to forget things	41	78	37
17	Apt to make mistakes	67	97	30
18	Uneasy about things	5	14	9
19	Unable to straighten posture	28	34	6
20	No energy	15	28	13
21	Headache	12	19	7
22	Stiffness in shoulders	121	120	-1
23	Low back pain	49	43	-6
24	Breathing oppressed	15	30	15
25	Thirsty	94	93	-1
26	Husky voice	39	50	11
27	Dizziness	6	10	4
28	Eyelids twitching	14	37	23
29	Tremor in limbs	3	13	10
30	Feel unwell	21	21	0

FIGURE 1

EXPT'L PHASE	MONDAY		TUESDAY		WEDNESDAY		THURSDAY		FRIDAY	
	Training		Baseline		CW1		CW2		Recovery	
TIME	WA	WB	WA	WB	WA	WB	WA	WB	WA	WB
00 - 01							15A	15B	15A	15B
01 - 02							16A	16B	16A	16B
02 - 03							17A	17B	17A	17B
03 - 04							SLEEP 0		SLEEP 1	
04 - 05	TRAVEL						SLEEP 2		SLEEP 3	
05 - 06										
06 - 07										
07 - 08	----- BREAKFAST -----									
08 - 09	Forms		1A	1B	1A	1B	1A	1B		
09 - 10	Max VO ₂ Testing		2A	2B	2A	2B	2A	2B		
10 - 11			3A	3B	3A	3B	3A	3B		
11 - 12	LUNCH**		4A	4B	4A	4B	4A	4B		
12 - 13	Computer Task Trn		----- LUNCH -----						LUNCH	
13 - 14			5A	5B	5A	5B	5A	5B		
14 - 15	ADG Training†		6A	6B	6A	6B	6A	6B		
15 - 16			7A	7B	7A	7B	7A	7B		
16 - 17	DINNER		8A	8B	8A	8B	8A	8B		
17 - 18	Computer Task Trn		----- SUPPER -----							
18 - 19			9A	9B	9A	9B	9A	9B		
19 - 20	N-D Read.††		10A	10B	10A	10B	10A	10B		
20 - 21	ADG Training†		11A	11B	11A	11B	11A	11B		
21 - 22			12A	12B	12A	12B	12A	12B		
22 - 23	Word Mem.		----- SNACK** -----							
23 - 24			ETS Task	13A	13B	13A	13B			
		EEG Hookup	14A	14B	14A	14B				
		SLEEP 0	SLEEP 1	15A	15B	15A	15B			

CW = Continuous Work

*Includes time for attachment of ECG electrodes and rifle assembly task.

**Includes time for rifle assembly task.

† Air Defense Game

†† Nelson Denny Reading Test

TEMPERATURE DEGREES FAHRENHEIT

EXERCISE ACTUAL EXERCISE PREDICTED CONTROL ACTUAL CONTROL PREDICTED

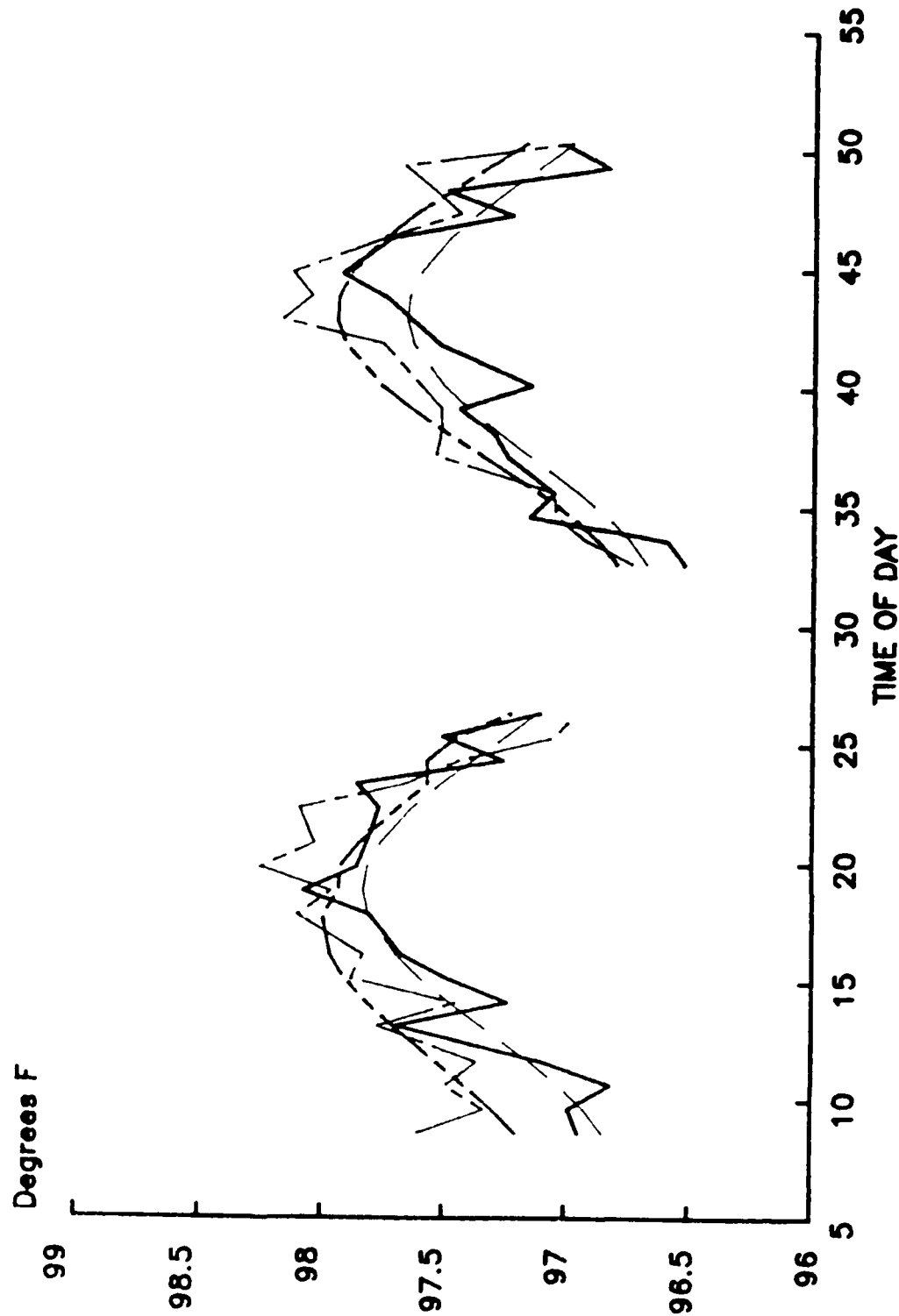


FIGURE 2

VIGOR

CONTROL
PREDICTED

CONTROL
ACTUAL

EXERCISE
PREDICTED

EXERCISE
ACTUAL

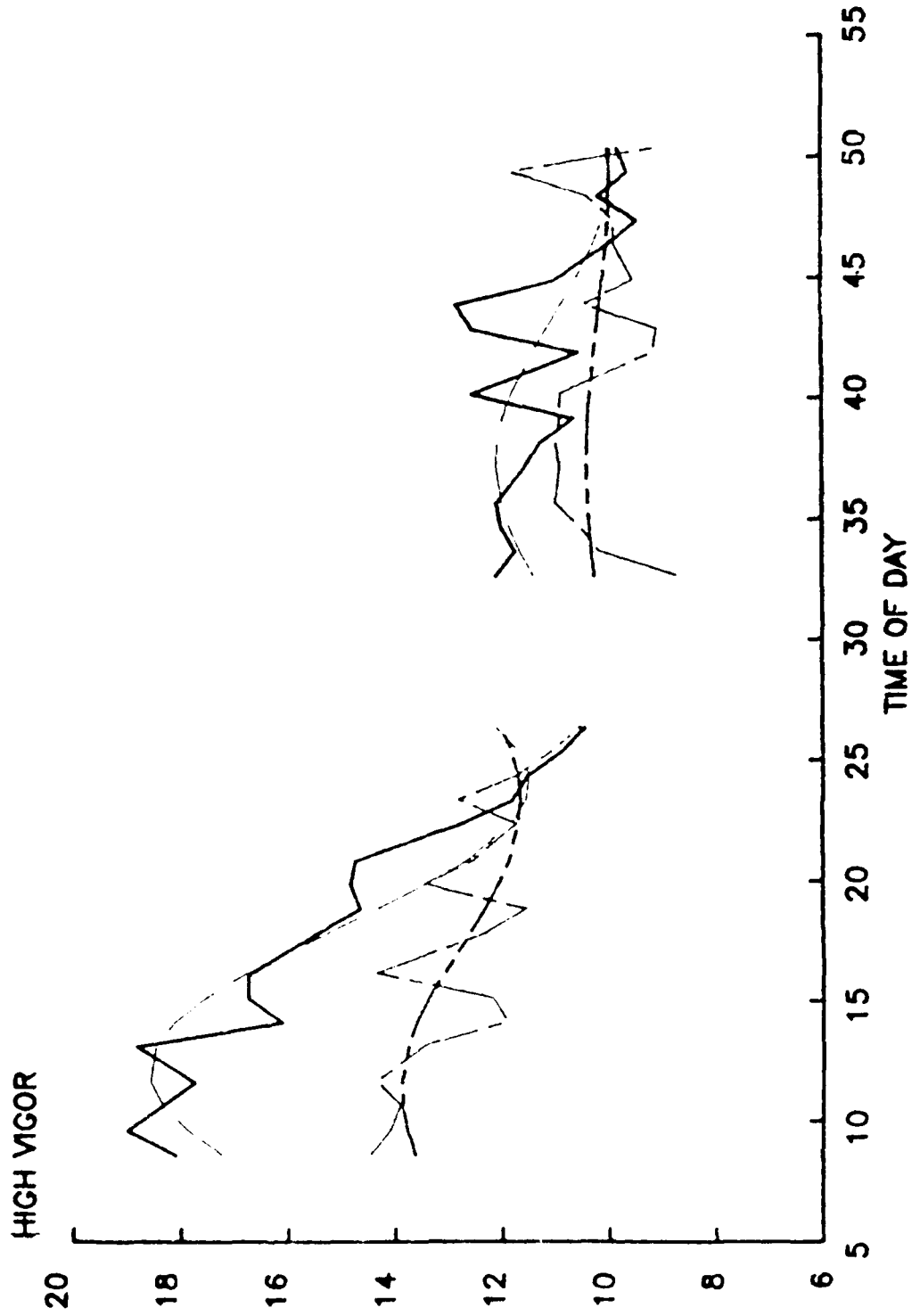


FIGURE 3

POSITIVE MOOD

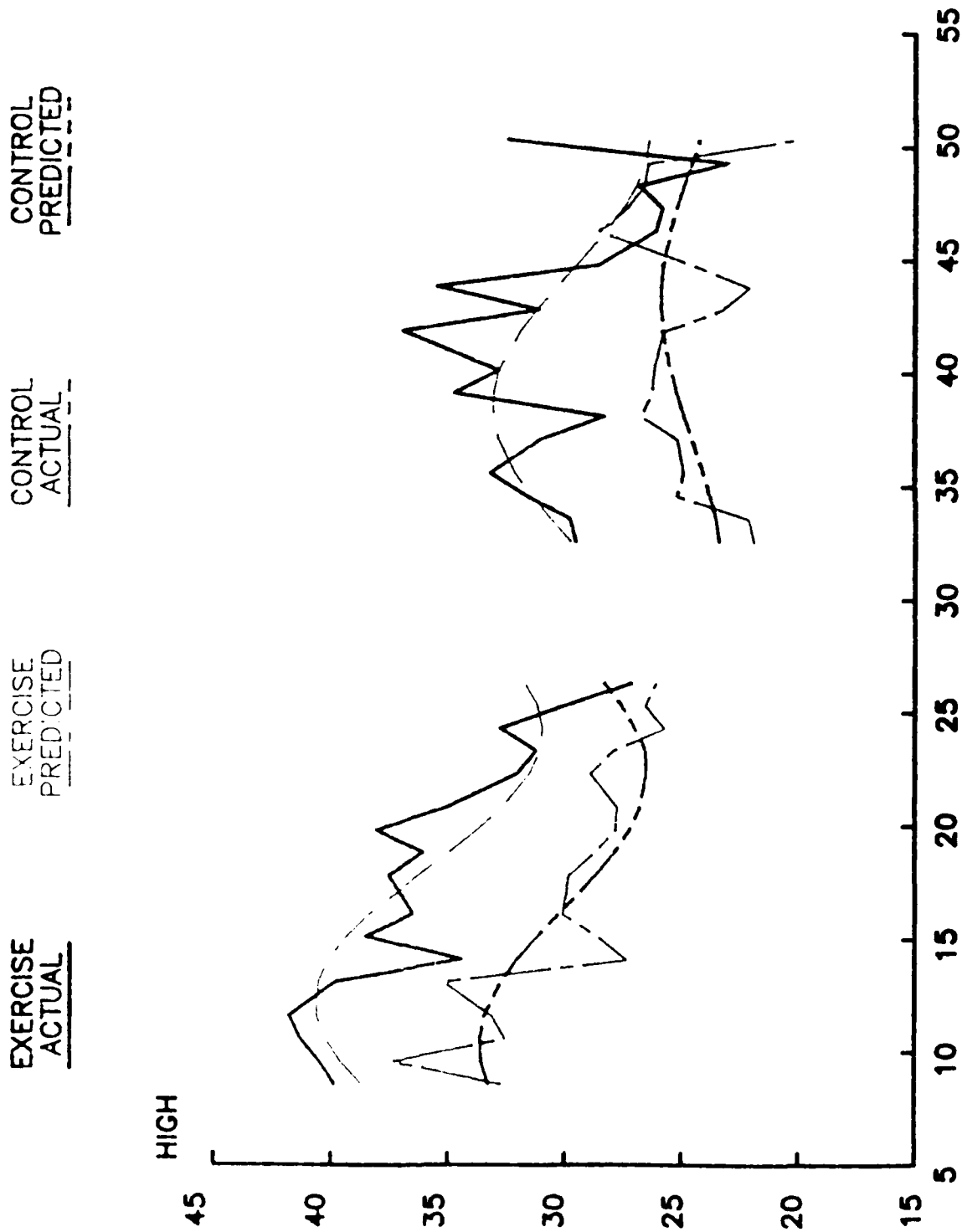


FIGURE 4

TOTAL PHYSICAL SYMPTOMS

EXERCISE ACTUAL EXERCISE PREDICTED CONTROL ACTUAL CONTROL PREDICTED

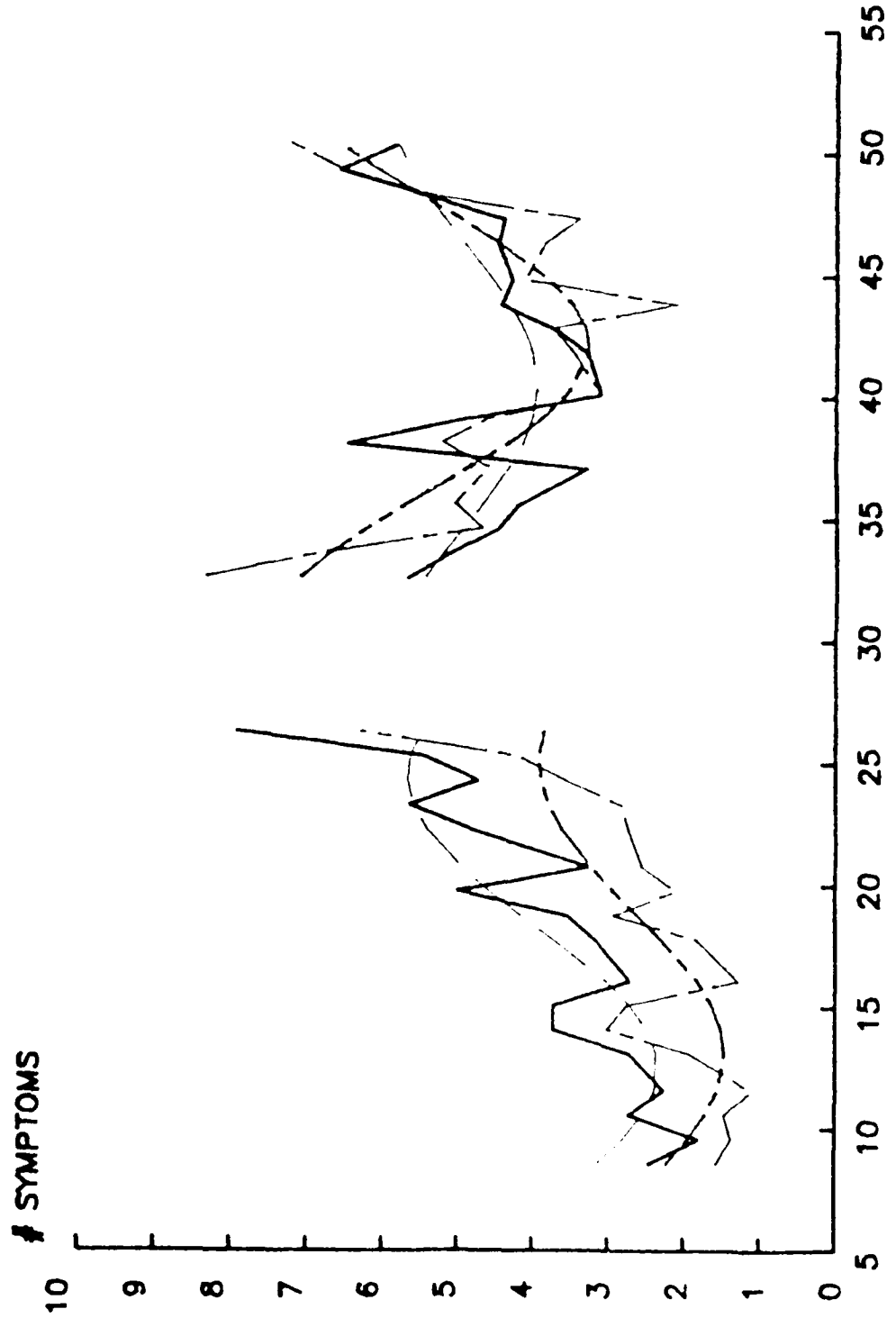


FIGURE 5

NEGATIVE MOOD

EXERCISE ACTUAL EXERCISE PREDICTED CONTROL ACTUAL CONTROL PREDICTED

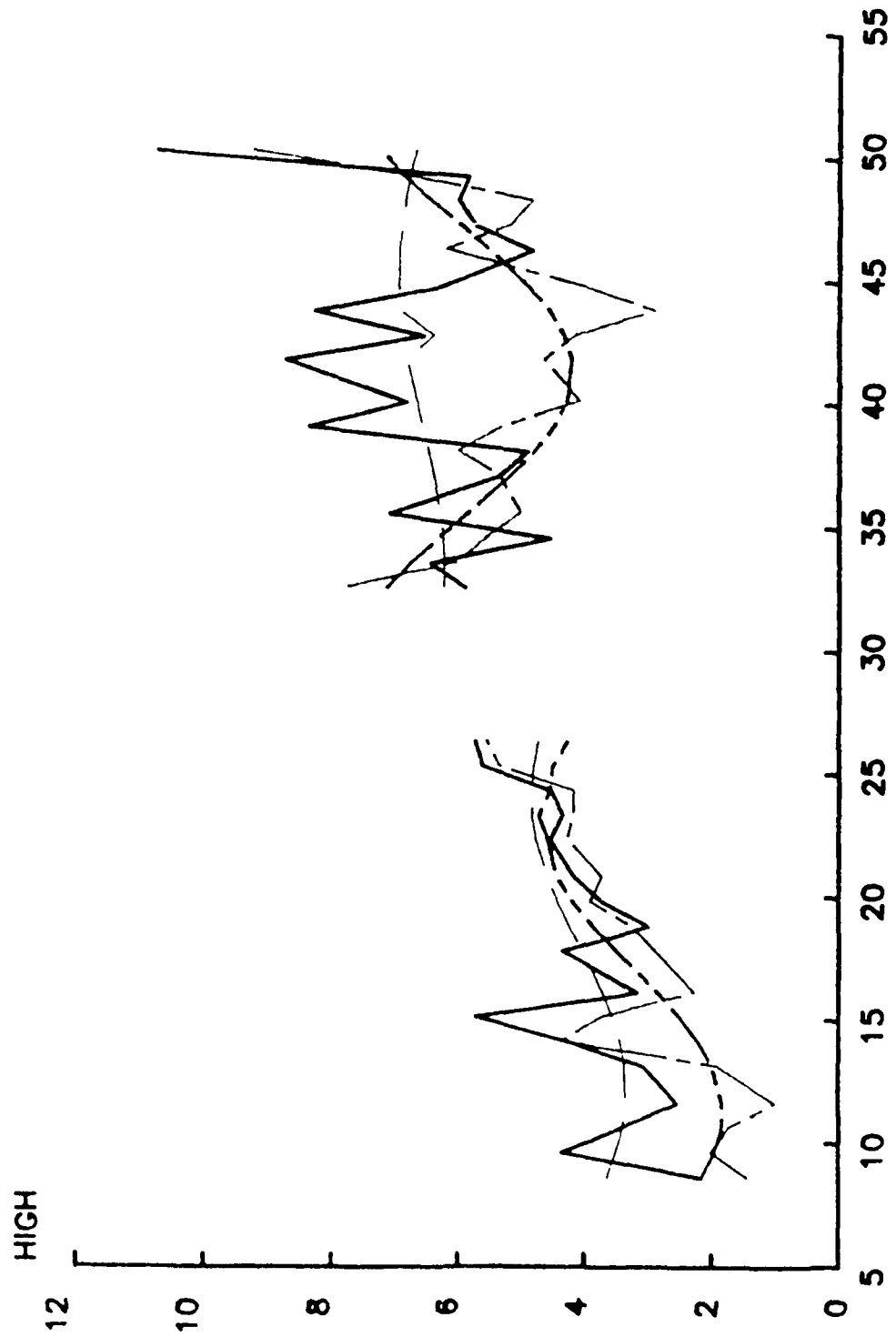


FIGURE 6

FATIGUE

CONTROL
PREDICTED

CONTROL
ACTUAL

EXERCISE
PREDICTED

EXERCISE
ACTUAL

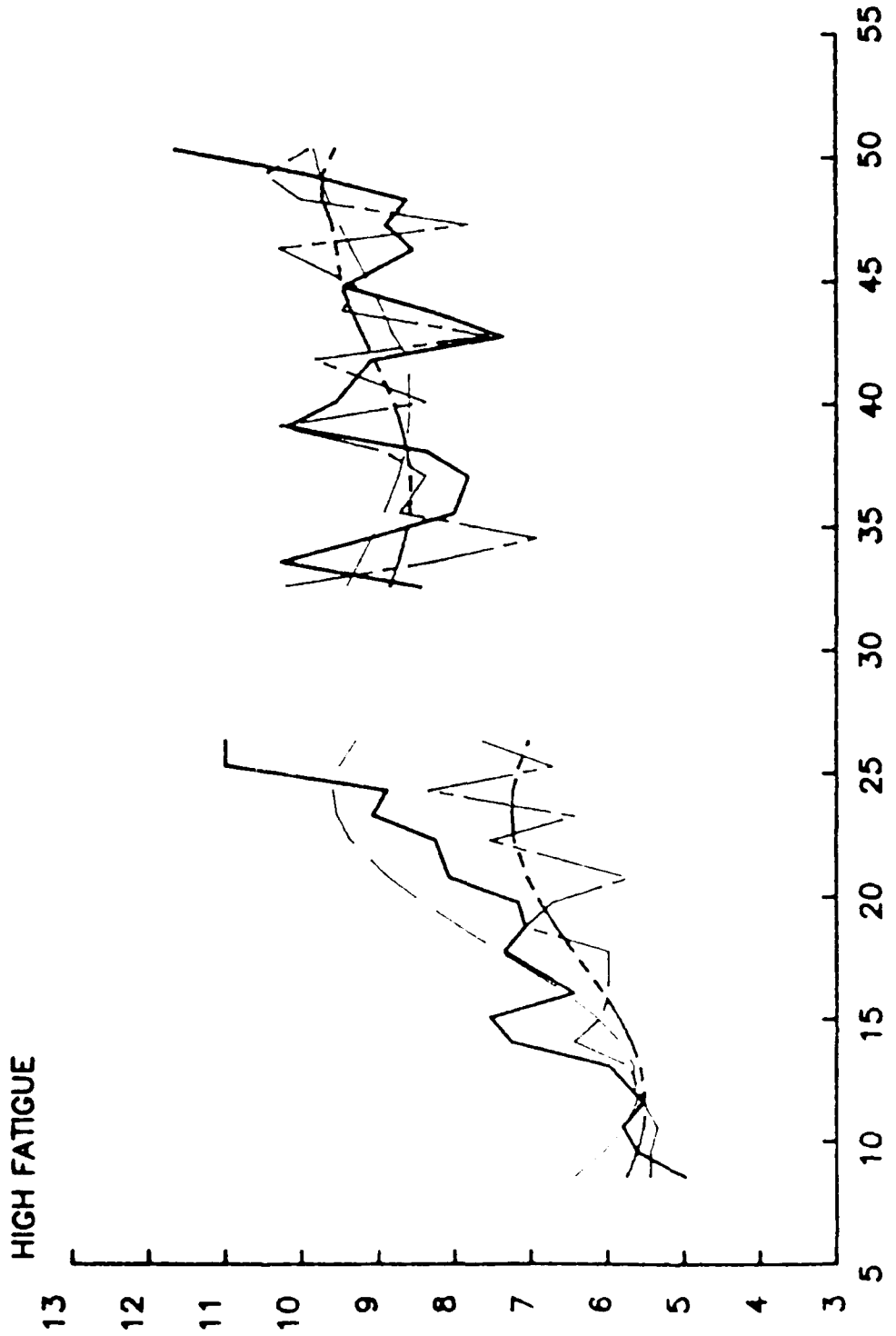


FIGURE 7

SIMPLE REACTION TIME FASTEST 10%

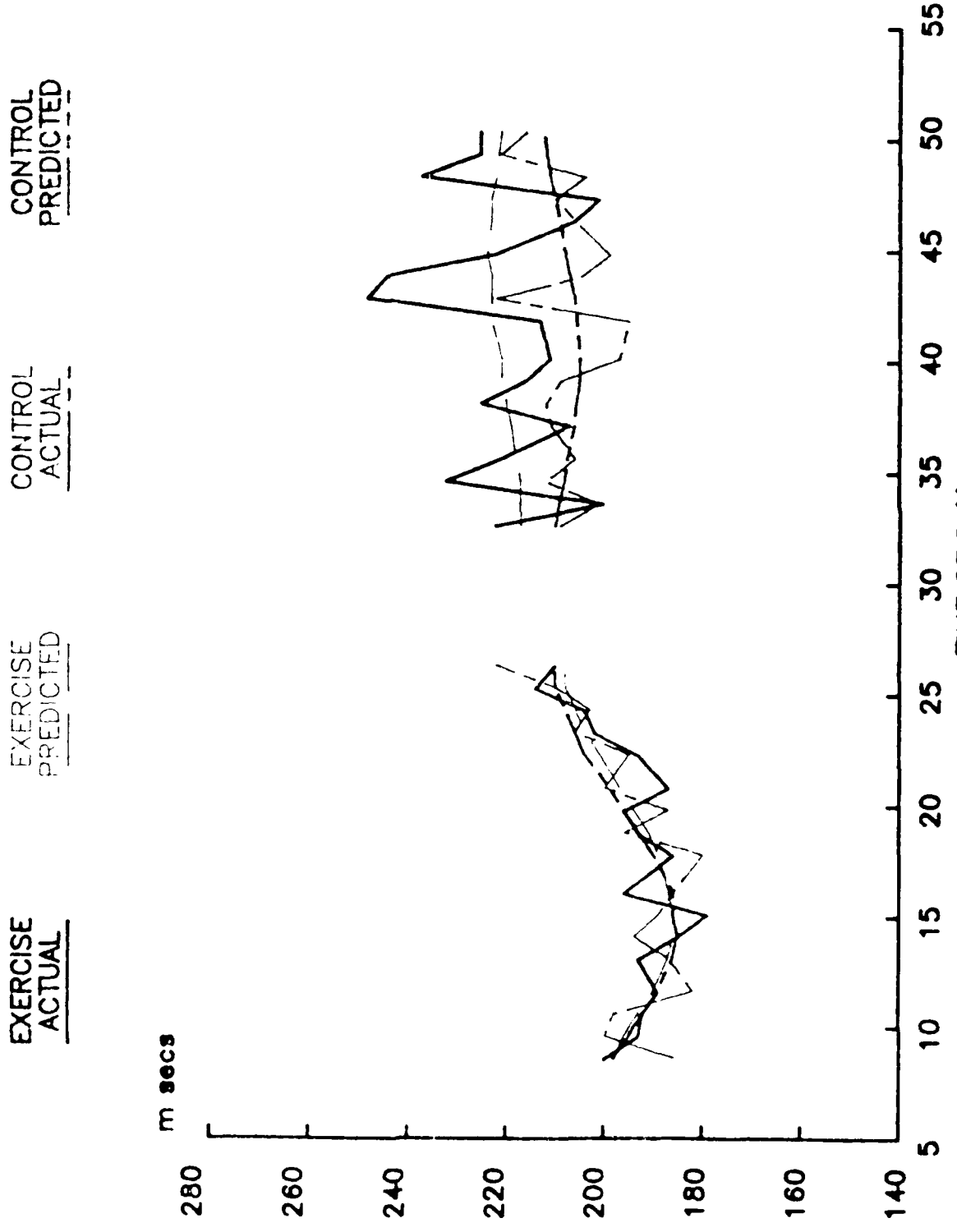


FIGURE 8

ALPHA NUMERIC MEAN REACTION TIME

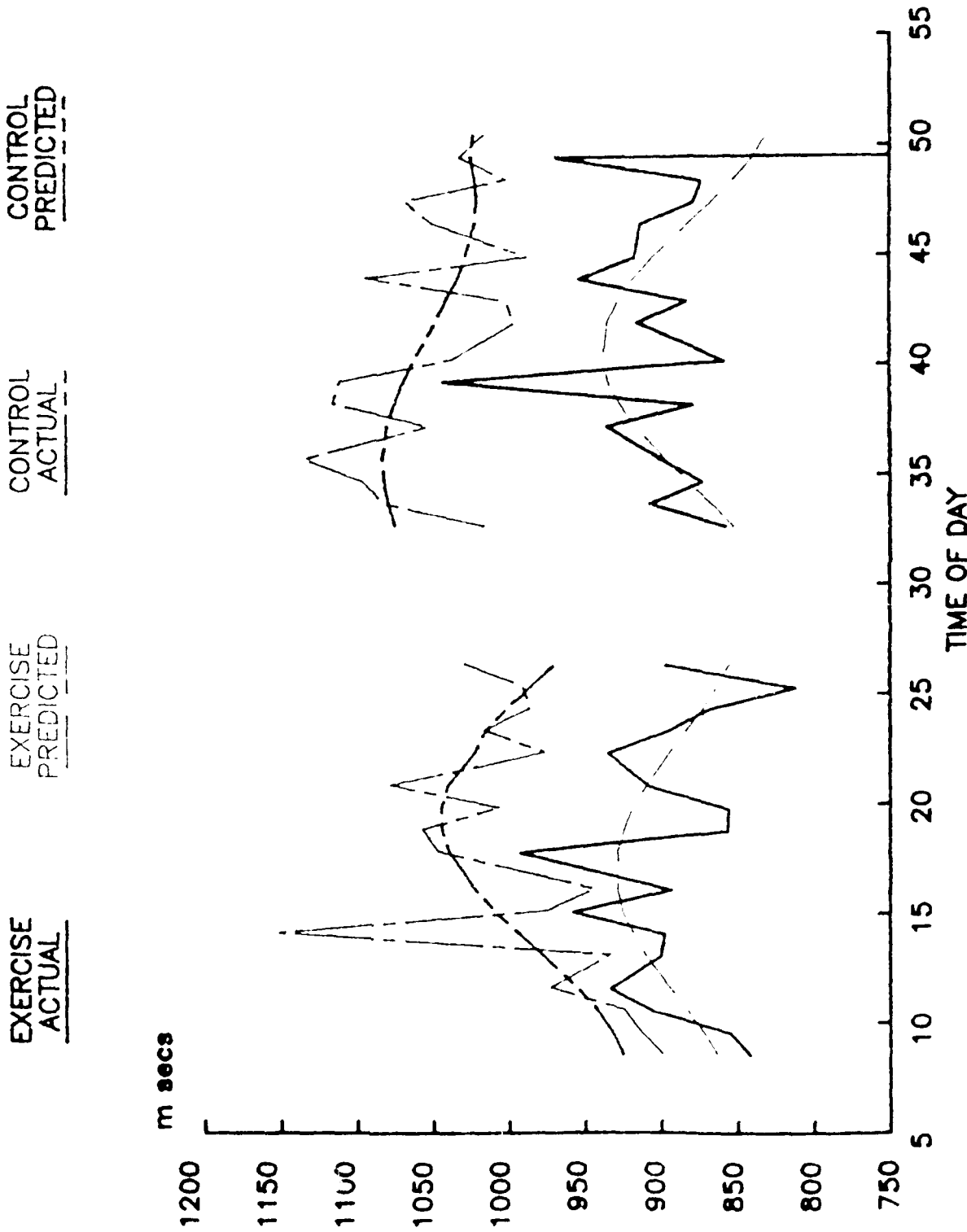


FIGURE 9

PERFORMANCE EFFECTS OF ATROPINE ON AVIATORS

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INTRODUCTION

Intelligence and published changes in Warsaw Pact Military Doctrine have led analysts to indicate that it is probable that during the next war the enemy will use chemical and biological agents. Although the threat of both conventional and nuclear weapons has been considered in U.S. military doctrine, it has been only recently that chemical weapons have received considerable emphasis when public attention was focused on chemical deployment and its usage by the Soviets and their counterparts.

Army aviation is at serious risk in this environment since even non-lethal riot control agents such as tear gas will disrupt the ability of aviators to maintain control of their aircraft. Thus, in real terms, should aviators encounter a chemical agent in aerosol form (or any other form), the potential outcome is the loss of the aircrew and aircraft and the failure of the mission. While crews and passengers could conceivably don protective gear, as needed, the ability of the pilot to turn from the flight tasks and the lack of sufficient room in the cockpit to don a chemical defense (CD) ensemble, necessitate that in any chemical threat situation the pilot must have previously donned the ensemble. Thus, the ability of the pilot to effectively operate his aircraft while in a CD ensemble is the first key to operational effectiveness on the chemically contaminated battlefield.

The second key to effective operation in a chemical environment is the development of antidote and pretreatment drugs which, at a minimum, will allow safe return of the crew and aircraft. The ideal compounds which would allow efficient mission accomplishment even after exposure have not been confirmed as safe. Three compounds - atropine, pralidoxime chloride (2 PAM-CL), and pyridostigmine - are under current consideration, but there are only limited studies which address the ability of aviators to fly helicopters after having taken these drugs without initial exposure to a chemical threat. Each drug has side effects which suggest "a priori" that effective mission accomplishment or safe flight may not be possible after receiving the normal doctrinal dose of these drugs. The need to determine the performance effects of antidote and pretreatment drugs is driven by the requirement for Army aviators to survive and maintain combat effectiveness on the chemically contaminated battlefield.

This report briefly outlines the first phase of a systematic program, using controlled, simulated flight conditions to identify and measure performance, physiological, and psychological effects of atropine on aviators. Future phases will validate the results from the simulated conditions during in-flight combat scenarios. It should be noted that this report reflects only partial completion of the first phased effort. Six of twelve projected subjects have participated to date.

METHOD

Subjects The first six subjects selected for the simulator phase were volunteer male aviators in good health possessing uncorrected normal vision and hearing. Each of the volunteers passed a comprehensive physical examination including a physiological stress screen, and were tested for atropine sensitivity prior to starting the project. Subject pilots were qualified and current in the UH-1 helicopter. The mean age of the sample was 27 with a range from 25 to 32 years old. The mean flight time was 931 flight hours with a range from 190 to 3000 flight hours. Three of the six subjects had in excess of 400 hours and two had in excess of 1100 flight hours. The mean flight experience in simulated flight was 141 flight hours and the range was from 50 to 300 flight hours.

Equipment and Procedures The first phase of the program was conducted within the research facilities of the Biomedical Applications Research Division at the US Army Aeromedical Research Laboratory. Since the subjects were required to remain within the laboratory for six consecutive days full living accommodations were provided. The simulated flights were conducted in the Laboratory's two degree of motion simulator which was designed and programmed to simulate the configuration and general flight dynamic characteristics of the UH-1 class helicopter. The simulator was linked to a real time data acquisition system (SIMUHIMS) which allows simultaneous data collection of pilot aircraft control inputs as well as aircraft dynamic response and flight status. The simulated flights consisted of precision "upper-air" instrument flight maneuvers and a standard instrument flight to include an instrument flight take-off, navigation/flight to a destination airport, holding at the outer marker, and an instrument (ILS) approach to minimums. A "standardization" instructor pilot performed copilot duties and rated the subject pilot's performance on each of the flight maneuvers.

Psychological, cognitive, and psychomotor measures were collected via the Laboratory's Psychological Assessment Battery (PAB) which consisted of classical subtests presented on a computer screen. The subtests included a self reported mood scale comprised of 65 descriptors, feeling/tone fatigue scale, short term memory task, logical reasoning task, addition/subtraction subtest, and a Wilkenson four-choice reaction test. The total test battery required approximately thirty minutes to complete. The subject response and time to respond were recorded and analyzed via a microcomputer.

Fine motor coordination as well as ability to respond to concurrent tasking was measured via the Laboratory's Zero Input Tracking Task (ZITA). The ZITA is a one-dimensional compensatory tracking task. Acceleration and reversal rates can be manipulated by the experimenter to develop differing levels of difficulties for the subject. An additional auditory stimulus/response paradigm was introduced to create a concurrent task. The Zita stimuli presentation and subject responses were controlled and recorded through microcomputer technology.

The effects of atropine on the visual chamber was measured and evaluated by contrast sensitivity and visual acuity tests. Contrast sensitivity served as a task for assessing the visual performance loss related to glare and transparency haze as a function of atropine dose level. Similarly, visual

acuity shifts were recorded to map the effects of the drug over the duration of time.

Physiological variables included subjects' ECG, heart rate, and EEG. These measures were continuously monitored via a physiological telemetry system to insure the subjects' safety as well as recorded for data analysis. Because of logistics, continuous blood sampling was not accomplished; however, urine was collected and analyzed to aid in tracking the drug over the duration of its influence.

Finally, two visual evoked potential response (VEP) paradigms were utilized to evaluate atropine influence on central nervous system (CNS) activity. Visual "checker board" stimuli ranging from 4X4 checks to 128X128 checks per screen were presented at one hertz for 100 presentations of each of six ranges. This test was designed to detect any shift in the N75/P100 VEP referenced from the frontal (FZ) to the occipital (OZ) cortical lobes. The second test utilized an "odd-ball" paradigm with an 4X8 checker board as a common visual stimuli presented at one hertz for 200 presentations. Randomly, 15% of the 200 stimuli reversed the black and white checks of the 4X8 checker board. The subject was directed to respond to the shift of the visual stimuli by pressing a red button as quickly as possible. These VEP recordings were collected from a parietal electrode referenced to a mastoid electrode. Both the P100 and P300 peak and latency values were scored and analyzed.

Procedurally, the simulator phase was designed as a double blind experiment i.e., neither the subjects nor the experimenters interfacing with the subject knew the dosage being administered. Three dosages were utilized - zero milligrams (saline solution), two milligrams of atropine sulfate. Non-dose control days were required between the two and four milligram dose days to insure that previous dosages would not contribute to an additive effect. Thus, subjects participation included one practice day (Sunday), three dose days, and two control days. The one hour and forty minute flight profiles were repeated twice each day and the remaining tests were repeated three times per day. The results of the first testing session (nonflight) were utilized to establish a daily baseline as well as evaluate day to day stability of each test.

Three null hypotheses exist for this first phase. The first null hypothesis was that pilot performance would not be degraded as a function of the atropine injections. The second was that the physiological and biochemical status of healthy subjects would not be adversely affected by atropine. Finally, psychomotor, psychological, and cognitive capabilities would not be adversely affected by administration of atropine as measured by laboratory tasks, performance batteries, and subjective evaluations.

RESULTS

Since only half of the projected subjects have completed the first phase of the investigation the results presented in this paper reflect preliminary analyses. More in-depth analyses will be provided in future USAARL reports. Analyses of control day data were omitted from this paper since the main interest was the immediate effects of the three doses administered to each subject.

Only two of the six subtests from the PAB (Wilkenson four choice reaction test and the Activation subtest) reflected any significant shift in behavior from the zero to four milligram dose days (P .01). None of the tests showed significant differences between the zero and the two milligram dose days. Wilkenson four-choice reaction test results reflected a reduction in the total number of responses for the set time period for subjects under the influence of the four milligram dosage. However, response accuracy was not effected. The activation subtest reflected that the subjects felt more active during the mid-day session (three hours post dose); and felt lethargic during the third session (seven hours post dose) on the four milligram days.

Results from the ZITA, like the PAB results, provided non-significant differences between the zero and two milligram dosages. Under the influence of four milligrams the subjects scored progressively worse as the delay in the cyclic control was increased and as the concurrent tasking was introduced. Scores obtained during the four milligrams condition increased (representing power response) by 20 to 50 percent of their morning baseline scores. These changes were significantly different from the changes seen on zero dose days. Visual contrast sensitivity also reflected significant shifts from the zero to four milligram days while non-significant changes were observed between zero and two milligram sessions. Although all sessions demonstrated some possible diurnal relationship, the effect of Atropine was significantly worse for subjects under the influence of the four milligrams of atropine.

Heart rates reflected the introduction of Atropine into the system within three minutes and returned to normal within four hours. The visual chamber was the last area which reflected effects of the drug as reflected by visual acuity tests, and the highest dosage had cleared this chamber by 24 hours.

Visual evoked potential results showed no significant difference across the three dosages for checker boards with check from 4X4 to 16X16 per screen. However, for stimuli with 32X32 to 120X120 checks per screen, subjects with four milligrams of atropine had a significant depressed N75 and P100 peak amplitude. Additionally, under the same dosage the 4X8 odd ball task did not have a significant shift of the P100 peak amplitude but did have a significant depression of the P300 response. There was no significant shift in the latencies.

The two direct measures of pilots' performance were the instructors rating and the SIMUHIMS data. While the SIMUHIMS data reflected no significant change in the flight performance of the six aviators over five flight maneuvers under the influence of the three dose levels, the instructors rating did show a significant difference between the subjects' performance with four milligrams of atropine and the zero milligram condition.

DISCUSSION

Having presented the results, some discussion is required. Although the simulator objective data appears to differ from the instructor pilot's evaluation, the difference is most likely not "operationally" significant. On the instructor pilots' rating scale, a perfect flight was given a combined rating of 20, and acceptable flight performance, per the aircrew training manual (ATM), was given combined score higher than 12. Even under the

influence of four milligrams the subjects' mean rating was 12.8. Thus, even though there was a significant shift in overall instructor pilot rating of the subject pilots' performance from the zero and four milligram dose days, none of the flights were below ATM standards.

The physiological data demonstrated that the injection of atropine did cause physiological changes. However, these changes did not on any occasion place any subject at risk nor did they adversely effect their flight performance.

Finally, the remaining laboratory type tests did reflect degradations in performance from 20 to 50% due to 4mg of atropine. However, one should view these results with some caution. The difference from the flight data and the laboratory results could be interpreted that the flight measures were not sensitive enough to identify accurately the effects of the atropine, or, the laboratory results do reflect some degradation of the pilot's total capacity. However, this degradation perhaps only reduced the pilot's spare capacity but not to an unacceptable level for safe flight performance under the simulated instrument flight profile.

The visual evoked potential data does appear to provide promising results. The fact that there was no drug effect on the 4X4, 8X8, and 16X16 checker board stimuli recognition, could be interpreted that if the signal to noise ratio is significantly different atropine will not affect performance. However, the 32X32, 64X64, and 128X128 results would suggest that as the signal to noise ratio is decreased the effect of the drug would effect visual cognitive recognition performance. This could be interpreted to mean that a pilot under the influence of the drug might not recognize/identify a ground threat which he normally would have. The P300 results demonstrated that while the subjects did not have any significant reduction in the recognition/identification of the 4X8 stimuli, they did have shifts in their cognitive decision performance (P300). Again, this could be interpreted that given a target of opportunity (or threat) pilots under the influence of 4mg of atropine would recognize targets with sufficient signal to noise signatures, however, they still might not make appropriate decisions of flight or fight.

CONCLUSION

Since only half of the total subjects dedicated to this phase of the program have been tested it would be inappropriate to draw major conclusions. The trends that have developed thus far would tend to support the null hypothesis that the maximum dosage of four milligrams of atropine would not adversely effect pilots ability to safely participate in similar instrument flight conditions like those experienced in the simulator. The physiological effects caused some subject discomfort, but none experienced any ill effects. Finally, although the laboratory test proved sensitive to the effects of atropine, their correlation to "operational" performance must still be determined. The final results of this phase of the Research Program will be published at the completion of the analysis of the remaining subjects. Future phases of research will investigate other chemical defense antidotes relative to aviator performance in order to ultimately develop a safe and effective counter measure to chemical weapons/doctrine.

CREW PERFORMANCE ASSESSMENT

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A brief overview of the capabilities and recent projects of the Crew Performance Laboratory (CPL) was presented. Our philosophy of "operational responsiveness" is carried out in several manners. First, we provide consultation to USAF major commands for test and evaluation projects. This often requires in-flight evaluations of aircrew workload and performance. For example, we recently assisted Military Airlift Command with the retrofit of cockpit avionics which allow non-voice interplane communications in aircraft formation flights (Miller and Storm, 1985).

Second, we conduct in-house and contract research aimed at developing performance measurement methods. Recent interests have included the eyeblink (Morris, 1985), the steady-state visually-evoked EEG potential (Eddy, 1985), temporospatial analyses of the EEG (Gevins et al., 1985), logical decision processes (Narvaez and Miller, 1985), multivariate psychophysiological analyses (Miller et al, 1985), and subjective estimation (Miller and Narvaez, 1986).

Finally, we conduct in-house investigations of simulated task performance. These efforts are supported by complex (GAT-3) and simple (GAT-1) flight simulators, automated task batteries, the USAF Flight Dynamics Laboratory Total Inflight Simulator (TIFS), and the USAFSAM human centrifuge and altitude chambers. Additionally, we have designed and are installing a sophisticated generic workstation for investigations of non-pilot aircrew performance. The current direction in this effort is toward crew performance enhancement. We are examining the effects of the pharmacological control of chemical agent insults (chemical defense) and aircrew sleep management.

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OBSERVATIONS FROM THE FIELD

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"Whether or not gas will be employed in future wars is a matter of conjecture, but the effect is so deadly to the unprepared that we can never afford to neglect the question." J. J. Pershing, General, 1919.

The integrated battlefield is "a combat zone in which the combatants either have employed, are employing or have the capability to employ nuclear, chemical and/or conventional weapons, singly or in combination, to achieve a military objective." (RB 100-34, U.S. Army Command and General Staff College).

In the recent past, Nuclear, Biological, and Chemical (NBC) Defense Training centered on individual survival and if any thought was given to the continued function of the unit, it was a well-kept secret. Comprehensive training meant that one carried his protective mask faithfully on his hip while in the field, and hopefully would recognize the signal for a gas attack when it sounded and would mask in a reasonable amount of time. This sort of training will produce only failure on the battlefield of tomorrow. The integrated battlefield will require rigorous and realistic NBC defense training both for the individual, as well as the unit, in order that combat operations can continue successfully under any conditions. This training must consist of repeated use of both active and passive techniques for protection against the effects of both nuclear and chemical weapons. NBC defense must be included in every facet of doctrine and training so that individuals, units, and commanders are physically, technically, and psychologically prepared to operate in any environment.

It is my opinion that fruitful and meaningful NBC defense training, and hence the ability to successfully operate in the hostile environment of the integrated battlefield, will come about only after a major change in the thinking of the members of the military community in regard to NBC defense training and the reality of chemicals on the battlefield. All too often we hear statements such as the following concerning NBC defense, "I know we should do more, but it takes so much time and no one likes to do it." This was made by an active duty U.S. Army company commander. An Army National Guard pilot made the following remark, "I don't have to practice being uncomfortable." An active duty Army battalion executive officer stated, "We can't do it, it's too bulky and hot, and probably won't work anyway," and finally, an active duty Army E-7 says, "We're all dead if they use it (chemicals), so why worry about training."

We are our own worst enemy. We are allowing uninformed talk and ignorance of the subject to sow doubt and the seeds of defeat in the minds of our soldiers. We are allowing our minds to defeat our bodies.

After spending over 100 hours during the current fiscal year in MOPP-4 (mission-oriented, protective posture, "4" being the highest level), including flying at night with night vision goggles, I am convinced that a

majority of the members of the U.S. Army and its Reserves do not fully comprehend how fine our protective equipment is. I find that they are all too ready to accept secondhand stories about how bad our equipment is. Most have spent, for the most part, six hours for three days in a row in MOPP-4, sitting in the shade, never doing their jobs to see what limitations they will encounter and how to overcome these limitations, waiting for the time to pass. Sitting around in MOPP-4 is a waste of valuable training time and resources and can only reinforce the perception that our equipment is bulky, hot, uncomfortable, and useless.

The biggest change that individuals in the U.S. Army will have to make is how they view their role in that Army. From the start, all members are going to have to see themselves, no matter what their rank or job skills, as an 11-B, an infantry soldier. This will mean that everyone must possess those basic skills required to survive on the integrated battlefield. They must be able to call up and use those skills with a minimum of thinking, almost automatically. Further, after accepting the fact that all are soldiers first, each must see himself as either an officer, warrant officer, or non-commissioned officer in the United States Army, and accept the responsibility to know and understand the tactical doctrine endorsed by the Army and be able to support that doctrine. Finally, all members, taking into account the current tactical doctrine, must prepare themselves mentally and physically to do their jobs, under all conditions on the integrated battlefield.

It is my experience that there are no tasks required in this military occupational specialty (MOS) that I cannot perform in MOPP-4. As I have spent more and more time training in MOPP-4, I have become quite comfortable in MOPP-4 in all but the worst of conditions. I have learned how to overcome the vast majority of shortcomings associated with the MOPP-suit. I have seen an increase in the confidence and the skills of the members of my unit as they have spent more and more time working in MOPP-4, and I feel confident that they could operate successfully in sustained operations on the integrated battlefield. This confidence comes from repetition of training, having a workable, evolving standard operating procedures (SOP) for NBC defense, and long hours doing a job in MOPP-4. The effort required and the psychological stress encountered are great, but the rewards on the integrated battlefield are tremendous.

DEVELOPMENT OF PROCEDURES FOR OBTAINING PERFORMANCE DATA
UNDER CONDITIONS APPROXIMATING COMBAT STRESS

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The human factors community is frequently called on for information regarding capabilities of soldiers to perform various tasks under a variety of stressful conditions, including the condition termed "combat stress." In a recent example, the Human Engineering Laboratory was called on to provide operations researchers with estimates of the performance decrements that might be expected for weapon systems whose human components were performing under the stress of combat. These estimates were needed for models they were creating to evaluate the effectiveness of the various weapon systems in scenarios of combat operations.

Considering the potential importance of the decisions that could be made based on the predictions of these models, it would seem that estimates of performance decrements should be based on data collected in well-designed laboratory and field studies which should include conditions mimicking, as closely as possible, those of real combat. At this time, however, the best, and most often the only, performance estimates available are those based on weapon-tests under well-controlled, non-stressful range conditions. There are numerous reasons why data are not collected under (combat-like) stress conditions. Among them are: 1) existing human use guidelines; 2) test participants' (TPs') sophistication regarding human use, procedures of deception and simulation, etc.; 3) the lack of realism in simulations used in laboratory and field studies; and 4) the lack of knowledge about the nature of "combat stress" -- its components and the full range of possible physiological and behavioral effects it can have.

In light of the just listed problems, we established as our goal the development of a set of test procedures which meet the following conditions: 1) that it elicit in the TPs a stress response pattern that can confidently be identified as response to severe stress; 2) that it not subject TPs to conditions exceeding minimal risk; and 3) that it be developed as a standardized set of operating procedures (SOPs) which can be applied with equal facility and validity to both laboratory and field test conditions. This SOP can then be used to test TPs in a variety of applications calling for stress conditions. It should provide more valid tests of man-machine interaction for design evaluation purposes; it should provide more valid field-derived data for operations researchers and their models; it could allow for the investigation of suppression effects in laboratory and field studies; and it should provide a more valid framework for testing the effectiveness of various intervention techniques for improving performance under stress.

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To achieve this goal we have established a long-term, multiple-phase program. In Phase I, we plan to determine which "stress indices" are likely to reflect the effects of acute exposure to stress in TPs and are likely to work best for us considering our particular test conditions. Both physiological and psychological indices will be assessed. In Phase II, we will conduct both laboratory and field studies in which a variety of psychosocial and motivational variables are to be manipulated, separately or in combination, to elicit stress responses in TPs. The goal will be to establish a set of SOPs which reliably elicit valid stress response profiles for severe stress in the TPs. In Phase III, we will demonstrate how test procedures can be applied in a field test of a major weapon system. Performance data will be collected on TPs exposed or not exposed to the stress SOPs and will be evaluated for that system. Phase IV represents possible future extensions of this research. Such extensions might include investigations of multiple and chronic stress effects as part of combat stress. It might be possible to demonstrate and study suppression effects using our SOPs. Finally, we would like to introduce some stress intervention procedures, under controlled conditions in SOP-induced stress situations, to see if we can counter negative stress effects and improve performance.

Phase I of the program is currently under way. In initiating this phase we considered many aspects of the problem. First, can we expect to be able to imitate the characteristics of combat stress? What are the characteristics of combat stress? After due consideration, we decided that we would not be likely to achieve any generally acceptable definition of the characteristics of combat stress and, therefore, that we could not hope to imitate them. Furthermore, we concluded that testing performance under any stress SOPs which reliably elicit stress profiles typical of a severe stress, would probably serve the purpose of evaluating performance under stress better than current test procedures, and that the results so obtained and the procedures used could be validated as combat stress characteristics are delineated in future efforts. We also decided that we would limit our present investigations to the effects of acute stress.

Further, we had to consider how we were going to know that our SOPs were stressing the TPs and to what extent. Could physiological and/or psychological assessment techniques help us measure the presence and degree of stress response: And if so, which techniques would be best?

Much research has been accomplished demonstrating a multitude of physiological parameters which respond to stress and might be useful as stress indices: e.g., catecholamines, hormones, and a variety of peripheral measures such as heart rate and galvanic skin response. The particular index used in a given study seems to depend at least as much on the personal biases of, or the technical capabilities at the disposal of, the researcher as on a rational choice of the best possible index or indices. Further complicating the issue are several other considerations. Different stressors appear to lead to different patterns of response across indices: e.g., Fibiger & Singer (1984) found differential response patterns among measures of heart rate, blood pressure, adrenaline and noradrenaline in subjects exposed to either physical or psychological stressors. Other research has shown the time courses of various measures to be quite different, varying from the rapidly responsive and changing measures such as heart rate and catecholamine responses to the

more delayed and longer-lasting hormone responses, which also vary considerably among themselves along these dimensions. Furthermore, evidence exists that the duration of certain responses may be related to the severity of the stressor. For instance Swenson & Vogel (1983) found that corticosterone levels in rats exposed to escapable shock peaked and returned to baseline within 90 minutes following exposure, while levels in rats exposed to inescapable shock peaked at about the same level but remained at that high level for at least 4 hours following exposure. And finally, great differences appear to exist in the ways individuals react to a given stressor (Rose, 1980). Mason (1975a) has postulated that various personality types, with differing coping styles, will show different physiological response patterns according to the particular environmental (physical and social) conditions.

Much research has also been directed toward assessing the psychological perception of stress, without which some contend stress cannot exist (Mason, 1975b). Measures have been developed for assessing the impact of stressful life events on individuals (e.g., Horowitz, Schaefer & Cooney, 1974). Measures have been developed, also, for assessing how anxious individuals are, both in general and in response to specific situations (e.g., the State-Trait Anxiety Inventory, Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983). Some recently developed scales show promise for identifying certain personality traits which might relate to how individuals respond to stress (e.g., the Sensation Seeking Scale, Zuckerman, 1979). Additionally, scales to assess the ways individuals cope with stressors have been developed (Vitaliano, Russo, Carr, Mairo & Becker, 1985). Generally, these psychological instruments have shown relatively low reliabilities, and their validities as "stress" measures have remained questionable. However, considerable recent research has been conducted in which several of these instruments have been used in conjunction with several more generally accepted physiological measures of stress. Significant relationships between the psychological and physiological indices are lending evidence to the notion that they are measuring aspects of the same phenomenon (e.g., Francis, 1979; Ballenger, Post, Jimerson, Lake, Murphy, Zuckerman & Cronin, 1983).

One additional complicating factor regarding the multitude of information already available on the various stress indices is that this information is derived from numerous studies employing different stressors which frequently are not clearly defined as to nature or severity, employing only one or a few physiological or psychological measures obtained under a particular set of experimental conditions, employing usually only one or a few measurement times (usually shortly following the stress period), and employing various biochemical assay techniques which are themselves notoriously variable between laboratories.

Phase I of our program has been designed to provide physiological and psychological profiles for a variety of kinds of stressors, for at least two distinct levels within those kinds of stress, employing (where possible) the same batteries of measures in all protocols, employing standardized experimental procedures across protocols for obtaining all measures, and employing the same laboratories and advanced analytical procedures for all biochemical assays. To accomplish these objectives in Phase I the following three protocols have been initiated:

Examination Stress Protocol. This naturally occurring stressor is being studied in groups of male pre-med students, medical students, medical residents or medical interns recruited at a major medical training facility in the Chicago area. Two stress intensity levels are being evaluated: Low stress -- written exams or quizzes of about one hour duration, which can take the form of a question-and-answer session, a seminar, or a lecture, for which the subjects will be graded and in which their performance will significantly impact on their standing in their training program. The exams will be conducted before, and evaluated by the subjects' peers and superiors within the program.

Surgical Stress Protocol. This naturally-occurring stressor is being studied in groups of husbands of women patients undergoing stressful surgical procedures at a university hospital in Chicago. In this protocol, again, two stress intensity levels are being evaluated: low stress -- spouses of women patients requiring a diagnostic laparoscopy procedure, the outcome of which would determine the couple's ability to conceive a child; high stress -- spouses of women patients facing a possible major abdominal operative procedure for cancer or other life-threatening condition.

Film Stress Protocol. This laboratory investigation is evaluating the reactions of male and female university students to viewing films which vary in their stress-evoking content: low stress -- a benign film depicting "Corn Farming in Iowa"; moderate stress -- a woodshop safety film "It Didn't Have To Happen," depicting realistically graphic, but somewhat obviously staged, shop accidents; and high stress -- a film titled "Subincision" taken by an anthropologist working with an Australian Aboriginal tribe, depicting very vivid sequences of crude operations performed with a piece of flint on the penis and scrotum of several adolescent boys going through ceremonial passage into the adult community. Previous research with the latter two films has documented their abilities to evoke stress-related physiological responses (e.g., Lazarus, Speisman, Mordkoff & Davison, 1962). All subjects will view all films in a repeated-measures design, with viewing order counter-balanced.

Physiological Measures. In all protocols, blood samples are being obtained at critical times over days to obtain stress and basal levels, and over several hours before and after the stress event in order to determine profiles for both the anticipatory and recovery phases of the process. The blood samples will be assayed for epinephrine, norepinephrine, cortisol, testosterone, prolactin, growth hormone, TSH, free triiodothyronine (T3), and luteinizing hormone, all of which have been shown to be responsive to various stressors. In addition, in the film protocol, blood pressure, galvanic skin response, and heart rate are being monitored during, and immediately before and after the film viewing.

Psychological Measures. Several categories of psychological assessments are being employed in the protocols:

Screening Measures:

- a. A medical history questionnaire to make sure subjects are healthy and have no endocrine abnormalities.

b. The Hamilton Depression and Anxiety Scales (Hamilton, 1960) to screen for and exclude those most likely to show clinically abnormal reactions to stress.

c. Life Events Questionnaire (Horowitz, Schaefer & Cooney, 1974) to determine what other life stress events might be affecting subjects' responses. This measure is repeated on each day that blood samples are taken.

Personality Measures:

a. State-Trait Anxiety Inventory (STAI, Trait portion) (Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983).

b. Multiple Affect Adjective Check List (MAACL, In General form) (Zuckerman & Lubin, 1985).

c. Eysenck Personality Questionnaire (Eysenck & Eysenck, 1975).

d. Sensation Seeking Scale (Zuckerman, 1979).

e. Locus of Control Scale (Rotter, 1966).

f. Test Anxiety Inventory (Spielberger, Gonzalez, Taylor, Algaze & Anton, 1978 - for the examination protocol only).

g. Test Anxiety Profile (Oetting & Deffenbacher, 1980).

Stress Perception/Anxiety State Measures:

a. STAI (State portion).

b. MAACL (Today form).

c. Subjective Stress Scale (Kerle & Bialek, 1958).

d. Stress Scale.

Coping Measure: Ways of Coping Check List (revised) (Vitaliano, Russo, Carr, Maiuro & Becker, 1985).

Figure 1 represents the general time course for obtaining the physiological and psychological stress measurements in all the protocols.

Recruitment takes place usually one to several weeks prior to the stress event, except for the surgical stress protocol, in which case, subjects are recruited around the time of their initial visit to the surgeon involved, following referral due to suspected cancer or an organic problem relating to fertility.

Basal blood samples are obtained at least one week prior to the stress event and at least one week following the event, except for the surgical protocol in which case they are obtained at least a week following the surgical procedure. Basal measures are obtained at 0900, 1230 and 1600 hours

on those days.

Stress samples are obtained every 15 minutes via an indwelling catheter, from two hours before to two hours following the stress event. Additional samples are obtained at +3, +4, and +24 hours in the examination and surgical stress protocols, and at +48 hours in the surgical stress protocol.

Screening psychological measures are given at the time of recruitment. The Life Events Questionnaire is given, in addition, on all other days when blood samples are obtained.

Personality measures are given, in all cases, on the day when initial basal blood samples are drawn. Pilot work has shown this battery is usually completed in about 30 minutes.

The stress perception/anxiety state measures are given immediately following the stress event. In the case of the surgical stress protocol, this is defined as the time the spouse is notified that the surgery was successfully completed. Pilot work has shown this battery is usually completed in about 15 minutes.

In the case of the film protocol, the appropriate stress perception measures, blood samplings, and other peripheral physiological measures are obtained during the -2 hour to +2 hour period each day that a different film is viewed.

The Ways of Coping Check List is given each time following the stress perception measures as a part of that battery.

Additionally, in the examination stress protocol, we are obtaining all test scores and performance ratings from peers and faculty as additional data to use in validating the stress measures as they reflect stress effects.

In this phase (Phase I) of our program, the results of the investigations described, and now underway, will provide us with a number of physiological and psychological profiles of stress responses surrounding a variety of kinds and severities of stress events. This should allow us to determine the existence, and assess degree, of stress responses we obtain in our future efforts in Phases II-IV. Other very important outcomes from this work include:

- a. Tests of the hypotheses that different stressors and different levels of stress result in different profiles of stress indices.
- b. Test of the hypothesis that individuals with different personality traits show different physiological stress response profiles.
- c. Additional information on the relationships between personality indices and psychological indices of stress perception and anxiety states.

d. Much information, now lacking in the literature on the amplitudes and time courses of several physiological "stress measures" over an extended time frame before and following several stress events.

e. A detailed study of the anticipatory phase which has been largely neglected in previous research.

f. Enough information to allow us to select from all the measures used, those which will be most useful to use in future work where practical considerations are not likely to allow the use of such extensive test batteries.

A fourth stress protocol is presently being planned for this coming spring, 1986. It will represent our initial attempt to introduce psychosocial and motivational factors designed to significantly increase the level of stress experienced by TPs while they are firing rifles for score. Army and Marine riflemen will be competing under field conditions where unit prestige and privilege will be at stake. In addition, other factors known to affect stress such as isolation, limited information, peer evaluation, etc., will be introduced into this pilot effort. The goal of this field study will be to determine the degree of stress which can be induced in TPs in such a controlled and manipulated circumstance as compared with the stress obtained under the conditions of phase I. The particular physiological measures used will not coincide exactly with those of Phase I for practical reasons. Blood samples will be fewer but will, for comparative purposes, coincide with several of the collection times of Phase I during both the anticipatory and recovery phases. The psychological measures will, for the most part, be the same as in Phase I.

Once the four protocols are completed, we should have enough information to fully implement Phase II, the development of SOPs for creating severe stress conditions in a reliable and valid manner. This will be accomplished through a series of laboratory and field studies in which the relative value of various psychosocial and motivational factors can be more clearly evaluated.

Phase III, a demonstration of the effectiveness of the stress SOPs on the performance effectiveness of a major weapon system should conclude that aspect of our program seeking to develop stress evoking SOPs for application in evaluation of performance under acute stress conditions.

With continuing support we will then extend our efforts in any or all of several other directions in Phase IV:

a. With standard stress and performance conditions it should be possible to design studies to make good evaluations of various intervention techniques thought to improve performance by reducing susceptibility to stress: e.g., physical conditioning.

b. If our stress SOPs prove effective enough, it is possible that under certain conditions complete suppression of performance could result, thus allowing further study of the factors leading to the phenomenon and of ways of coping with it.

c. Since acute stress events in combat occur against a background of chronic stressful conditions and in conjunction with other acute stressors making it a multiple-stress situation, these represent challenging areas for expanding our investigations.

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TIME CHART FOR STRESS PROTOCOLS

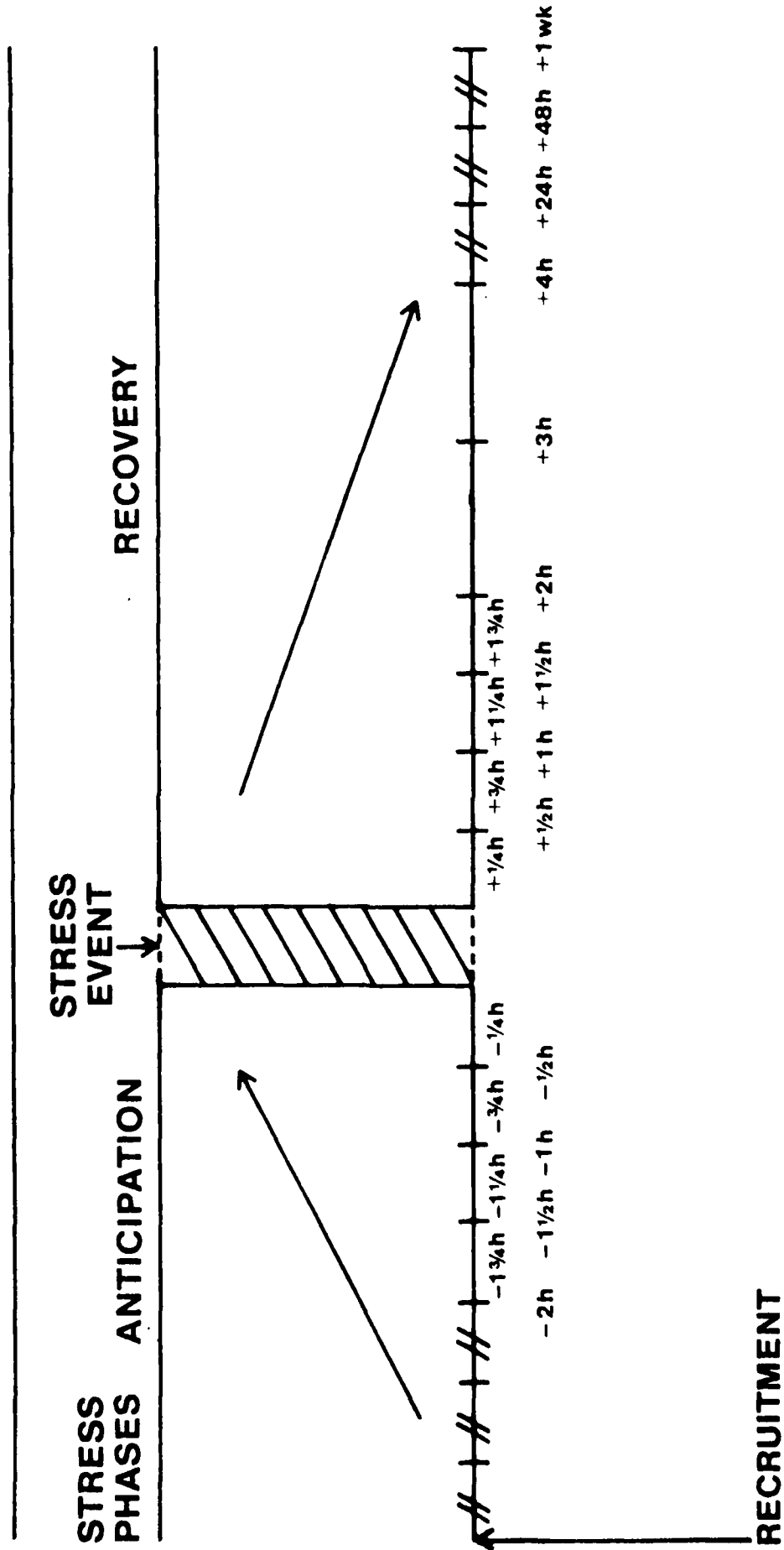


Figure 1

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