

ARI Research Note 95-21

Development of Courage in Military Personnel in Training and Performance in Combat Situations

Stanley Rachman

University of London



for

**Contracting Officer's Representative
George W. Lawton**

**ARI Scientific Coordination Office, London
Michael H. Strub, Chief**

**Research and Advanced Concepts Office
Michael Drillings, Acting Director**

January 1995

19950710 066



DTIC QUALITY INSPECTED 5

**United States Army
Research Institute for the Behavioral and Social Sciences**

Approved for public release; distribution is unlimited.

U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction
of the Deputy Chief of Staff for Personnel

EDGAR M. JOHNSON
Director

Research accomplished under contract
for the Department of the Army

University of London

Technical review by

George W. Lawton

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

NOTICES

DISTRIBUTION: This report has been cleared for release to the Defense Technical Information Center (DTIC) to comply with regulatory requirements. It has been given no primary distribution other than to DTIC and will be available only through DTIC or the National Technical Information Service (NTIS).

FINAL DISPOSITION: This report may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

NOTE: The views, opinions, and findings in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other authorized documents.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE 1995, January	3. REPORT TYPE AND DATES COVERED Final Jan 80 - Dec 81	
4. TITLE AND SUBTITLE Development of Courage in Military Personnel in Training and Performance in Combat Situations		5. FUNDING NUMBERS DAJA37-80-C-0254 0601102A B74F	
6. AUTHOR(S) Rachman, Stanley			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Institute of Psychiatry, University of London London, England De Crespigny Park, UK 99		8. PERFORMING ORGANIZATION REPORT NUMBER ---	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Research Institute for the Behavioral and Social Sciences ATTN: PERI-BR 5001 Eisenhower Avenue Alexandria, VA 22333-5600		10. SPONSORING/MONITORING AGENCY REPORT NUMBER ARI Research Note 95-21	
11. SUPPLEMENTARY NOTES Contracting Officer's Representative, George W. Lawton.			
12a. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.		12b. DISTRIBUTION CODE ---	
13. ABSTRACT (Maximum 200 words) The objective of this study was to investigate the components of courage, to study the development of courage through training to performance, and to identify the distinctive qualities, if any, of courageous people. The study was directed toward the selection, training, performance, and post-tour adjustment of bomb-disposal operators of the Royal Army Ordnance Corps (RAOC).			
14. SUBJECT TERMS Fear Courage Performance		15. NUMBER OF PAGES 175	16. PRICE CODE ---
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unlimited

FINAL TECHNICAL REPORT

1. Objectives
2. Part One - Overview
3. Part Two - Psychometric Analyses
4. Part Three - Psychological Effects of Training Course
5. Part Four - Performance in Combat Conditions
 - (i) Self-reported fear during tour
 - (ii) Mid-tour reports
 - (iii) End-of-tour reports
6. Part Five - Fear & Fearlessness among Trainee Parachutists
7. Part Six - Laboratory Stress Experiment
8. Part Seven - Summary & Conclusions
9. References
10. Publications
11. Administrative
12. Appendix

OBJECTIVES

The objectives of the Project are:

- (i) to investigate the components of courage
- (ii) to study the development of courage through training to performance
- (iii) to identify distinctive qualities, if any, of courageous people.

PART ONE - OVERVIEW

Fearlessness and Courage in Bomb-Disposal Operators

Much of our knowledge about fearless and courageous performance is derived from the study of military personnel. In setting out to test some fresh ideas on the nature and development of courageous performance, it was felt that military bomb-disposal operators would make a particularly suitable group for study. They are regularly required to deal with dangerous and ingenious improvised explosive devices (IEDs) and to perform highly technical work, involving careful judgments, during the most hazardous parts of the task. This demanding work, in which a major error is likely to be fatal, seemed to us to provide an unusual opportunity for attempting to expand our understanding of courageous performance. Fortunately, we were able to obtain admirable cooperation from the Royal Army Ordnance Corps (RAOC) and from the Royal Army Medical Corps (RAMC), and this enabled my colleagues (Dr. R. Hallam and Dr. D. Cox) and me to carry out a series of investigations over the past four years.

These investigations, ranging from retrospective analyses of statistical data obtained in the field to psychophysiological laboratory experiments on performance under stress, have in turn been directed at the selection, training, performance and post-tour adjustment of bomb-disposal operators of the RAOC. By also obtaining the cooperation of a group of bomb-disposal operators who had received awards for gallantry, we were placed in an especially fortunate position to address the intriguing question of whether or not there exists a group of people who are particularly resistant to stress, i.e. who

are especially fearless, in our terms.

All of the bomb-disposal operators who participated in these studies had completed a tour of duty in Northern Ireland. Since the bombing campaign gained momentum in the late 1960s, the annual rate of incidents reached 3,000 to 4,000, or approximately 10 per day. Between 1969 and September 1981, 31,273 incidents were dealt with. The hazardous and demanding nature of the work can be gauged from the fact that 17 operators were killed between 1969 and 1981, and roughly 1 in 4 operators have received decorations for gallantry. During the period from 1970 to 1981, 177 awards were made to members of the Royal Army Ordnance Corps engaged in bomb-disposal work. In the earliest stages of the campaign, the bomb-disposal operators were exposed to extreme danger. With growing experience, and the introduction of increasingly reliable techniques and equipment, the hazards of the tasks have been reduced. However, it will be appreciated that in spite of these advances, rendering safe an improvised explosive device inevitably involves danger. In view of the large number of incidents that have been successfully dealt with, the performance of the bomb-disposal operators has been astonishingly successful. All suitably qualified officers and soldiers in the RAOC with the rank of sergeant and above are considered eligible for bomb-disposal duties, and when selected, they are given the specialised training that enables them to carry out their hazardous work. The bomb-disposal operators are organised into small cohesive units, and typically spend four months on a tour of duty. A non-technical account of their duties is given by Macdonald (1977) in Stopping the Clock.

Background

A few words on the background of this research are necessary before relating the results of our investigations. Pursuing a new view of fear, originally proposed by Professor Lang of Wisconsin University, enables one to deduce some fresh notions on the nature of courage. Lang (1970) argued that fear consists of at least three major components (overt behaviour, subjective report, and physiological activity) and that these components are imperfectly coupled. He criticised the view that fear is "some hard phenomenal lump that lives inside people, that we may palpate more or less successfully". The three major components of fear are related to each other, but in an imperfect manner, for they are partially independent.

Regarding fear as a unitary phenomenon, and relying on a single measure of fear, has several disadvantages. Because many people are inclined to under-rate their ability to cope with dangerous situations, too great a reliance on a person's expectations of how frightened he or she will feel in some anticipated situation, may lead one to underestimate his courage. On the other hand, placing too little reliance on a person's subjective expectations may lead one to underestimate the degree of his fear.

Applying Lang's views to the analysis of courage, leads one to expect that people may be willing to approach a frightening object or situation but experience a high degree of subjective fear and/or unpleasant bodily reactions. Persistence in the face of these subjective and physical signs of fear is one definition of courage.

In technical terms, psychologists can now describe courageous conduct as an example of the uncoupling of the three major components of fear, in which the person's overt behaviour has advanced 'beyond' his subjective discomfort. In this distinction, people who continue to approach a fearful object or situation without experiencing subjective fear or unpleasant bodily reactions, are displaying fearless rather than courageous conduct.

Reviewing a range of evidence in 1978, it proved possible to compile a list of factors that contribute to courageous behaviour (Rachman, 1978). In brief, it was concluded that possession of the appropriate skill required in the dangerous situation serves to increase courage, and the most important immediate determinant of courageous performance is a sense of self-confidence about one's skills. A high level of motivation to succeed makes an important contribution to initiating and maintaining courageous behaviour; similarly, the demands placed upon the person in the particular situation (e.g. group pressure to proceed) have a powerful influence. The results of this review were consistent with the emphasis that is so often placed on the need to train people in order to carry out hazardous duties. What might be called "training for courage" plays an important part in preparing people to undertake dangerous jobs such as fire-fighting or parachuting. One element of such training, the gradual and graduated practice of the dangerous tasks likely to be encountered, seems to be especially valuable. In the early stages of training people to carry out hazardous tasks, success is more likely if the person's motivation is raised appropriately. This should assist the person to persevere in spite of his subjective apprehension.

The successful practice of courageous performance should lead to a decrease in subjective fear, a corresponding increase in confidence and finally, to a state of fearlessness. In this sense, courage turns into fearlessness. Inexperienced parachutists display courage when they persevere with their jumps despite subjective fear; veteran jumpers, having successfully adapted to the situation and acquired the necessary skills, no longer experience fear when jumping. They have moved from courage to fearlessness.

Investigations

To begin with, we carried out a detailed statistical analysis of data collected on 280 bomb-disposal operators during routine assessments made by Army psychiatrists and psychologists, and here we are indebted to G. Thompson and D. Stewart for their assistance. The information consisted of the results of psychological tests, interviews conducted by Army psychiatrists, performance on formal training courses, and end-of-tour reports provided by superior officers. Perhaps because of the high overall competence and success of the bomb-disposal operators, this analysis produced few results of significance.

The information from the psychological tests showed that the operators were, with very few exceptions, people of stable personality and a high level of competence. On most of the psychometric tests, they were above the norms for the civilian population on all of those characteristics that we would regard as indicating psychological health.

We then carried out a comparison between those bomb-disposal operators who at the end of their tour of duty received ratings of above

6.

average, average or below average, from their supervising officer. There were surprisingly few differences between the operators in the three categories but there was a slight tendency for the above average operators to be a little more calm and confident than the other operators — bearing in mind that the total sample consisted of people who were unusually competent and fit. Continuing our search for markers that might indicate whether there exists a select few who are capable of carrying out acts of exceptional courage that distinguish them from their fellow (highly competent) operators, we carried out a comparative analysis of decorated operators and equally competent but non-decorated operators. Somewhat to our surprise, we came across one feature that distinguished the decorated operators. They were found to be slightly but significantly superior in all-round psychological health and bodily fitness. They felt well in their bodies and mentally fit and alert — even to a higher degree than their competent colleagues, who, in any event, scored well above the civilian norms. The opposite characteristic to that reported by the decorated operators is described as "hypochondriasis", and on this particular scale, most of the decorated operators returned zero scores. In other words, they reported no bodily or mental complaints whatsoever.

Although most of the evidence which we gathered points to the overwhelming importance of training, group cohesion and situational determinants, this finding on the decorated operators suggests that individual characteristics do make some contribution to the likelihood of carrying out exceptional acts of gallantry. In response to the ancient question, it raised the possibility that there are courageous actors as well as courageous acts. This question was taken up again at a later stage of the research when we carried out a psychophysiological analysis of performance in the laboratory under stress (see below).

Turning to the effects of specialized training, we obtained clear evidence of a substantial increase in skill and confidence after completion of the special course. The value of the course is emphasized by the finding that, after completion, the novices (i.e. those who had not yet carried out a tour of duty as bomb-disposal operators) expressed approximately 80% of the confidence reported by experienced operators. To put it another way, the training course succeeded in taking them 80% of the way towards that combination of confidence and competence that makes a successful operator. The specific value of the training is evident from the finding that, prior to entering the training course, soldiers with previous military experience unrelated to ordnance duties, had as little confidence in dealing with explosive devices as did those soldiers who had never been on active service.

Combat performance

The next investigation dealt with the performance and adjustment of the bomb-disposal operators during a tour of duty in Northern Ireland. The most important finding is that almost all of them performed their duties successfully and without problems. They quickly adapted to the hazards of their work, despite the fact that most of them had to live under constricted and difficult improvised conditions. The process of adaptation was accelerated once the operator successfully carried out his first operation on a genuine device. Experience of dealing with false alarms or hoaxes made no contribution to increasing their confidence or competence. However, once a new operator successfully completed his first task, his confidence and feelings of competence rose close to the level of the experienced operators. In some of the new operators, their first successes were followed by a brief spell of over-confidence. During the tour of duty, most of the

operators reported feeling calm and relaxed for much of the time. Seven reported no fear at any time, but four reported high levels of fear. On the whole, comparatively little dysphoria or psychological problems arose, but boredom and physical constriction were common problems. Those operators who continued to perform satisfactorily despite their fears, especially the four who reported high levels fear, were showing courage. Experienced operators were better able to adjust their level of arousal during on-duty and off-duty periods; they were more proficient at switching on and switching off discriminatively.

At the end of the tour, operators felt satisfied with their performance and many regarded themselves as more mature because of their combat experience. Most felt that their skills improved during the tour.

For experienced operators, the adjustment after completing a tour of duty was almost always uneventful. In the case of 'inexperienced' operators, however, the post-tour adjustment period was sometimes bumpy. Some of them reported a feeling of being let down when they returned to the usually undemanding and more mundane existence of home service. Among those operators who experienced a difficult or demanding tour, there were signs of significant psychological change in the post-tour period. Both the operators themselves and their spouses (answering separately) reported more changes than did operators whose tour of duty had been comparatively uneventful. In a number of cases, the operator's marriage was discernibly altered, sometimes in the form of greater closeness, but in others, leading to seapration.

Reactions to laboratory stress

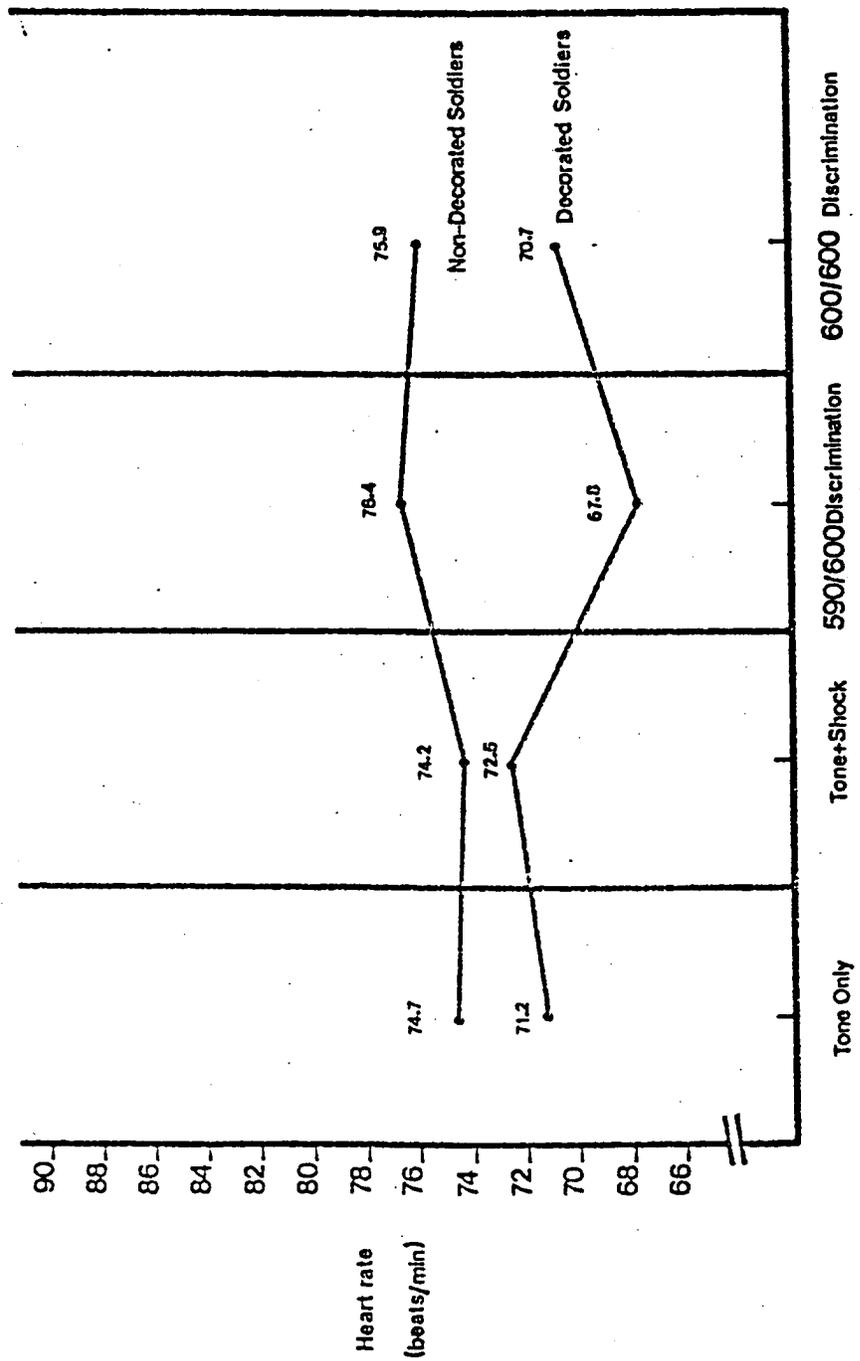
Following our discovery of a psychometric distinction between successful bomb-disposal operators and their colleagues who had additionally been given awards for gallantry, we set out to determine whether two such groups of subjects would perform differently under stress in an experimentally controlled laboratory setting. The subjective and psychophysiological reactions of a group of decorated bomb-disposal operators were measured during a laboratory stress task and compared to the reactions of a group of equally experienced and successful, but non-decorated bomb-disposal operators. There were no differences between the groups in subjective reactivity, with both sets of operators describing relatively little apprehensiveness and no anxiety. As can be seen from Figure 1, however, we came across a clear psychophysiological difference between the groups.

Insert Figure 1 here

The laboratory stress test is divided into four periods with the third and fourth being the most demanding. During the first two periods of the experiment, the heart rate responses of the two groups were not significantly different. However, during the most difficult third and fourth periods of the stress test, the decorated subjects maintained a significantly lower heart rate than did the comparison subjects.

Figure Caption:

Fig.1. The heart rate of decorated and non-decorated bomb-disposal operators during the four stages of the stress test. In the most stressful final two stages, the heart rate of the decorated operators was significantly lower than the heart rate of the non-decorated operators. (Data from Cox, Hallam, O'Connor & Rachman, 1981.)



Conditions

The fact that the two groups of subjects did not differ in subjective reactivity adds to the interest of the psychophysiological findings. The "courageous actors", in this case the decorated bomb-disposal operators, reported an awareness of their bodily sensations to a similar extent as did the other subjects during the stress tests and had similar subjective reactions. It was formerly thought possible that these people have the usual psychophysiological reactions under stress, but fail to read the signs. The results of our experiment however, indicate that the "courageous actors", strictly speaking the fearless actors, were in fact less aroused psychophysiologically — they were not merely misreading their bodily reactions. As far as this group of men is concerned, the results also rule out the hypothesis that fearless performers are peculiarly insensitive, or that they are denying their disturbing feelings (of fear, etc.).

Our findings are in keeping with comparable research carried out by Dr. Walter Fenz (1975) on parachute jumpers, and by a Czechoslovakian worker, Dr. Daniel (1976) who reported that the most competent parachutists in his group displayed the lowest heart rate responses during stress. The findings of our experiment on bomb-disposal operators are also consistent with the studies of the Mercury astronauts (reviewed by Rachman in 1978) and raise the possibility that the astronauts belong to the same general pool of people from which the decorated bomb-disposal operators are drawn.

As far as the question of courageous actors is concerned, we now have evidence drawn from two different investigations to support the identification of a group of people who appear to react differently when placed in a stress situation, and who obtain slightly different

scores on self-report psychometric tests in which they indicate an optimal level of functioning.

The results of the research are not inconsistent with the analysis of courage set forward in Fear and Courage. The main determinants of courageous behaviour include effective training, perceived competence, and high group morale and cohesion. Adequate training and skills reduce one's estimate of danger and increase self-confidence. Training experiences facilitate the transition from courage to fearlessness. In addition to these determinants of courageous or fearless acts, we now have some slight evidence of the existence of a small group of people who are unusually competent and calm, and who may be particularly well suited for carrying out hazardous tasks.

Summary and Discussion

Any results produced by this research should be seen in the context of the high success rate of members of the RAOC in carrying out bomb-disposal duties in Northern Ireland, and of the apparent efficacy of the training procedures in making this possible.

The primary aim of the first phase of the research was to seek out variables which might predict an operator's performance in Northern Ireland. Success in predicting poor performance would have a greater practical utility than success in predicting excellent performance, for the obvious reason that such information could be useful at the time of selection of candidates for the work.

In fact, very few operators received poor end-of-tour reports, and the group of operators who were described as 'low-average' in this report cannot be considered to be failing in an absolute sense.

The consistent finding which has emerged from the present data and Colonel Thompson's survey is that the above-average operator stands out from the large group of average and low-average operators, but the latter cannot be distinguished from each other. Psychometric test results, psychiatric screening grade and IED course grades do not pick out the 'low-average' operator from the average operator.

The above-average operator, on the other hand, can be predicted to some extent from his 16 PF psychometric test record. He is more likely to be tough-minded and forthright, and also to have obtained slightly higher course grades.

According to the CAQ psychometric results, the decorated ATs and ATOs obtained exceptionally low scores on one of the scales (Hypochondriasis) indicating a marked lack of concern with bodily health and a lack of any feeling of being rundown, weak or ill.

The George Medallists, considered separately, were also more calm, confident, relaxed and considerate, according to two other scales of the CAQ.

There are probably several factors contributing to the lack of any relationship between predictor variables and 'low-average' performance.

- (1) Potentially poor operators may already have fallen by the wayside before they attain the rank of sergeant or captain and become eligible for selection
- (2) The performance criterion used in this study (end-of-tour report) may be inadequate for the purpose of identifying low-average operators
- (3) The 'low-average' operator may be cushioned against severely testing circumstances by careful assignment to teams and areas, and by 'balancing', the proportion of 'excellent' and 'low-average' operators in any EOD team. Teams are, in any case, balanced for the degree operational experience of the members and assignment to sections in Northern Ireland is not entirely random. Perhaps the careful assignment of operators (e.g. to town or country areas) and the shared knowledge of an individual operator's strengths and weaknesses, which is circulated in a relatively small, friendly, and cohesive corps, should not be underestimated as a factor in the successful record of the RAOC in Northern Ireland.

The results do not point to any obvious ways in which the selection procedure could be changed or improved, or any need to improve them! Schemes to improve selection would have a greater chance of success, if satisfactory measures of an operator's performance could be devised.

PART TWO - PSYCHOMETRIC ANALYSES

The primary aim was to analyse the information which had already been collected by RAOC staff on 218 operators who had completed a tour of duty between 1969 - 1978. In particular, we set out to

- a) relate psychiatric screening grades, psychometric test results, training course results and other variables to ratings of performance made by senior officers at the end of a tour of duty
- b) examine the psychometric test results (obtained at selection) of the operators who were subsequently decorated for gallantry
- c) examine the psychometric test results of candidates rejected at selection

A second aim was to conduct some further analyses on data which had been collected by Colonel Thompson, an Army psychiatrist formerly responsible for screening soldiers for IED disposal duties.

A comprehensive questionnaire survey of 218 operators who had completed a tour of duty was kindly made available by the RAOC for analysis.

Background to the Research

The hazardous and demanding nature of the work is indicated by the fact that fifteen operators were killed between 1969 and 1975. One in four received decorations for gallantry. Seventy-three awards were made to members of the Royal Army Ordnance Corps, in Northern Ireland, during the period 1970/1978. Fortunately, several developments have made the duties less hazardous. Firstly, knowledge of the techniques of construction of improved explosive devices (IEDs) has increased so that there is less need to examine the IED before destroying it, although the military authorities need to be constantly on the alert for new methods of detonation and construction. Radio-controlled detonation is a recent example of a technical innovation used by bombers. Secondly, the introduction of remote-controlled RSPs (render safe procedures) based on the use of the 'wheelbarrow', which is a small remote controlled caterpillar-tracked vehicle, has reduced the need for a manual approach to the IED. Manual approaches still have to be employed when, for example, the terrain prohibits the use of the 'wheelbarrow'. Thirdly, the number of incidents has been declining over the past few years.

In broad perspective, and given the huge number of incidents that have been dealt with, it must be emphasised that the Army's selection and training procedures, and its operational record, have been unusually successful. This success has been achieved without any positive selection of soldiers according to their suitability for work. Negative selection has operated in a variety of ways

in that the Army does not attract, retain or promote obviously unsoldierly individuals. Some soldiers are also rejected as unsuitable for bomb-disposal duties at a later stage. However, all members of the Royal Army Ordnance Corps with the rank of sergeant or above (in the case of non-commissioned ranks) and captain and above (in the case of officers) are considered eligible for bomb-disposal duties. Officers receive seven months training at the Royal Military College of Science plus specialised instruction at the Army School of Ammunition. Basic training for the private soldiers lasts nine months, when they become junior corporals. After a minimum of three years further experience, they may be promoted to sergeant and become eligible for IED disposal duties. It must be emphasised that IED disposal is only a small part of the work of a soldier in the RAOC. Up to 1970, only volunteers were employed in Northern Ireland to deal with the increasing level of terrorist bombing. It was then decided to screen all members of the RAOC of the appropriate rank and to request the suitable candidates to volunteer for these duties. There is a general acceptance of the notion that IED disposal is a necessary though small part of the role of the AT (ammunition technician) or ATO (ammunition technical officer) and all ATs and ATOs expect to take their turn, on the understanding that their colleagues will do likewise. Thus, an unwillingness to volunteer on the part of an AT or ATO who was considered suitable, would receive general disapproval, and in practice, it might result in a transfer to another branch of the Army on lower pay.

The selection process consists of the administration of psychometric tests, the results of which are considered in conjunction with an interview conducted by an Army psychiatrist. Several months, or even more than a year later, the selected soldiers attend an intensive three-week long training in IED disposal which combines theoretical instruction and simulations of actual incidents. If the AT or ATO fails the course, he usually repeats it. Courses are also repeated for the purpose of updating the operator on new techniques.

Posting to Northern Ireland usually follows within a matter of weeks, where the operator joins a team of 1 officer, 1 warrant officer, 1 sergeant and 1 driver. Members of the team are replaced every four months on a rotational basis. At any one time, there are 14 operators on duty in Northern Ireland, dispersed in teams at different localities in the Province. Operators are not accompanied by their wives or family during the four month tour, and opportunities for leisure and recreational activity are limited. Operators are essentially on duty twenty-four hours per day, although the eight-hour rest period is normally inviolate. At other times, they are either on immediate call, responding to incidents as they are reported, or on stand-by, responding only if the immediate call operator is working on a job. Incidents are of three types:- (1) genuine, i.e. known to involve an explosive device, (2) hoaxes, i.e. an incident is set up to appear as a genuine IED so that Army personnel are deployed unnecessarily or expose themselves to other hazards, (3) false-alarms, i.e. the incident turns out to be innocuous. All calls are, of course, treated as genuine until proved otherwise. Operators have one four-day rest and relaxation break midway through the tour.

It is now common for operators to be sent for two tours of duty during the course of their Army career, and a third tour is also a possibility.

First, the information already gathered on 218 operators who had completed a tour of duty was analysed.

RESULTS

The relationship between psychiatric screening grades, personality, pre-operation course grades, and performance in Northern Ireland as measured by officers' reports

Previous researches into the pre-tour characteristics of 'good' and 'not-so-good' operators have suffered from methodological weaknesses, and it was hoped that the present study would remedy this situation. Mead and Stewart (1975) had studied 20 'successful' bomb-disposal operators and 20 drawn at random from the files and compared their personality profiles as revealed by tests completed at the selection procedure prior to the special pre-operational training course in IED disposal. The test results of the two groups were very similar, but it must be noted that the 'successful' operators were selected by one person by a process which is not made very clear, and the comparison with a randomly selected group of operators would attenuate any differences that might be present. An unpublished study by Thompson compared operators who received a low performance rating from two senior officers with those who received a low rating from only one of the officers. Good operators appear not to have been considered. These two groups had done equally well on their preoperational course, but there was a suggestion that the poorer operators had received lower psychiatric ratings at selection, though numbers were small.

Stimulated by the Thompson findings, we conducted a fuller analysis of British bomb-disposal officers serving four month tours in Northern Ireland between 1974 and 1977, a period when disposal techniques and end-of-tour reporting by senior officers were fairly standard. The number of terrorist explosive devices detected was high, though fluctuating, over this period; operators assigned to HQ were not included in the study.

A two-thirds random sample of all ATs (Final N=52) was drawn from the files, for whom psychiatric ratings and personality test data (taken at selection) and end-of-tour reports were available, which was the vast majority. The end-of-tour reports (i.e. global evaluative ratings of overall performance made by senior officers in Northern Ireland in fairly close contact with the AT) were read independently by two experienced officers in England, after all personal identifying information had been deleted from the reports. The reports were categorized according to a five point scale shown below, which was collapsed into a three point scale as the extreme categories were rarely used.

<u>Grade</u>		<u>No. of operators</u>
1	More than one outstanding quality	0 (0%)
2	One outstanding quality	15 (29%)
3	Average	26 (50%)
4	One negative quality	9 (17%)
5	More than one negative quality	2 (4%)

There was complete agreement on 65% of the ratings and the remainder were 1 point disagreements, i.e. there was no overlap between the above and below average group. Discrepancies of one category were resolved by mutual agreement between the two raters. It should be

emphasized that virtually all operators performed well or at least adequately in Northern Ireland. Below average refers here only to the overall standard of operators, not to an absolute standard of proficiency. They will therefore be described as low average.

The results shown in Table 1 do not indicate reliable differences between the three groups of operators according to chi-square tests of statistical significance. The operators, whether rated above or below average, were of a similar age and rank and had achieved similar preoperational course grades and psychiatric ratings. There is a slight tendency for the above average operators to have received higher preoperational course grades, but a higher proportion of them had been required to repeat their courses.

The distribution of psychiatric ratings is slightly different in this sample from that reported by Col. Thompson for 127 ATs interviewed between 1972 and 1976. In the present sample, the proportion of ATs about whom there was some doubt is double that found in the above sample (60% versus 31%).

In connection with this difference it should be pointed out that (1) not all of the present sample were interviewed by Col. Thompson and criteria varied slightly at different times, (2) there would be a natural tendency to err on the side of caution when selecting a man for a dangerous assignment, and (3) the higher proportion of doubtful candidates should bring out rather than conceal any relationship between psychiatric rating and performance during the tour.

TABLE 1

FREQUENCY OF RATING IN END-OF-TOUR REPORTS IN RELATION TO PREDICTOR VARIABLES

RATING	RANK		AGE
	WO1 / WO2	SSGT / SGT	
Above	6	9	31.7 yrs
Average	8	18	30.9 "
Below	3	8	30.6 "

RATING	AREA OF TASK ASSIGNMENTS			
	Belfast	Londonderry	Lurgan	Other
Above	6	0	5	4
Average	10	8	7	1
Below	1	5	3	1

RATING	No. of PRE-OP COURSES ATTENDED			NO. REFERRED (Required to Repeat)
	1	2	3	
Above	8	6	1	4
Average	14	11	1	6
Below	6	5	0	2

RATING	PRE-OP COURSE GRADE	
	1.0 → 2.4 (Good Pass)	2.4 → 3.0 (Pass)
Above	10 (66%)	5 (33%)
Average	11 (42%)	15 (58%)
Below	5 (45%)	6 (55%)

RATING	PSYCHIATRIC RATING *			
	1	2	3	4
Above	4	1	8	2
Average	3	9	13	1
Below	2	2	7	0

* N.B. Abbreviated from Thompson

- 1 = Entirely satisfactory: No reservations (A)
- 2 = Satisfactory : minor reservations (B+)
- 3 = Considerable doubt about suitability (B-)
- 4 = Unsuitable : Flaws in personality or stability (C)

The only other point to note here is that fewer of the low-average group had originally been sent to work in Belfast. This might indicate a non-random allocation of operators according to an intuitive preoperational assessment of their ability, and this would be consistent with the practice of matching operators, to some degree, to their area of assignment.

Personality Test Results and Performance Rating

Table 2 shows the average scores on the 16 personality scales of the Cattell 16 PF scale and on the 12 (CAQ) pathology scales of the Clinical Analysis Questionnaire (CAQ). In personality, the ATS are close to the population norms (mean of 5-6) on most scales. On two scales, the above-average operators stand out above the rest and differ significantly from the low-average operators. These scales are Tough-minded - Tender-minded ($t = 2.59$ $p < .05$) and Forthright-Shrewd ($t = 4.06$ $p < .01$). Successful operators were more tough-minded and forthright. The interpretation of these scales, provided by Cattell, is given in Appendix 2.

On the CAQ, all three groups score as being stable (non-anxious and non-psychotic) individuals and there are no differences between the groups. Anecdotal evidence suggests that the majority of candidates at selection want 'to pass' the psychometric tests and there must be a strong tendency to 'fake good' their answers. Also, the questions relating to anxiety concern the feelings generated by prolonged stress, conflict or unhappiness. They do not generally refer to anxiety experienced in threatening or dangerous situations, which is of a more specific and possibly unrelated type.

TABLE 2

PSYCHOMETRIC TEST RESULTS IN RELATION TO END-OF-TOUR REPORT RATING

16 P.P. PERSONALITY SCALE

N	RATING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
14	Above	4.4	6.9	5.6	6.9	6.0	6.4	6.5	3.4*	4.3	5.3	3.5**	4.1	5.1	4.3	5.6	4.1
26	Average	5.0	7.5	5.8	5.8	6.2	6.1	5.7	4.8	4.4	6.3	5.2	4.5	5.3	4.9	6.2	4.5
11	Below	5.9	7.5	5.9	6.2	6.0	5.7	5.0	4.9	4.6	5.5	5.6	4.5	4.3	4.5	6.9	4.0

CLINICAL ANALYSIS QUESTIONNAIRE

N	RATING	1	2	3	4	5	6	7	8	9	10	11	12
14	Above	3.2	2.6	4.9	3.9	2.4	4.1	4.3	4.7	6.2	3.1	4.1	3.6
26	Average	2.8	2.6	4.8	4.3	2.5	4.2	4.1	3.2	5.7	3.0	4.4	3.7
11	Below	2.7	2.8	4.5	4.2	2.7	4.1	4.3	4.0	6.2	3.2	4.4	3.5

* $p < .05$ (above versus below gpa., 2 tailed t-test)** $p < .01$

Rejected Candidates

The aim of looking at the psychometric test results of rejected candidates was to ascertain whether rejected candidates were distinguishable from the accepted candidates on the basis of the tests alone. The usual procedure at screening is for the psychiatrist to use the test results (available as a thumb-nail personality sketch) in combination with his interviews, to reach a decision, expressed as a grade on a four point scale (see Table 1). Officers are screened prior to their one year ammunitions course, and any unsuitable candidates are rejected at this stage. In the case of NCOs, it is considered that, being younger, their personalities are more likely to show major changes over the years, and so their psychiatric screening takes place approximately one year after the completion of their general ammunition training. NCOs only are considered here. Between April 1974 and December 1977, only 25 NCOs were rejected out of several hundred interviews which were conducted (precise numbers were difficult to compute). The psychiatric decision is not an absolute bar to receiving a tour assignment; in some cases, a second screening is suggested, and in others, the decision is overruled because of other considerations. In fact, seven of the twenty-five rejected candidates were later accepted, and so the remainder constitute a small, and presumably atypical, group. Table 3 shows that on psychometric tests at least they are almost indistinguishable from the operators who are selected. One scale shows a significant difference -- Suicidal Disgust, which Cattell defines as "disgusted with life, harbouring thoughts or acts of self-destruction". It must be emphasized that

TABLE 3

PSYCHOMETRIC TEST SCORES OF CANDIDATES ACCEPTED, REJECTED, OR REJECTED AND LATER ACCEPTED (REJ/ACC) AT THE PSYCHOMETRIC SCREENING INTERVIEW

16 P F PERSONALITY SCALE

N	RATING	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
51	Accepted	5.0	7.3	5.8	6.2	6.0	6.1	5.8	4.4	4.4	5.8	5.0	4.4	5.0	4.7	6.2	4.3
15	Rejected	4.1	7.5	6.5	6.0	6.1	5.8	5.5	4.2	4.5	6.0	4.6	4.3	5.9	5.7	6.4	4.1
6	Rej./Acc.	5.3	5.3	4.7	5.5	5.8	5.5	5.3	5.3	3.8	5.2	4.7	5.7	4.7	3.8	5.2	4.5

CLINICAL ANALYSIS QUESTIONNAIRE

N	RATING	1	2	3	4	5	6	7	8	9	10	11	12
51	Accepted	2.9	2.7*	4.8	4.2	2.6	4.1	4.2	3.8	5.9	3.0	4.3	3.6
15	Rejected	3.0	4.1	4.8	4.5	2.9	3.9	5.1	4.4	6.1	3.7	4.5	4.1
6	Rej./Acc.	4.5	4.8	4.3	4.3	4.3	5.0	4.8	6.3	6.0	4.8	5.2	5.2

p < .05 (accepted versus all rejected, 2 tailed t-test)

the average score of the rejected candidates is still below the mean of the standardization sample, i.e. they would generally be classed as being contented with life with no death wishes, but, relatively speaking, they are less content than the accepted candidates.

Other Predictors of Proficiency (Col. Thompson's Data)

Along with the questionnaires obtained from 218 operators, Col. Thompson had obtained ratings on the proficiency of a subsample of 104 operators. These were carefully assessed on 5 point scales for various attributes, but as the average rating was high (typically, only 3 out of the 5 points were used), the rating system was replaced by a 100 mm line without intermediate anchor points to define the level of proficiency. Of the 104 operators, 37 were categorized as average, 36 as above average and 14 below average, and in 17 cases it was not possible to judge proficiency. Because the general standard of ratings was high, the below-average group will hereafter be referred to as low-average. The answers to the questionnaire of this subsample of operators had already been analysed by Col. Thompson, and a brief description of the results follows.

The questions were grouped under 6 headings: (1) personal background (including reasons for volunteering, attitudes to the IED disposal aspects of the work, etc.), (2) Pre-tour background (including attitudes to going to Northern Ireland, attitudes to training and the presence of pre-tour stresses, or problems), (3) Tour in Northern Ireland (including anxiety, self-evaluation of performance, personal problems, etc.), (4) Medical (including use of tobacco and alcohol, psychosomatic symptoms, etc.), (5) IED work (including

effects of working on a device, attitude to risk, factors associated with making errors of judgment, etc.), (6) After-tour (including effects on self-confidence, psychosomatic symptoms, etc.).

In addition, there was a section for the wife of the operator to complete dealing with her ability to cope with the stress, psychosomatic symptoms, and the perceived affect of the tour on her husband and their marriage.

The operator's rank, age, tour dates and task load in NI, psychiatric history, psychiatric grades at screening, pre-operational course result (pass/fail), and base on tour were also available. Only a small minority of operators had a history of psychiatric consultation, and, unfortunately, psychiatric screening grades were not available for the majority of the operators.

The pattern of responses to over 100 questions was compared for the three levels of proficiency (above-average, average, and low-average) by means of the chi-square test.

With a few exceptions, all these tests proved non-significant. Thus, the proportion of above-average operators who had failed a course, or attended more than one course (possibly referred) was 38%, and for low-average operators, 33%. The relationship between psychiatric ratings and proficiency could not be properly assessed, because numbers were too small.

The lack of significant findings in these data could be attributed in part to the small number of low-average operators (n=14) who were not below average in an "absolute" sense.

The only significant finding to emerge was a relationship between proficiency-ratings and the effect of the tour on the marriage.

Ninety per cent of the low-average operators and all of their wives

reported that the marriage had either improved or deteriorated as a result of the tour. The comparable figures for above-average operators were 48% (husbands) and 30% (wives), and for average operators 32% (husbands) and 56% (wives). This unexpected finding will be examined in more detail later.

Soldiers who received decorations

A list of all soldiers in the RAOC who had received decorations in Northern Ireland was obtained, and psychometric data were collated on the subsample of soldiers decorated between 1973 and 1978. All tests had been conducted prior to the award being received. The following groups, of which there was a sufficiently large sample, were considered:-

- (1) George Medal (n=8, 2 officers, 6 NCOs)
- (2) Queens Gallantry Medal (n=20, 4 officers, 16 NCOs)
- (3) British Empire Medal (Gallantry), (n=9, all NCOs)

The 16 PF and CAQ group averages for all decorated soldiers, the George Medallists, and for the random sample (non-decorated) are shown in Table 4.

The George Medallists were considered separately, because this was the highest award considered and because the group averages appeared to differ for these soldiers on a rough eye inspection.

All decorated soldiers versus the random sample

The difference between the group means on Factor 13 of the Cattell Scale (Q_1 , Conservative-experimenting), just falls short of statistical significance ($t = 1.98$, $p < .10$) with the decorated soldiers describing themselves as more experimenting (5.95 vs 5.00, sten scores).

TABLE 4

PSYCHOMETRIC TEST RESULTS OF SOLIERS AWARDED MILITARY DECORATIONS COMPARED WITH
A NON-DECORATED RANDOM SAMPLE

CATTELL 16 PF

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
51	5.0	7.3	5.8	6.2	6.1	6.1	5.7	4.4	4.4	5.8	5.0	4.4	5.0	4.7	6.2	4.3
37	5.5	7.4	6.0	6.7	6.5	6.4	6.4	4.6	4.9	6.2	4.9	4.4	5.0	5.0	6.5	4.7
8	5.9	7.3	6.3	6.6	7.2	6.6	6.9	4.6	4.7	6.3	4.3	3.1	5.6	4.5	6.6	4.1

CLINICAL ANALYSIS QUESTIONNAIRE

n	1	2	3	4	5	6	7	8	9	10	11	12
51	2.9	2.6	4.8	4.2	2.5	4.1	4.2	3.8	5.9	3.0	4.3	3.6
37	2.1*	2.6	4.7	3.8	2.7	3.9	3.9	3.8	5.9	3.3	4.1	3.5
8	1.3**	2.0	5.5	2.4**	1.6	3.4	2.6*	2.5	6.5	2.7	3.6	3.1

* $p < .05$ (decorated versus random sample, 2 tailed t-test)

** $p < .01$

On the CAQ, the decorated soldiers are significantly less hypochondriacal (2.05 vs 2.90 sten scores, $t = 2.06$, $p < .05$).

George Medallists versus random sample

On the 16 PF the George Medallists tend to be more happy-go-lucky (Factor 5) more venturesome (Factor 7) and less apprehensive (Scale 12) but these differences do not attain a satisfactory level of statistical significance. However, the difference on the hypochondriasis scale of the CAQ is even more marked on this sample (1.3 vs 2.9, sten scores, $t = 2.39$ $p < .05$). Seven out of the 8 George Medallists scored 1 on this scale — the lowest possible score, and it will be noted that the average of the random sample is itself very low. The George Medallists also obtain significantly lower scores on factors 4 and 7 of the CAQ (Anxious Depression and Bored Depression) 2.4 vs 4.2, $t = 2.85$, $p < .01$, and 2.6 vs 4.2, $t = 2.44$, $p < .05$). To sum up the descriptions of these scales (see Appendix 2), the George Madallists are happy, clear thinking, not concerned with bodily functions or health, calm in emergency, confident, not tense or easily upset, relaxed, considerate and involved with other people.

This exceptional group of soldiers is being contrasted with a sample of officers and NCOs who score in the normal range or well below it on all the clinical scales of the CAQ. They are, therefore, very stable according to their personality test results. Unfortunately, British norms for the scale are not available, and so the comparison with the standardization sample is less valid than the comparisons made between the various groups of soldiers.

Conclusion

The aim of the research described above has been to relate the personal characteristics of an operator to his performance on tour in Northern Ireland, as reported by superior officers. The most obvious constraint on detecting a relationship of this kind is the fact that the requirement of the rank of sergeant or captain for the work is likely to exclude unsuitable operators in the first place. In fact, very few operators (less than 5%) fail to perform at a satisfactory level in Northern Ireland. Personality tests show the operators to have normal and particularly stable personalities. Those few soldiers who are incompetent or inadequate are likely to have been weeded out long before they present themselves for selection, even though all ATOs and ATs of the appropriate rank are considered eligible for the work. This is borne out by the low rejection rate and the more or less identical psychometric test results of the accepted and rejected candidates.

What is surprising is the considerable doubt expressed by the screening psychiatrists about the suitability of over half the candidates, although it is understandable that they must err on the side of caution if any inadequacy, or its merest indication, is intuited. Results of the psychometric tests suggest that a lack of zest for life (or even a self-destructive tendency) is one dimension to which the psychiatrist is alerted. Whether this concern is justified cannot be determined from the data available. The absence of a marked lack of proficiency in any of the operators is confirmed by Col. Thompson's inability to obtain low ratings from senior officers when they were required to grade the performance of operators.

The data which have been collected are more likely to be useful in differentiating the excellent from the average operator, assuming that careful attention to selection and training, together with natural wastage, has excluded the lower end of the performance distribution.

The two methods used to categorise the operators in the present research have yielded different findings. The use of end-of-tour reports (or officers' ratings in Col. Thompson's study) as a measure of proficiency revealed some minor differences in personality of the above and low-average rated operators, but in terms of preoperational courses, and psychiatric screening grades, the two groups are very similar. There is a tendency for the above-average operators to have slightly better preoperational course grades. The personality scales which differentiate the above- and low-average group are not the scales which differentiate the operators who have received awards for gallantry from those who have not. It is possible that those personality traits which relate to end-of-tour reports (forthrightness and tough-mindedness) are simply the ones that are generally considered to be characteristic of good soldiers rather than good or courageous operators. The personality characteristics of the decorated soldiers (especially the George Medallists) on the other hand may be more pertinent to the expression of courage under difficult and dangerous conditions. These exceptional soldiers are particularly calm and clear-thinking and not concerned with their bodily reactions. (See Appendix 5 for hypochondriasis items). They are likely to be task-orientated and efficient. It is tempting to conclude that the possession of the converse qualities would predispose an operator to commit more errors, but this would be an unwarranted extension of the findings, though worthy of further investigation.

Performance Ratings and Questionnaire Items Relating to Marriage

As noted above, the only section of Col. Thompson's Questionnaire which appeared to differentiate the operators who were rated as performing less well concerned the effect of the tour in Northern Ireland on their marriages. Of these 14 operators, two were single and one divorced, leaving 11 operators for consideration. Operators normally see their wives only once during the 3-day mid-tour rest and relaxation break. Ten out of 11 husbands and 11/11 wives reported an effect on the marriage (good or bad), whereas in the remainder of the sample, approximately 40% of husbands and wives reported changes. Table 5 shows these changes in more detail, and compares them with the changes reported by 11 other operators (average or above on Thompson's ratings), drawn at random, except for matching of the date of tour in Northern Ireland. Numbers are small, and so only a descriptive analysis will be given. In summary:

- a) None of the random sample had permanent marital difficulties after the tour, but two husbands and two wives in the below-average group reported this, and two other wives left this part of the questionnaires blank. There was also one case of inconsistency in the direction of change reported by man and wife. One couple had divorced at some time after the tour.
- b) Two operators in the 'low-average' group reported marital problems during the 12 months prior to the tour, and one of them checked this item as a continuing problem during the tour itself, and as having a marked effect on his efficiency.
- c) Six out of 11 'low-average' operators checked off other personal problems (mean number of problems 2.5) in the 12 months prior to the tour compared with 4 out of 11 of the random sample (mean 1.75 problems).

TABLE 5

REPLIES TO QUESTIONS CONCERNING THE MARRIAGE ON COL. THOMPSON'S QUESTIONNAIRE: LOW-AVERAGE OPERATORS AND A COMPARISON SAMPLE

LOW AVERAGE OPERATORS N = 11				RANDOM SAMPLE N = 11			
No. 27	EFFECT : HUSBAND ; WIFE*		WIFE'S COPING ; DOCTOR	No. 01	EFFECT : HUSBAND ; WIFE ; COPING ; DOCTOR		WIFE'S COPING ; DOCTOR
	NONE	↓			↑	NONE	
31	↓ ↓	—	—	36	↑	↑	NO
38	↓ ↓	↓ ↓	—	44	↓	↓	YES
63	↓	↓	NO	59	↑	↑	NO
64	↑	↑	YES	91	NONE	NONE	NO
68	↑	↑	Some diff.	98	↓	↓	NO
116	↓	↓	YES	121	NONE	NONE	NO
124	↑	↑	YES	128	NONE	↑	NO
125	↓	—	—	171	NONE	↓	NO
175	↑	↑	YES	211	↑	↑	NO
247	↑	↓ ↓	some diff.	246	NONE	↑	NO

* the wording of the question differed slightly for husband and wife

↑ = improvement

↓ = temporary deterioration (husband) or difficulties (wife)

↓ ↓ = permanent deterioration (husband) or continuing difficulties (wife)

d) Only one wife in the random sample reported some difficulty in coping during the husband's tour. In the low-average group, two wives had some difficulty, one coped only with the help of friends and relatives, and three left this question blank. However, the number of wives reporting nervous symptoms during the husband's absence was similar for the two groups and on average, more than 2 symptoms were reported by the majority of wives (e.g. difficulty sleeping, irritability, tense and depressed). Three out of six wives in the low-average group (remaining wives did not respond) consulted a doctor or specialist on this account, but only one of 11 did so in the random sample.

In conclusion, there is suggestive evidence that problems within the marriage during the tour of duty in Northern Ireland are reflected in the rating of performance the operator receives from his senior officers. There are several possible explanations for this:

1. The type of operator who has marital problems may be a less efficient operator or have fewer desirable qualities in the eyes of his senior officers.
2. Marital problems during the tour affect an operator's efficiency regardless of his previous personality or "normal" efficiency. As a sub-hypothesis, it might be suggested that wives who have difficulty in coping with stress pose an additional burden on the operator.

These ideas are speculative, but the data on which they are based provide the only clues as to why an operator's performance is rated sub-optimally.

Patterns of Response on Col. Thompson's Questionnaire

The purpose of looking at patterns of response on the questionnaire was to simplify the interpretation of the results which in raw form provide only a mass of frequencies. Thirty-four variables were selected from 82 numerically coded questions some of which were multiple choice questions. Some multiple choice questions were simplified as, for example, not applicable versus any other response, while other multiple choices were treated as a collection of Yes/No variables, even though respondents were only instructed to check those alternatives which applied to them and not to give a categorical Yes/No response for each alternative.

The questions selected from the Questionnaire reflected the present author's interest in reports of stress, attitudes to risk, admission of weaknesses or errors as an operator, and the effect of the tour on personality and behaviour. In addition, the operator's rank, age, date of tour, number of sports interests and previous IED experience, were included as variables; a complete list of variables and significant correlations between them appears in Table 6.

The correlation matrix was factor analysed to produce a set of simpler dimensions (Promax method, Hendrickson and White, 1964). The total number of subjects in the analysis was 208, as 10 with incomplete data were dropped. The loadings of variables on three second order factors are shown in Table 7.

The factor analysis reveals three discernible patterns of response in the questionnaire answers to selected questions. This does not mean that there are three types of operator, but only that the

TABLE 6

29a.

	CORRELATED VARIABLES		$r = > .20$ $p < .05$
	$r = > .23$	$p < .01$	
1. Rank			27(+.20)
2. Age	27(-.34), 24(+.25)	26(-.26)	25(-.21), 34(-.20)
3. Tour date	12(+.24)		9(+.21) 10(-.21)
4. Previous IED experience			
5. Total number of problems/stresses 12 months prior to tour	6 (+.50), 33(+.26)		10(+.22)
6. Ditto during tour	7 (+.33)		22(+.22)
7. Total number of stress symptoms during tour	23(+.23) 25(+.23) 27(+.26) 32(+.29)		20(-.23) 22(+.22), 33(+.22)
8. Anxiety waiting for a call	9(+.23)		
9. Anxiety working on a device	10(-.33)		
10. Total number of stress symptoms working on a device	13(-.25)		19(+.20)
11. Risk attitude (RA) reliance on good luck			14(+.20)
12. RA - reliance on training			
13. RA - reliance on skill			14(-.22) 22(-.21)
14. RA - reliance on God			34(+.21)
15. RA - No danger exists		18 (+.125)	
16. RA - working for just cause			
17. RA - Team spirit			
18. RA - Couldn't happen to me			
19. RA - fear of showing anxiety			
20. Admission of errors (dangerous)		21(-.41)	22(-.21)
21. Total no. of types of error of procedure		22(+.40)	
22. Total no. of stylistic weaknesses as operator			
23. Feeling of doom			
24. Post-tour effect (PTE) - No change	25(-.31) 26(-.57) 27(-.26)		28(-.20) 31(-.21)
25. PTE - more mature	32(-.23) 33(-.24)		
26. PTE - more self-confident	26(+.34) 27(+.31)		
27. PTE - better soldier	27(+.28) 31(+.20) 32(+.24)		
28. PTE - more cynical	32(+.22)		
29. PTE - more critical	29(+.28) 30(+.25)		
30. PTE - less satisfied			
31. Feeling of let down	32(+.30)		33 (+.22)
32. Total no. of personality changes in first month	33(+.54)		
33. Total number of personality changes months 2-6			
34. No. of sports interests			

CORRELATIONS BETWEEN SELECTED VARIABLES IN COLONEL THOMPSON'S QUESTIONNAIRE

TABLE 7

Three second order factors and their loadings (35 variables from Colonel Thompson's Questionnaire)

FACTOR ONE

Variable	Loading	Label
32	+ .61	Change in personality/behaviour first month after tour
25	+ .57	More mature and contented since tour
26	+ .56	Increased self-confidence and self-respect since tour
33	+ .53	Change in personality/behaviour months 2-6 after tour
34	+ .49	Number of sports interests
27	+ .42	A better soldier since tour
7	+ .42	Stress symptoms during tour
6	+ .38	Problems and stresses during tour
31	+ .39	Feeling of 'let-down' after tour
24	- .49	Tour has <u>not</u> changed me as a person

FACTOR TWO

10	+ .48	Stress symptoms working on device
22	+ .48	Stylistic weaknesses as an operator
21	+ .44	Number of errors of procedure
7	+ .41	Stress symptoms during tour
23	+ .37	Feeling of doom starting a job
8	- .40	(No) anxiety waiting for a call
13	- .56	RA - reliance on skill and confidence
9	- .62	(No) anxiety working on device

FACTOR THREE

29	+ .48	More intolerant and critical since tour
28	+ .38	More cynical and disillusioned since tour
15	+ .37	RA - No danger exists
12	- .48	RA - (No) reliance on IED training
3	- .51	Tour date

variation in the responses can be accounted for largely by three dimensions of evaluation which each operator uses to a greater or lesser extent. The first dimension seems to refer to the impact of the tour on personality and behaviour. The variables which indicate there has been change in the personality (greater maturity and confidence) as well as stress during the tour and afterwards have high loadings on this dimension. The stress items are concerned with general problems and not explicitly with the stress associated with danger, i.e. it is likely we are dealing with the stress of 'challenge' as suggested by variable 31 ("sense of let-down" after the tour), and variable 27 (a better soldier since the tour). The second factor is explicitly concerned with the operator's evaluation of his own competence when working on a device, his stress symptoms and anxiety in this situation and his method of coping with the risks. The dimension seems to divide operators into those who say they have little or no anxiety and rely on their skill and confidence versus those who think they are vulnerable and may fail to follow standard operating procedures and sometimes experience a feeling of doom starting a job. They experience situational stress symptoms and report anxiety.

The third factor is a dimension of evaluation which is related to the time period in which the operator served his tour of duty in Northern Ireland. Thus, earlier in the campaign, bombings were more widespread, the work more dangerous, and the disposal techniques less sophisticated. In association with an earlier tour date, we see more intolerance, cynicism, and criticism expressed. An attitude of 'pretending no danger exists' and lack of reliance on IED training also contribute to this dimension. Overall, the factors

extracted can be interpreted to mean:

1) that the tour represents a challenging and demanding experience to some operators and not to others. If the former, stress symptoms were commonly experienced for more than a few days during the tour (e.g. poor sleep, butterflies in stomach, irritability) and more concern was expressed about problems of a general kind (career, difficulties with colleagues, illness in family, etc.). Following the tour, the operators in the former category are more likely to experience a 'let-down' effect and less likely to say that there has been no change in their personality. In fact, they are likely to report greater maturity, confidence and to reckon that they are better soldiers. However, in association with these attitudinal changes, there is an increase in restlessness, irritability, and nervous and depressive symptoms, lasting up to six months, and possibly longer in some cases. Frequency of post-tour effects is shown in Appendix 4.

It is rather surprising that rank, age, and previous IED experience are not associated with this factor. However, rank is not directly related to military experience except within officer and non-commissioned ranks. From the correlation matrix (Table 7), we see that the lower ranks are more likely to say they have become better soldiers (VI and V27, $r = +.20$). Older operators are less likely to say that the tour has changed them or that they have become better soldiers (V2 and V27, $r = -.34$, V2 and V24, $r = +.25$).

As for previous IED experience, 44% of operators had had at least some experience in a variety of countries, but only 3% had worked as a No.2 operator (assistant to the operator) in Northern Ireland prior to their first tour. It seems likely that the challenge of a tour and its impact on the personality is likely to be far less

the second time round but there may have been too few operators experienced in a Northern Ireland setting to bring out an association between previous experience and Factor 1.

- 2) It can be inferred from Factor 2 of the analysis that the experience of stress and anxiety when working on a device is associated with the operator's awareness that he might be working too quickly, cutting corners or have a tendency to deviate from standard operating procedures. At the other pole of this dimension is the operator who does not admit personal weaknesses as an operator, relies on his skill and self-confidence, and does not experience anxiety when working on a device. The anxious operator is probably more aware of the risk, and may report feelings of doom prior to taking on a job. In drawing these inferences from the results, it has to be remembered that the dimension being considered here is an attitudinal one, which may bear little relationship to actual performance during the task. One might make the prediction that operators at either extreme (over-confident or under-confident) would make more errors of judgment.
- 3) From the third factor, it can be inferred that a critical and cynical attitude can be induced by the tour if the operator does not rely on his training and he may pretend that no danger attaches to a job. The fact that an early tour date in the campaign is associated with these attitudes implies that the attitudes may have had some basis in fact (i.e. that training was not adequate in some instances early on in the campaign).

Factor scores and proficiency ratings

The rating of an operator's proficiency was available for a subsample of the total group, and it could be compared with his factor score on each of three factors derived from the factor analysis, i.e. the factor score is a measure of the extent to which an individual falls at one or the other poles of the attitudinal dimension measured by the factor. Table 8 shows the results of this comparison; the differences between the groups are not statistically significant. The mean for the low-average group on Factor 2 is inflated by the scores of two operators who received the highest scores on this factor in the subsample (indicating high stress and admission of anxiety).

To summarise, the operator's description of his attitudes to the tour and its effect on him is not associated with the rating of his proficiency made by superior officers. This applies only to a selection of the responses to the questionnaire, but is consistent with the general lack of significant relationships reported earlier.

A further analysis, which will not be described in detail here, failed to establish a relationship between factor scores and the task load of the operator during his four month tour.

TABLE 8

MEAN FACTOR SCORES AND PROFICIENCY RATINGS

PROFICIENCY	FACTOR 1	FACTOR 2	FACTOR 3	n
Above average	-1.22	-1.66	+ .52	36
Average	-18.40	-3.62	-39.29	37
Low average	+ 2.42	+45.28	+10.00	14

Skill and Willingness

To assess skill and willingness, 25 ATs and ATOs were interviewed at the selection phases prior to attending the three week IED training course, and 11 had been interviewed at the end of the course. Unfortunately, these are not the same soldiers because of the time that elapses between selection and course attendance. It was not possible to interview soldiers at the beginning of the course, because of the tight scheduling of the training programme. Results on the following aspects of the attitudinal and rating measures are summarized below.

The scales used for assessing the operator's skill in dealing with, and willingness to undertake, seven IED tasks is shown in Appendix 3. For the purpose of this report, operators are described either as skilled or unskilled, i.e. achieving a mean score greater or less than 60 ("skills are just about adequate"), and as willing or reluctant, i.e. achieving a mean score greater or less than 60, ("would accept with slight reluctance").

Prior to IED training, all novices (soldiers who have not worked previously as a No. 1 or No.2 operator in Northern Ireland) rate themselves as unskilled, whereas the majority (13 veterans) rate themselves as skilled. After the course, all soldiers rate themselves as skilled.

In terms of willingness, 44% of the veterans were reluctant before training, and 22% after training. In the novices, willingness is highly related to skill: only one untrained novice was willing to undertake IED disposal, whereas 8 were willing after training.

These results show in a crude way that training is achieving its objectives. It might be profitable to pursue the phenomenon of discordance between skill and willingness as a potentially useful aid to selection, i.e. to follow up the performance of soldiers who are willing to do IED disposal even when they describe themselves as unskilled, and, conversely, to study the skilled but reluctant operators.

Attitude to Risk

It has been possible to categorise soldiers into three groups according to their attitudes to bomb-disposal duties and to the prospects of going on a tour, i.e. (1) soldiers who tend to deny the risks (given adequate training), (2) soldiers who cautiously accept the risks (given adequate training), and (3) soldiers who express considerable apprehension about the magnitude of the risks (despite adequate training). The inter-rater reliability of these judgments still needs to be improved, but the preliminary results do indicate some change of attitude as a function of training and experience.

Apprehensive attitudes are almost entirely confined to untrained novices. Training appears to encourage novices to adopt a cautious acceptance of the risks, whereas actual experience of a tour (as indicated by the attitudes of veterans before or after training) tends to produce a denial attitude. There is also a group of novices with denial attitudes.

There appear to be two main effects of training and experience on actual ratings of the degree of risk attached to specified IED disposal tasks. Training appears to reduce the degree of risk

perceived to be present in the most difficult and dangerous of 7 IED tasks, in both novices and veterans. However, actual experience of a tour (veterans contrasted with novices) seems to diminish the degree of risk perceived to be present in the easiest and least dangerous of 7 IED tasks. These results could be taken to mean that familiarity with bomb-disposal work reduces the perceived risk of jobs frequently encountered. The less commonly encountered difficult task is not seen as any less risky by veterans than by novices, but theoretical and practical instruction reduces the degree of risk which is seen to be attached to this type of task.

PART THREE - PSYCHOLOGICAL EFFECTS OF TRAINING

The theoretical question of greatest interest here is whether or not it is possible to train people to perform courageous acts. The practical importance of assessing the effects of training is self-evident.

Two points are worth noting at the outset. Firstly, over 50% of the trainees were unaware on joining RAOC that bomb-disposal work would be included. Secondly, before starting the training course, the soldiers had very little confidence in their bomb-disposal skills and expressed little willingness to serve in combat conditions.

Terms

The term "experienced operator" is used to describe those soldiers who had served in Northern Ireland as IED disposal operators prior to this study, and "inexperienced operator" refers to a soldier who has had no previous IED experience in Northern Ireland. Within this category, however, there are some soldiers who had served in Northern Ireland previously in some other capacity, usually the Infantry, and reference will be made to this distinction later in this report. In describing the results obtained from these various sub-groups, the following abbreviations will be used:-

- EO is experienced operator
- IO is inexperienced operator
- IO1 is previous non-IED military experience in Northern Ireland
- IO2 is no previous military experience in Northern Ireland

Psychological Effects of Training Course

Information was obtained from 80 soldiers prior to their undertaking a tour of operational duty in Northern Ireland. Of this group, 43 were experienced operators (EO), and 37 were inexperienced operators (IO) - 'experienced' meaning previous combat experience as a bomb-disposal operator.

Skill and Willingness

The soldiers were asked to rate themselves with respect to their skills and their willingness to perform the 7 IED tasks, using a scale ranging from 0 to 100. The 7 tasks were, dealing with:- a suspicious parcel in a post office; land mine in culvert; car bomb in urban area; bomb in petrol tanker; bomb in derelict house, suspect milk churn in country lane; bomb on fifth floor building - See Appendix 8. The means given in Table 1 show the average scale value over the 7 tasks, given separately for each of the 4 sub-samples as well as the total population.

The most significant finding is that the subjects' self-estimation of their own IED skills increases from a pre-course mean of 49.3 to the very high level of 83.6 at the completion of the training course. Similarly, the willingness to carry out the IED tasks increased from a pre-course level of 44.3 to the very high level of 78.2 on completion of the training.

TABLE 1Percentage estimates of skill, pre- and post-training

	<u>PRE-COURSE</u>		<u>POST-COURSE</u>		<u>SIG. CHANGE</u>
	49.5 (n=45)		85.6 (n=35)		.01
EO	70.9 (n=21)	} p=.01	85.5 (n=21)	} N.S.	.01
IO	28.5 (n=22)		80.5 (n=12)		.01
IO	28.5 (n=9)	} N.S.		}	
IO2	27.7 (n=13)				

TABLE 2Percentage Estimates of Willingness,
Pre- and Post-Training

	<u>PRE-COURSE</u>		<u>POST COURSE</u>		<u>SIG CHANGE</u>
	44.3 (n=40)		78.2 (n=35)		.01
EO	66.0 (n=19)	} p=.01	30.2 (n=22)	}	.01
IO	25.0 (n=21)		74.0 (n=15)		.01
IO1	25.7 (n=8)	} N.S.		}	
IO2	25.8 (n=13)				

TABLE 3Estimates of danger, pre- and post-training

	<u>PRE-COURSE</u>		<u>POST-COURSE</u>		<u>SIG. CHANGE</u>
High Danger %	60.0 (N=45)		51.1 (N=33)		.05
Low Danger %	25.9 (N=45)		24.4 (N=33)		N.S.

A comparison between experienced and inexperienced operators showed that, prior to training, there were large and significant differences between the experienced and inexperienced operators both in respect of skill and of willingness. The remarkable success of the training course, shown in Table 1, can be seen from the fact that the low (self-estimated) skills of the inexperienced operators were transformed by the training course into very high levels of self-estimated skill, so that at the end of the training, there no longer was any difference between the experienced and inexperienced operators. To this extent at least, the training course successfully bridges the gap between the experienced and inexperienced operators. Similarly, the willingness to undertake IED tasks showed a significant increase as a result of the training course, and after completion, the initial differences between the inexperienced and experienced operators disappeared (Table 2).

Once again, it is of interest to notice that previous military experience in Northern Ireland appears to have no influence on the operators' self-estimated skill and willingness, unless they have had specific experience of IED work in Northern Ireland. Military experience of other kinds has no detectable influence on their skill or willingness to carry out IED tasks.

We also examined the relationship between self-estimated skill and willingness to carry out the IED tasks. Not surprisingly, it was found that the relationship was highly significant. Prior to entering the training course, the correlation between skill and willingness was 0.87 ($p = < .01$) and after completing the training course, the correlation remained significant ($r = .50$, $p = < .05$).

These increases in self-estimated skill and willingness to perform IED tasks were sustained. As can be seen from Figures 1(a) and 1(b), the increases in skill and willingness that were reported after completing the training course, were still present, indeed even slightly increased, at the mid-point of the operational tour of duty, and still present after completing the tour of duty in Northern Ireland. The sustained changes in self-estimated skills are particularly noteworthy in the inexperienced group of operators. Prior to the training course, they estimated their IED skills at 28.5%, but after completing the training course, their estimates had increased to 80.3. At the mid-point of their tour of operational duty, these previously inexperienced operators estimated their skill to be 92.5% and this figure had scarcely changed by the end of their tour of duty (89.5%). The willingness of inexperienced operators to carry out IED tasks showed a similar pattern, in which the substantial improvements that took place during the training course were sustained throughout the tour of duty. As far as the experienced operators are concerned, their skill and willingness were fairly high prior to completing the training course, but nevertheless, they appear to have benefited. It is tempting to infer from these substantial increases in skill and willingness, and particularly from the fact that they were sustained, that the self-reports given by these soldiers were indeed valid estimates of their skill and willingness. Given their validity, these self-estimates provide remarkable evidence of the enormous benefits conferred by the training course.

16

page 41 (b)

PART THREE- FIG

WILLINGNESS

100%

80

Willingness to

40

20

100%

Willingness to

80

60

INSTR. OPS.

25%

PRE-TRAIN

EXP. OPS.

66%

POST-TRAIN

INSTR. OPS.

OPS. EXP.

OPS.

POST-TRAIN

MID-TOUR

INSTR. OPS.

EXP. OPS.

OPS.

MID-TOUR

POST-TOUR

INSTR. OPS.

OPS. EXP.

OPS.

POST-TOUR

2

Ratings of Danger

The soldiers assessed the degree of danger attached to each of seven bomb-disposal tasks they were likely to encounter during an operational tour in Northern Ireland. Estimates of danger were obtained before and after completing the course. As can be seen from Table 3, there was a significant decrease in the ratings of danger after completing the course; this change in estimation was confined to the task rated as being most dangerous. There was no significant change in the soldiers' ratings of the task to which they attached least danger.

A comparison between the danger ratings made by experienced and inexperienced operators produced no significant differences. It is of particular interest that no significant differences in estimates of danger emerged in the comparison between those soldiers who had had previous military experience (e.g. infantry) in Northern Ireland that did not involve IED work and those soldiers who had no military experience of any kind in Northern Ireland. As can be seen from Table 4, these two groups of soldiers made comparable estimates of the dangers which they were likely to face. This result points to the specificity of the psychological consequences of having experience of IED work. It is not sheer military experience that produces a significant decline in the operator's estimation of the danger of his task, but rather the specific experience of having completed IED work in Northern Ireland.

Mood changes during training

We also took the opportunity of studying the effects of the training course on mood factors. We used a scale comprising six factors: general activation, high activation,

TABLE 4 Percentage Estimates of Danger: Inexperienced Operators
with (IO1) or without prior NI Tour (IO2).

IO1 High Danger	65.7	} N.S.	(n=9)
IO2 High Danger	61.5		
IO1 Low Danger	32.6	} N.S.	(n=9)
IO2 Low Danger	34.1		

TABLE 5 MOOD SCORES OF 19 EXPERIENCED (EO) AND 13 INEXPERIENCED (IO) OPERATORS

	<u>PRE-COURSE</u>	<u>POST COURSE</u>	<u>SIG. CHANGE</u>
EO GEN. ACTIVATION	6.4	7.5	N.S.
IO GEN. ACTIVATION	6.7	6.7	N.S.
EO HIGH ACTIVATION	1.4	2.0	N.S.
IO HIGH ACTIVATION	1.2	3.9	.05
EO DEACTIVATION	5.5	4.1	N.S.
IO DEACTIVATION	5.0	3.3	N.S.
EO DEPRESSION	.8	.4	N.S.
IO DEPRESSION	.6	2.7	.05
EO HOSTILITY	1.3	1.8	N.S.
IO HOSTILITY	1.0	2.6	N.S.

deactivation sleepiness, depression and hostility (See Appendix 9 for details). The results of this study, given separately for the experienced and inexperienced operators, are given in Table 5. As far as the experienced operators are concerned, participation in the course was not accompanied by any significant change in the generally stable mood reported by these soldiers. Among the inexperienced operators, however, there were three significant mood changes observed in the interval between beginning and completing the training course. At the end of the training course, they were significantly more highly activated, less deactivated, and slightly more depressed than they were prior to completing the course.

Conclusion

The training course apparently produced a steep increase in self-estimated skill and in willingness to serve under combat conditions, even though the potential operator's ratings of the danger of IED work remained high.

This combination of psychological effects falls into Rachman's (1978) definition of courage, i.e. persisting in one's performance despite the presence of estimated danger. To this extent, then, we can answer the theoretical question of whether or not it is possible to train people to perform courageously. Yes.

PART FOUR - PERFORMANCE UNDER COMBAT CONDITIONS

In the final analysis, the value of the selection and training procedures must be judged in the light of the operator's performance under combat conditions. Moreover, the theoretical questions of central interest - the nature and determinants of courageous performance - cannot be answered satisfactorily in the absence of information about combat performance. In the present Project, the high level of performance exhibited by the large majority of operators limited the range of the new data.

Study 1

In this first study, we used information on 82 operators, including week-by-week reports of the performance under combat conditions of 23 operators.

The results showed that almost all of the operators performed competently and smoothly throughout their operational tour. Failures, such as the operator whose breakdown is described below, are exceptional. We did, however, find evidence of a transient deterioration in psychological status after loss or serious injuries to members of the unit.

The terms introduced in Part Three are used in this section:-

- EO - Experienced operator
- IO - Inexperienced operator
- IO1 - Previous non-IED military experience in Northern Ireland
- IO2 - No previous experience in Northern Ireland

The information about the operator's performance in combat conditions is based on their weekly diaries, specially constructed questionnaires (see Appendix 10) senior officers' ratings and own interviews carried out in the operational area. The diaries report the weekly activities of each of the operators while in Northern Ireland and are based on a 16-week period, although in some cases, the number of reports obtained from particular soldiers was slightly less than this number.

To begin with, we obtained self-estimates of their overall confidence and of their confidence in their ability to deal with particular IED tasks. After a preliminary analysis, the data from the experienced and inexperienced operators were analysed separately. In Table 1, the weekly scores of self-estimated confidence are given for each group separately. Three points are worth noticing. In the first place, the confidence levels of the experienced operators were remarkably stable throughout their tour of duty. In the final part of their tour, there was a slight decrease in confidence; perhaps this is the so-called "end-of-tour jitters". The self-confidence reported by the inexperienced operators showed a different pattern, marked by quite sharp fluctuations. In the second and third weeks of their tour, they were particularly confident, even over-confident. In fact, during the second week of their tour they were significantly more confident than the experienced operators. However, this excessive confidence began to wane and by the mid-point of their tour, had changed to a slightly negative score that was now significantly lower than the confidence level reported by the experienced operators. During

the second half of the tour, their level of confidence showed less steep fluctuations, and levelled out during the final three weeks.

As far as mood was concerned, the most remarkable finding here was that the experienced operators showed comparatively little fluctuations in the equable and calm mood which was present from the first week (see Figures 1-7). The inexperienced operators showed some slight fluctuations in mood during the course of their duty, but the point of greatest interest emerges from the analysis of the mood ratings provided by the operators when asked to distinguish between their moods on duty and when they were resting. As can be seen from Figure 8, experienced operators reported distinctly different levels of general activation on duty and off duty. The inexperienced operators, on the other hand, showed the same level of activation whether they were on duty or off duty. In simple terms, the experienced operators were able to "switch off" when they were not on duty. The same switching pattern can be seen in respect of other mood measures such as deactivation, sleepiness and high activation. Incidentally, it is this last measure, high activation, that comes closest to self-reports of fear or jitteriness. As with the other mood measures, the experienced operators were able to "turn off" their emotional readiness when not on duty, but the inexperienced operators were less successful in doing so.

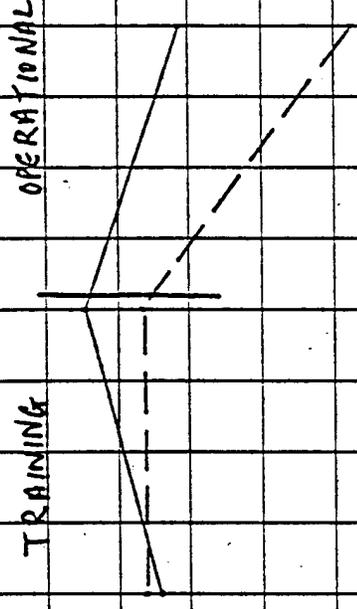
Although one might expect that the inability of the inexperienced operators to distinguish adequately between on duty and off duty demands might have an adverse effect on their military competence, we are not in a position to reach this conclusion. It should

General Admissions

(Mod Fig: 1-7)

Page: 47 a-9

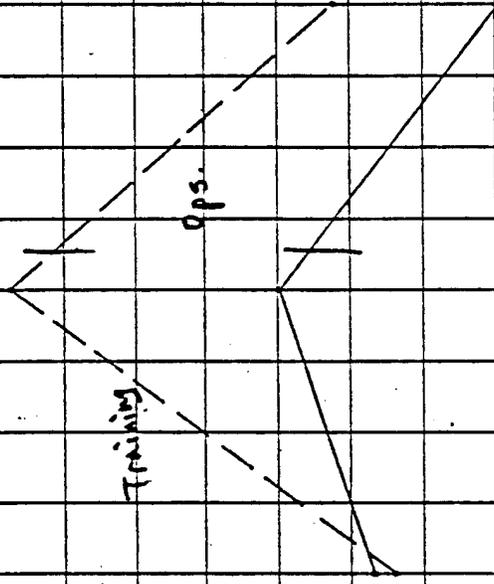
2



Postcourse Postcourse Postcourse

High Acquisition

A
B
C
D



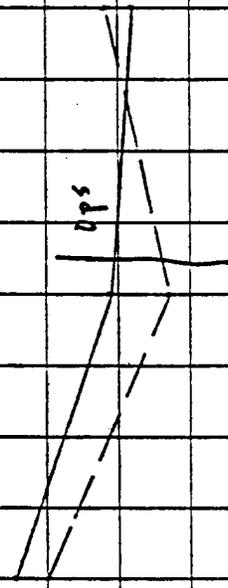
ED
ID

Pre-course Post-course Post-Hour

Deformation

6 5 4 3 2 1

FO
FO



Pre-dance

Post-dance

Post-tow

Sleepiness

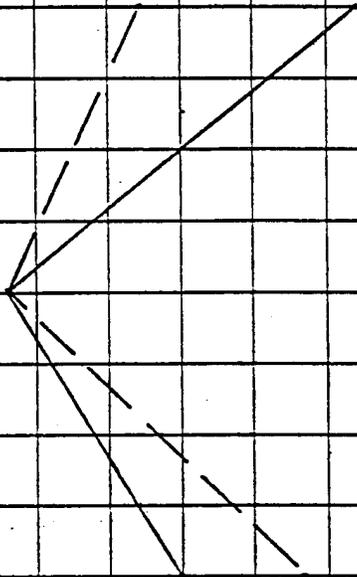
5

4

3

2

1



EO
IO

Post-hour

Post-course

Pre-course

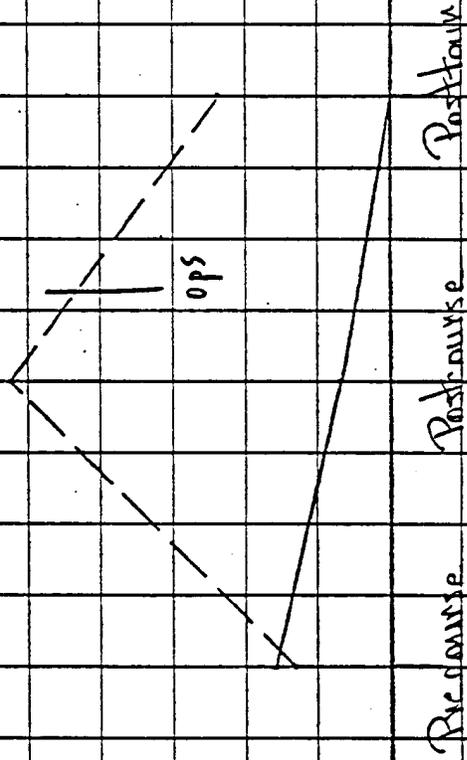
Depression

3

2

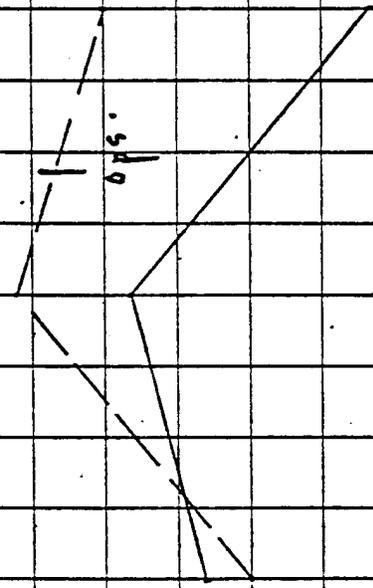
1

— ED
- - IO



Hostility

3
2
1



Pre-course Postcourse Post-Hour

EO
IO

General Admission

8
7
6
5
4
3
2
1

(G.A.)

— EO on task
- - EO not on task
— IO on task
- - IO not on task
x EO+IO



1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Weeks

Figure 12a

be remembered that all the operators whose reports are discussed in this analysis, excluding the soldier whose breakdown is to be described, performed competently throughout. During the period of the study, none of our operators was injured or killed, despite the fact that there was a high, if diminishing, level of terrorist activity.

Demand and Satisfaction

Operations were rated on 7 point scales according to how demanding they were (difficult, dangerous, puzzling, etc.) and how much satisfaction the operators derived from completion of the job. When there were two or more operations in a particular week, this rating was completed for the one which gave them most satisfaction and least satisfaction. For the novice operators, the most satisfying job of the week is usually rated at the highest points on the scales for satisfaction and demandingness, whereas for the experienced operators, more of jobs are rated as both less satisfying and less demanding. In the case of the least satisfying operation of the week, there is no evidence of a relationship between the measures of demandingness and satisfaction. None of the operators was in fact dissatisfied with his performance overall, but on some tasks, they felt that their performance could have been better. As we shall see, a majority reported at the end of the tour that they had made at least one serious error.

Self-efficacy and Type of Jobs Performed

Self-reported increases or decreases in confidence in applying skills were tabulated against the type of bomb-disposal operations

which had been assigned during the week, i.e. (a) a genuine bomb (or genuine and hoax bombs), (b) hoax bombs only, (c) no jobs assigned.

Increases in confidence are most evident during weeks that genuine devices are defused. It is also noted that decreases in confidence (which occur only occasionally) are also more likely following the defusing of a genuine device. Very little change in confidence occurs during weeks when no jobs are assigned.

Novices show greater increments in confidence than experienced operators, especially over the first two months of the tour.

Mood Change during the Tour

The dominant self-reported mood for both novice and experienced operators is one of being generally alert and active, and this remains true throughout the tour. In both groups, sleepiness and drowsiness are high initially and then decline, presumably as the operators become adapted to the increased work demands of the tour. Novices report a moderate degree of anxiety throughout the tour, whereas experienced operators rarely report this feeling at all. Novices also report slightly more hostility and depression, but there is a trend, yet to be confirmed on a larger sample, that the experienced operators have a tendency to become more hostile as time goes on. Overall, the absence of mood fluctuations is the most striking feature of this part of the study.

Changes in Self-Report Measures from Pre- to Post-Tour

The following self-report information was collected immediately after the preoperational course, mid-way through the tour, and 6-8 weeks after the tour. The scales are included in the Appendix||,

Assessment of risk attached to military and non-military activities

The risk attaching to various military and on-military activities was measured on an analogue scale (a 13 cm line, labelled from "0%, completely safe" to "100%, near certain serious injury or death to myself"), and mean scores for the novice and experienced operators are shown in Table 2.

The categories of event which were rated are as follows:-

1. Non-military risk — the event in the soldier's life, of a non-military kind, which he considers to have been most risky in retrospect. (These often included motor accidents, and risky sport mishaps.)
2. Military risk — the most risky circumstances of his military career.
3. Highest IED — risk attached to carrying out the most risky of seven designated IED disposal tasks (improvised explosive devices).
4. Lowest IED — the least risky of the seven IED tasks.

For the novices and some experienced operators, 3 and 4 had to be rated in prospect, as they had not yet performed these tasks.

TABLE 2

SELF-REPORTED RISK ATTACHING TO MILITARY, NON-MILITARY, AND DOND-DISPOSAL ACTIVITIES BEFORE, DURING AND AFTER A TOUR OF DUTY (NOVICE COMPARED WITH EXPERIENCED OPERATORS)*

FIRST TOUR OPERATORS (NOVICE) n = 5											
PRE-TOUR			MID-TOUR			POST-TOUR					
Highest non-military	Highest military	Lowest IED	Highest non-military	Highest military	Lowest IED	Highest non-military	Highest military	Lowest IED	Highest non-military	Highest military	Lowest IED
Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk
14.6	15.0	11.8	15.4	9.6	9.6	12.6	14.2	11.0	15.0	15.0	13.2

SECOND TOUR OPERATORS (EXPERIENCED) n=5											
PRE-TOUR			MID-TOUR			POST-TOUR					
Highest non-military	Highest military	Lowest IED	Highest non-military	Highest military	Lowest IED	Highest non-military	Highest military	Lowest IED	Highest non-military	Highest military	Lowest IED
Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk	Risk
12.8	13.0	10.0	10.00	8.6	5.2	10.2	10.6	12.4	12.4	12.4	7.2

The figures refer to a point marked on a 13 cm line representing the degree of risk (individual scores can vary between 0 and 26)

Results

The most dangerous bomb-disposal task is seen to be about as dangerous as the most risky military experience the soldier has ever had.

The least dangerous bomb-disposal task is seen to be less risky than the most dangerous non-military experience the soldier has ever had. There is a difference between the novice and experienced operators, however. For the latter, the simplest bomb-disposal tasks are perceived as being much less risky, and we may be detecting here a sign of the over-confidence which is said to develop in some experienced operators. To give some indication of the meaning of the ratings, the simplest IED disposal tasks are seen as being less risky, on average, than driving down a motorway, by the experienced operators.

In general, the ratings of the risk attaching to non-military experience change little according to the context in which the ratings are made (pre-tour, mid-tour or post-tour). On the other hand, previous military experiences seem to be rated somewhat less risky in the context of the Northern Ireland tour, when compared with pre- and post-tour ratings.

Although requiring further substantiation, post-tour ratings of the risk attached to bomb-disposal are somewhat higher than pre-tour ratings. This may be evidence of a "minimalization of risk" phenomenon which precedes and accompanies the execution of risky tasks. It seems to be characteristic of the novice and experienced operators alike.

The assessment of the risks attaching to non-military activities stays approximately the same over the three time periods, indicating that whatever tendencies there are towards under- or over-assessing risks, according to environmental context, they are specific to military activities in a military context.

Skill and Willingness

Operators assessed the adequacy of their skill in performing 7 IED tasks and their willingness (reluctance) to undertake these same 7 tasks. Table 3 shows the mean scores of the novices and experienced operators according to the time at which the ratings were made. (Scores range between 0% and 100%, where 80% indicates adequate skill in one scale, and acceptance of the task without reluctance in the other.)

Results

1. Self-perceived level of skill climbs to a high level by mid-tour and remains high post-tour. As one might expect, novice operators are less confident of their skills pre-tour.
2. Ratings of willingness do not parallel ratings of skill in the novice operators, and by mid-tour they are still more reluctant than the experienced operators. By the end of the tour, however, the two groups are equivalent. The novice operators, although perceiving themselves as highly skilled after two months into the tour, appear to require additional experience before feeling fully confident in their job.

The diary information has provided a general description of the operator's perception of his work from which specific hypotheses can be derived and tested. Comparison between novice and experienced operators has partially revealed the sequence of changes which accompany the effects of practice in the combat situation.

The more dangerous bomb-disposal tasks are likely to be viewed as being as risky as anything else the soldier has experienced but the least-threatening bomb-disposal tasks eventually come to be viewed as no more risky than driving on a motorway. However, the decline in perception of risk is not apparent after the operator's first tour, and presumably develops with more prolonged experience.

Self-perception of skill is high immediately after training, and after two months experience in Northern Ireland, the novice operator sees himself as performing the task just about as well as it could possibly be performed. Confidence in skill remains high after the tour. However, the novice operator is still a little more reluctant to tackle certain jobs than his experienced counterpart, but this reluctance has disappeared by the time the operator assesses his confidence again some weeks after the tour has finished. The disjunction between skill and willingness ratings is of theoretical interest because some writers have not distinguished these two aspects of "perceived self-efficacy" (e.g. Rachman, 1980).

Operators were rarely dissatisfied with their performance. Novice operators were likely to be satisfied with all the jobs they undertook, whereas experienced operators were likely to be less satisfied with the less demanding jobs.

Confidence in skills changed little in a week when no jobs were performed. Defusing a genuine bomb gives rise to greater changes of confidence (usually higher but sometimes lower) than defusing a hoax bomb. The greatest increments in confidence are observed in the novice operators after they have dealt with the first few genuine devices.

Problems During Tour of Duty

When the groups were equated for sample size, it was calculated that for the sixteen-week period of operational duty, the mean number of problems acknowledged per operator was as follows: experienced operators - 20.3; inexperienced operators 45.9. The specific problems reported by the experienced and inexperienced operators are shown in Table 4. Although the major problem was the same for both groups, i.e. lack of opportunity for sport and exercise, some minor differences emerged. As far as the severity of the problems was concerned, the order for the two groups was different (see Table 5). The main problem for EOs arose from difficulties with colleagues or seniors. The inexperienced operators complained of inadequate exercise and of paperwork. It must be said that, having visited most of the operational units, Dr. Cox and I had no difficulty in understanding the problem reported by the soldiers. In many instances, they were obliged to live and work under extremely difficult, cramped, improvised conditions.

TABLE 3 MEAN SCORES ON SCALES OF SKILL AND
WILLINGNESS

NOVICE OPERATORS n = 5					
PRE-TOUR		MID-TOUR		POST-TOUR	
Skill	Willingness	Skill	Willingness	Skill	Willingness
76	63	91	69	83	81

EXPERIENCED OPERATORS n = 5					
PRE-TOUR		MID-TOUR		POST-TOUR	
Skill	Willingness	Skill	Willingness	Skill	Willingness
87	86	93	92	91	86

TABLE 4 TOUR PROBLEMS, EXPERIENCED AND INEXPERIENCED OPERATORS
(FREQUENCY COUNT)

EO	IO
1. Opportunity for sport and exercise	1. Opportunity for sport and exercise
2. Difficulty with colleagues or seniors	2. Lack of sleep
3. Lack of sleep	3. Paperwork/reports
4. Opportunity for social life	4. Opportunity for social life
5. Lack of entertainment	5. Difficulty with colleagues or seniors

TABLE 5 TOUR PROBLEMS (SEVERITY)

EO	IO
1. Difficulties with colleagues or seniors	1. Opportunity for sport and exercise
2. Opportunity for sport and exercise	2. Paperwork/reports
3. Lack of sleep	3. Opportunity for social life
4. Career problems	4. Lack of sleep
5. Opportunity for social life	5. Food

Post-tour reports

Following the completion of their tour of duty, the operators were asked to complete a questionnaire (Table 6) containing fifteen questions designed to tap their tour experiences. The full results of this enquiry are given in Table 4. In summary, it was found that the majority of operators were satisfied with their tour of duty; felt satisfied with their operational performance and reported that they had improved throughout the tour (a recollection that is not fully consistent for EOs). To begin with, the majority found that waiting for a task made them tense and anxious and that in the early stages, working on a device had the same effect. One quarter of the respondents reported that working on a device had made them extremely tense. The operators attributed their successful performance to the quality of their training; their skill and confidence, and the support of their colleagues in the team. Slightly over half of the respondents admitted to having made at least one serious mistake during their tour. The most common error reported was the tendency to cut corners and work too quickly. Slightly under half of the soldiers who reported that the tour had changed them, felt that they had grown in maturity and self-respect. The majority felt a sense of let-down after returning from their tour; in particular, they missed the group identity of their unit colleagues and the sense of excitement and responsibility that went with the job.

Remarkably few adverse experiences were reported. Eighteen percent of the sample said that they felt restless or agitated after returning from duty, another 18% reported having bad dreams, and 12% reported an inability to settle down. None of them complained of intrusive thoughts related to their operational duties in Northern Ireland. Relatively few of the operators reported any change in their intake of alcohol or the consumption of cigarettes after returning to the United Kingdom.

Summary

Virtually all of the bomb-disposal operators studied performed smoothly and competently. During tours of operational duty, levels of confidence were mainly high and stable, especially among the experienced operators. These operators reported few fluctuations in their stable, calm mood states and were better able to "switch off" when not on operational duty. The inexperienced operators showed broadly stable patterns of mood and confidence but were subject to a few significant fluctuations.

The most common problem reported on tour was the lack of opportunity for sport and exercise, but among EOs the most serious problems were inter-personal.

At the end of tour most operators felt satisfied with their performance and many felt too that they had benefited from the experience. The most common error reported was that of cutting corners on a task. Few adverse post-tour experiences of significance were reported.

Conclusions

Although the findings are of interest, the need for fuller information from many more operators in the field was apparent. Hence, a fresh group of 20 operators were studied in a replication design, the results of which are given in the second half of this chapter.

Two findings stood out in the first study. Firstly, the majority of operators performed these demanding and dangerous tasks competently and calmly (hence, coming closer to Rachman's (1978) definition of "fearlessness" rather than "courage"). Secondly, the experienced operators performed more economically (in the psychological sense), more consistently and have fewer post-tour adjustment problems.

It is not clear what mediates this psychologically economical performance, but it is of some interest in recalling the findings of Epstein & Fenz (1972) on trainee and veteran parachutists. The phenomenon may be of some potential value and is worth pursuing.

On the theoretical side, the results point to "fearless" rather than "courageous" performances, but this is not in keeping with the conclusions of Part Three, on the effects of training. There, it was felt that the trained operators, expressing willingness to perform tasks that they estimated to be dangerous, were being courageous. There is no conflict of evidence or conclusions here, because we can see once more the movement from courageous to fearless performance, described on earlier occasions (Rachman, 1978).

Note on a casualty

So far, we have come across one operator (Subject No.20) who suffered a serious psychological breakdown following his tour-of-duty. Through an examination of pre-tour data and the weekly diaries obtained from this soldier, and other operators who were in Northern Ireland during the same period, the deterioration in his psychological condition while in Northern Ireland is apparent. He failed the IED training course and had to repeat it; he also stated that he did not want to serve in Northern Ireland as an IED operator. Over the tour, his confidence on IED tasks decreased considerably, the number of personal problems (e.g. alcohol, discipline) he acknowledged increased, and the amount of hostility and depression he experienced also increased. These changes were particularly striking when compared with other operators working in the same situation (Subjects No. 54, 47, 23). As we continue the detailed examination of this material, it will be interesting to note whether similar trends are noted with any other operators. Findings such as these gain significance, when one considers the effect such behaviour may have on the entire bomb-disposal team and that ultimately, this particular soldier had to be hospitalized.

POST-TOUR QUESTIONNAIRE: RESULTSCIRCLE ANY OF THE ALTERNATIVES THAT APPLY TO YOU

1. In general, and taking such factors as fatigue, anxiety, work load, boredom into account, was your tour - N= 19
- | | | |
|--------------------------------|---|-----|
| a. Much better than expected | a | 25% |
| b. Rather better than expected | b | 36% |
| c. Generally as expected | c | 21% |
| d. Rather worse than expected | d | 15% |
| e. Much worse than expected | e | |
2. Were the devices with which you had to deal - N=19
- | | | |
|---|---|-----|
| a. Mainly in a town setting | a | 52% |
| b. Mainly in a country setting | b | 15% |
| c. Equally divided between town and country | c | 32% |
3. Did you feel that your performance as an operator - N=19
- | | | |
|--|---|-----|
| a. Improved steadily throughout the tour | a | 68% |
| b. Fluctuated throughout the tour | b | 10% |
| c. Was unchanged throughout the tour | c | 21% |
4. How did waiting for a task when on call affect you? N=19
- | | | |
|--|---|-----|
| a. Generally made me quite tense and anxious | a | 5% |
| b. At first made me quite tense and anxious but gradually got used to it | b | 63% |
| c. Did not make me anxious and tense | c | 32% |
5. What effect did working on a device have on you? N=19
- | | | |
|--|---|-----|
| a. Generally made me extremely tense and anxious | a | 25% |
| b. Generally made me quite tense and anxious | b | 53% |
| c. At first made me tense and anxious but gradually got used to it | c | 21% |
| d. Did not make me anxious and tense | d | |

6. How did you come to terms with the risks and dangers of your job on tour? (Circle as many alternatives as you wish and add any further views under (j) Other_____) N=55

- | | |
|--|-------|
| a. Reliance on good luck | a |
| b. Reliance on your IED training | b 29% |
| c. Reliance on skill and confidence to analyse job in hand | c 27% |
| d. Reliance on God or religious faith | d 7% |
| e. Pretending that no danger existed | e |
| f. Conviction that doing an important job for a just cause | f |
| g. Identification with your colleagues and team | g 20% |
| h. Conviction that it couldn't happen to me | h |
| i. Fear of letting yourself down or showing anxiety | i |
| j. Other _____ | k |

7. Were you ever aware (or was it pointed out to you by others) that you had made a mistake in approach or techniques which could have had potentially dangerous consequences? N=19

- | | |
|------------------------------------|-------|
| a. Yes - on a single occasion only | a 32% |
| b. Yes - more than one occasion | b 26% |
| c. Never | c 42% |

8. Deleted

9. Were you aware of any personal tendencies or weaknesses which could have made you vulnerable as an operator and against which you had to guard - in effect an Achilles Heel? N=36

- | | | |
|---|---|-----|
| a. To work too quickly | a | 19% |
| b. To work too slowly | b | |
| c. To plan approach by inspiration rather than by logical thought | c | |
| d. To become casual and complacent | d | 11% |
| e. Too much preoccupation with detail | e | |
| f. Tendency to cut corners | f | 25% |
| g. Trying to meet expectations of SF and others | g | 14% |
| h. To become less alert after several false alarms | h | |
| i. Failure to anticipate likely results of actions taken | i | |
| j. Intolerance of fatigue or sleep loss | j | |

10. Do you feel that your tour has changed you in any way as a person? N=35

- | | | |
|---|---|-----|
| a. No | a | 17% |
| b. More mature and contented | b | 20% |
| c. Increased self-confidence and self-respect | c | 23% |
| d. A better soldier | d | 17% |
| e. More cynical and disillusioned | e | |
| f. More intolerant and critical | f | |
| g. Less satisfied with your career | g | |
| h. Other _____ | h | |

11. Did you have any sense of let-down persisting for more than a few days after your tour in N.I.? N=32

- | | | |
|---|---|-----|
| a. No | a | 19% |
| b. Yes - missed excitement of IED work | b | 19% |
| c. Yes - missed responsibility of IED work | c | 19% |
| d. Yes - missed doing a vital and valuable job | d | |
| e. Yes - missed comradeship and group identity of Felix teams | e | 25% |
| f. Other _____ | f | |

12. Since your return from N.I. have you experienced any of the following which were not your normal attitudes and behaviour? N=

- | | | |
|--|---|-----|
| a. Restlessness, agitation | a | 18% |
| b. Irritability | b | |
| c. Difficulty in sleeping | c | |
| d. Feeling jumpy, easily startled | d | |
| e. Inability to settle down | e | 12% |
| f. Depressed mood | f | |
| g. Feeling-tired out | g | |
| h. Being very talkative | h | |
| i. Bad dreams | i | 18% |
| j. Boredom | j | |
| k. Getting angry more easily | k | |
| l. Bothered by thoughts of tour in N.I.,
coming into your mind when you dont
want them | l | |
| m. Feeling elated | m | |

13. Since your tour has your intake of alcohol shown- N=19

- | | | |
|-------------------------------------|---|-----|
| a. No change from pre-tour levels | a | 79% |
| b. An increase from pre-tour levels | b | nil |
| c. A decrease from pre-tour levels | c | 21% |

14. Since your tour has your consumption of cigarettes shown - N=13

- | | | |
|-------------------------------------|---|-----|
| a. No change from pre-tour levels | a | 69% |
| b. An increase from pre-tour levels | b | 15% |
| c. A decrease from pre-tour levels | c | 15% |

Study 2 - Self-reported Fear during a Nineteen-week Tour of Duty

The interesting results that emerged from the first study on changes in self-reported fear during a nineteen-week tour of active duty, encouraged us to expand the sample and to collect some additional information. The main aim of the second study was to collect information about the incidence, distribution and fluctuations of self-reported fear during a nineteen-week tour of duty, punctuated by a four-day rest interval midway through the tour period.

All of the subjects were number one operators, responsible for the planning and execution of bomb-disposal tasks. They were located in different parts of Northern Ireland, and we ensured that rural and urban postings, active and inactive postings, were adequately represented. Each operator was required to complete the weekly diary, setting out his experience for the preceding week. It was explained to each operator that the material would be kept confidential and would have no bearing on their army careers. They were provided with self-addressed stamped envelopes which allowed them to return the diaries by ordinary post directly to the research team in London. As far as we were able to ascertain, the operators accepted our assurances about the confidentiality of the reports, and it certainly is the case that many of the reports contained frank accounts of difficulties encountered, even including direct conflicts with superior officers. Presumably, the operators would have taken care to exclude such information if they had not accepted our assurances.

The diaries consisted of the following sections. In Part 1, they had to complete a Mood Adjective Checklist relating to their psychological feelings when carrying out a bomb-disposal task. In Part 2, they were asked to rate their psychological feelings, on a similar scale, but referring to their state when they were not actually on duty. The third part of the diary consists of a list of 15 commonly encountered aspects of bomb-disposal work, and the operators were required to indicate on these charts whether their confidence in their ability to perform the particular tasks had increased, decreased or remained steady during the last week. The fourth part of the questionnaire consists of a list of 19 commonly encountered problems and they were asked to check off whether they had encountered such problems, slightly or seriously, during the past week. At the end of the diary form, they were provided with a free comment section, and they often took advantage of the opportunity to add or qualify the more formal information (Appendix 6).

In addition, they were asked to complete a slightly extended diary after returning from their four-day rest period, which in all cases was taken outside of Northern Ireland. Most of the operators spent the rest period in the United Kingdom with their families.

Finally, at the end of the tour, the operators were asked to fill in a three-page questionnaire (Appendix 7) which was designed to provide a summary of their experiences during the entire nineteen-week tour period, while the information was still fresh. Three months after

the completion of their tour of duty, they were asked to complete a follow-up report (Appendix 8) which was similar in structure, but had a slightly different intention to the end-of-tour report itself. (The follow-up reports are not yet complete - April, 1982).

Results

The amount of IED work carried out by the operators can be gauged from the following figures, which are divided into tasks involving genuine devices and a combination of hoaxes and false alarms.

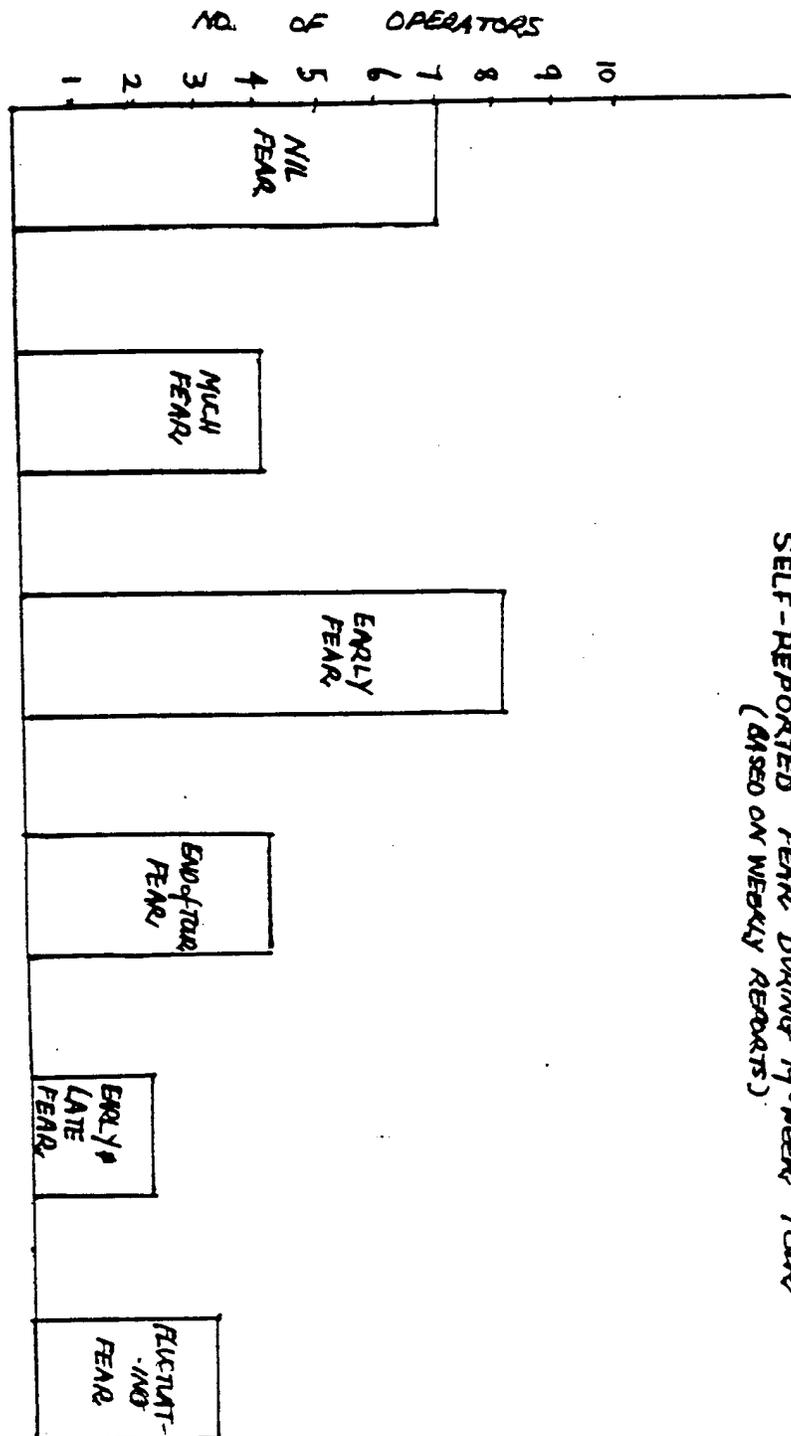
The average number of genuine devices dealt with during a complete tour was 15.25, with a range of from 6 to 24. The average number of hoaxes and false alarms dealt with (bearing in mind that each such call has to be dealt with as if it is genuine) was 21.75. The range of hoaxes and false alarms was from 6 to 38.

One operator who was not called upon to deal with a single genuine device during his entire tour, and whose reports showed scarcely any change whatever, was replaced in our study by an operator in a more active zone.

Seven of the operators reported no fear during any of the nineteen weeks of their tour (see Figure I). Four of the operators reported a great deal of fear at various times during their tour; operators were placed in the High Fear category if they endorsed the 'very fearful' column on more than three occasions, or the 'moderately fearful' column on more than six occasions. A separate analysis was made of those operators who reported moderate or high levels of fear during the first three weeks of their tour (2 scores of very fearful, or one score of very fearful and two scores of moderately fearful were needed for inclusion in the group).

Eight of the twenty operators reported significant fear during the first three weeks of their tour of duty.

SELF-REPORTED FEAR DURING 19-WEEK TOUR
(BASED ON WEEKLY REPORTS)



Using the same system of classification for the last three weeks of the tour, it was found that four operators experienced significant fear in the closing stages of their stay in Northern Ireland. Two operators experienced significant levels of fear both early in the tour and late in the tour, and three others showed significant but fluctuating levels of fear.

The fact that so many of the operators were willing to report experiencing significant fear at some stage during their tour of duty encourages the view that we were receiving valid information. It should be mentioned, however, that of the thirteen operators who reported significant fear at some stage, seven out of thirteen stated in their final, end-of-tour report, that they had not experienced fear at any stage. This selective recall, tending to give an impression of greater fearlessness than was experienced during the tour itself, was an unexpected finding.

As some of the operators can appear in more than one frequency account (e.g. "much fear" and "end-of-tour fear") the total number of instances exceeds the size of the sample which was of course, $n = 20$. These results show that just under half of the operators reported having experienced little or no fear during the entire tour of duty. A slightly larger number reported having significant fear early in the tour. Four operators reported a great deal of fear throughout much of the tour, and three others reported significant but fluctuating fears. As far as the end-of-tour fear is concerned, only four operators gave clear evidence of having undergone such an experience.

Discussion

This second study revealed evidence of more fear than was encountered in the first study. The early part of the tour was most fear provoking. The operators who reported little or no fear presumably are drawn from the same pool as those operators who participated in our stress experiment and experienced very little fear in the laboratory. The present result is entirely consistent with the suggestions put forward by Cox et al (1982) that there exists a small group of people, highly represented among bomb-disposal operators, who are relatively invulnerable to danger and stress. On the other hand, the results can be looked at in another way. Nearly two-thirds of the operators who participated in this study experienced and reported significant levels of fear at some stage during their tour. Bearing in mind that they all performed their duties satisfactorily, and therefore completed the entire tour, we have fair evidence of what Rachman (1978) has defined as essential courage, i.e. persistence in carrying out a dangerous or stressful task despite the experience of subjective fear. Among these operators, we found evidence of fearlessness and of courage.

Following this definition, the four operators who completed their tour successfully despite reporting a considerable amount of fear, can be considered as the most courageous of the group. The occurrence of fluctuations in fear was rather unexpected and no explanation is readily available. An inspection of the diaries of three operators concerned, failed to reveal any close or

obvious connections between their military experiences or particular events in the field and the occurrence of subjective fear.

One of the most interesting aspects of these results is the common report of significant fear early in the tour, i.e. within the first three weeks - and its dissipation within such a relatively short time despite the continuing exposure to danger and stress. In other words, we have here an example of fairly rapid habituation to a dangerous and fear-provoking set of circumstances (see Rachman, 1978 for other examples). Close inspection of the diaries of the eight operators concerned showed that the dissipation of this early fear almost always occurred shortly after they had successfully completed the disposal of a genuine explosive device. The completion of this task most often was followed by steep increase in confidence and a decline of fear, that in most cases was enduring. In two cases, bomb-disposal operators who overcame their early fear experienced a return of significant fear in the closing stages of their tour. On the other hand, there were four operators who had their first experience of significant fear in the closing stages of the tour - the well known end-of-tour jitters. Interestingly, it was amongst this group of four operators that we came across most evidence of fear being experienced while not actually on duty. In other words, the end-of-tour fear is rather more diffuse than the fears experienced early in the tour, which tend to be confined to the bomb-disposal task itself or to making the journey to and from the site of the bomb.

Before turning to our examination of the concomitants of fear, it must be pointed out that there was no simple connection between the sheer number of exposures to danger (indexed by the number of tasks involving genuine and/or hoax devices) and levels of fear. Some of the operators who experienced most fear were kept very busy while others were situated in areas that were relatively inactive. Equally, some of the operators who experienced little or no fear were busy, and others inactive. Among those operators who experienced little or no fear, the most common psychological state experienced off-duty was tiredness, and occasional anger. Among the operators who reported the highest levels of fear, the most common psychological state (off-duty) was unhappiness. Our data do not allow us to put forward a causal hypothesis to explain this association, but presumably if you are repeatedly experiencing high levels of fear under dangerous conditions, it is very likely to induce a state of unhappiness!

This, however, may be too simple an explanation, bearing in mind that two of the operators who showed high levels of fear reported themselves as being significantly unhappy during the first week of their tour, and then again at intervals during the remaining four months. Unless it can be shown that the unhappiness with which they arrived was itself related to anticipatory fear, the supposition that high levels of fear gave rise to unhappiness, cannot be consistently maintained. It is also of interest to notice that the operators who reported the

highest levels of fear were those who complained of the greatest number of problems during their tour. Characteristically, these complaints ranged over a wide number of subjects, but almost always included difficulties with senior officers, and not infrequently were accompanied by medical problems and sleeplessness. For reasons that are not clear, the operators who reported medium levels of fear had a significantly greater number of reports of anger.

As far as the ratings of confidence are concerned, the most interesting finding has already been referred to i.e. that ratings of confidence in one's competence showed a steep increase shortly after the successful completion of the first one or two bomb-disposal tasks involving a genuine device. It was rare to find reports of any significant decrease in confidence during the tour, but those two operators who did make such reports both fell into the group of high fear responders. They also endorsed the unhappy mood item significantly more often than the other operators. It should be noticed, however, that the four operators in the high fear group did not start off with confidence levels that were significantly below those of the other operators. It appears rather that they arrived for their tour of duty in a dysphoric mood state, experienced a considerable amount of fear in the early weeks, and probably as a result, underwent a loss of confidence. This loss of confidence may itself in turn promote more fear. In all, the data on self-confidence are readily understood in terms of Bandura's (1977) theory of self-efficacy. Having given this discussion of the main findings, it remains to provide a selection of extracts from the diaries, which it is hoped, will convey more vividly one part of the psychological

experience of carrying out bomb-disposal duties under conditions of considerable danger.

Illustrative excerpts from diaries

Operator One: These first extracts are taken from the diaries returned by a Staff Sergeant who was carrying out his second tour of duty in Northern Ireland. During his first week he dealt with one explosive device and reported himself as being very lively and active, both on duty and off. His comment was "Newly arrived in Province - no particular problems". He had a very busy second week during which he dealt with three explosive devices and reported that he had been slightly frightened when dealing with one of them, but remained lively and alert throughout the week. In order to render safe one of the devices, he had to spend a lot of time exploring the area, ruling out a range of possible dangers. As a result he was working on the device most of the night and suffered a slight disturbance of sleep on the following day. He reported having a confused and disturbing dream involving bombs, violence and hi-jacking. However, when he had completed this most difficult job, he reported a large and significant increase in confidence. He reported no fear during the second week. His third week was uneventful and he was not called out "The past week has been exceptionally quiet with not even a smell of an IED incident. I'm worried about the team losing its edge."

During the fourth week, he dealt with two devices and was called out to deal with one false alarm. He remained lively, alert and interested, and found that he was better able to relax off duty. The week was marked by the appearance of a new type of explosive

device, which he referred to as "a funny". He reported: "We were faced with a new type of device but were flexible enough to deal with the new threat until such time as new or modified equipment appears.". The fifth week was very busy and he had to deal with several explosive devices, including a number that were hidden in various parts of a large warehouse. "I was involved for something like twenty-four hours and towards the end of the task I was well and truly shattered, as were the rest of the team. I had a constant worry throughout that there was a booby-trap somewhere. However, by a gradual process of elimination this proved not to be so. During the reconnaissance phase of the operation, the cab of (a suspect) vehicle exploded quite violently. The fact that precisely one minute before I was on a house roof looking down on it, did not scare me at the time nor during the task. However knowing now what happened, the cab bomb certainly inspires me to think that these tipper trucks should be marked with a Government health warning!". In the sixth week, he dealt with one explosive device, smoothly and according to plan. He reported a significant increase in confidence at the end of this week.

During the next three weeks he had relatively little work to do and spent most of the time training some new members of his team. He remained alert and active while carrying out a task, and was finding it easy to relax when off duty.

Shortly after, he went for four days of rest to the United Kingdom. On returning, he had very soon to deal with a large explosion, and the operation went according to plan. During the second half

of his tour of duty he continued to be called on frequently and had to deal with a steady flow of devices. He reported no further experience of fear, but on a number of occasions, described himself as having been very angry. All of these incidents were the results of disagreements with soldiers from the supporting regiment, or on one occasion, with a superior officer.

This operator had a reputation for being highly skilled, and he certainly displayed a great deal of interest and enthusiasm for the job, which can be illustrated by a comment he made three weeks before the end of his tour. After a week in which he had dealt with two explosive devices and two hoaxes, he remarked, "A reasonably busy week with some enjoyable tasks."

Operator Two: The next set of illustrations comes from the diary of an operator who was completing his first tour of duty in Northern Ireland. The main feature of interest here was that he reported no fear during his tour of duty, but suffered from repeated periods of acute boredom. The only satisfactory antidote for his boredom was to be called out to deal with an explosive device.

By the sixth week he was complaining of the lack of opportunity for exercise and the long periods of inactivity. He also complained of disturbed sleep, during which he dreamt about bomb-disposal activities. In the following week he was extremely busy and was called out to deal with five different explosive devices and one hoax. His level of activity went up and his confidence increased. The following week was very quiet and he received no calls whatever. His comment was "Boredom, I think the bloody war is over!". The following week was another

busy time and he wrote this comment: "I feel great. It's good to do some real work. Glad to have the opportunity. I thought the war had ended and felt better that I was not wasting my time. Not now. I feel much more confident and 100%".

During the next two weeks, he had very little to do, but managed to have two fairly serious arguments with superior officers. His comment for the week was, "Great disappointment not doing more work.". Three weeks later he had an extremely busy week and was called out to deal with six explosive devices in the course of four days. He dealt with them correctly and quickly and had a boost in his confidence. His comment was brief: "I feel great". Three weeks later he was again very busy and dealt with seven devices, reporting that "I have much enjoyed the week!!".

This operator's experiences provide a vivid illustration of a phenomenon which we encountered early on in our contacts with the bomb-disposal personnel. To our great surprise, the operators told us that they actually looked forward to the alarm telephone ringing so that they could go out on a task. The notion that someone could look forward to being called out to carry out such a dangerous task, one in which you often risk your life, can only be comprehended against a background of considerable inactivity, restriction and ensuing boredom. For a significant minority of operators, the boredom involved in sitting around and waiting to be called out, presented the greatest problem. It says something for the power of boredom that so many people in these circumstances preferred exposure to great danger in preference to sitting in cramped quarters watching dreary and repetitious television programmes.

It should not be thought, however, that the desire to carry out bomb-disposal activities is simply or even mainly an attempt to get away from the boredom of the cramped barracks. Virtually all of these bomb-disposal operators took great pride in their skills and the responsibility entrusted to them. Almost all of them felt it important to demonstrate their value by performing their important protective functions.

Operator Three: Before turning to extracts from the diary of an operator who had a difficult and unhappy tour of duty, some brief examples will be taken from the records of an operator who described the circumstances under which he experienced fear. During his first six weeks he had to deal with only one explosive device but was called out to deal with a number of hoax calls. His confidence, although at a satisfactory level, had not increased since arriving in Northern Ireland. Then in the seventh week, he successfully dealt with a difficult device and his confidence improved, shortly followed by a decrease in his ratings of unhappiness. Then in the eighth week, he gave a very high fear score, which he explained in this way: "The fearful and jittery feelings during the task were caused by the hoax, which I was sure was a set-up for shooting. I do not like being in a situation where I could be shot at.". Here it is worth remarking that a number of the operators spontaneously remarked that they felt more frightened going to and from the site of an explosive device, than they did in dealing with the explosive devices directly. Unlike some of the infantry soldiers with whom we discussed the matter, the bomb-disposal operators expressed great fear of snipers.

For their part, the infantry soldiers found it almost incomprehensible how someone could approach and calmly deal with an explosive device. Although we did not tackle the question directly, the strong inference from the information which we have gathered from the bomb-disposal operators leads us to believe that above all it is their sense of skill and controllability which helped them to perform their tasks with so little fear. When they are being driven to or from the site of the bomb, they are passive, feel exposed and have little control over events. In these circumstances, they not infrequently report having some fears.

Operator Four: We can now turn to consider the performance of a Warrant Officer who had an unhappy tour, but who in our strict definition of courage, performed bravely because his competence was not significantly impaired despite the fact that at times he felt extremely frightened.

This operator had to deal with three different devices, one hoax and one false alarm during his first week in Northern Ireland. He reported having felt extremely frightened and very stirred up when dealing with the devices, and that he was tired, drowsy and unhappy, even when off duty. His confidence in his ability to deal with the tasks fluctuated during this week and subsequently. The lack of consistency in his self-ratings of confidence was a notable feature of his tour. During the second week he was again very busy, and had to deal with four genuine devices, two hoaxes and two false alarms. He reported himself as feeling jittery but not frightened. Off duty he remained

unhappy, tired and drowsy. He complained of experiencing a number of problems, including boredom, family difficulties, insufficient opportunity to exercise and so on.

During the third week he dealt with two devices and two hoaxes and once more said that he had felt frightened, although not quite as frightened as during the first week.

By the third week, he was reporting a sense of stress in these words: "Increased pressure always occurs when (the Senior Officer) attends an incident. It is now necessary for me to inform the hierarchy of any tasks. I resent interference regardless of good intention. I must now resist the temptation to speed up in order to complete the task prior to (Senior Officer's) arrival".

The next week was uneventful but he noticed that he was becoming increasingly irritable and angry, and had lost confidence in his ability to operate some of the equipment. The fifth week was busy again and he complained of no fewer than seven off-duty problems. While on duty he said that he was alert and active. The following week was busy, and he showed a surprising loss of confidence in his ability to deal with the devices even though his performance had been competent. The next week he reported feeling unhappy, tired and helpless - in addition to the irritability reported earlier. Despite these growing difficulties he found the boredom hard to tolerate and expressed a preference for going out on a task. "The boredom is now acute and difficult to overcome. The team is awaiting a big job which is due in this area but as time drags on, frustration is setting in.". The next week was relatively inactive and he rated himself as being very, very unhappy.

Shortly after this week he went home for the prescribed four days of rest and reported on his return that he had felt extremely drowsy and tired while at home. On his return to duty he had to deal with one explosion and three false alarms in the first few days. He found that he had lost some confidence and once again reported himself as being very frightened and jittery while dealing with the device. In the subsequent week he felt very, very fearful when dealing with a false alarm. In the subsequent weeks he expressed a further loss of confidence in his ability and reported another fearful experience. "I can feel myself becoming increasingly lethargic, short-tempered and irritable, which isn't my normal self. The tedium and futility of the days of inactivity is becoming oppressive." The following two weeks were rather inactive and his unhappiness scores reached the maximum point. Two more bad weeks followed, in which he felt frightened on a number of occasions, stirred up and very unhappy. "I'm having to work under intolerable pressure due to the vindictiveness of a superior and a lack of confidence in my ability."

Despite all these difficulties, he stayed on till the end of his tour and in all, successfully dealt with twenty-three explosive devices and twenty-three false alarms/hoaxes.

Curiously, his end-of-tour report did not reflect the unhappiness which he had experienced. He felt that the tour had gone more or less as expected, and that his performance had remained constant throughout the tour. He stated that he had not felt anxious either before or during the execution of a bomb-disposal

task. On the other hand, he did mention that he had at times felt under pressure from his superior officers, and that on one occasion he had made an avoidable error of potentially dangerous consequences.

Addendum: Physical reactions during bomb-disposal duties

In order to gauge how many and what kinds of physical reactions were experienced, 15 operators completed the Sensation Perception Questionnaire (SPQ) reproduced below. The operators were asked to rate the presence of any of 25 bodily sensations during "the most dangerous IED situation you can imagine", and as they were all veteran operators, their ratings reflected their own experiences. With 25 items and a maximum score of 9 on each, the maximum total is 175. The range of 0 to 127 was so extreme, that we decided to concentrate only on frequently rated items of 5 or over (out of a maximum of 9). The results were as follows, and discussion is held over to Part 5.

Frequency ratings

1. Pounding or racing heart	X12
2. Sensation of breathing heavily and deeply	X11
3. Mouth dry	X10
4. Trembling	X10
5. Sweating	X10
6. Urge to urinate	X9
7. Sensations from stomach	X8
8. Face hot	X5

The remaining sensations all scored below a frequency of 5.

No. _____

Date _____

Sensation Perception Questionnaire

The purpose of this questionnaire is to find out whether you have ever experienced sensations arising out of bodily reactions associated with stress or tension. We would like you to consider the most dangerous IED situation you can imagine and indicate which of the bodily sensations listed below you would expect to experience and the degree to which they would be present. Each sensation listed below should be rated on a scale from 0-9, where 0 = never experienced the sensation under the specified conditions, and 9 = have experienced the sensation frequently.

(circle the appropriate number)

	NEVER	0	1	2	3	4	5	6	7	8	9	VERY FREQUENT
Face hot		0	1	2	3	4	5	6	7	8	9	
Mouth dry		0	1	2	3	4	5	6	7	8	9	
Ringing or buzzing in ears		0	1	2	3	4	5	6	7	8	9	
Pounding or racing heart		0	1	2	3	4	5	6	7	8	9	
Trembling		0	1	2	3	4	5	6	7	8	9	
Numbness in skin		0	1	2	3	4	5	6	7	8	9	
Blood rushing to head		0	1	2	3	4	5	6	7	8	9	
Pain in chest region		0	1	2	3	4	5	6	7	8	9	
Muscles twitching and jumping		0	1	2	3	4	5	6	7	8	9	
Sensation of breathing heavily and deeply		0	1	2	3	4	5	6	7	8	9	
Sensations from stomach (e.g. sinking, churning, 'upset')		0	1	2	3	4	5	6	7	8	9	
Loss of balance (e.g. in walking)		0	1	2	3	4	5	6	7	8	9	
Nausea		0	1	2	3	4	5	6	7	8	9	
Headache		0	1	2	3	4	5	6	7	8	9	

Hands cold	NEVER	0	1	2	3	4	5	6	7	8	9	VERY FREQUENT
Sweating		0	1	2	3	4	5	6	7	8	9	
Urge to urinate		0	1	2	3	4	5	6	7	8	9	
Sensation of being close to fainting		0	1	2	3	4	5	6	7	8	9	
Urge to vomit		0	1	2	3	4	5	6	7	8	9	
Bowel sensations (e.g. urge to defaecate)		0	1	2	3	4	5	6	7	8	9	
Muscles tense and rigid		0	1	2	3	4	5	6	7	8	9	
Dizziness		0	1	2	3	4	5	6	7	8	9	
Sensation of breathing shallowly and quickly		0	1	2	3	4	5	6	7	8	9	
'Lump' in the throat		0	1	2	3	4	5	6	7	8	9	
Tingling sensations in skin		0	1	2	3	4	5	6	7	8	9	

The effects of the mid-tour interval

Roughly half way through their nineteen-week tour of duty the operators have a four-day break. Eighty percent of the sample spent the four days with their families either in the United Kingdom or at a military base in Germany. The remaining twenty percent spent their holiday with their families abroad.

On returning to duty in Northern Ireland each operator completed a post-R & R Report consisting of the usual mood adjective check list and some specific questions about how they had spent the time during their rest interval, any changes which they had noticed, and their willingness to return to bomb-disposal duties.

The scores recorded on the adjective check list for the R & R period closely resembled the scores which the operators had recorded in their off-duty periods immediately prior to the rest interval. There were no large changes reported between off-duty periods and R & R period.

Most of the operators reported that they were able to relax adequately during their rest, and a few caught up on lost sleep. Twenty percent said that they had found themselves involuntarily thinking about their bomb-disposal work in Northern Ireland, but none found it to be particularly disturbing.

Ten percent said that a close relative had found them more tense and/or irritable than usual. After completing their rest period forty percent reported themselves as being eager to return to bomb-disposal work, forty percent regarded it as

a job that had to be completed, and the remaining twenty percent offered no comment.

On returning to bomb-disposal duties, very few differences in performance or psychological reaction were reported in the first week of their return to duty. Two of the operators reported that they had experienced the return of some degree of fear during the first post-rest week, but in both cases this had disappeared by the end of their second week of duty.

In all, the results of the R & R period revealed little and were unsurprising; a majority of the operators did however express appreciation of the rest period.

End-of-Tour Reports

On completion of their tour of duty in Northern Ireland, but before returning to the United Kingdom, the operators completed a Final Report which was intended to give a summary account of their assessment of their experiences. The full results are given in Table 1. Four of the operators failed to complete their forms correctly, so the $n = 16$.

Most of the operators found the tour to be better than they had expected it would be, and only two found it much worse than expected. Furthermore, the majority found that their performance improved steadily throughout the tour. The most commonly reported method of dealing with the risks and dangers of the job was a reliance on their skills and confidence, closely followed by their reliance on their specialised training. The identification with colleagues and team played an important part in helping them to carry out their work satisfactorily. Eight of the operators said that they were assisted by the conviction that they were doing an important job for a just cause, three of them expressed some reliance on religious faith, and three on good luck.

Four of the operators said that at first they had felt quite tense while waiting to be called to an incident, but the large majority experienced no anxiety at this time. As far as anxiety while working with the devices was concerned, none were anxious for a prolonged part of the tour. Six of the operators reported that they had felt anxious at first but gradually got used to it; the majority (14) stated that they had not felt anxious or tense at any time. As mentioned earlier, this report is not entirely consistent with reports which some of the operators were making

on a weekly basis. If we attach greater weight to the weekly reports, rather than to a single statement summarising the experiences over a nineteen-week period, we can conclude that there is a certain amount of selective recall in which some of the operators fail to remember having felt frightened at some stage while on duty.

As far as personal tendencies and weaknesses are concerned, the most commonly reported problem was that of working too quickly, closely followed by the tendency to cut corners. Additionally, seven of the operators felt that they were rather too inclined to meet the expectations of the security forces or other people. Nine of the operators admitted to having made at least one particularly dangerous mistake during their tour, two of them said that they had made more than one significant error, and five said that they had not made any significant error at any stage.

As far as the general effects of the tour are concerned, the majority felt that they had changed for the better and were more mature and contented after the tour. Ten of them felt that they were better soldiers and eight described an increase in self-confidence and self-respect. Two felt that they had become more intolerant and two others were less satisfied with their careers.

None of the operators reported having increased their intake of alcohol during the tour, and twelve reported decreased drinking. Among the smokers, only three out of fifteen reported an increase during the tour.

END OF TOUR REPORTS (n = 16)

In general, and taking such factors as fatigue anxiety, workload, boredom into account, was your tour -

- | | |
|--------------------------------|---|
| a. Much better than expected | 7 |
| b. Rather better than expected | 1 |
| c. Generally as expected | 7 |
| d. Rather worse than expected | 0 |
| e. Much worse than expected | 1 |

Did you feel that your performance as an operator -

- | | |
|--|----|
| a. Improved steadily throughout the tour | 12 |
| b. Fluctuated throughout the tour | 2 |
| c. Was unchanged throughout the tour | 2 |

How did you come to terms with the risks and dangers of your job on tour? (Circle as many alternatives as you wish)

- | | |
|---|----|
| a. Reliance on good luck | 2 |
| b. Reliance on your IED training | 15 |
| c. Reliance on skill and confidence to analyse
job in hand | 15 |
| d. Reliance on God or religious faith | 3 |
| e. Pretending that no danger existed | 0 |
| f. Conviction that doing an important job for a
just cause | 7 |
| g. Identification with your colleagues and team | 15 |
| h. Conviction that it couldn't happen to me | 2 |
| i. Fear of letting yourself down or showing anxiety | 7 |

How did waiting for a task when on call affect you?

- | | |
|---|----|
| a. Generally made me quite tense and anxious | 0 |
| b. At first made me quite tense and anxious but
gradually got used to it | 2 |
| c. Did not make me anxious and tense | 14 |

(Only 16 of the 20 reports were complete and useable. On some questions more than one answer was allowed, e.g. Question 3)

What effect did working on a device have on you?

- | | |
|---|----|
| a. Generally made me extremely tense and anxious | 0 |
| b. Generally made me quite tense and anxious | 0 |
| c. At first made me tense and anxious but
gradually got used to it | 4 |
| d. Did not make me anxious and tense | 12 |

Were you aware of any personal tendencies or weaknesses which could have made you vulnerable as an operator and against which you had to guard - in effect an Achilles Heel?

- | | |
|--|----|
| a. To work too quickly | 11 |
| b. To work too slowly | 0 |
| c. To plan approach by inspiration rather than
by logical thought | 1 |
| d. To become casual and complacent | 0 |
| e. Too much preoccupation with detail | 0 |
| f. Tendency to cut corners | 5 |
| g. Trying to meet expectations of SF and others | 5 |
| h. To become less alert after several false alarms | 0 |
| i. Failure to anticipate likely results of actions
taken | 0 |
| j. Intolerance of fatigue or sleep loss | 1 |

Were you ever aware (or was it pointed out to you by others) that you had made a mistake in approach or technique which could have had potentially dangerous consequences?

- | | |
|------------------------------------|---|
| a. Yes - on a single occasion only | 7 |
| b. Yes - more than one occasion | 3 |
| c. Never- | 6 |

Less than half of the operators reported any significant changes in their attitudes or feelings towards other people. Three of the operators said that they had come to value their family more as a result of their experiences, four said that they felt rather more distant from people than before the tour, one found himself more tolerant of people but another found himself more intolerant after the completion of the tour.

In the Free Comments section, those operators who offered spontaneous remarks were for the most part satisfied with their performance and the experience generally. Very few critical remarks or untoward experiences were described.

In summary, on end-of-tour reports, most of the operators felt that their performance had been competent and satisfactory, and there were indications steady improvement in performance and adjustment throughout the tour. They attached considerable importance to their specialised training, which appears directly related to their self-confidence.

Comparatively little fear was reported, and what there was, tended to dissipate with increasing practice.

The major error was that of working too quickly or not sticking to standard operating procedures as rigidly as expected. One of the more noteworthy findings was the admission by eleven of the operators that they had made at least one potentially dangerous mistake. It is of concern that two of these operators admitted to having made a mistake of this type on more than one occasion.

Examples of errors include the following:- "Instinct often suggested that a particular action was OK but afterwards I realised if that instinct had been wrong, I could have been killed/injured." "I moved the seat (remotely) of a suspect car while much too close to it." "I stood fairly close to a (suspect) car, although slightly

protected by a wall, to use a shotgun, and discovered later that the car boot contained 30 lb explosive and a radio controlled device."

"I made a manual approach to a known booby trap without fully thinking out the final stage of approach. The error dawned on me before it was too late." "On more than one occasion, I made errors while attempting to gain too much forensic evidence by manual approaches."

On the whole, the tour was viewed as having been of some value and a majority felt that they were more mature and contented and/or more confident and better soldiers. Negative effects of the tour were uncommon. It is also of some interest that smoking and drinking rates, which might be regarded as indices of stress, changed in ways consistent with the finding that the tour was well tolerated.

The evidence on the Social Effects of the tour of duty is too scanty to draw conclusions, but there is a suggestion that for some operators the tour brought them closer to their family; a few operators experienced a growing distance from other people.

To conclude, the majority of the operators viewed their tour of duty in Northern Ireland positively, and as a constructive personal experience.

PART FIVE - FEAR AND FEARLESSNESS AMONG TRAINEE PARACHUTISTS*

The primary purpose of this study was to assess the extent to which the findings obtained on the bomb-disposal operators could be extended to other military personnel. Among other questions, we were interested in trying to determine whether a specialised training programme increases self-efficacy scores (as happened with the bomb-disposal operators), whether self-efficacy is related to experienced fear during parachute jumping, whether the fear (or fearlessness) experienced during parachute jumping is related to fears of other sorts, whether one can speak of courageous actors or should restrict oneself to speaking of courageous acts, and so on.

Parachute trainees were selected because of a presumed similarity between the danger involved in jumping and the danger involved in dealing with explosive devices, and because both samples had the benefit of military training as well as the specialised preparation that preceded the carrying out of their particular tasks. Additionally, as there is a small but useful amount of psychological knowledge about the experience of parachuting from aircraft (e.g. Walk, 1948; Fenz & Epstein, 1966; Basowitz, 1955), the selection of parachutists enabled us to draw on existing information. Moreover, the use of this sample enabled us to carry out a partial replication of earlier studies.

The theoretical aims of the study were served by reassessing the generality (or specificity) of fearless performance, and by carrying out another test of Bandura's (1977) theory of self-

*This study was carried out in collaboration with Mr. K. Ellis of the Army Personnel Research Establishment at Farnborough

efficacy. The findings from the bomb-disposal operators indicated that there was a significant if small degree of generality in the courageous performances of operators who had been decorated for gallantry; in addition, however, there was a good deal of evidence pointing to the substantial contribution made to courageous performance by specialised military training. In other words, we were able to find evidence of contributions to courageous performance made by the psychological attributes of the performer, and important contributions from training and from situational demands. In the case of the trainee parachutists, we were once again interested in whether or not their fearless (or fearful) jumping performances were related to other kinds of fears. In regard to Bandura's self-efficacy theory, we were hoping to test the extent to which self-efficacy scores can be improved by specialised training, and then examine the relationship between perceived self-efficacy and successful performance of the pertinent (parachuting) task.

The study was carried out on 21 trainee parachutists, who formed a group undergoing training. All of the subjects were members of the Parachute Regiment, and none of them had had any previous parachuting experience. Thirteen of the trainees were new recruits to the Regiment, and had a mean age of 19.6 years. The remaining 8 soldiers were experienced men transferred from other regiments, and had a mean age of 22.7 years. As the two groups did not differ on any of the measures, they will throughout this report be regarded as a homogeneous group. The training course which took place during a two-week period consisted of theoretical instruction, followed by practice in jumping and falling, practice jumps from a balloon, and jumps from an aircraft.

At the beginning of the course, and prior to making any jumps, all of the subjects were required to fill in a set of questionnaires. At the mid-point of the training course they were asked to give a short account of their progress and finally, they filled in a set of questionnaires after the completion of the course.

The pre-course assessment consisted of the H scale used in earlier work(Appendix 5) to provide a measure of healthiness and alertness, a series of self-efficacy estimates (how much skill S has for dealing with the task of jumping) on 8 jumping tasks ranging from low danger to high danger, and ratings of expected confidence, danger, success in jumping performance, and anticipated fear. On all of these scales, a score of 0 indicates a small amount of the attribute in question, and 100 is the maximum amount possible. As far as the H scale is concerned, a zero score indicates a total absence of any bodily or mental complaints, scores of 5 indicate a moderate amount of complaints, and scores above 5 are indicative of a high level of complaint.

At the completion of the training course, all of the subjects were asked to repeat the self-efficacy estimate for the same range of jumping tasks, ranging from minimal danger to highly dangerous. They were also asked to rate again how much confidence, and how much fear they had experienced during their most dangerous jump. They were also asked to rate the dangerousness of the jump, and how well they thought that they had performed. Lastly, they were asked to fill in the Sensation Perception Questionnaire (see p.84) in order to report which bodily sensations they had experienced during their most dangerous jump, and the intensity of any such sensations.

Results

The mean scores for self-efficacy ratings on the most dangerous task, the least dangerous task and the average of 6 such ratings, are shown in Table 1. Also given in this table are the subjects' expected confidence in their ability to perform well and their felt confidence as reported after the completion of the training course. Similar pre- and post ratings of jitteriness, dangerousness estimates, self-reported fear, expected performance and felt performance, were collected. The data were subjected to an analysis of variance and the significant pre- and post changes are indicated by asterisks.

The majority of measures had changed significantly by the end of the course. The subjects' ratings of expected self-efficacy changed from a low of 21% on the dangerous tasks pre-training, to a greatly increased 73% after the completion of training - a very large increase in perceived self-efficacy on the most dangerous task. On the least dangerous task the self-efficacy scores started at a higher level, and also showed a substantial increase at the completion of training. On average, the ratings of perceived self-efficacy increased from 41% to 80% at the end of training. It would appear therefore that training successfully increased the subject's perceived self-efficacy in respect of parachuting. The anticipated confidence scores increased only slightly and did not reach significance, nor did the anticipated dangerousness of the task change as a result of the training. The subjects' estimates of their parachuting competence started at a fairly high level and did not change after they had completed their jumping practice. As far as fear is concerned, they expected to experience slightly more fear than was reported after completing the jumps ($p = < .05$).

Trainee Parachute Troops, Means & S.D.'s Pre and Post-Training
(n = 21)

	<u>Mean</u>	<u>S.D.</u>
Self-efficacy, high danger, pre	29.19	17.81
Self-efficacy, high danger, post	73.37**	16.07
Self-efficacy, low danger, pre	65.23	19.71
Self-efficacy, low danger, post	83.80**	17.52
Self-efficacy, average, pre	41.04	15.91
Self-efficacy, average, post	80.42**	12.18
Parachute confidence, pre	57.61	14.88
Parachute confidence, post	63.33	17.12
Jittery, pre	56.19	22.46
Jittery, post	44.28**	19.89
Dangerousness, pre	40.47	32.20
Dangerousness, post	42.85	21.18
Self-rated performance, pre	62.61	21.25
Self-rated performance, post	58.57	11.41
Self-rated fear, pre	48.09	26.09
Self-rated fear, post	40.00*	19.87

(* p = <.05, ** p = <.01)

Table 2 is the correlation matrix, with all variables intercorrelated. Those correlations which reached a 5% level of significance are indicated by a single asterisk, and those which reached a 1% level of significance are indicated by a double asterisk.

As far as intercorrelations are concerned, the variable of greatest relevance for present purposes is the trainee's self-reported fear after completing the jumping practices. The most interesting result here is the highly significant (negative) correlation between perceived self-efficacy and experienced fear of $-.58$ ($p < .01$). A comparably high negative correlation was also obtained between anticipated efficacy on the most dangerous task and experienced fear $-.50$ ($p < .05$). Reported fear also correlated significantly (negatively) with experienced confidence in the jumper's performance. The most surprising result was the absence of any correlation between the trainee's post-training estimate of the dangerousness of the task and the amount of self-reported fear. This absence of any relationship between dangerousness and fear ($r < .02$, ns) is not easily explained.

As far as anticipated -efficacy ratings are concerned, the highest correlations were with self-reported fear, self-reported competence in performing the jump, and post-training efficacy ratings of the most dangerous task. The trainee's estimates of the dangerousness of parachuting, both before and after training, were surprisingly unrelated to other factors, with the exception of post-training estimate of self-efficacy ($r < .45$, $p < .05$) However, the trainees' self-reported competence in performing the jumping tasks was significantly and negatively correlated with their

TABLE 2

Correlation Matrix (** p = .01, * p = .05)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. HI EFF PRE	-															
2. LO EFF PRE	27	-														
3. AV EFF PRE	72**	79**	-													
4. HI EFF POST	19	60**	44*	-												
5. LO EFF POST	-13	23	17	20	-											
6. AV EFF POST	09	52*	37	89**	35	-										
7. CONFID PRE	19	47*	35	16	09	06	-									
8. CONFID POST	10	16	21	10	22	21	43*	-								
9. JITRS PRE	-02	-05	01	-18	-05	-15	-45*	-21	-							
10. JITRS POST	-12	-01	-08	-10	-07	-17	-37	-59**	-							
11. DANGER PRE	-17	-05	-17	27	12	-42*	-31	-36	11	24	-					
12. DANGER POST	-05	-07	00	-05	45*	07	00	03	-02	-11	10	-				
13. PERF PRE	-12	10	-01	-08	13	-04	45*	10	-12	-20	21	35	-			
14. PERF POST	29	19	38	-11	-15	-08	18	46*	17	-37	-51*	-07	00	-		
15. FEAR PRE	-18	-31	-23	-34	07	-35	-54*	-42*	59**	56**	06	06	-32	-13	-	
16. FEAR POST	-49*	-34	-58**	-01	-29	-08	-38	-51*	13	50**	31	02	-13	-36	31	

(Hi = dangerousness, Eff = Self-efficacy rating, Jtrs = Jitters, Dangerousness of jumping, Perf = self-rated performance, Fear = self-rated fear jumping)

estimates of the dangers of jumping made prior to the training course. At the completion of the training course, the estimates of danger were no longer related to estimates of successful performance. The trainees were surprisingly unsuccessful in predicting the success of their overall jumping performances. Their pre-training estimates failed to correlate with their self-reported success. Self-reported fear after the completion of the training course correlated significantly with a lack of confidence, feeling jittery, low self-efficacy (pre-training) ratings, and negatively with self-rated performance.

As far as self-rated performance is concerned, in addition to the moderate but non-significant correlation with self-reported fear ($r = -.36$), self-rated performance showed a significant correlation with self-reported confidence and high but non-significant correlations with pre-training self-efficacy ratings, post-training jittery feelings, and anticipated danger pre-training ($r = -.51$, $p = < .05$). As mentioned earlier, self-rated performance showed little correlation with expected performance, nor was it related to post-training estimates of the dangerousness of jumping. The pre-training ratings of self-efficacy correlated significantly with post-training ratings of self-efficacy on the most dangerous task, moderately but non-significantly with self-reported performance, and negatively with self-reported fear ($r = .58$, $p = < .01$).

Health/alertness

The ratings of subjects who had high or low scores on the healthiness/alertness scale are shown in Tables 3 and 4. Table 3 shows the mean self-ratings of fear, danger, performance and self-efficacy among high and low scorers on the H scale. It can be seen that high scorers reported (retrospectively) greater fear while jumping than did the low scorers, even though their self-rated jumping performances did not differ. The high scorers (i.e. those with the most complaints about their health) made significantly greater estimates of the dangerousness of jumping than did the low scorers. High scorers also returned larger scores on the SPQ which measures bodily sensations during jumping. On the self-efficacy ratings, the high and low scorers did not differ either before or after completion of the training course. However, both groups showed substantial and significant increases in self-efficacy ratings after completing the course.

Scores on Table 4 show the percentage of paratroop trainees reporting physical reactions during the most dangerous jump. This result shows two things - in the first place, the trainees were not reluctant to admit having experienced these physical reactions during jumping, and secondly, the pattern and rank of the physical reactions is similar to that reported among infantry combat veterans and other paratroop trainees. The correlation between the subject's total SPQ score (i.e. the total number of physical reactions reported during the most dangerous jump) and the self-reported fear during the most dangerous jump was significant at the 5% level ($r = 0.46$). Furthermore, there was a significant correlation between low scores on the SPQ (i.e. few physical reactions) and low scores on the Fear Survey Schedule, which the subject's filled out

TABLE 3

Mean Self-Ratings of Fear, Danger, Performance
and Self-Efficacy among High and Low Scorers
on H scale (21 Paratroop Trainees).

<u>H Scale</u>	<u>Experienced</u> <u>Fear</u>	<u>Jump</u> <u>Performance</u>	<u>Danger</u> <u>Estimate</u>	<u>SPQ</u> <u>Total</u>	<u>Efficacy</u>	
					<u>Pre</u>	<u>Post</u>
Over 5 complaints (n = 5)	51.4	57.0	54.0	78.2	36.0	72.5
Under 5 complaints (n = 17)	34.1	62.6	37.5	53.4	41.2	81.0

prior to taking the training course, ($r = .37$, $p = < .05$).

Another way of looking at this data was to separate out the trainees who had the highest number of physical reactions and compare them with those who had the lowest SPQ scores. As can be seen from Table 5, the four soldiers who had SPQ scores of more than 80, reported more fears on the Fear Survey Schedule, and also reported a higher degree of experienced fear during the most dangerous jump. The 9 trainees with SPQ scores of less than 50 on the other hand, endorsed a low number of items on the Fear Survey Schedule and also had a lower self-reported fear rating (during jumping) of 35.

Summary

All but 1 of the trainees completed the course successfully. The one exception was a recruit who injured his ankle during a training jump and was unable to continue. The trainees anticipated that jumping would be moderately dangerous but felt confident that they would manage successfully. Their expected and actual (self-rated) performances were similar. They anticipated experiencing a moderate amount of fear and in the event, reported slightly less fear than expected. One can sum up by saying that their performance was satisfactory despite their estimates of the dangerousness of the task, and only modest levels of fear were experienced.

TABLE 4

Percentage of paratroop trainees (n = 21) reporting physical reactions during most dangerous jump (0 = not at all, 9 = a great deal - percentages based on scores of 5 or more on this 10 point scale). (SPQ)

<u>Reaction</u>	<u>Percentage</u>
Sweating	78
Pounding and racing heart	61
Urge to urinate	48
Face hot	44
Stomach sensations (sinking, churning)	44
Trembling	38
Dry mouth	38
Bowel sensations	32
Lump in throat	28
Tingling sensations in skin	24
Headache	21
Twitching muscles	21
Shallow, rapid breathing	14
Loss of balance	14
Ringling or buzzing ears	14
Blood rushing to head	9
Dizziness	9
Urge to vomit	9
Close to fainting	4
Nausea	4
Pain in chest	0
Numbness in skin	0
Tenseness in muscles	0
Cold hands	0

TABLE 4aBodily Reactions Reported under Stress/Danger

(In descending order of frequency)

<u>Veteran Infantrymen Pacific 1944 (Janis)</u>	<u>Bomb-disposal operators Northern Ireland, 1981</u>	<u>Combat fliers, Europe 1944 (Shaffer)</u>
1. Pounding heart	1. Pounding heart	1. Pounding heart
2. Sinking stomach	2. Heavy breathing	2. Tense muscles
3. Trembling	3. Dry mouth	3. Irritability
4. Sick stomach	4. Trembling	4. Dry mouth
5. Cold sweat	5. Sweating	5. Cold sweat
6. Feel weak or faint	6. Urge to urinate	6. Stomach unease

High & Low SPQ Scorers

	<u>Total, fear-</u> <u>survey</u>	<u>Self-reported</u> <u>fear (0 - 100)</u>
SPQ Score > 80 (n = 4)	11	56%
SPQ Score < 50 (n = 9)	4	35%

SPQ Total score and Self-reported (parachuting)
 fear correlated 0.346 ($p = <.05$), and
 SPQ Total Score correlated 0.382
 ($p = <.05$) with Total Fear Survey Score.

Discussion

The fact that the training was broadly successful is in keeping with similar research reported elsewhere (e.g. Basowitz, 1955; Walk, 1948; Epstein & Fenz, 1966). Leaving aside the ankle casualty, their failure rate was 0, and despite their estimate of the dangerousness of parachuting, most of the trainees experienced only a modest amount of fear during the most dangerous jump. Before starting parachute training their self-efficacy ratings were modest, but as observed in the comparable study of bomb-disposal operators, the ratings of self-efficacy showed a very large and significant increase on the completion of the specialised training course. The average self-efficacy rating prior to the course was 41% but rose to 80% on completion of the course. To this extent at least, the training course was highly successful.

On Bandura's (1977) theory of self-efficacy, one would anticipate a high correlation between pre-course ratings of self-efficacy and successful performance (including low levels of fear). The correlations between the pre-course self-ratings and experienced fear were all substantial and negative, as predicted. That is to say, trainees who expressed high self-efficacy ratings experienced relatively little fear even during the most dangerous jumps. Less favourable for the theory, however, were the correlations between self-efficacy ratings and jumping performance. Although the correlations between pre-course self-efficacy ratings and performance were all positive, the levels were not high and none of them reached significance. If the post-training course ratings of self-efficacy are taken as a measure of the likely parachuting performance of these soldiers, and on Bandura's

evidence and the present evidence this is reasonable, this group of parachute soldiers will perform their jumping duties satisfactorily. At the end of the course, most of the soldiers placed their self-efficacy ratings in the range 70% - 80%; only 1 soldier rated his self-efficacy below 50% at the completion of the training course.

Given the validity of Bandura's theory, the substantial self-efficacy ratings observed after training for bomb-disposal duties, or as in the present case for parachute jumping, would indicate that the training programmes are highly successful in achieving their aims.

The information drawn from the trainees' self-ratings of their health and alertness is interesting and of potential value.

As in the bomb-disposal research (e.g. see Hallam & Rachman, 1980), an association was found between low complaint scores and fearlessness. Those soldiers who reported little or no bodily or mental complaints had a significantly lower self-reported fear score for the most dangerous jump. This measure of relative fearlessness is in keeping with our earlier finding that decorated bomb-disposal operators had a significantly lower number of complaints on this scale of physical and mental health. Interesting too is the fact that despite the higher number of complaints, and the significantly greater amount of self-reported fear, the adequacy of their jumping performances of the high H-scores did not differ from those of the low complainers who had relatively little fear. Once again, we find a slight disassociation between self-reported fear and competent performance.

It has been argued (Rachman, 1978) that the definition of courage should be confined to those who persist in carrying out a stressful or dangerous task despite experienced fear. The data gathered on the trainee parachutists shows that the high complainers not only experienced more fear during the most dangerous jumps, but they also experienced a larger number of bodily physical reactions. Their scores on the Sensation Perception Questionnaire were on the high side and significantly greater than those reported by the non-complainers. Once again, it is worth remarking that despite their reports of subjective fear and the experience of a large number of physical reactions during the jump, their performance was no different from those of the low-complainers. This provides justification for regarding them as having performed courageously.

As far as the non-complainers are concerned (i.e. those with low complaint scores on the health scale), they seem to fit best into the description of fearlessness, in that their performance was competent but not accompanied by notable amounts of subjective fear or adverse physical reactions. This part of the results appears to be accommodated comfortably within the distinction between courageous performance and fearless performance set out in 1978. It is also interesting to notice that the high and low complainers did not differ in their ratings of self-efficacy, either before training or after training.

The physical reactions during the most dangerous jump reported by the trainees are similar to the physical reactions reported by the 16 bomb-disposal operators described earlier. The seven most common physical reactions reported by the trainee parachutists and the bomb-disposal operators include the following: sweating,

pounding heart, urge to urinate, hot face, stomach sensations, trembling, dry mouth. Although there is close agreement on these physical reactions, more of the bomb-disposal operators reported sensations of deep and heavy breathing than did the trainee parachutists. Only 14% of these trainees reported shallow rapid breathing. The type and pattern of physical reactions described by the trainee parachutists and bomb-disposal operators also bears a strong resemblance to the reactions reported by the infantry troops in combat divisions in the Pacific theatre during the Second World War (Janis, 1949). Here too, pounding of the heart, sinking feeling in the stomach, trembling, seating and so on were prominent. In some measure of contrast, Schaffer (1947) reported that combat fliers in the Second World War reported most frequently having a pounding heart, muscle tenseness and irritability. Although they also reported dryness of the mouth, sweating and so on, the inclusion of muscular tenseness and irritability was not reported by the trainee parachutists, none of whom reported tenseness in the muscles (they were not asked to rate irritability). One might have expected that the bomb-disposal operators, who like the fliers are required to spend long periods of time in dealing with their dangerous tasks, might complain of muscular tension, but this was not the case. Presumably then the aviator's muscular tenseness resulted from working in confined cramped conditions. With the slight exception of the combat fliers, the military groups (parachute soldiers, bomb-disposal operators, infantrymen) showed similar patterns of physical reaction when performing under dangerous conditions. The most prominent signs

are sweating, racing heart, hot face, dry mouth, trembling, stomach sensations and urge to urinate.

The results of this study add some new information that might help clarify the question of the degree of generality of fearless performance. Low scores on the bodily reactions scale (SPQ) correlated with low scores on the Fear Survey Schedule, which measures the range of fears; hence there appears to be some degree of generality of fearlessness, across systems and situations. The trainees who reported having relatively few fears also reported having few physical reactions during the most dangerous jump sequence. At the other extreme, those trainee parachutists who reported a large number of bodily reactions during the most dangerous jump, had also reported (prior to the training course) that they had a wider range of (unrelated) fears than did the people who had low scores on the SPQ (few bodily reactions).

Another piece of evidence, pointing in the direction of the generality of fearless performance comes from the positive correlation between pre-course reports of how many fears the person was aware of (Fear Survey scores) and self-reported fear after completion of the most dangerous jump in the training programme. In other words, those trainees who stated before the course began that a relatively large number of stimuli might frighten them, reported higher levels of fear during the most dangerous jump than did those trainees who endorsed a small number of items on the Fear Survey Schedule. It appears therefore that there is a link between the range of

fears which the person acknowledges, the amount of fear experienced during the execution of a dangerous jumping task, and the amount of adverse physical reactions experienced during the completion of a dangerous task. Although none of the measures is an ideal index of the three systems which are said to comprise fear (behavioural, cognitive, and physiological), the results suggest that in this group of trainees there was a reasonably high concordance between the three systems. The only evidence of possible discordance is that, despite higher levels of self-reported fear, and the experience of more bodily reactions, the group of trainees with elevated scores did not rate their jumping performance as being inferior. Subject to confirmation by an external observer, this discordance between jump performance and self-reported fear provides the basis for a keen distinction between fearless and courageous performance

Conclusions

The main conclusions can be stated in the form of answers to the questions posed in the Introduction. Specialised training did increase self-efficacy scores. The pattern and extent of the increase resemble those observed after training for bomb-disposal duties (among RAOC personnel). As predicted from Bandura's theory, negative correlations between fear and self-efficacy, were obtained. Evidence of some generality of fearfulness (and of fearlessness) was obtained, and a basis for identifying fearless and courageous performers was discerned.

PART SIX - LABORATORY STRESS EXPERIMENT

The aim of the experiment was to find out if decorated bomb-disposal operators perform differently from non-decorated but competent operators when subjected to stress under controlled conditions. The retrospective analysis of the psychometric, psychiatric and field training performance measures of a group of military bomb-disposal operators, described in Part Two of this Report, produced an unexpected result. All of the operators had performed competently while on active duty and this may have precluded the emergence of even more distinctive features of courage. Be that as it may, a small number of soldiers who had received decorations for gallantry rated their health, mental and physical, more favourably on psychometric tests of psychopathology than did their colleagues in the same unit. These psychometric tests were completed well before the acts of gallantry took place, and the decorated soldiers obtained even "healthier" scores than their colleagues who were themselves well above the norms for a non-military sample. The suggestive hint of the existence of a distinctive group of courageous actors provided the impetus for a prospective experiment.

It was decided to carry out an experimental analysis of the performance under stress of a selected group of bomb-disposal operators who had received decorations for gallantry. We were particularly interested to find out how these operators would react psychophysiologicaly when given a stressful task, and to discover whether their reactions to stress were in any way different from those of other bomb-disposal operators. Their subjective and psychophysiological reactions under stress were therefore compared to those shown by a group of highly competent operators from the same unit who had not however received decorations

for gallantry. This comparison, between the decorated and the non-decorated operators, is the core of study, but we also took the opportunity of testing a small number of recently trained soldiers and some civilians.

The subjective and psychophysiological reactions of a group of decorated bomb-disposal operators were measured during a conflict test. Compared to a group of equally experienced and successful, but non-decorated, bomb-disposal operators, the decorated subjects maintained a lower cardiac rate when making difficult discriminations under threat of shock. There were no differences between the groups on subjective reactivity.

The full results of their implications are spelled out in the manuscript attached to this Report.

It remains to be determined whether the physiological pattern identified in this study is attributable to military training or to constitutional factors, or both. Bearing in mind the differences between the decorated and non-decorated operators, it is difficult to defend the argument that the physiological pattern is the result solely of military training. However, the non-decorated operators (and the recently trained young soldiers) showed less cardiac acceleration than the civilians and this may point to the contribution of (military) training for coping with stress. As in our psychometric study of the distinction between courageous actors and courageous acts, we seem to require a bi-factorial explanation. The decorated and non-decorated operators have a great deal in common (stability of mood, professional competence, etc.) but some slight differences can be found.

The differences between the soldiers and the civilians, if confirmed in a full replication, would point to the influence of military training and/or military selection. Without denying the value of selection, it should be said that in the various related but unpublished projects carried out on these bomb-disposal operators, we have repeatedly come across evidence of the substantial contribution made by military training as such. It remains to be shown however that such training contributes to a generalised resistance to stress.

As far as the question of courageous actors is concerned, we now have some evidence, drawn from two totally different investigations, to support the identification of a group of people who appear to react differently when placed in an experimental stress situation, and who obtain some different scores on self-report psychometric tests in which they indicate an optimal level of functioning.

The main theoretical and practical implications of our findings, apparently identifying a distinctive pattern of cardiac reactivity in a group of competent people who have received decorations for gallantry, are self-evident. Their potential significance for selecting and training people to carry out dangerous/difficult tasks under stress is wide-ranging, and for this reason, a replication study is being planned.

(A full technical account of this experiment is in press with the British Journal of Psychology; a copy of the article is included in the Appendix)

PART SEVEN - SUMMARY AND CONCLUSIONS

The results of the research are consistent with the psychological analysis of fear set forward in Fear and Courage. Many of the operators, who have to carry out skilled tasks under dangerous conditions, experienced some subjective fear and associated physical reactions including sweating, pounding heart, etc. Their ability to persist and to perform competently, despite such fear, meets the definition of courage. Additionally, some operators reported little or no fear, and their performances fall into the class of fearless behaviour. With adequate training and after the successful execution of dangerous missions, fears tend to decrease, and we see the predicted transition from courageous performance to fearless performance. The main determinants of courageous behaviour include effective training, perceived competence, and high group morale and cohesion. Adequate training and skills reduce one's estimate of danger and increase self-confidence. Training experiences facilitate the transition from courage to fearlessness. In addition to these determinants of courageous or fearless acts, we now have some slight evidence of the existence of a small group of people who are unusually competent and calm, and who may be particularly well suited for carrying out hazardous tasks.

The main conclusions include the following:-

1. The bomb-disposal operators have a very high success rate
2. Failures during an operational tour are rare

3. Given the success of the training provided and the effective selection process (albeit based on negative, excluding criteria), virtually all qualified ordnance officers and NCOs appear to be capable of carrying out their skilled tasks in dangerous conditions. The ability to perform bomb-disposal duties is not confined to a small group of exceptional soldiers.
4. Many operators experience some fear, but virtually all of them nevertheless perform well.
5. The overall success rate vindicates the (negative) selection process and the specialized training.
6. A large minority of operators experience little or no subjective fear before, during or after carrying out their duties.
7. No predictors of poor performance were established.
8. Operators who received decorations for gallantry obtained exceptionally low scores on the Hypochondriasis scale - they reported virtually no mental or physical problems.
9. Equally competent, but non-decorated, operators also obtained scores below civilian norms, but not as low as their decorated colleagues.
10. Decorated operators showed less physiological responsiveness under laboratory stress than did other operators, who in turn showed less responsiveness than civilians.
11. The difference between decorated and non-decorated operators in physiological responsiveness under stress, was not accompanied by differences in subjective reactions to stress.

12. The psychometric tests and psychiatric screening interviews did not predict success or failure under combat conditions.
13. The specialized training course was followed by a steep increase in self-estimated skill and in willingness to serve under combat conditions.
14. Broadly, the results of the training course support the view that soldiers can be trained to perform courageously and/or in other cases, fearlessly.
15. Under combat conditions, self-estimated skill increased to a very high level by mid-tour and remained high post-tour
16. With some exceptions, operators were well satisfied with their performance of bomb-disposal duties, as reported weekly during the tour.
17. The most frequently reported problem was the lack of opportunity for exercise/sport, followed by excessive paper work and difficulties with superiors.
18. During the tour, levels of confidence were high and usually stable, especially among the experienced operators.
19. Mood states were mostly calm and stable, but a few notable exceptions were observed.
20. Experienced operators were better able than novices to "switch off" when not on operational duty.
21. At the end of the tour, most operators expressed satisfaction with their overall performance and a majority felt that they had benefited from the experience (more mature, better soldier, etc.). However, there was selective forgetting of earlier reports of subjective fear.

22. A small majority reported that they had made at least one major error during their tour.
23. The most frequently reported weakness was a tendency to cut corners.
24. Nearly two-thirds of the fullest sample of operators reported significant fear at some stage of their combat tour - one in three reported that they never experienced significant combat fear.
25. Significant fear was reported early in the tour (first three weeks) more often than late.
26. Diffuse fear was reported by 1 in 4 operators towards the end of the tour.
27. Fear was not related to the sheer number of exposures to danger.
28. Operators who reported most fear had higher ratings of unhappiness on the self-reported mood scales.
29. Ratings of competence increased markedly after the successful completion of the first one or two disposal tasks.
30. Physical reactions (such as sweating, trembling) were reported to have been experienced commonly during operations.
31. The pattern of these reactions resembles that reported by paratroop trainees and by other military samples in varying combat conditions.
32. The mid-tour rest was appreciated, but not preceded or followed by any notable changes in performance or confidence.
33. Paratroop trainees reported steep increases in self-confidence after training; the pattern was comparable to that seen among the operators.

34. Among the paratroop trainees there was a negative association between fear (during jumping) and confidence; however, this fear was not related to trainees' estimates of the dangerousness of jumping.
35. Paratroop trainees who scored high on the Hypochondriasis scale reported greater fear during jumps than did trainees who scores low on the H scale.
36. All the trainees completed the parachuting course successfully - even those who gave high fear reports.
37. Trainees who reported most physical reactions during jumping also gave high subjective fear reports, and disclosed a wider range of general fears prior to training.
38. As in the case of the bomb-disposal operators, performance of a dangerous task was generally successful.
39. The specialized training appears to have made an important contribution to skill and confidence in parachuting. Confidence in turn, is related negatively to subjective fear during the commission of the task.
40. To some extent, fear and fearlessness are general traits.

PUBLICATIONS, ETC.

The first scientific paper, on the specificity of courageous behaviour, has now been published and copies are attached. A second paper, given at the Anglo-US Military Psychiatry Symposium at the Royal Army Medical College in October, 1980, is in press. In addition, we are in the process of preparing a longer report on the effects of training, operational tour performance, reactions, and post-tour adjustment. A technical paper reporting the results of the laboratory stress test has been accepted for publication, and a non-technical paper summarizing the progress of the research is nearing a final draft. Copies of the four publications are enclosed. I have given a number of talks to scientific audiences with a military interest, and the possibility of widening our sample to include other types of operational personnel is being explored.

ADMINISTRATIVE

There have been no administrative changes since the Interim Report was prepared.


S. Rachman

REFERENCES

- BANDURA, A. (1977) Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.
- BASOWITZ, H., PERSKY, H., KORCHIN, S. and GRINKER, R. (1954) Anxiety & Stress. New York, McGraw Hill
- COX, D., HALLAM, R., O'CONNOR, K. and RACHMAN, S. (1982) An experimental analysis of fearlessness and courage. Brit.J.Psychology. (in press)
- DANIEL, D. (1976) Rating of resistance to stress in parachute jumpers. Studia Psychologica, 18, 89-91.
- FENZ, W. (1975) Strategies for coping with stress, in Stress and Anxiety (Ed: I. Sarason & C. Spielberger) New York, Wiley
- FENZ, W. and EPSTEIN, S. (1967) Gradients of physiological arousal in paracutists. Psychosomatic Medicine, 29, 33-51.
- HALLAM, R. and RACHMAN, S. (1980) Courageous acts or courageous actors? Pers.Ind.Diffs., 1, 341-346.
- JANIS, I. (1951) Air War & Emotional Stress. New York, McGraw Hill
- LANG, P. (1970) Stimulus control, response control and desensitisation of fear, in Learning Approaches to Therapeutic Change (Ed: D. Levis) Chicago, Aldine.
- MACDONALD, P. (1977) Stopping The Clock. London, Hale.
- MEAD and STEWART (1975) "FELIX": A preliminary study of psychological characteristics of EOD operators. Univ.Man. M.Phil Dis.
- RACHMAN, S. (1976) Courage, fearlessness and fear. New Scientist, Feb.5.
- RACHMAN, S. (1978) Fear and Courage. San Francisco, W.H. Freeman.
- RACHMAN, S. (1980) (Ed) Perceived Self-Efficacy Adv.Beh.Res.Ther., 1, 139-269.
- SCHAFFER, R. (1949) American Soldier Vol.II: Combat and Its Aftermath (Ed: S. Stouffer) Princeton, Princeton Univ.Press.
- WALK, R. (1956) Self-ratings of fear in a fear-evoking situation. Journal of Abnormal & Social Psychology, 52, 171-178.

APPENDIX 1 - WEEKLY DIARY

Code no. _____

Date _____ Week no. _____

General level of activity this week: (FOR YOURSELF)

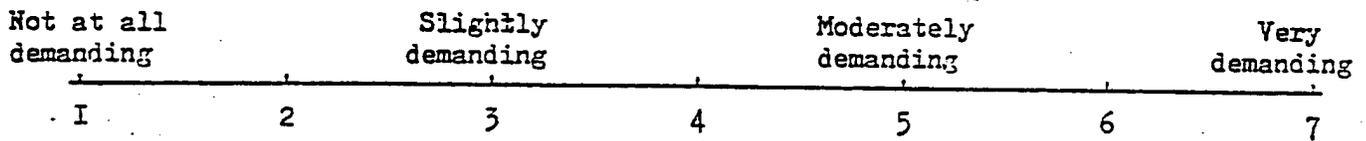
Number of hoax calls

Number of genuine calls

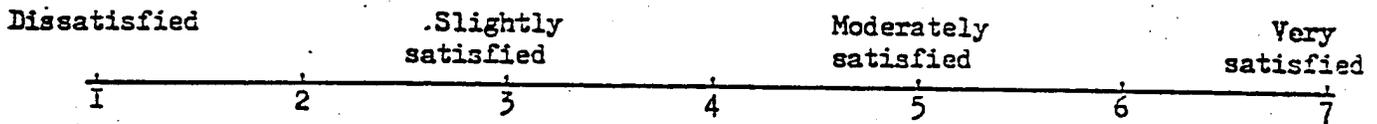
Satisfaction with your performance:

THE JOB YOU WERE MOST SATISFIED WITH THIS WEEK

Taking all factors into account how demanding (ie difficult to carry out/puzzling/risky etc was it? Place an X against one of the numbers.



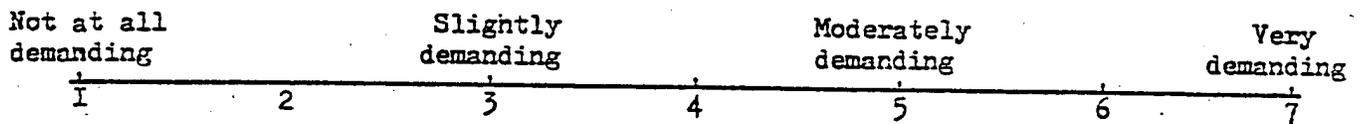
How do you feel about your performance on this particular operation?



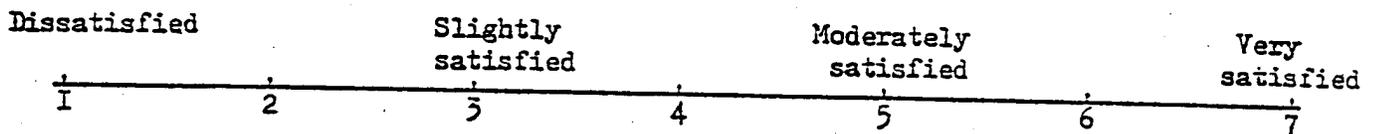
THE JOB YOU WERE LEAST SATISFIED WITH THIS WEEK

Please repeat these same measures for the job you were least satisfied with this week.

How demanding was it?



How do you feel about your performance on this particular operation?



Any further comments you would like to make about these jobs?

APPENDIX 1 (contd)

PLEASE CHECK (✓) AS APPROPRIATE

This week my confidence in my performance on the following items showed;

	A definite drop	A Slight drop	No Change	A Slight increase	A definite increase
Flexible planning of operations					
Manual RSP					
Working with SF support					
Thinking logically about information provided					
Ability to use remote handling equipment					
Staying alert and vigilant					
Resisting pressure for haste					
Obtaining information about IED's					
Use of protective clothing					
Use of hook and line					
Resisting tendency to act too quickly					
Approaching IED after soak time					
Handling civilians at scene of incident					
Resisting tendency to act too slowly					
Use of ECM equipment					

PLEASE CHECK ANY OF THE FOLLOWING PROBLEMS THAT ARE CONCERNING YOU THIS WEEK

(✓) = slight concern, (✓✓) = definitely concerned. (Check only the problems that concern you)

- | | |
|--|--------------------------------------|
| Illness affecting wife/children/parents. () | Opportunity for social life. () |
| Food. () | Unpleasant working conditions. () |
| Bereavement. () | Lack of entertainment. () |
| Lack of sleep. () | Paperwork/reports. () |
| Difficulties with colleagues or seniors. () | Opportunity for sport/exercise. () |
| Medical symptoms. () | Any other problems not listed above: |
| Career problems. () | ----- |
| Financial problems. () | ----- |
| Disciplinary or court matters. () | ----- |
| Marital problems. () | ----- |
| Quartering. () | ----- |
| Insomnia. () | ----- |

APPENDIX 1(contd)

PLEASE RATE WHAT YOUR MOOD HAS BEEN LIKE IN GENERAL OVER THE PAST WEEK

Encircle one of the alternatives for each adjective as follows:

- vv v ? no = definitely feel (the word definitely describes how you have been feeling)
 vv v ? no = feel slightly (the word applies only slightly to your feelings over the past week)
 vv v ? no = cannot decide (you cannot decide whether the word describes how you have been feeling)
 vv v ? no = definitely do not feel (this word definitely does not describe how you have been feeling)

LEISURELY	vv	v	?	no	UNHAPPY	vv	v	?	no
ACTIVE	vv	v	?	no	JITTERY	vv	v	?	no
WORTHLESS	vv	v	?	no	TIRED	vv	v	?	no
SLEEPY	vv	v	?	no	FURIOUS	vv	v	?	no
CLUTCHED UP	vv	v	?	no	STILL	vv	v	?	no
AT REST	vv	v	?	no	STIRRED UP	vv	v	?	no
GROUCEY	vv	v	?	no	HELPLESS	vv	v	?	no
LIVELY	vv	v	?	no	DROWSY	vv	v	?	no
FULL OF PEP	vv	v	?	no	ANGRY	vv	v	?	no

Please do not leave out any of the adjectives.

APPENDIX 2 CATTELL CAQ SCALE DESCRIPTIONS

Part II. The Pathology Supplement

Factor	Low Sten Score Description (1-3)	High Sten Score Description (8-10)
D ₁	Is happy, mind works well, does not find ill health frightening LOW HYPOCHONDRIASIS	Shows overconcern with bodily functions, health, or disabilities HIGH HYPOCHONDRIASIS
D ₂	Is contented about life and surroundings, has no death wishes ZESTFULNESS	Is disgusted with life, harbors thoughts or acts of self-destruction SUICIDAL DISGUST
D ₃	Avoids dangerous and adventurous undertakings, has little need for excitement LOW BROODING DISCONTENT	Seeks excitement, is restless, takes risks, tries new things HIGH BROODING DISCONTENT
D ₄	Is calm in emergency, confident about surroundings, poised LOW ANXIOUS DEPRESSION	Has disturbing dreams, is clumsy in handling things, tense, easily upset HIGH ANXIOUS DEPRESSION
D ₅	Shows enthusiasm for work, is energetic, sleeps soundly HIGH ENERGY EUPHORIA	Has feelings of weariness, worries, lacks energy to cope LOW ENERGY DEPRESSION
D ₆	Is not troubled by guilt feelings, can sleep no matter what is left undone LOW GUILT AND RESENTMENT	Has feelings of guilt, blames himself for everything that goes wrong, is critical of himself HIGH GUILT AND RESENTMENT
D ₇	Is relaxed, considerate, cheerful with people LOW BORED DEPRESSION	Avoids contact and involvement with people, seeks isolation, shows discomfort with people HIGH BORED DEPRESSION
P _a	Is trusting, not bothered by jealousy or envy LOW PARANOIA	Believes he is being persecuted, poisoned, controlled, spied on, mistreated HIGH PARANOIA
P _p	Avoids engagement in illegal acts or breaking rules, sensitive LOW PSYCHOPATHIC DEVIATION	Has complacent attitude towards own or others' anti-social behavior, is not hurt by criticism, likes crowds HIGH PSYCHOPATHIC DEVIATION
S _c	Makes realistic appraisals of himself and others, shows emotional harmony and absence of regressive behavior LOW SCHIZOPHRENIA	Hears voices or sounds without apparent source outside himself, retreats from reality, has uncontrolled and sudden impulses HIGH SCHIZOPHRENIA
A _s	Is not bothered by unwelcome thoughts and ideas or compulsive habits LOW PSYCHASTHENIA	Suffers insistent, repetitive ideas and impulses to perform certain acts HIGH PSYCHASTHENIA
P _s	Considers himself as good, dependable, and smart as most others LOW GENERAL PSYCHOSIS	Has feelings of inferiority and unworthiness, timid, loses his head easily HIGH GENERAL PSYCHOSIS

Note: High score means the description on the right.

Capsule Descriptions of the Sixteen Primary Personality Factors
(more technical titles are in parentheses)

Low Score Direction

FACTOR A (1)

High Score Direction

Reserved, Detached, Critical, Cool
(Sizothymia, previously Schizothymia)*

vs. Outgoing, Warmhearted, Easy-going,
Participating
(Affectothymia, previously Cyclothymia)*

The person who scores low (sten of 1 to 3) on Factor A tends to be stiff, cool, skeptical, and aloof. He likes things rather than people, working alone, and avoiding compromises of viewpoints. He is likely to be precise and "rigid" in his way of doing things and in personal standards, and in many occupations these are desirable traits. He may tend, at times, to be critical, obstructive, or hard.

The person who scores high (sten of 8 to 10) on Factor A tends to be goodnatured, easy-going, emotionally expressive (hence naturally Affectothymia), ready to cooperate, attentive to people, soft-hearted, kindly, adaptable. He likes occupations dealing with people and socially-impressive situations. He readily forms active groups. He is generous in personal relations, less afraid of criticism, better able to remember names of people.

*Because of its excellent confirmation of the Bleuler and Kretschmer schizothymia-cyclothymia dimension, Factor A has been so named since its discovery some twenty years ago. Unfortunately, the less-informed general public has insisted on the dramatic association with the schizophrenic abnormality rather than the normal dry, withdrawn temperament. Worse, the literal translation as "split personality" has led to the erroneous association of a schizothyme with multiple personality—a disorder perhaps more likely to be found at the opposite end of the scale!

Accordingly, it seems best henceforth to refer to the A dimension as *Sizothymia* (sī-zō-thī-mī-ā) vs. *Affectothymia*. "Sizo" stresses the emotional detachment, dryness, or flatness of A- (sizo from *assidere*, as in the root for painter's *size* used to make colors "lie flat"). At the same time, it would improve the A+ reference to call it *Affectothymia*, emphasizing the affective rather than the cyclical aspect, since easy emotional expansiveness and contact are more central than mood swings. Associations with the abnormal projection, as in affective psychosis, may be present but have not been proved. The clearer distinction by sound of *Sizothymic* and *Affectothymic* should also assist oral discussion.

FACTOR B (2)

Less Intelligent, Concrete-thinking
(Lower scholastic mental capacity)

vs. More Intelligent, Abstract-thinking,
Bright
(Higher scholastic mental capacity)

The person scoring low on Factor B tends to be slow to learn and grasp, dull, given to concrete and literal interpretation. His dullness may be simply a reflection of low intelligence, or it may represent poor functioning due to psychopathology.

The person who scores high on Factor B tends to be quick to grasp ideas, a fast learner, intelligent. There is some correlation with level of culture, and some with alertness. High scores contraindicate deterioration of mental functions in pathological conditions.

FACTOR G (6)

Expedient, Evades Rules, Feels Few Obligations
(Weaker superego strength)

The person who scores low on Factor G tends to be unsteady in purpose. He is often casual and lacking in effort for group undertakings and cultural demands. His freedom from group influence may lead to anti-social acts, but at times makes him more effective, while his refusal to be bound by rules causes him to have less somatic upset from stress.

vs. Conscientious, Persevering, Staid, Rule-bound
(Stronger superego strength)

The person who scores high on Factor G tends to be exacting in character, dominated by sense of duty, persevering, responsible, planful, "fills the unforgiving minute." He is usually conscientious and moralistic, and he prefers hard-working people to witty companions. The inner "categorical imperative" of this essential superego (in the psychoanalytic sense) should be distinguished from the superficially similar "social ideal self" of Q₂+

FACTOR H (7)

Shy, Restrained, Diffident, Timid
(Threctia)

The person who scores low on this trait tends to be shy, withdrawing, cautious, retiring, a "wallflower." He usually has inferiority feelings. He tends to be slow and impeded in speech and in expressing himself, dislikes occupations with personal contacts, prefers one or two close friends to large groups, and is not given to keeping in contact with all that is going on around him.

vs. Venturesome, Socially-bold, Uninhibited, Spontaneous
(Parmia)

The person who scores high on Factor H is sociable, bold, ready to try new things, spontaneous, and abundant in emotional response. His "thick-skinnedness" enables him to face wear and tear in dealing with people and grueling emotional situations, without fatigue. However, he can be careless of detail, ignore danger signals, and consume much time talking. He tends to be "pushy" and actively interested in the opposite sex.

FACTOR I (8)

Tough-minded, Self-reliant, Realistic, No-nonsense
(Harria)

The person who scores low on Factor I tends to be practical, realistic, masculine, independent, responsible, but skeptical of subjective, cultural elaborations. He is sometimes unmoved, hard, cynical, smug. He tends to keep a group operating on a practical and realistic "no-nonsense" basis.

vs. Tender-minded, Dependent, Over-protected, Sensitive
(Premsia)

The person who scores high on Factor I tends to be tender-minded, day-dreaming, artistic, fastidious, feminine. He is sometimes demanding of attention and help, impatient, dependent, impractical. He dislikes crude people and rough occupations. He tends to slow up group performance, and to upset group morale by unrealistic fussiness.

APPENDIX 2 (contd)

FACTOR L (9)

Trusting, Adaptable, Free of Jealousy, vs. Suspicious, Self-opinionated, Hard to
Easy to Get on With Fool
(Alaxia) (Protension)

The person who scores low on Factor L tends to be free of jealous tendencies, adaptable, cheerful, un-competitive, concerned about other people, a good team worker.

The person who scores high on Factor L tends to be mistrusting and doubtful. He is often involved in his own ego, is self-opinionated, and interested in internal, mental life. He is usually deliberate in his actions, unconcerned about other people, a poor team member.

N.B. This factor is not necessarily paranoia. In fact, the data on paranoid schizophrenics are not clear as to typical Factor L value to be expected.

FACTOR M (10)

Practical, Careful, Conventional, Regu- vs. Imaginative, Wrapped up in Inner Ur-
lated by External Realities, Proper gencies, Careless of Practical Matters,
(Praxernia) (Autia)

The person who scores low on Factor M tends to be anxious to do the right things, attentive to practical matters, and subject to the dictation of what is obviously possible. He is concerned over detail, able to keep his head in emergencies, but sometimes unimaginative.

The person who scores high on Factor M tends to be unconventional, unconcerned over everyday matters, Bohemian, self-motivated, imaginatively-creative, concerned with "essentials," and oblivious of particular people and physical realities. His inner-directed interests sometimes lead to unrealistic situations accompanied by expressive outbursts. His individuality tends to cause him to be rejected in group activities.

FACTOR N (11)

Forthright, Natural, Artless, vs. Shrewd, Calculating, Worldly,
Sentimental Penetrating
(Artlessness) (Shrewdness)

The person who scores low on Factor N tends to be unsophisticated, sentimental, and simple. He is sometimes crude and awkward, but easily pleased and content with what comes, and is natural and spontaneous.

The person who scores high on Factor N tends to be polished, experienced, worldly, shrewd. He is often hardheaded and analytical. He has an intellectual, unsentimental approach to situations, an approach akin to cynicism.

APPENDIX 2 (contd)

FACTOR O (12)

Placid, Self-assured, Confident, Serene vs. Apprehensive, Worrying, Depressive,
(Untroubled adequacy) (Troubled
(Guilt proneness))

The person who scores low on Factor O tends to be placid, with unshakable nerve. He has a mature, unanxious confidence in himself and his capacity to deal with things. He is resilient and secure, but to the point of being insensitive of when a group is not going along with him, so that he may evoke antipathies and distrust.

The person who scores high on Factor O tends to be depressed, moody, a worrier, full of foreboding, and brooding. He has a childlike tendency to anxiety in difficulties. He does not feel accepted in groups or free to participate. High Factor O score is very common in clinical groups of all types (see *Handbook*).

FACTOR Q₁ (13)

Conservative, Respecting Established vs. Experimenting, Critical, Liberal,
Ideas, Tolerant of Traditional Analytical, Free-thinking
Difficulties (Radicalism)
(Conservatism)

The person who scores low on Factor Q₁ is confident in what he has been taught to believe, and accepts the "tried and true," despite inconsistencies, when something else might be better. He is cautious and compromising in regard to new ideas. Thus, he tends to oppose and postpone change, is inclined to go along with tradition, is more conservative in religion and politics, and tends not to be interested in analytical "intellectual" thought.

The person who scores high on Factor Q₁ tends to be interested in intellectual matters and has doubts on fundamental issues. He is skeptical and inquiring regarding ideas, either old or new. He tends to be more well informed, less inclined to moralize, more inclined to experiment in life generally, and more tolerant of inconvenience and change.

FACTOR Q₂ (14)

Group-dependent, A "Joiner" and vs. Self-sufficient, Prefers Own Decisions,
Sound Follower Resourceful
(Group adherence) (Self-sufficiency)

The person who scores low on Factor Q₂ prefers to work and make decisions with other people, likes and depends on social approval and admiration. He tends to go along with the group and may be lacking in individual resolution. He is not necessarily gregarious by choice; rather he needs group support.

The person who scores high on Factor Q₂ is temperamentally independent, accustomed to going his own way, making decisions and taking action on his own. He discounts public opinion, but is not necessarily dominant in his relations with others (see Factor E). He does not dislike people but simply does not need their agreement or support.

APPENDIX 2 (contd.)

FACTOR Q₃ (15)

Undisciplined Self-conflict, Careless of Protocol, Follows Own Urges vs. *Controlled; Socially-precise, Following Self-image*
(Low integration) (High self-concept control)

The person who scores low on Factor Q₃ will not be bothered with will control and regard for social demands. He is not overly considerate, careful, or painstaking. He may feel maladjusted, and many maladjustments (especially the affective, but not the paranoid) show Q₃-.

The person who scores high on Factor Q₃ tends to have strong control of his emotions and general behavior, is inclined to be socially aware and careful, and evidences what is commonly termed "self-respect" and regard for social reputation. He sometimes tends, however, to be obstinate. Effective leaders, and some paranoids, are high on Q₃.

FACTOR Q₄ (16)

Relaxed, Tranquil, Torpid, Unfrustrated vs. *Tense, Frustrated, Driven, Overwrought*
(Low ergic tension) (High ergic tension)

The person who scores low on Factor Q₄ tends to be sedate, relaxed, composed, and satisfied (not frustrated). In some situations, his oversatisfaction can lead to laziness and low performance, in the sense that low motivation produces little trial and error. Conversely, high tension level may disrupt school and work performance.

The person who scores high on Factor Q₄ tends to be tense, excitable, restless, fretful, impatient. He is often fatigued, but unable to remain inactive. In groups he takes a poor view of the degree of unity, orderliness, and leadership. His frustration represents an excess of stimulated, but undischarged, drive.

APPENDIX 3

Skill and Willingness Scales

The Seven IED situations for rating:

1. Suspicious parcel in a post-office
2. Suspected land-mine in a culvert beneath a country road
3. Suspected car bomb in an urban area
4. Suspected bomb in a petrol tanker in an urban area.
5. Suspected bomb in a derelict home in Falls Road
6. Suspect milk-churn in country lane
7. Suspected bomb on fifth floor of building

Skill Scale

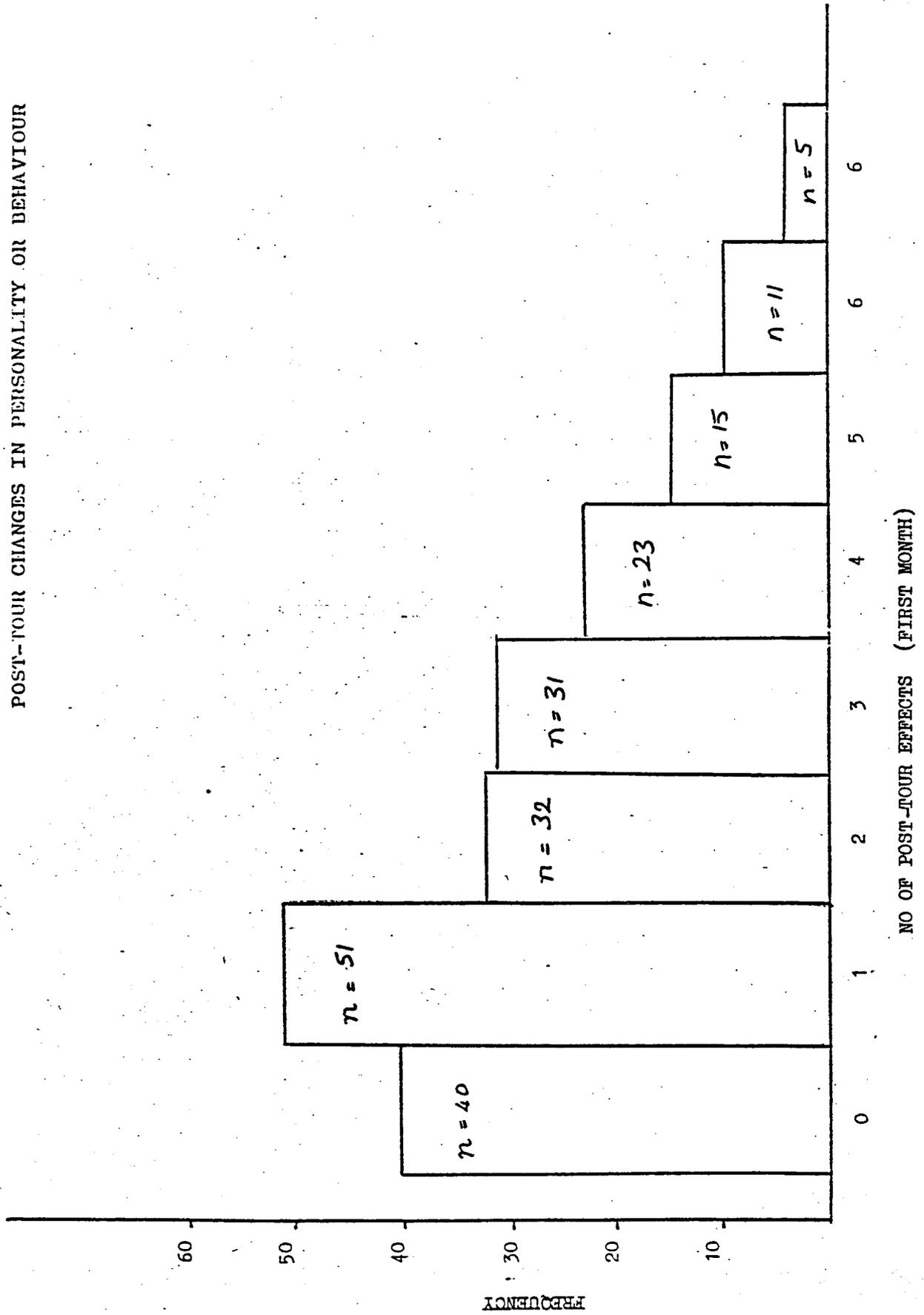
- 0 ----- No skills or knowledge for dealing with this situation
- 10 -----
- 20 ----- Some degree of skills and knowledge but definitely not adequate for dealing with this situation successfully
- 30 -----
- 40 ----- Fair degree of skills and knowledge but not adequate for dealing with this situation
- 50 -----
- 60 ----- Skills and knowledge are just about adequate
- 70 -----
- 80 ----- Skills and knowledge are adequate
- 90 -----
- 100 --- Skills and knowledge are adequate for dealing with this situation in the best possible manner

Willingness Scale

- 0 ---- Would not accept
- 10 ----
- 20 ---- Would accept with extreme reluctance
- 30 ----
- 40 ---- Would accept with a moderate degree of reluctance
- 50 ----
- 60 ---- Would accept with slight reluctance
- 70 ----
- 80 ---- Would accept without reluctance
- 90 ----
- 100 ---- Would accept and look forward to operation

APPENDIX 4

NUMBER OF OPERATORS SHOWING NONE, ONE OR MORE
POST-TOUR CHANGES IN PERSONALITY OR BEHAVIOUR



Positive Scoring Items

19. Sometimes I feel that my nerves are going to pieces
(true/uncertain/false)
20. I can't keep up with daily activities because I don't feel well
(true/uncertain/false)
37. Every few days my stomach feels bloated and uncomfortable
(Yes, definitely/a little/no, not at all)
38. I feel weak and ill
(most of the time/sometimes/practically never)
56. I feel my health is rundown and I should see a doctor soon
(true/uncertain/false)
73. Much of the time I feel sluggish and too weary to move
(true/partly true/false)

Negative Scoring Items

1. My mind works quickly and well these days
(yes, nearly always/sometimes/hardly ever)
2. I feel fit and happy
(most of the time/sometimes/very rarely)
55. I hardly ever feel unwell and 'out of sorts'
(true, I hardly ever feel out of sorts/in between/false, I often feel that way)
91. I almost never feel that life is a burden
(true/in between/false)
109. I don't often have trouble in swallowing my food
(true/in between/false, I can sometimes scarcely eat)
127. I don't feel I'm any worse or have more bad health than anybody else
(true, I don't feel this way/uncertain/false)

APPENDIX 6

WEEKLY DIARY

Code No. _____ Date _____ Week No. _____

Activity level for this week: (number of calls you personally dealt with)

Genuine _____ Hoaxes _____ False alarms _____ Other (explosions, etc.) _____

Each of the following adjectives describe different moods, feelings, and states of mind. Please indicate how you would describe your feelings over the past week when (a) working on a suspected IED, and (b) when on call, by encircling one of the alternatives against each adjective. You may check off opposite feelings (eg. sleep and active) if both describe how you have been feeling in these situations at different times.

- vv = definitely felt this way (the word definitely describes how you have been feeling)
- v = felt slightly (the word applies only slightly to your feeling)
- ? = cannot decide (you cannot decide whether the word describes how you have been feeling)
- no = definitely did not feel this way (this word definitely does not describe how you have been feeling)

(A) WHEN ON TASK (WORKING AS THE NO 1 OPERATOR, PLANNING AND EXECUTING A JOB)

LEISURELY	vv	v	?	no	UNEASY	vv	v	?	no
ACTIVE	vv	v	?	no	JITTERY	vv	v	?	no
WORTHLESS	vv	v	?	no	TIRED	vv	v	?	no
SLEEPY	vv	v	?	no	FURIOUS	vv	v	?	no
FEARFUL	vv	v	?	no	QUIET	vv	v	?	no
AT REST	vv	v	?	no	WIPED UP	vv	v	?	no
GROGGERY	vv	v	?	no	HELPLESS	vv	v	?	no
LIVELY	vv	v	?	no	BROSY	vv	v	?	no
FULL OF PEP	vv	v	?	no	ANGRY	vv	v	?	no

(B) WHEN ON DUTY BUT NOT TASKED TO DEAL WITH AN IED

LEISURELY	vv	v	?	no	UNEASY	vv	v	?	no
ACTIVE	vv	v	?	no	JITTERY	vv	v	?	no
WORTHLESS	vv	v	?	no	TIRED	vv	v	?	no
SLEEPY	vv	v	?	no	FURIOUS	vv	v	?	no
FEARFUL	vv	v	?	no	QUIET	vv	v	?	no
AT REST	vv	v	?	no	WIPED UP	vv	v	?	no
GROGGERY	vv	v	?	no	HELPLESS	vv	v	?	no
LIVELY	vv	v	?	no	BROSY	vv	v	?	no
FULL OF PEP	vv	v	?	no	ANGRY	vv	v	?	no

APPENDIX 6 contd...

PLEASE CHECK (✓) AS APPROPRIATE

This week my confidence in my performance on the following items showed:

	A definite drop	A Slight drop	No Change	A Slight increase	A definite increase
Flexible planning of operations					
Manual ESP					
Working with SF support					
Thinking logically about information provided					
Ability to use remote handling equipment					
Staying alert and vigilant					
Resisting pressure for haste					
Obtaining information about IED's					
Use of protective clothing					
Use of hook and line					
Resisting tendency to act too quickly					
Approaching IED after soak time					
Handling civilians at scene of incident					
Resisting tendency to act too slowly					
Use of ECM equipment					

PLEASE CHECK ANY OF THE FOLLOWING PROBLEMS THAT ARE CONCERNING YOU THIS WEEK

(✓) = slight concern, (✓✓) = definitely concerned. (Check only the problems that concern you)

- Illness affecting wife/children/parents. ()
 - Food. ()
 - Bereavement. ()
 - Lack of sleep. ()
 - Difficulties with colleagues or seniors. ()
 - Medical symptoms. ()
 - Career problems. ()
 - Financial problems. ()
 - Disciplinary or court matters. ()
 - Marital problems. ()
 - Quartering. ()
 - Insomnia. ()
 - Boredom. ()
 - Opportunity for social life. ()
 - Unpleasant working conditions. ()
 - Lack of entertainment. ()
 - Paperwork/reports. ()
 - Opportunity for sport. ()
 - Opportunity for exercise. ()
- Please list any other problems you have encountered over the past week that are not listed above:
-
-
-

APPENDIX 6 contd...

FREE COMMENT: please feel free to add any additional comments pertaining to your activities over the past week that you feel will be of interest to us.

APPENDIX 7

WEEKLY DIARY : Post R&R Report

Code No. _____

Date _____

Week No. _____

Activity level for this week: (number of calls you personally dealt with)

Genuine _____ Hoaxes _____ False alarms _____ Other (explosions, etc.) _____

Each of the following adjectives describe different moods, feelings, and states of mind. Please indicate how you would describe your feelings over the past week when (a) working on a suspected IED; and (b) when on call, by encircling one of the alternatives against each adjective. You may check off opposite feelings (eg. sleepy and active) if both describe how you have been feeling in these situations at different times.

- VV = definitely felt this way (the word definitely describes how you have been feeling)
- V = felt slightly (the word applies only slightly to your feelings)
- ? = cannot decide (you cannot decide whether the word describes how you have been feeling)
- NO = definitely did not feel this way (this word definitely does not describe how you have been feeling)

(1) WEEK ON TASK (WORKING AS THE NO. 1 OPERATOR, PLANNING AND EXECUTING A JOB)

DESIRESLY	VV	V	?	NO	UNHAPPY	VV	V	?	NO
ACTIVE	VV	V	?	NO	JITTERY	VV	V	?	NO
WORKLESS	VV	V	?	NO	TIRED	VV	V	?	NO
SLEEPY	VV	V	?	NO	FURIOUS	VV	V	?	NO
FEARFUL	VV	V	?	NO	QUEEN	VV	V	?	NO
AT REST	VV	V	?	NO	SLEEPED UP	VV	V	?	NO
CROUCHY	VV	V	?	NO	HELPLESS	VV	V	?	NO
LIVELY	VV	V	?	NO	DROWSY	VV	V	?	NO
FULL OF FEP	VV	V	?	NO	ANGRY	VV	V	?	NO

(2) WEEK ON DUTY BUT NOT TASKED TO DEAL WITH AN IED

DESIRESLY	VV	V	?	NO	UNHAPPY	VV	V	?	NO
ACTIVE	VV	V	?	NO	JITTERY	VV	V	?	NO
WORKLESS	VV	V	?	NO	TIRED	VV	V	?	NO
SLEEPY	VV	V	?	NO	FURIOUS	VV	V	?	NO
FEARFUL	VV	V	?	NO	QUEEN	VV	V	?	NO
AT REST	VV	V	?	NO	SLEEPED UP	VV	V	?	NO
CROUCHY	VV	V	?	NO	HELPLESS	VV	V	?	NO
LIVELY	VV	V	?	NO	DROWSY	VV	V	?	NO
FULL OF FEP	VV	V	?	NO	ANGRY	VV	V	?	NO

APPENDIX 7 contd...

PLEASE CHECK (✓) AS APPROPRIATE

This week my confidence in my performance on the following items showed;

	A definite drop	A Slight drop	No Change	A Slight increase	A definite increase
Flexible planning of operations					
Manual ESP					
Working with SF support					
Thinking logically about information provided					
Ability to use remote handling equipment					
Staying alert and vigilant					
Resisting pressure for haste					
Obtaining information about IED's					
Use of protective clothing					
Use of hook and line					
Resisting tendency to act too quickly					
Approaching IED after soak time					
Handling civilians at scene of incident					
Resisting tendency to act too slowly					
Use of ECM equipment					

PLEASE CHECK ANY OF THE FOLLOWING PROBLEMS THAT ARE CONCERNING YOU THIS WEEK

(✓) = slight concern, (X) = definitely concerned. (Check only the problems that concern you)

- | | |
|---|---|
| <p>Illness affecting wife/children/parents. ()</p> <p>Food. ()</p> <p>Bereavement. ()</p> <p>Lack of sleep. ()</p> <p>Difficulties with colleagues or seniors. ()</p> <p>Medical symptoms. ()</p> <p>Career problems. ()</p> <p>Financial problems. ()</p> <p>Disciplinary or court matters. ()</p> <p>Marital problems. ()</p> <p>Quartering. ()</p> <p>Insomnia. ()</p> <p>Boredom. ()</p> | <p>Opportunity for social life. ()</p> <p>Unpleasant working conditions. ()</p> <p>Lack of entertainment. ()</p> <p>Paperwork/reports. ()</p> <p>Opportunity for sport. ()</p> <p>Opportunity for exercise. ()</p> <p>Please list any other problems you have encountered over the past week that are not listed above:</p> <hr/> <hr/> <hr/> |
|---|---|

APPENDIX 7 contd...

R & R Report: Please indicate how you would describe your feelings over the R&R period.

LEISURELY	VV	V	?	no	UNHAPPY	VV	V	?	no
ACTIVE	VV	V	?	no	JITTERY	VV	V	?	no
WORDLESS	VV	V	?	no	TIRED	VV	V	?	no
SLEEPY	VV	V	?	no	FURIOUS	VV	V	?	no
FEARFUL	VV	V	?	no	QUEER	VV	V	?	no
AT REST	VV	V	?	no	STERED UP	VV	V	?	no
GROUCHY	VV	V	?	no	HELPLESS	VV	V	?	no
LIVELY	VV	V	?	no	DROWSY	VV	V	?	no
FULL OF PEP	VV	V	?	no	ANGRY	VV	V	?	no

Where did you spend your R&R. _____

How do you feel about returning to IED work. _____

Do you notice any change in yourself as the result of the R&R. _____

Free comment: please feel free to add any additional comments pertaining to your activities over the past week that you feel will be of interest to us. This information may relate to both IED activities and the R&R period.

APPENDIX 8

Final Report: would you please complete this report when you have finished your tour in N.I. and before you return home

Circle any of the alternatives that apply to you

In general, and taking such factors as fatigue, anxiety, work load, boredom into account, was your tour -

- | | |
|--------------------------------|---|
| a. Much better than expected | a |
| b. Rather better than expected | b |
| c. Generally as expected | c |
| d. Rather worse than expected | d |
| e. Much worse than expected | e |

Did you feel that your performance as an operator -

- | | |
|--|---|
| a. Improved steadily throughout the tour | a |
| b. Fluctuated throughout the tour | b |
| c. Was unchanged throughout the tour | c |

How did you come to terms with the risks and dangers of your job on tour? (Circle as many alternatives as you wish and add any further views under (j) Other_____)

- | | |
|--|---|
| a. Reliance on good luck | a |
| b. Reliance on your IED training | b |
| c. Reliance on skill and confidence to analyse job in hand | c |
| d. Reliance on God or religious faith | d |
| e. Pretending that no danger existed | e |
| f. Conviction that doing an important job for a just cause | f |
| g. Identification with your colleagues and team | g |
| h. Conviction that it couldn't happen to me | h |
| i. Fear of letting yourself down or showing anxiety | i |
| j. Other_____ | k |

How did waiting for a task when on call affect you?

- | | |
|--|---|
| a. Generally made me quite tense and anxious | a |
| b. At first made me quite tense and anxious but gradually got used to it | b |
| c. Did not make me anxious and tense | c |

APPENDIX 8 contd...

What effect did working on a device have on you?

- a. Generally made me extremely tense and anxious a
- b. Generally made me quite tense and anxious b
- c. At first made me tense and anxious but gradually got used to it c
- d. Did not make me anxious and tense d

Were you aware of any personal tendencies or weaknesses which could have made you vulnerable as an operator and against which you had to guard - in effect an Achilles Heel?

- a. To work too quickly a
- b. To work too slowly b
- c. To plan approach by inspiration rather than by logical thought c
- d. To become casual and complacent d
- e. Too much preoccupation with detail e
- f. Tendency to cut corners f
- g. Trying to meet expectations of SF and others g
- h. To become less alert after several false alarms h
- i. Failure to anticipate likely results of actions taken i
- j. Intolerance of fatigue or sleep loss j
- k. Other _____ k

Were you ever aware (or was it pointed out to you by others) that you had made a mistake in approach or techniques which could have had potentially dangerous consequences?

- a. Yes - on a single occasion only a
- b. Yes - more than one occasion b
- c. Never c

If you marked a or b, can you briefly say what these mistakes were?

APPENDIX 8 contd...

Do you feel that your tour has changed you in any way as a person?

- a. No a
- b. More mature and contented b
- c. Increased self-confidence and self-respect c
- d. A better soldier d
- e. More cynical and disillusioned e
- f. More intolerant and critical f
- g. Less satisfied with your career g
- h. Other _____ h

During your tour has your intake of alcohol shown-

- a. No change from pre-tour levels a
- b. An increase from pre-tour levels b
- c. A decrease from pre-tour levels c

During your tour has your consumption of cigarettes shown -

- a. No change from pre-tour levels a
- b. An increase from pre-tour levels b
- c. A decrease from pre-tour levels c

During your tour, have you noticed any change in your attitudes or feelings towards other people, close friends or relatives? If so, please specify.

Do you anticipate any problems in adjustment following your tour in H.I., and, if so, could you indicate what these might be.

APPENDIX 8 contd...

Free Comment: please feel free to add any additional comments pertaining to your tour of duty in N.I. that you think will be of interest to us.

We are planning to follow-up your tour in N.I. with a final questionnaire in approximately three months. Could you indicate where you will be going following your tour so that we might contact you directly.
