



WOMEN IN THE ARMED FORCES

May 2002

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(A Report by the Employment of Women in the Armed Forces Steering Group)

ISSUE

1. To present the results of academic and other work, that will contribute to an assessment of the impact on combat effectiveness of removing the present exclusion of women from Royal Marines General Service (RMGS), Household Cavalry and Royal Armoured Corps (H Cav/RAC), Infantry, and RAF Regiment.

BACKGROUND

2. On 27 Oct 97, SofS announced that the Army was to extend employment opportunities for women from 47% to 70% of posts. At the same time, he ordered "... an investigation as to whether employment options for women in the Armed Forces can be expanded still further. The results will depend, in part, on a full investigation of any potential impact on combat effectiveness that the introduction of women to forward units could cause ..."

3. CDS advised SofS that the issue of any further expansion of employment opportunities for women, across all three Services, should be reviewed again in three years, once the results of a comprehensive programme of monitoring and evaluation was complete. He intended to complete a formal evaluation of the opening of 70% of posts to women in the Army, and allowing women to serve in attached billets in the Royal Marines, before considering whether to move to a totally unrestricted policy. He anticipated that this process would take at least two years to achieve meaningful results.

DEFINITIONS, ASSUMPTIONS, AND SCOPE OF STUDY

4. Combat Effectiveness is the ability of a unit/formation/ship, weapon system or equipment to carry out its assigned mission, role or function. The cohesion of a unit is a vital factor in its combat effectiveness¹.

5. Cohesion is defined in this paper as the ability of a unit to remain committed towards the same goal utilising the unit members' shared standards and support for each other. This will be especially vulnerable in the harshest of conditions (combat), when the commitment of individuals to remain in the unit, and the motivation to complete the assigned goal, will be under extreme pressure.

6. Interoperability is the ability of an individual to carry out a range of tasks within his or her unit, without extra training. Units involved in direct combat have a greater requirement for interoperability because the need for immediate replacement of casualties is greater. Thus in an infantry unit all soldiers must possess the skills, and be at the required standard, for inclusion in a combat team.

7. The British Armed Forces are raised, structured and equipped principally for combat. They are to be capable of intervening effectively at short notice in any type of conflict short of general war. They train therefore for high intensity warfare, and adapt for operations at lower levels.² It has

1. JWP 0-01-1.

2. British Defence Doctrine.

been the experience of British Armed Forces in recent years that units deployed on operations other than war (OOTW) may also have to engage in direct combat without warning.

8. The posts currently closed to women are those where they would be required to close with and kill the enemy using direct fire weapons. In practice this means RMGS, H Cav/RAC, Infantry, and RAF Regiment. The employment of women in Special Forces is not considered here.

9. The study has not examined the present exclusion on health and safety grounds of women from serving in submarines or as mine clearance divers.

10. This paper presents the results of several studies and a summary of the experiences of the three Services in the employment of women. It does not draw conclusions nor offer any opinion, but observations are made.

LEGAL POSITION

11. The lawfulness of the current MoD policy rests on evidence that it was adopted for the purposes of ensuring combat effectiveness, and that the policy was made in good faith. Counsel has advised that although Section 85(4) of the Sex Discrimination Act 1995 states that “nothing in the Act shall render unlawful an act done for the purposes of ensuring combat effectiveness”, this should be interpreted narrowly; the purposes of this section being to bring into effect the Equal Treatment Directive (ETD)(EC Council Directive 76/207 EEC of 9 Feb 1976). There is no blanket exclusion of the Armed Forces from the EC Treaty, and subordinate legislation and the ETD, therefore, apply to the Armed Forces.

12. In the case of *Mrs Sirdar v the Army Board and SofS for Defence*,³ the European Court of Justice (ECJ) ruled that Member States can derogate from the principle of equal treatment in the interests of combat effectiveness but such derogation must be necessary and appropriate. The case was referred to the British Courts but was settled without being tested under British law. The burden of proof in that case would have been upon the Department to show, as a matter of fact, but allowing for a degree of discretion, that interoperability is necessary to achieve combat effectiveness; and that it is necessary that the RMGS must be all male to achieve combat effectiveness.

METHODOLOGY

13. The study is presented in two parts. Part 1 consisted initially of two formal literature reviews. The first considered gender and bio-medical aspects of performance assessed as relevant to the performance of military tasks. The second examined the impact of gender on group task performance in order to identify areas where further study was required. The experience of other nations was considered, and finally a review of the experience of the Armed Forces in the employment of women over the past few years was carried out, and in particular, the experience of the Army since the numbers of posts open to women were increased from 47% to 70%.

14. Part 2 presents the results of further work that was conducted in order to gain a better understanding of the impact of employing women in the most demanding combat roles. A survey of attitudes towards the employment of women in the Army was conducted by an independent polling organisation. A field experiment was carried out at ITC Wales to examine the cohesion of small mixed gender teams.

3. ECJ Judgement C-273/97 26 Oct 99 and ET 29410/95 28 Apr 97, *Mrs Sirdar vs Army Board and SofS*.

15. A schematic of the logic path for the study is at Annex A.

PART ONE

SURVEY OF SCIENTIFIC LITERATURE

16. Bio-Medical Aspects of Performance. A review of the scientific literature on gender issues in physiological performance was conducted⁴, with emphasis on areas deemed relevant to the performance of military tasks. Over 100 studies were reviewed, and a summary is at Annex B. The key findings were:

- a. Anatomical and physiological factors disadvantage women in most aspects of physical performance. Male attributes of greater height, weight, fat free mass and lower body fat are associated with better performance in military tasks such as lifting and carrying weights, and marching with a load. Muscle strength, endurance and power are 30-60% lower in women, and only 1% of women match the mean level of these attributes in men. Similarly in aerobic fitness, only the fittest 1% of women reach the level of fitness of the average man. Thus women have a lower overall work capacity and must exert themselves 25-30% more than a man to achieve the same output. By operating closer to their maximum level more of the time, endurance is reduced.
- b. Men and women exhibit similar gains in fitness as a result of training, but women may not have the same overall capacity. In part this is due to a lower capacity for increasing muscle bulk because of lower levels of testosterone. Differences between men and women are less among trained soldiers than among recruits, with women narrowing the gap in levels of aerobic fitness. However, size and muscle bulk remain the most important factors associated with increased performance of military tasks.
- c. Because women are generally working at a higher percentage of their maximal effort to achieve the same levels of performance as men, they are at increased risk of over-use injury, and this finding was confirmed by morbidity data from the Army's Training Agency and from the Field Army. Smaller size and lower bone density also predispose to a higher incidence of stress fractures. However, men and women of equal fitness have an equal incidence of injuries.
- d. A review of female recruits entering the Army in 1999 showed that if current selection standards were applied retrospectively, only 0.1% of those applying would have reached the standard for entry to the Infantry or RAC. Of trained female soldiers, 1% would reach the standard⁵.
- e. While there is little evidence to suggest that the onset of a normal menstrual period affects job performance, irregular menstrual cycles pose health risks, and painful menstruation can impair performance. Some women report a significant impact of menstrual and pre-menstrual symptoms on academic, physical and military activities, others report enhanced performance, and some favour artificial suspension of their cycle during exercise and operational deployments. Heat tolerance may be impaired at some stages of a normal cycle.

4. Gender and Bio-Mechanical Aspects of Performance in the Infantry and Royal Armoured Corps, A Review of Literature for AG Human Sciences (Army) Mark Rayson, 11 Dec 00.

5. See also para 25.

17. Observation. If entry standards are set realistically against the demands of the military tasks, a small number of women will reach them and pass through training. There is no research available that can predict how they would cope with the sustained physical workload that is a feature of the progressive training that an infantry soldier undergoes over several years. The average fitness of any group will be reduced by mixing in a population with a lower mean fitness level, but it is still the case that individual women will attain the set standards for physical fitness.

18. Impact of Gender on Group Task Performance. The scientific literature was reviewed for research on areas that were deemed to be relevant to military personnel. The Executive Summary of this study is at Annex C. A total of 107 published scientific studies from the last 15 years were reviewed⁶. Academic studies on non-military participants, and applied military research were included, but the selection of research concentrated on areas deemed relevant to the military environment. The main areas covered considered individual and group characteristics relating to: gender differences in mental characteristics, mental toughness, physical toughness, aggression, impact of social processes on group task performance, organisational culture and groups, group formation, leadership, performance of mixed gender teams, cohesion and bonding, protection and sexual relationships. Briefly covered were gender differences in physical characteristics, health, and experiences of post-traumatic stress disorder. None of these studies had been carried out in a combat setting.

19. Mental Characteristics. It is not possible to state unequivocally that all women will have certain mental characteristics that will predispose them to particular patterns of behaviour. This is equally true for men. There were some trends however:

a. After physical capacity, the second largest area of gender difference was apparent in the capacity for aggression. There was evidence that women required more provocation and were more likely to fear the consequences of their aggressive behaviour. The evidence led to the conclusion that given social licence and enough provocation, the gap between male and female aggression could be closed.

b. Women and men suffer from a different pattern of physical and mental ailments, although the reasons for this are varied and not fully understood. This observation is of significance when the experience of the Armed Forces is examined below⁷.

c. Some other gender differences were apparent, such as differences in spatial abilities, but of no obvious relevance in the work setting. On the whole there are more similarities in male and female abilities than differences.

d. Several studies illustrated the influence of negative and positive attitudes to gender that exist within groups, and showed that the perception of status, and prevalent stereotypes, can affect group dynamics and ultimately group effectiveness. The findings from research into small groups highlighted common problems in constructing cohesive teams, and the importance of maintaining them through effective one-to-one interaction and teamwork skills.

e. Organizational culture is a strong determinant of views about appropriate conduct, and has been shown to influence the achievement of goals. Studies have shown that some military groupings derive their group identity from a set of masculine values. Other

6. The Impact of Gender on Group Task Performance; May 1999, Kendall W; Human Sciences (Army).

7. See also para 38.

organisational work shows that violation of norms that express the identity and values of a group can have a major impact on the group's performance.

f. A further review has been undertaken since this study was commissioned to determine the extent of knowledge about the effects of introducing lone women into a male grouping. Negative consequences reported include the high profile given to token women, isolation, and pressure to demonstrate performance. These negative consequences are not experienced by token men in a female environment.⁸

20. Observations.

a. There exists a wide body of literature that reports on the psychological differences between men and women. This work covers many areas from mental/cognitive characteristics to leadership and performance in mixed gender groups. These areas have also been investigated in a number of different environmental settings ranging through business, academic and military. The findings and results from this work have produced ambiguous evidence concerning the psychological differences between men and women. The end result is that no clear conclusion can be drawn regarding the psychological characteristics of men and women. In the area of group dynamics, it may be easier to achieve and maintain cohesion in a single sex team, and there is resistance to inclusion of members who do not conform to group norms.

b. It will be necessary to define more clearly the physical and mental requirements of combat before it is possible to judge whether women could perform as effectively as men. No evidence was found to suggest that mixed gender teams performed less well than single sex teams in settings that did not include combat. The importance of attitudes to changes in established views, and the importance of organisational culture was emphasised, and led to recommendations for the further studies undertaken in Part 2.

PHYSICAL SELECTION AND PSS(R)

21. The adoption of Physical Selection Standards (Recruits) (PSS(R)) introduced a gender-free, job-related physical selection system for recruits joining the Army from April 1998. The programme uses a battery of 9 physiological tests to predict performance on a series of Representative Tasks (RMTs) conducted at the end of the Common Military Syllabus (Recruit) (CMS(R)). The RMTs were derived from scientific study⁹ of 64 physically demanding role-related tasks extracted from 132 role-related tasks identified by Arms Directors across the Army. The criteria identified at the outset for the PSS(R) tests were:

- a. They were to be related to the military task.
- b. They were to set common standards which were bias free.
- c. They should act as a scientifically valid predictor of physical performance.
- d. They should be cost effective.

22. The PSS(R) initial tests were designed to indicate a greater than 90% probability of passing the RMTs at the end of CMS(R). Immediately prior to the introduction of PSS(R), the Army decided

8. The Differential Impact of Gender on Tokenism Expectancies. Macdonald TW, Dissertation University of Wisconsin, Dec 1998.

9. APRE Report 94RO36 dated Mar 94.

that a probability of 90% could have an adverse effect on the numbers of recruits entering training and so extended the probability of success down to greater than 60%. Whilst PSS(R) was validated before introduction, for men, the trial sample of females was insufficient to provide useful statistical evidence of any potential bias. A contract has been let (Jan 2001) to re-validate PSS(R), specifically focusing on females and juniors. This will report in late 2002.

23. A review of the PSS(R) grades of 2,367 female recruits attempting to join the Army in a 12 month period revealed that only a very small number would have achieved the grades required for entry to the Combat Arms had they been eligible and wished to apply. It also showed that in one Arm, the Royal Artillery (RA), different grades were required for different trades. This has led to a predictable problem, where women have joined the RA but now find that their career progression is limited by an inability to compete for all posts. Grade A is a pass, but it was decided in 1998 that Bs & Cs would be accepted. D - E is a fail.

| Arm | Grade A | B | C | D - E | Total |
|----------|------------|------------|------------|-------------|-------|
| Infantry | 2(0.1%) | 22(0.9%) | 40(1.7%) | 2303(97.3%) | 2367 |
| RAC | 0 | 9(0.4%) | 18(0.8%) | 2340(98.9%) | 2367 |
| RA | 14(0.6%) | 123(5.2%) | 226(9.5%) | 2004(84.7%) | 2367 |
| RA dvrs | 254(10.7%) | 690(29.2%) | 272(11.5%) | 1151(48.6%) | 2367 |
| RE | 1 | 27(1.1%) | 42(1.8%) | 2298(97%) | 2367 |

Table 1. Theoretical numbers of female recruits achieving PSS(R) grade for entry to Combat Arms.

24. Observation. Having agreed that a physical standard is required, it is important to validate that standard against the tasks to be performed, and against the population undergoing testing. Modification of selection tests to ensure greater uptake of candidates may have unforeseen adverse consequences. Selection and training regimes were changed to ensure that they were gender free in 1998 and the impact that this change has had has not yet been fully evaluated. It is not known why there is a disproportionately high rate of injury among female recruits and further work is required in this area. Evidence available suggests that only a very small number of women wishing to join the Army would achieve the necessary grades for entry to the combat Arms.

IMPACT OF WIDER EMPLOYMENT OPPORTUNITIES IN BRITISH ARMED FORCES

25. Several recent changes are worthy of analysis: the removal of the exclusion of women from going to sea in 1990; the increase in Apr 98 of the posts in the Army that are open to women from 47% to 70%; the opening of 1,300 attached billets in 3 Cdo Bde from 1998, and the introduction of female aircrew in 1989. There are differences in the experience of the 3 Services.

26. The Naval Service. The nature of combat in ships is different from that in the infantry and armour. Whilst damage control of a ship can impose very great physical burdens, and there is no doubt that the combat effectiveness of a ship in the front line depends on teamwork and cohesion, the primary role of Royal Naval personnel is not to close with and kill the enemy in hand to hand combat. The percentage of women in the Royal Navy has increased over the last 10 years and this trend looks set to continue.

| Year | Apr-90 | Apr-91 | Apr-92 | Apr-93 | Apr-94 | Apr-95 | Apr-96 | Apr-97 | Apr-98 | Apr-99 | Apr-00 | Oct-00 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Male | 53,476 | 52,066 | 51,973 | 51,177 | 48,528 | 44,639 | 42,233 | 38,878 | 37,585 | 36,310 | 35,681 | 35,290 |
| Female | 3,183 | 3,441 | 3,956 | 4,106 | 3,886 | 3,557 | 3,317 | 2,802 | 2,771 | 2,761 | 2,854 | 2,878 |
| Total | 56,659 | 55,507 | 55,929 | 55,283 | 52,414 | 48,196 | 45,550 | 41,680 | 40,356 | 39,071 | 38,535 | 38,168 |
| % Female | 5.6% | 6.2% | 7.1% | 7.4% | 7.4% | 7.4% | 7.3% | 6.7% | 6.9% | 7.1% | 7.4% | 7.5% |

Table 2 Trained strength of the Royal Navy, by gender, 1990 to 2000

27. In Aug 00, the University of Plymouth published its third and final report into the integration of women into surface ships. Its principal findings were:
- a. That significant progress has been made in integrating women into the Royal Navy since the 1993 report. They are increasingly accepted as a normal part of Naval life. Women are more confident in their tasks and duties and report less hostility and harassment. Now only 13% of male officers and senior ratings expressed a preference to serve on an all-male ship (down from 47% in 1993). Amongst junior ratings the figure was 37% down from 70%, although 50% of ratings still express some negative opinions about mixed crewing.
 - b. The Study also found that officers and senior rates now tend not to see the disciplining of women as a problem. Male junior rates, however, are still likely to consider that discipline may be undermined if favouritism is shown to women. Almost 50% of Junior Rates expressed some negative opinions about mixed crewing, especially in relationship to the physical capabilities of women and the belief that women are not being allocated their fair share of physically demanding tasks. This remains an important management issue
 - c. A second area of concern which is growing in prominence is the management of relationships. The problems they cause were the possible disturbance of working, social and disciplinary relationships caused by indiscreet behaviour, inter-rate/rank relationships, or by the jealousies and tensions that can arise, especially when relationships end. Dealing with relationships is now seen as the biggest single issue for both male and female officers. It is noteworthy that the Plymouth Study predated the introduction of the Code of Social Conduct.
 - d. Men have become more likely to agree that the presence of men and women on board leads to there being a “more normal environment”.
 - e. The lack of female senior rates, and therefore an insufficient number of sea-going role models at senior rate level, continues to be seen as a problem.
 - f. Women are more likely to anticipate shorter careers, and unlikely to feel it possible to combine a Naval career with motherhood.
 - g. Privacy and decency are not issues on board ships at present but might become one in a mixed gender amphibious force. The nature of accommodation on board ships means that a minimum number of women are needed to fill the accommodation set aside for them. There is no similar consideration for officers for whom single cabin accommodation may be possible. Isolation of female officers and ratings is not seen as a problem.

28. The Army - Impact of Change from 47% to 70%.

- a. In April 1998 the Army changed its employment policy to open all posts in the RA, RE and REME to women, and removed restrictions on where theoretically they might serve on a linear battlefield. The chart below illustrates the increased trained female representation in these Arms since the change:

| | 1 Apr 98 | | | | 1 Oct 00 | | | |
|------|----------|-----|-------|-----|----------|-----|-------|-----|
| | Offr | OR | Total | % | Offr | OR | Total | % |
| RA | 23 | 191 | 214 | 2.7 | 41 | 344 | 385 | 4.8 |
| RE | 17 | 2 | 19 | 0.2 | 40 | 5 | 45 | 0.5 |
| REME | 23 | 128 | 151 | 1.5 | 27 | 160 | 187 | 2.0 |

Table 3. Numbers of women serving in Arms where all posts were opened to them since 1998.

b. Although all Career Employment Groups (CEGs) are open to women in these Arms, experience is showing that, having passed through CMS(R) and reached the necessary standard, they are tending to gravitate by choice towards the more technical and less physically demanding CEGs. In the RA more women are employed in driving, signalling and command post work than on the gun line. In the REME a higher proportion are employed as technicians and technical stores persons than vehicle mechanics. There are no female recovery mechanics. There are only five female other ranks (ORs) in the RE.

c. Since 1 April 1990 the female proportion of the Army's total trained strength has increased from 4.5% to 6.7%. The total number of women serving in the Army, however, has been remained fairly constant over that time, dipping in the mid 1990s, and rising steadily but slowly since 1996.

| Year | Apr-90 | Apr-91 | Apr-92 | Apr-93 | Apr-94 | Apr-95 | Apr-96 | Apr-97 | Apr-98 | Apr-99 | Apr-00 | Oct-00 |
|--------|---------|---------|---------|---------|---------|---------|---------|--------|--------|--------|--------|--------|
| Male | 131,273 | 129,943 | 126,810 | 119,708 | 109,746 | 98,759 | 94,550 | 93,239 | 91,683 | 90,214 | 90,079 | 89,701 |
| Female | 6,155 | 6,682 | 6,640 | 6,777 | 6,367 | 5,773 | 5,527 | 5,507 | 5,769 | 6,086 | 6,396 | 6,409 |
| Total | 137,428 | 136,625 | 133,450 | 126,485 | 116,113 | 104,532 | 100,077 | 98,746 | 97,452 | 96,300 | 96,475 | 96,110 |
| % F | 4.5% | 4.9% | 5.0% | 5.4% | 5.5% | 5.5% | 5.5% | 5.6% | 5.9% | 6.3% | 6.6% | 6.7% |

Table 4. Trained strength of the Army, by gender, 1990 to 2000.

d. Examining how the distribution of women across the Army as a whole has changed since Apr 98, given the wider choice of career employment, the overall impression is of only slight change. The RLC, Int Corps and QARANC had fewer serving female soldiers in Oct 00 than Apr 98. As a percentage of the total serving female soldier population, the RLC share has fallen by 3.7%, the QARANC by 0.9% and the Int Corps by 0.4%. The RA share has risen by 2.5%, the RAMC by 0.8%, the REME by 0.3% and the RE by 0.1%. Whilst the statistical evidence is not definitive, there is some evidence to suggest that women are now driving vehicles for the RA, who, had the policy change not occurred, would be driving for the RLC.

e. Views of Army Arms and Service Directors. Directors of those Army Arms and Services that employ women directly, expressed a generally positive view of the impact on standards of behaviour and discipline, but concerns about the sharing of physically demanding tasks. In technical trades women perform as well as men. It was felt that the available pool of women was finite, and wider opportunities would spread the available talent more thinly. A clear distinction was drawn by the Arms Directors between Peace Support Operations (PSO) and warfighting. PSO had dominated recent deployments. It was felt that the employment of female soldiers had, on balance, had no adverse impact on combat effectiveness during PSO, and in reasonably benign operational circumstances.

f. Manning/Return of Service. As a proportion of the total strength of the Army, the percentage of women has increased annually over the last 10 years. In the Army, whilst the average return of service (RoS) for men and women is increasing, the average female officer serves four years less than her male counterpart and female soldiers serve three years less than males. The average RoS for women in all 3 Services is less than for men. It follows that a higher percentage of women leave the Army while still at a junior rank, both officers and other ranks. RAMC Combat Medical Technicians CEG has a female population of 50% in the rank of Private, 25% at Lance Corporal, only 3% in the rank range Sergeant/Warrant

Officer. REME reported that 91% of female soldiers had left prior to reaching the rank of Cpl.

29. The Royal Air Force.

a. The RAF has employed women in diverse areas of employment for a considerable length of time but there have been two significant changes in the last 12 years: first, in common with the other Services, the possibility of further service following pregnancy; and second, the opportunity for females to serve as pilots or navigators. The policy change to allow female pilots and navigators was set in place in 1989. Initially, women were eligible for service to fly multi-engined aircraft and helicopters but, in 1991, the policy was again changed to allow them to serve as fast jet aircrew. As at Jan 01 there were 34 female pilots and 33 female navigators (with a further 18 pilots and 30 navigators in training), many of whom have already served (and continue to serve) in operational environments. There is no empirical evidence but the subjective view within the manning directorate is that there has been no adverse effect on operations.

b. Since 1 Apr 90, the proportion of women serving in the RAF has increased from 7.2% to 9.6%. Moreover, this percentage increase reflects a real rise in the number of women serving in that period. Currently, 96.4% of officer and airman posts are open to women; the 3.6% of posts not open to women are in the branches of RAF Regt and RC padre, and the trade of Gunner (who may be employed on either Rapier or Field Sqn duties). Women are predominantly employed within the Medical and Dental, and communications and administration CEGs, although some are employed in the more physically demanding trades of fire-fighting (2 females, or 0.3% of the Trade's trained strength), physical training (43 or 9.2%) and aircraft engineering (215 or 2.2%).

| Year | Apr-90 | Apr-91 | Apr-92 | Apr-93 | Apr-94 | Apr-95 | Apr-96 | Apr-97 | Apr-98 | Apr-99 | Apr-00 | Oct-00 |
|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Male | 77,457 | 76,174 | 75,196 | 72,247 | 67,956 | 63,525 | 57,212 | 49,653 | 48,149 | 47,175 | 46,170 | 45,413 |
| Female | 6,018 | 6,447 | 6,777 | 6,616 | 6,253 | 5,906 | 5,298 | 4,543 | 4,528 | 4,586 | 4,823 | 4,842 |
| Total | 83,475 | 82,621 | 81,973 | 78,863 | 74,209 | 69,431 | 62,510 | 54,196 | 52,677 | 51,761 | 50,993 | 50,255 |
| % F | 7.2% | 7.8% | 8.3% | 8.4% | 8.4% | 8.5% | 8.5% | 8.4% | 8.6% | 8.9% | 9.5% | 9.6% |

Table 5 Trained strength of the RAF, by gender, 1990 to 2000

30. Morbidity Rates. The incidence of sickness in the three Services differs between men and women:

a. Naval Service. On 1 Dec 00 the total naval strength was 42,450, 93.3% male and 6.7% female. Of the total, 5.3% were in remedial medical categories: 76.7% male and 23.3% female. Thus the proportion of men who were in remedial medical categories was 4.3% of their total strength, as opposed to 16.2% of women (excluding pregnancy). Since 1995 there has been a slight increase in the percentage of men in remedial categories, from 3.9% to 4.4%. For women there has been a steady increase from 7.8% to 16.2%.

b. Army. As at Jan 01, 9.8% of UK Trained Adult Personnel (UKTAP) in the Army were non-FE. Of that number, 86.7% were male, and 13.3% were female. As a percentage of their overall representation, 9.1% of all men were non-FE as at 1 Jan 01, compared with 19.3% of women. The most significant statistical change over the last six years is the rise in female non-FE rates compared to the male rates. The percentage of men non-FE has risen from 5.4% in Apr 94 to 9.1% in Jan 01, while the percentage of women non-FE has risen from 7% to 19.3%. It is thought that a number of factors have had a compounding influence. The

Army is ageing, it has a tauter manning structure, and a higher operational tempo, which is likely to have lead to a stricter application of the grading criteria, coupled with changes in the organisation of the AMS, and access to military medical specialists. Nonetheless, the discrepancy between male and female rates is real, and requires further analysis. The male/female non-FE ratio is consistent across the age groups (with a steady rise for both genders with age) and is true for all capbadges employing a substantial proportion of women, with no bias by capbadge.

c. Army Recruits. A similar trend is seen in Army recruits. Since the introduction of PSS(R) and CMS(R), female recruits are more likely to suffer musculo-skeletal injury than men. Data are not available to quantify this across the recruiting and training organization. However they are eight times more likely to be discharged in training as a result¹⁰. New work has been commissioned to determine reasons for this, and also to examine whether there are any long-term physical consequences resulting from physical training regimes on those who do pass successfully.

d. RAF. In the RAF, 7% of the total trained strength are medically downgraded. Records of downgrading have only been analysed centrally for the past four years, but in that time the percentage of personnel downgraded has risen from 3.5% to 7%. Analysis of the Jan 01 data shows that 6.7% of men are downgraded in comparison to 15.6% of women.

31. Pregnancy and Parenthood. Pregnancy in the military population is managed by application of medical employment standards that can be used to monitor the incidence, and also enable application of restrictions on employment. However, the three Services record this data in different ways.

a. Naval Service. Pregnant women are placed in medical category P3R, which is not unique to pregnancy. At 01 Dec 00, the declared number of pregnant women in MedCat P3R was 61 out of the total number of women who were in remedial medical categories of 517. Because of the latitude allowed in terms of reporting, this number is likely to underestimate the actual number of pregnant servicewomen.

b. Army. In the Army, the percentage of personnel having notified pregnancy at 01 Jan 01 were, Officers 3%, other ranks 5.8%, overall 5.6%.

c. RAF. In the RAF at 01 Jan 01, 5% of the total female workforce had notified pregnancy.

32. Observations. The presence of women has been welcomed in most areas and is felt to contribute to a more mature and civilised environment. The management of intra-unit relationships is a problem that remains unresolved. Women are meeting entry standards but then gravitate to technical, less demanding roles. Where physical standards are not clearly defined or enforced, anecdotal evidence suggests that a disproportionate physical workload is falling on men. It is not clear whether wider employment opportunities, or attempts to apply equal physical standards during training, are causing a disproportionate level of injury and morbidity among female personnel. Pregnancy and maternity absence is predictable and at a reasonably steady state, but denudes the workforce and a manning margin might have to be considered. The RAF already has a manning margin which generates around eight officer and 50 ground trades posts in the trained requirement.

10. DASA.

PRIVACY AND DECENCY

33. The Armed Forces aim to provide privacy and decency for all people, regardless of gender, where operationally possible. Although anecdotal reports suggest that this aim is not being met everywhere, the Army attitude survey¹¹ confirmed that it was not a major concern for service personnel, but might be a concern for spouses. However, the relatively benign conditions that prevail on exercises and current operations may affect that view.

OTHER NATIONS' PRACTICE

34. Most nations have little or no experience of employing women in ground combat units in high intensity warfare. Historically women have been actively involved in irregular warfare, typically in revolutionary movements as partisans and guerrillas. When those forces came to power and formed their own government they have tended to organize their armed forces conventionally and have not allowed women to serve in the combat arms.

35. Two nations are commonly cited as having employed women in traditional combat roles. The Israeli forces did employ women up until 1948, but withdrew them abruptly. Different reasons are cited. Firstly, casualty rates had been higher in mixed gender units than in all male units. The assumption was that Arab soldiers had fought more determinedly against women rather than risk disgrace by surrendering to them. Other accounts indicate that this decision was made arbitrarily following the massacre of women in a small patrol that had been captured. It was assessed that Israeli male morale suffered disproportionately when a female soldier was killed or wounded¹². The Soviet Army employed almost one million women during WWII, many in frontline units. There is no question that they were effective, but casualty rates were high and this was a war of national survival. They discontinued the policy at the end of the war.

36. The US Government also reviewed the role of women in its Armed Forces after the 1991 Gulf War¹³. Approximately 41,000 female service personnel (7% of the total US force) deployed to the Persian Gulf between Aug 90 and Feb 91, most in the Army. Thirteen US service women were among the 375 US service personnel who died, and two women were prisoners of war. The lack of public reaction to female casualties, and the requirement to recognize current practice, led to Congress (in 1992) repealing the 1948 law prohibiting women in combat aircraft and the "risk rule", which had presupposed a linear battlefield. In 1993 the Secretary of Defence invited the three Services to review their gender employment policies, and that year service on naval combat ships was opened to women. The Army opened a number of posts in the combat support areas to women in Oct 94, but re-affirmed that women should not serve in direct ground combat units.

37. The Canadian Forces (CF) lifted all restrictions on the employment of women in 1989 and reviewed their policy and experience 10 years later¹⁴. The representation of women had risen marginally (11.8% of Officers, 10.5% ORs), but total numbers had fallen as a result of the fall in overall numbers within the CF. They found that women still tended to join or migrate to traditional employment areas and that in the combat arms problems remained in selection, training, the application of physical standards, sexual harassment and fraternisation. Physical standards were seen as a mask for much more complex issues, and were applied erratically. The majority of women who had attempted to enter the combat arms reported mainly negative experiences, and those reporting positive experiences were still more likely to have left the CF or transferred to another Arm.

11. Referred to in part 2 of this paper.

12. Armed but not Dangerous: Women in the Israeli Military: M van Creveld, War in History, 2000, 7 (1).

13. Women in Combat: The 1992 Presidential Commission on the Assignment of Women in Combat in the Armed Forces, Brassey's (US) 1993.

¹⁴ Gender Integration in The Canadian Forces – A Quantitative and Qualitative Analysis, Dept of National Defence Canada Report R9901, April 1999

38. As a general trend, women are being employed more widely than ever before in Armed Forces, principally in technical, administrative and support functions. A number of European countries have made, or are in the process of making, significant policy changes, either to allow women to serve in the Armed Forces (Germany and Italy) or to broaden their employment. The rationale seems to be a combination of the need to re-structure from conscript to professional forces, and the Equal Treatment Directive. Combat effectiveness does not seem to have been an important consideration. Almost all Armed Forces continue to place some restrictions on where and how women are employed, and most debar them from serving in ground combat units. The exceptions to this are Belgium, Canada, Denmark, Norway, Spain and Sweden, and since Jan 01, Germany.

39. Observations.

a. Those nations that optimize their forces for high intensity warfare, who see war fighting rather than OOTW/Peacekeeping as their purpose, appear most cautious about deploying women in combat units. Where change is being made it may indicate largely unstated assumptions about the future nature of military operations.

b. Some nations have widened employment opportunities for women but none have actually tested them in combat. Arguments about decency, reaction to casualties and rights of women have been implicitly laid to rest by those nations that have adopted more open policies. The lessons available to be learned are less about the effects of wider employment, and more about how to manage the change.

PART TWO

ATTITUDE SURVEY

40. Methodology. The review of gender effects on group performance identified a number of areas where further work was required. To deliver this it recommended a cross sectional survey of attitudes and perceptions to identify and quantify factors that would enable or impede the extension of women's employment to HCav/RAC and Infantry. This research was conducted in two stages by an independent market research company. Stage 1 was a qualitative survey using focus groups and structured interviews to ascertain the key issues and range of attitudes around the debate. This information was used in the design of a questionnaire for Stage 2. This aimed to quantify the size and shape of attitudes that might impact on combat effectiveness. Participants were drawn from a representative sample, by rank and gender, of trained personnel (UKTAP), recruits (mainly Phase 1) and spouses of serving personnel. Focus groups in Stage 1 were conducted in groups of 10-12, and in depth interviews were conducted with 10 commanders at a senior level, lieutenant colonel and above, seven male and three female. Self completed questionnaires were sent to 10,500 people and response rates exceeded 50% in all groups except spouses. The executive Summary is at Annex D.

41. Results.

a. Respondents were asked which Arms and Services women should serve in. Men were less in favour of women serving in all areas of the Army than women were. The greatest divergence of opinion between male and female UKTAP concerns their attitudes towards women serving in RE and RA. More than half of the serving women surveyed supported employment of women in HCav/RAC and Infantry. 36% of men disagreed strongly with the suggestion, but even in HCav/RAC and Infantry between 20-30% men thought it should be allowed.

- b. It was not generally felt that recruitment of women into HCav/RAC and Infantry would affect recruitment of men, but nor was it felt that it would increase the number of women wishing to join the Army.
- c. 19 statements covered issues relating to combat effectiveness, some making direct reference to increasing or decreasing combat effectiveness. UKTAP, recruits and spouses agree strongly that the Army must operate to maximum combat effectiveness, even if this means excluding women from roles in which they wish to serve. However, the majority of UKTAP and recruits also think that it is important that the Army demonstrate equal opportunities by allowing women into all posts where they pass the necessary physical tests. However, having agreed with that proposition, 45% of women felt that standards should take account of gender differences.
- d. 10 statements referred to men and women being treated differently. The majority of UKTAP and recruits of both sexes do not believe that men get more or better training or promotion opportunities than women. Neither, do UKTAP or spouses agree the women are often given better promotion opportunities than men. Men were more likely to feel that women were treated more leniently in training, and women felt that they had to do more to prove themselves. Sexual harassment was not generally thought to be a problem but men felt that a male superior was less likely to discipline a woman for fear of being accused of it.
- e. The issue of decency was not felt to be a major problem. Relationships were acknowledged as inevitable. Men were more likely to view this as a problem than women.
- f. Four statements related to the potential for death or injury while serving. Men tended to think that women are generally more vulnerable to injury than men, and are more vulnerable to being attacked on operational tours. Women tend to disagree with these statements. Most respondents agree that putting women at risk of death, rape or torture could negatively affect general public support for operations.

42. Observation. Attitudes shown by men and women in this survey were predictable in their direction but in many areas did not demonstrate such high barriers as had been expected. Nevertheless there are areas where strong opinions are held and these would be important if a change of policy were to be implemented.

FIELD EXPERIMENT

43. Background. A field experiment was conducted at ITC Wales between 3-29 Sep 00. A summary of the experimental design and results is at Annex E. It was designed to provide a method for measuring cohesion in small military groups, and to apply this to mixed gender sections. The hypothesis is that cohesion is the most important factor in motivating and sustaining combat performance among small groups of soldiers. There is little effective research on the effect of mixing gender and group performance. This experiment tested four hypotheses that assumed that varying the gender composition of sections would not affect cohesion and military performance.

44. Study Design. Most participants came from the Royal Artillery, were not specifically selected, and varied in age and experience. A total of 53 soldiers took part. A measure of cohesion was developed and piloted using data from research on US Army personnel. Military performance was measured by criteria in use at ITC Wales, and commanders were assessed separately by Directing Staff (DS) against standards set for the Junior Non-Commissioned Officer (NCO) Cadres. Six sections of varying gender composition were formed; five mixed and one all male. Training in basic infantry skills was given for two weeks followed by a testing phase of 12 days. During this

phase the sections completed a series of seven representative infantry exercises. Section cohesion was assessed by questionnaire against five factors, Leadership, Teamwork, Group Membership, Team Building and Group Stability. This was completed by section members to produce a subjective rating, and by DS to give a more objective assessment. Data collection was supervised by psychologists from Human Sciences (Army) who observed each of the exercise phases.

45. Findings. The Executive Summary is at Annex E but the experiment broadly showed that:
- a. The subjective measures of cohesion recorded by section members conformed with the assessment of cohesion observed by the DS, and varied between sections.
 - b. Measures of military performance were graded higher in sections with high cohesion scores.
 - c. Performance varied between the sections. Leadership and teamwork as assessed by section members and DS were more important in explaining variation between sections than gender mix.
 - d. Section leaders were assessed by DS on their command skills and qualities. Leadership qualities varied on different tasks but it was not possible to conclude that they were not related to gender because of the small sample size and limitations given below.
 - e. No method existed previously to measure the cohesion of an infantry section. It was therefore not possible to compare the findings of this experiment with any other data. This methodology could now be used to measure cohesion in an infantry section.
46. Limitations. The experiment could not replicate the infantry combat environment. Tasks were chosen to be representative in difficulty but it was never expected that they would be completed to the infantry standard. Subjects were not selected at the infantry standard nor did they have experience of infantry operations. They were not all volunteers and levels of motivation varied, and were not measured or controlled in the allocation of subjects to groups. All subjects did however find the exercise conditions demanding and were tested to the limit of their capabilities. The sample size was not large enough to allow extrapolation to the Field Army since at least six sections of each composition would be required to allow statistical inferences to be drawn. In order to conclude statistically that cohesion is an important element of combat effectiveness it will be necessary to measure it in infantry sections and other combat teams, and show that performance in those teams varies with the level of cohesion. Thus the findings of this study merely indicate trends, and highlight areas where further work is required, and how it may be conducted.
47. Observations. It has been suggested that cohesion is an important component of combat effectiveness but there is little experimental data to demonstrate this. In this experiment a methodology has been devised and tested that would enable this work to be undertaken in more representative conditions in the future. Looking specifically at the effect of mixed gender teams, the conclusion appears to be that leadership is more important than gender mix in determining cohesion.

Annexes:

- A. The Logic Path.
- B. Executive Summary of the Gender and Bio Mechanical Aspects of Gender Performance in The Infantry and Royal Armoured Corps.
- C. Executive Summary of The Impact of Gender Group Task Performance.
- D. Executive Summary of The Attitudes to Women in the British Army.
- E. Executive Summary of Field Experiment - The Impact of Mixed Gender Section on Cohesion and Military Performance.

The Logic Path**The Secretary of State Asks:**

“What would be the impact on the operational effectiveness of the Armed Forces of opening all posts to women?”
(Oct 97)

We can already made reasoned judgements about:

- Physical Strength PSS(R).
- Other armies experiences.
- Impact of extending employment options for women (eg 47% to 70%).
- Impact on women at sea.
- Privacy and decency.
- Morbidity rates of women.
- Return of service from women.

We do not yet know:

- Impact on team dynamics in high intensity operations.
- Extent to which attitudinal barriers would affect effectiveness.
- Whether there are any psychological limitations which make women less able to do the job.

Need for a Study
(May 98)

Phase 1 - Literature Survey

- What can scientific and academic work already tell us?
- What gaps will remain in our ability to answer

Answers (May 99)

There is no single personality characteristic that can be attributed exclusively to gender, so *theoretically* it should be possible for women to perform Inf and RAC task. But attitudinal barriers will be significant, and are unquantified.

There is no current data on team dynamics (as a function of gender mix) in mix) in a British military context.

Need for further review of physiological data.

Phase 2 - Attitudinal Survey (Aug 00)

To determine the size and shape of the barriers in order to assess their likely impact on operational effectiveness and how manageable

Phase 3 - Field Experiments (Sep 00)**Levelling the Playing Field**

- Common Military experience
- Infantry skills new to all of them
- Physical strength

To assess the impact of gender mixing on the dynamics of team.

Report
(Early 01)

Statistical Analysis
(Oct 00)

Military Judgement

Political Decision
(Mid 01)

EXECUTIVE SUMMARY OF GENDER AND BIO-MECHANICAL ASPECTS OF GENDER PERFORMANCE IN THE INFANTRY AND ROYAL ARMoured CORPS , A REVIEW OF LITERATURE FOR AG HUMAN SCIENCES (ARMY); RAYSON M, 11 DECEMBER 2000

INTRODUCTION

1. This document reviews over 100 studies that inform the discussion on the relevance of gender to bio-medical aspects of performance that are relevant to the Infantry and Royal Armoured Corps (RAC). This review focuses on the most recent and most relevant work. Interpretation is provided by the author, Mark Rayson PhD, a Consultant Military Physiologist with 15 years of consultancy and research experience.
2. The physical requirements of the Infantry and RAC roles are widely perceived to be very physically demanding where effective performance can differentiate life and death. Currently in the British Army, Career Employment Groups in these Arms are closed to women for a complex and controversial range of reasons. Lack of physical robustness, both in terms of physical fitness and susceptibility to injury are often cited as reasons for the continued exclusion of women. This document reviews the evidence that substantiates or refutes these commonly held perceptions.

BODY SIZE AND COMPOSITION

3. Anatomical and physiological factors disadvantage women in most aspects of physical performance that are associated with military performance. Greater height, weight and fat free mass, and less body fat are associated with better performance on military tasks such as lifting and carrying equipment and loaded marching.
4. On average, female to male ratios of body size and composition in British Army applicants and trained soldiers are:
 - a. 0.93 for height.
 - b. 0.85 to 0.89 for body weight.
 - c. 1.93 to 2.32 for body fat.
 - d. 0.74 to 0.76 for fat free mass.

BONE

5. Women have smaller bones than men do, which results in 30%-40% higher mechanical stress within vertebral bodies for equivalent applied loads. Female bones, on average, are narrower and have thinner cortices. The smaller size of the femur and tibia in women is associated with a higher risk of developing stress fractures during military training.

STRENGTH

6. Muscular strength, muscular endurance and power are strongly related to military task performance. Meta-analyses of the civilian literature report women's upper body strength to average 56-58%, lower body strength 66-72% and trunk strength 62-64% of men's values.
7. On average, female to male ratios in both British Army applicants and trained soldiers are:
 - a. 0.55 to 0.68 for static strength.

- b. 0.55 to 0.63 for dynamic strength.
- c. 0.39 to 0.49 for power.

8. Less than 1% of women can match the average man for strength.

AEROBIC FITNESS

9. Aerobic fitness is also key to performance on sustained military activities, be they loading and unloading munitions, marching with loads or digging trenches. On average, female to male ratios for aerobic fitness in British Army applicants and trained soldiers are:

- a. 0.75 to 0.78 when corrected for body weight (applicable to unloaded running).
- b. 0.67 when uncorrected for body weight (applicable to activities with a significant external load such as loaded marching, material handling).

10. The aerobically fittest 1% of women approximate the average man.

11. The implications of this difference in aerobic fitness between men and women are twofold. First, women have a lower work capacity than men. Second, women exposed to the same physical workload as men have to exert themselves around 25-35% more to achieve the same results and are therefore at greater risk of sustaining an injury.

THERMAL TOLERANCE

12. The higher work intensity in women while performing any given task results in elevated heart rates and higher core and skin temperatures. Women are therefore likely to be exposed to relatively greater physiological and heat stress than men for a given activity in a given environment.

13. Women are less physiologically tolerant than men are to both extreme heat and cold. Smaller body size, greater body surface area to body weight and lower levels of aerobic fitness result in poorer thermal tolerance. In environments where evaporative and convective heat loss is limited, such as while wearing protective clothing or in hot, humid climates, females may be especially disadvantaged.

MATERIAL HANDLING CAPABILITY

14. Material Handling tasks (lifting, lowering, carrying, pushing, pulling) are the most common type of routine physical tasks performed by the British Army. Typically female to male ratios are:

- a. 0.5 for occasional lifting tasks.
- b. 0.29 to 0.41 for more sustained carrying and repetitive lifting tasks.

15. For lifting and carrying tasks, less than 1% of females achieve the scores of the average male.

16. The implications of this difference in material handling capability between men and women are twofold. First, women have a lower work capacity than men. Second, women exposed to the same physical workload as men have to exert themselves around 50-80% more to achieve the same results and are therefore at greater risk of sustaining an injury.

LOADED MARCHING

17. Loaded marching is a fundamental military task required of all Army personnel. Female to male performance while marching is more similar than it is for materials handling tasks. Typically female to male ratios are between 1.11 and 1.38, indicating that female performance is between 11%

and 38% worse than male performance.

18. In both genders loaded march performance is best among Officer Cadets and worst among recruits. Performance between the genders is also most similar among Officer Cadets. Among Officer Cadets and trained soldiers the top 10% of females match the average male. The greater the load carried, the greater the discrepancy becomes between male and female performance.

COMBAT TASKS

19. Gender differences exist in the performance of other simulated military or combat tasks under load, such as sprinting, reaction movements, agility runs, ladder climbs *etc.* In all tasks, female performance is worse than male performance. As with loaded marching women show a greater decrement in performance than men with increasing load.

20. Wearing protective clothing significantly increases the energy cost of performing military tasks in both men and women. Gender differences in the increase in energy cost with protective clothing are seen only for tasks that involve continuous mobility, such as load carriage and on the assault course, where the energy cost increases proportionately more in women.

EXTENDED OPERATIONS

21. There are very few data comparing female and male performance during extended or sustained operations. One recent study found that female soldiers had lower core temperatures (0.5 °C) and higher heart rates than their male counterparts on a 48-hour operation, though military task performance was not reported to be impaired. Manual Dexterity in females was poorer than males throughout the operation and declined in females over the period.

22. The authors concluded that inclusion of female soldiers on extended operations would have no significant impact, but the validity of generalising the findings from that study will depend upon the nature of the tasks, the environment in which the task is performed and the calibre of the individuals.

INJURY

23. As the physical demands of a task approach or exceed the physical capabilities of the individual, efficient and effective performance is inhibited, productivity declines and the risk of injury is increased. Women's general lower physical capabilities than men's result in them having to work at a higher percentage of maximum effort than men, thus creating a higher risk of injury for a given task.

24. Many risk factors for injury have been identified in armed forces personnel, including factors associated with the training load (*e.g.* the type of activity, frequency, intensity) and the individual (*e.g.* prior physical activity, aerobic fitness).

25. Although gender is frequently reported as a risk factor for injury, closer examination of the data suggests that while women suffer a higher incidence of injury than men, it may not be gender *per se* that is responsible but rather the underlying levels of fitness, especially aerobic fitness. Men and women of equal physical fitness suffer a similar incidence of musculoskeletal injury.

26. Women's bones are smaller and less able to resist stress than men's are. Further, for a given external work load, the weaker surrounding musculature in women fatigues more readily passing further strain onto the bone and soft tissue, thereby exacerbating the risk of injury in women.

27. Stress fractures provide a specific example of an overuse injury that is prevalent during training where there is a marked higher incidence in female than in male soldiers. Rates of 10-15% in females compared to 1-3% in males have been cited in the US Army.

28. The implementation of the new job-related Physical Selection Standards for Recruits (PSS(R)) in April 1998 heralded the prospect of reducing the incidence of injury in recruits by improving the match between the requirements of the job and the capability of the soldier. However, injury data from periods pre and post implementation suggest the reverse has happened in women.

29. The reasons for this increased injury incidence in women is uncertain but may be the result of the Army's decision to implement a Risk Management Strategy to protect manning levels. Adoption of this Strategy effectively lowered physical entry standards and allowed sub-standard recruits access to CMS(R). While the variable length Army Foundation Scheme provided the opportunity to raise the physical capability of sub-standard recruits prior to embarking on CMS(R), this scheme no longer operates. This line of investigation exploring the relationship between PSS(R) Grade and injury requires further examination.

30. There are a number of initiatives that may reduce the risk of injury in recruits in general and in female recruits in particular. These include:

- a. Raising the fitness standards at selection.
- b. Reducing the total training load during CMS(R).
- c. Ensuring adequate recovery between training bouts.
- d. Reducing running and other load bearing activities.
- f. Increasing the amount of strength training.

TRAINING

31. Military studies show that men and women exhibit similar relative gains in strength to resistance training programmes, at least in the short-term. In some studies, women show a slightly greater gain than men do. However, the disparity in absolute strength between genders, and hence the female to male ratio does not reduce.

32. Low levels of testosterone may limit the capacity in women for longer-term strength gain. Increases in strength of between 50 and 100% would be required in women if the disparity between the genders were to disappear. Increases of this magnitude are unlikely to occur during British Army training without a huge investment of resources.

33. Military studies tend to report a greater response to aerobic fitness training in women than in men and a corresponding reduction in the aerobic fitness gap between genders. This differential response may reflect an initially lower state of training among females on entry to the army, and therefore a greater potential to respond to training or it may reflect a genuinely greater training responsiveness.

MENSTRUATION AND PREGNANCY

34. While there is little evidence to suggest that the onset of a normal menstrual period affects job performance, irregular menstrual cycles pose health risks and painful menstruation can impair performance. More than 70% of female Officer Cadets in the US reported a significant impact of menstrual and pre-menstrual symptoms on academic, physical, or military activities. Thermoregulation may be somewhat compromised during prolonged exercise or heat exposure in the luteal phase of the cycle.

35. By contrast, some women experience no discomfort and perform normally or better during menstruation. Many British Army female soldiers reportedly favour suspending menstruation when mobilised for operations, thereby eliminating or alleviating any potential problems.

36. Up to 10% of female soldiers may be pregnant at any given time and some of these women

do not yet know. Pregnancy deserves consideration on two counts. First, female personnel may be exposed to toxins, vibration, jolt and electromagnetic fields, which have not been evaluated for their effects on women or embryos. Second, hospitalisation and loss of work attributable to pregnancy complications directly affect productivity, unit effectiveness and mission accomplishment.

FUTURE TRENDS

37. The Army's current Risk Management Strategy would potentially allow access to an estimated 64 (2.7%) to the Infantry and 27 (1.1%) to the RAC per annum, if the restrictions were lifted. However, most of these women will be moderate or high risk candidates.

38. The evidence suggests that there are extremely few (<0.1% of army applicants) who are truly of suitable physical calibre. Analysis of the PSS(R) data of army applicants from 1999 suggests that only 3 of 3,475 women were of suitable physical calibre to join the Infantry and only 1 was suitable to join the RAC. These figures compare with approximately 72% and 82% of male applicants. The height, body weight and fitness scores of the 3 elite women achieving the Infantry standards were close to the mean values of the men, indicating that they would be able to compete on level terms with the men.

39. An additional strategy to focussing on recruitment is to focus on improving the effectiveness of military training. The fittest 1% of female applicants, for example, could be accepted as risk candidates - they would probably achieve the required standards with additional, better-focused physical training.

40. Allocation of recruits to their Career Employment Group at the end of CMS(R), rather than at the Recruit Selection Centres may be a more logical and cost-effective approach. The resource implications of these strategies need to be explored to ascertain if they are economically viable.

41. A further option might be to look to the field army and to select physically elite, trained female soldiers and retrain them as Infantry or RAC soldiers. The data presented in this review suggest that the top 1% of trained female soldiers would achieve the required standards.

CONCLUDING REMARKS

42. There is a large discrepancy between the size, fitness and physical capability of the average male and female recruit and soldier. The lower performance capabilities of the average female soldier compared with her male counterpart will impact on her ability to perform the physically demanding tasks required of Infantry and RAC personnel. The overwhelming majority of females applying to the Army or currently serving in the Army would be physically incapable of performing many of the tasks required by the Infantry and RAC. Among the remainder who might achieve the required standards, the risk of injury will be higher than among their male counterparts, as these individuals will be working at a higher percentage of their maximum capability, and their reserve capacity will be less.

43. However, there remains a tiny minority of women estimated at 0.1% of recruits and 1% of trained soldiers who could probably achieve the required standards and perform the job effectively without sustaining higher rates of injury. These elite women will be as physically capable as their average male counterparts, their thermal tolerance will be similar, and their injury risk, largely comparable. While there remains a few unresolved health and safety issues associated with women's tolerance of certain hazards, job and task-related selection and training programmes could be fine-tuned to optimise the performance of these elite few.

Appendix:

1. Reference List from Gender and Bio-medical Aspects of Performance in the Infantry and Royal Armoured Corps.

Reference List from Gender and bio-medical aspects of performance in the Infantry and Royal Armoured Corps

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EXECUTIVE SUMMARY OF THE IMPACT OF GENDER ON GROUP TASK PERFORMANCE; MAY 1999, KENDALL W, HUMAN SCIENCES (ARMY)

INTRODUCTION

1. In May 1998, Human Sciences (Army) was tasked to carry out a review of the scientific literature concerned with the impact of gender on group task performance as part of the gender study.

AIMS AND SCOPE OF THE LITERATURE REVIEW

2. The aims of the literature review were to analyse relevant scientific literature that illustrated the impact of gender on group task performance, carry out a gap analysis and make recommendations for Phases 2 and 3 of the study.

METHOD

3. *The research started with an initial set of key words derived from the Statement of Requirement and the relevant areas of scientific research identified above. Key words were then developed using an iterative process of interrogation of the databases and reference sections of accumulated reports¹⁵.*

4. *The majority of the studies used in this research were collected via the PsychLit and PsychInfo databases, both of which cover the entire international published psychological abstracts from 1884 to the present day. However, for the purposes of this research, it was decided to sample the previous 15 years' research, in the first instance, from 1983. Research that was carried out prior to this was accessed primarily using the reference sections of cogent studies found during the database trawl.*

5. *A total of 107 studies were reviewed, derived from the database searches and the reference sections of related texts and articles. Studies were included in the review if they met the criteria in the Statement of Requirement or if they examined related issues. As the research progressed, the literature search and review process reached what is known as 'theoretical saturation', attained when the researcher is confident that additional studies only lend further weight to the existing theoretical framework. At this point, it is a matter of judgement for the researcher whether a study should be included in the review in the interests of parsimony.*

FINDINGS

GENDER DIFFERENCES IN INDIVIDUAL CHARACTERISTICS

6. Primarily, women and men differed in terms of their physical capacity, although on examination the evidence concerning physical gender differences held some interesting insights. It was clear that there were a number of areas where men's capacities were more likely to exceed women's capacities, but this was not 'across the board'.

7. The second largest area of gender difference was apparent in the capacity for aggression. There was evidence that women required more provocation and were more likely to fear the consequences of their aggressive behaviour, and that they were less aggressive because they feared social disapproval. The evidence led to the conclusion that given social licence and enough provocation, the gap between male and female aggression could be closed.

8. Some other gender differences were apparent, such as differences in spatial abilities, although on the whole there are more similarities in male and female abilities than differences.

9. The overall conclusions from consideration of the effect of gender characteristics at the individual level on group task performance are as follows:

¹⁵. *A full list of the key words and phrases can be found at Annex B of the main report.*

- a. People of either gender cannot be ascribed a set of characteristics based on membership of that gender. The most effective way of ensuring successful performance of any team task, therefore, is to evaluate the strengths and weaknesses of individuals and match them to the task requirements.
- b. It is impossible to speculate about any gender effects on group task performance without specifically defining the task requirements. In the context of performance in high-intensity combat, the tasks to be performed, and the mental and physical requirements of those tasks, would require specifying.

SOCIAL GENDER DIFFERENCES

10. *The findings from research into small groups highlighted the importance of maintaining effective groups through effective one-to-one interaction and teamwork skills. Research showed that the way that members of a group are valued can determine the effectiveness of the group through such interactions. If members are not valued the effect may be detrimental as members are excluded from full participation. Research showed that changing the way members are valued could reverse or counteract the process of exclusion. As group values are derived from the organisational culture, the responsibility lies with ensuring the effective communication of cultural values, particularly if they have changed, to all levels in the organisation. It is clear, therefore, that a well-targeted and positive process of integration, which tackles core cultural values in the British Army, will be critical to the ultimate effect on combat effectiveness. The first step of this will be to understand the attitudes and perceptions that currently exist in the British Army.*

11. *Several studies showed how the perception of status and prevalent stereotypes could affect group dynamics and ultimately group effectiveness. It is important to examine the following groups in the British Army to investigate the barriers and enablers that exist (negative and positive attitudes):*

- a. Senior/top level commanders of both gender.
- b. Established soldiers and Officers of both gender.
- c. New soldiers and Officers of both gender.
- d. Potential recruits of both gender.
- e. Spouses and partners of serving personnel (both gender).

CONCLUSIONS

LITERATURE REVIEW

12. *The primary conclusion of the review of scientific literature concerning individual characteristics is that there is no decisive evidence for the existence of any uniquely female characteristic that would have a significant negative impact on the performance of high-intensity combat tasks. However, this does not mean that every woman will be automatically suitable for employment in the Infantry and RAC, in the same way that all men are not suitable for the Infantry and RAC.*

13. *The evidence considered in the section on social gender issues leads to the conclusion that the effects on combat effectiveness will be largely determined by the way in which any extension of employment opportunities for women is managed. This conclusion is encouraging in that it indicates that it is within the power of the Army to introduce women into the Infantry and RAC without a marked negative effect on combat effectiveness. One proviso is that a long-term and well-targeted process of integration will be necessary.*

AREAS FOR FUTURE WORK

14. Several areas were identified during the literature review for further examination to help assess the likely impact of the extension of women's employment opportunities on combat effectiveness:

- a. Attitudes and perceptions existing within the British Army and other groups of interest require examination to understand barriers or enablers to the integration of women in the Infantry and RAC.
- b. The link between existing attitudes towards the inclusion of women and combat effectiveness requires further research. This would allow for extrapolation concerning the likely impact on combat effectiveness.
- c. The precise physical requirements of Infantry and RAC tasks critical to high-intensity operations need to be examined so that informed conclusions can be reached about individuals' ability to carry out such tasks.
- d. The extent to which present British Army physical training is oriented to the male physique and the feasibility of optimising training for the female physique needs to be investigated to assess how the potential of the female physique can be maximised.

15. It is apparent that combat effectiveness is multidimensional and, since no study has yet adequately defined a measure that encapsulates this multidimensionality, such a measure requires development. This will facilitate the reliability and validity of the field trials. It would also be advantageous for a quantitative composite score¹⁶ to be developed. This would reduce the number of subjects required for Phase 3 of the study (field trials).

16. An evaluation of the successes of the integration of women into the RA and RE is also required within this study. Examining the experiences of women recently employed in the RA and RE, cross-referencing the results with both a quantification of the attitudes of RA and RE personnel and of field trials of mixed-gender RA and RE teams should provide such an evaluation.

17. At some point, it may be necessary to examine public opinion surrounding the issue of combatant women to gauge the likely response to any change in policy. To conduct a valid public opinion survey, it would be necessary to gather a representative sample of the general British population. To do this, people would need to be selected according to, for example, their gender, social class, the region in which they live, whether they are or have been, a serving member of the Armed Forces, and whether any of their family is, or has, served in the Armed Forces. The required sample size for such a survey is likely to exceed 10,000 people to be statistically sound. Such a survey will not be providing evidence about the likely effects on combat effectiveness for the British Army, and if it were to be included in the scientific effort for this study, it could, potentially, harm the validity of the study's results. A more appropriate way of sampling public opinion would be to carry out a content analysis of the daily and tabloid press over the last five years and cross-reference this with the results of focus groups representing gender, social class and military connection.

RECOMMENDATIONS

18. Phases 2 and 3 should comprise a behavioural study (psychological/sociological) to address the issues for which sufficient evidence did not exist in the scientific literature.

19. The aims of Phase 2 should be as follows:

- a. To describe and quantify attitudinal and perceptual enablers and barriers to the inclusion of women in the Infantry and RAC.
- b. To provide evidence concerning the integration of women into the RA and RE.

¹⁶ Composite scores are used to express the total of a group of other scores. They are developed statistically to account for any correlations (associations) that occur between individual scores.

20. The aims of Phase 3 should be:
- a. To investigate the relationship between attitudes and perceptions and outcomes for combat effectiveness and,
 - b. To collate evidence concerning the integration of women into the RA and RE to provide an evaluation of the integration of women into these Arms.
21. The following recommendations for carrying out Phases 2 and 3 are made:
- a. A cross-sectional survey¹⁷ of attitudes and perceptions should be carried out to identify and quantify enablers and barriers to the extension of women's employment opportunities to the Infantry and RAC.
 - b. The survey should be aimed at the following groups, ensuring equal representation of both gender and all Arms and Services:
 - (1) Senior and top level commanders.
 - (2) Established¹⁸ soldiers and Officers.
 - (3) New soldiers and Officers¹⁹.
 - (4) Potential recruits.
 - (5) Spouses of serving personnel.
 - c. As a basis for the survey, focus groups should be carried out with each of these groups to explore the attitudes that exist. However, it should be ensured that the following issues are addressed:
 - (1) Attitudes about women leading men.
 - (2) Attitudes about the potential for inappropriate relationships.
 - d. Quota sampling²⁰ should be used to gather participants for the focus groups, with equal representation of males, females and ethnic backgrounds. The focus groups should be single-gender.
 - e. The survey should report on the relative prevalence of attitudes within the groups of interest and should offer reliable and valid quantitative data to support its conclusions.
 - f. The results of the survey of attitudes and perceptions should be analysed to examine differences occurring by gender and by Arm and Service, including any interactions that occur.
 - g. The results gathered from the RA and RE (including spouses) should be collated to show the prevalent attitudes within these Arms.

¹⁷. A cross-sectional survey is one that measures at one point in time the differences between discrete groups of people, as opposed to studying the differences that occur in the same group of people over a specific period of time.

¹⁸. Established soldiers being those with over five years' service.

¹⁹. New soldiers are those with less than two years' service.

²⁰. Quota sampling is where people with specific characteristics of interest are selected to take part in the research.

h. A qualitative study of the experience of gender integration of serving RA and RE women should be carried out. This should form part of the evaluation of the move to 70% of posts being open to women.

g. Field trials should be carried out to investigate the relationship between current attitudes towards women and gender integration in small work groups (ie sections) and the effects on cohesion and overall combat effectiveness.

h. The trials should be carried out using RA or RE field Army personnel (subject to the required numbers of suitable females being available). Male and female subjects should be matched according to experience in the field Army and then randomly assigned to trial conditions.

i. Established sections should not be used for the trials; the aim should be to create novel sections.

j. The field trials should be based around core military tasks, such as those found in the Common Military Syllabus for Recruits (CMS(R)). The scenario within which the subjects will be carrying out the military tasks should aim to be high-stress and tactical to simulate actual combat conditions as closely as possible.

k. The field trials should last one week to allow a substantial period of time for social interaction to occur.

l. The structure of the trials should be as follows:

| Trial condition | Subjects | Predictor variable ²¹ | Criterion variable |
|--|--|----------------------------------|---|
| Male section commander, tilted ²² gender ratio. | 1 x male section commander, male section 2IC, 2 x females and 4 x males rest of section. | Attitudes prior to integration | Outcome on measure of combat effectiveness. |
| Male section commander, skewed ²³ gender ratio. | 1 x male section commander, male section 2IC, 1 x females and 5 x males rest of section. | | |
| Male section commander leading all male section. | All male section. | | |
| Female section commander, skewed gender ratio. | 1 x female section commander, male section 2IC, 2 x females and 4 x males rest of section. | | |

²¹. 'Predictor' and 'criterion variable' are the technical terms for the factors to be examined during the trials.

²². A 'tilted' gender ratio is approximately 65:35 males to females.

²³. A skewed gender ratio is approximately 85:15 males to females.

| | | | |
|---|--|--|--|
| Female section commander, token gender ratio. | 1 x female section commander, male section 2IC, 1 x females and 5 x males rest of section. | | |
| Female section commander, all male section. | 1 x female section commander, male section 2IC, 6 x males rest of section. | | |

Table 1. Recommended structure of the field trials.

- o. Three sections should be used for each trial condition.

- p. Methods of measuring combat effectiveness should be examined by reviewing relevant scientific literature. A multidimensional measure and composite score should be developed from this. Such a measure should account for the existing literature concerning the appropriate use of subjective and objective methods.

- q. Multiple regression (MR) analysis²⁴ should be used to analyse the relationship between attitudes and outcomes for each trial condition. Inferential testing²⁵ should then be carried out on the results of the MR analyses to identify statistically significant differences between the trial conditions.

- r. Following the trials, the results of the qualitative study of the experience of women in the RA and RE, the results of the survey of attitudes in the RA and RE and the results of the field trials should be collated to provide an evaluation of the move to 70% of posts being opened to women.

- 22. A physiological study is also required to examine the following:
 - a. The precise physical requirements of Infantry and RAC tasks performed during high-intensity operations, and the frequency with which these are likely to be performed, to inform decisions about individuals' ability to carry out such tasks.
 - b. The extent to which present British Army physical training is oriented to the male physique, and the feasibility of developing training designed to optimise training for the male and female physique.

- 23. A survey of public opinion should not be subsumed within the study, as part of the scientific examination of the likely impact on combat effectiveness. If such a survey is required, it is appropriate that it be conducted separately from the scientific parts of the study.

- 24. A cost exercise should be carried out to investigate the requirement for a qualitative study of public opinion

²⁴. Multiple regression analysis is a statistical procedure that finds correlational relationships between different factors.
²⁵. Inferential testing is a statistical procedure that looks for statistically significant differences between results on MR analysis.

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EXECUTIVE SUMMARY OF ATTITUDES TO WOMEN IN THE BRITISH ARMY; TNS HARRIS, DECEMBER 2000

Methodology

1. Self-completion questionnaires were sent to samples of United Kingdom Trained Adult Personnel (UKTAP), recruits and spouses. The questionnaires collected opinions on which parts of the Army women should serve in, and measured strength of agreement with a range of up to 48 attitudinal statements about women in the Army and working in mixed gender units. Respondents were also asked to prioritise 14 actions for maximising combat effectiveness. In addition, information was collected about factors such as age, gender, rank, arm or service, and number of years served. Core questions from the UKTAP survey were included in the Recruit and Spouse questionnaires and reworded as appropriate. Questions from the UKTAP survey which were not relevant to recruits or spouses, were replaced with more appropriate questions.
2. Throughout this report, the term 'recruits' refers collectively to soldiers in Phase 1 Training and officer cadets unless separate mention is made.

Response rates

3. Good response rates were achieved overall, especially from UKTAP. Response rates are presented in the main report (p.31 and p.32).
4. A brief summary of the profile of respondents can be found at the end of this Executive Summary (p.20) and full profiles of UKTAP, recruit and spouse respondents can be found in the main report (section 4, p.34: section 11, p.72: section 18, p.99 respectively).

Reporting

5. At a confidence level of 95% differences of 5% are required between male and female UKTAP to be considered significant. Similarly, between male and female recruits differences of around 6% are required, and between male and female spouses differences of 10% are required.
6. Relevant sections and figures of the main report are shown as page numbers in brackets throughout this Executive Summary.
7. The questionnaires asked respondents to rate the strength of their agreement with a range of statements using a ten-point scale, where a score of 1 represented complete disagreement and a score of 10 represented complete agreement with the statement. The term 'the majority agree' means that more than 50% of respondents gave a score of 7-10, and 'the vast majority agree' has been used for more than 70% giving a score of 7-10. The term 'significant numbers' has been used for proportions between 20% and 49%.
8. The following sections summarise the main findings of the surveys, grouping statements together in a thematic way, rather than in the order in which they are asked of respondents.

Attitudes to women in Arms and Services

See section 5 (UKTAP), section 12 (recruits), section 19 (spouses)

9. Respondents were asked which Arms and Services women should serve in. 30% of male UKTAP and 41% of female UKTAP think that women should be allowed to serve in all areas of the Army. Only 26% of male recruits, but 52% of female recruits agree with this. More soldier recruits than officer cadets are in favour of all roles being open to women.

10. The greatest divergence of opinion between male and female UKTAP concerns their attitudes towards women serving in two of the Corps recently opened to women. 80% of women and 61% of men agree that the Royal Artillery (RA) should be open to women, similarly, 84% of women and 63% of men agree that the Royal Engineers (RE) should be open (see Figure 13, p.41). Amongst recruits, the differences between male and female attitudes to where women should serve are greater than between male and female UKTAP. Female recruits believe strongly that women should serve in most areas, whilst significant numbers of male recruits think that women should be excluded from many Arms and Services where women currently serve, particularly the RA and RE (see Figure 46, p.77). However, there is little difference between opinions of husbands and wives (see Figure 75, p.105).

11. The majority of female recruits think that the Household Cavalry / Royal Armoured Corps (HCav/RAC) and Infantry (Inf) should be open to women. However, significantly fewer male recruits, UKTAP (both male and female) and spouses agree with this view, (male UKTAP and recruits are the least likely to agree). 61% of male UKTAP do not agree that the HCav/RAC should be open to women, and 68% do not agree that women should serve in the Inf. Only 28% of the HCav/RAC and Inf think that their own Arms should be open to women.

12. More officers than soldiers are in favour of women serving in the HCav/RAC and Inf, conversely, officer cadets are less likely than soldier recruits to express this view. Agreement that these Arms should be open to women increases with age and length of service.

Attitudes to Combat Effectiveness

See sections 6, 7, 8 & 9 (UKTAP), sections 13, 14, 15 & 16 (recruits), sections 21 & 22(spouses)

13. Nineteen statements dealt with issues relating to combat effectiveness. All groups of respondents agree strongly that the Army must operate to maximum combat effectiveness, even if this means excluding women from roles in which they wish to serve. Somewhat paradoxically, the majority of UKTAP and recruits also think that it is important that the Army demonstrate equal opportunities by allowing women into all posts where they pass the necessary physical tests: 31% of male UKTAP/recruits disagree with this view.

14. Significant numbers of male UKTAP (47%) think that combat effectiveness is lower in mixed sex units, whilst an equally high proportion (51%) of female UKTAP think women have no adverse effect on the combat effectiveness or cohesion of the unit. The majority of female UKTAP and recruits believe that mixed gender units lead to better skills, and that women have a positive impact on the overall effectiveness of the unit, although significant numbers of male UKTAP disagree. In addition, the vast majority of female UKTAP do not agree that mixed sex units have lower morale (88%), or weaker team bonding/team working (82%). Men are much less likely to adhere to this viewpoint (52% and 42% for morale and team bonding/team working respectively).

15. Just over a third of male UKTAP/ recruits expressed concerns that there may be lower levels of discipline in mixed units due to the distraction of serving alongside women. 40% of male recruits and 57% of male UKTAP agree that men may focus on protecting or supporting female colleagues rather than on performing their own tasks to the best of their abilities. On both of those issues, the vast majority of women disagree.

Attitudes to Physical Ability

See sections 7 & 8 (UKTAP), section 15 (recruits), sections 21 & 22 (spouses)

16. Three statements referred directly to the physical ability of men and women. 77% of male UKTAP and 59% of male recruits agree that women tend to lag behind on physical tasks. 50% of female UKTAP agree, whilst 25% disagree that women lag behind.

17. The majority of male UKTAP disagree strongly that physical testing should take into account the different physical abilities of men and women, but female UKTAP are divided equally between strong agreement and strong disagreement. 64% of female recruits and 47% of male recruits disagree that men and women should undertake physical training in single sex groups.

Attitudes to the Treatment of Men and Women

See section 8 (UKTAP), section 15 (recruits), section 22 (spouses)

18. Ten statements referred to men and women being treated differently. The majority of UKTAP and recruits of both sexes do not believe that men get more or better training or promotion opportunities than women. Neither, do UKTAP or spouses agree that women are often given better promotion opportunities than men. The majority of male UKTAP/recruits disagree that women have to prove themselves more than men to gain respect and promotion, whereas 81% of female UKTAP and 55% of the female recruits agree. Over 60% of recruits (both male and female) clearly agree that the Army provides equal opportunities regardless of gender, but within UKTAP opinion is almost equally divided between agreement and disagreement.

19. UKTAP and male recruits feel that men tend to be given the more physical tasks in the unit, even if female colleagues are able to do them. However, there is wide disagreement between men and women over whether women are treated more leniently, and get away with breaking rules that men would be disciplined for. 49% of male recruits think that male instructors manage male and female recruits differently, but only 31% of female recruits agree. The majority of female recruits think that the use of female instructors would provide better balanced training of men and women; male opinion is unclear on this.

Attitudes to Decency and Sexual Relationships

See sections 8 & 9 (UKTAP), sections 15 & 16 (recruits), section 22 (spouses)

20. Seven statements related to issues of decency and sexual relationships in the Army. Just over three quarters of male and female UKTAP agree that sexual relationships are fairly common in mixed sex units, but opinion is very much divided at recruit establishments. Only 12% of recruits agree that sexual relationships between recruits and instructors are fairly common. 63% of male UKTAP feel that sexual relationships within units can create difficulties, whereas 50% of female UKTAP disagree.

21. Significant numbers of male and female UKTAP do not think that policies against sexual harassment in the Army are effective enough, and there is strong agreement from both UKTAP and recruits, that any allegation of sexual harassment should be investigated. 55% of male UKTAP and 47% of male recruits think that male superiors tend not to discipline women as much as men, for fear of accusations of sexual harassment: 57% of female UKTAP and 71% of female recruits disagree. There is no clear opinion among UKTAP or recruits as to whether sexist verbal banter is just part of Army life that should be accepted, but recruits strongly disagree that instructors used too much sexist verbal banter during training.

22. Male UKTAP/recruits have mixed views on whether decency is a problem in mixed sex units, but female UKTAP/recruits strongly disagree that it is a problem. Spouses would be bothered if their husband or wife had to share sleeping accommodation with or undress/wash in front of the opposite sex. However, despite this, they would not prefer their spouse to go on operations in a single sex unit.

Risk of Death or Injury

See sections 6 & 8 (UKTAP), sections 13 & 15 (recruits), section 20 (spouses)

23. Four statements related to the potential for death or injury while serving. Male UKTAP and male recruits have mixed opinions, but tend to agree that women are generally more vulnerable to injury than men (women tend to disagree), and 48% of male UKTAP agree that women are more vulnerable to being attacked on operational tours (women tend to disagree). The majority of female UKTAP, female recruits and wives disagree strongly that it is less acceptable for a woman to be killed in combat than a man. Male recruits have mixed opinions on this, although male UKTAP tend to disagree. Most respondents agree that putting women at risk of death, rape or torture could negatively affect general public support for operations; however, a third of female UKTAP/recruits disagree with this suggestion.

Attitudes to Recruitment

See sections 6 & 7 (UKTAP), sections 13 & 14 (recruits), section 21 (spouses)

24. Five questions were asked about recruitment. Less than a third of UKTAP and recruits think that women are needed to boost numbers in HCav/RAC and Inf, and less than a third of all respondents think that opening these roles to women would have a negative effect on recruitment of men to these Arms. The majority of UKTAP and recruits (both male and female) feel that it is important that the Army is seen as an equal opportunities employer, but opinion is divided on whether policies should be changed to allow women in to all roles. Female respondents (particularly UKTAP and recruits) also feel that as women already serve in roles where they may be involved in combat, they should be allowed in HCav/RAC and Inf. 50% of male UKTAP disagree.

Priority actions to maximise combat effectiveness

See section 10 (UKTAP), section 17 (recruits)

25. UKTAP and recruits were asked to prioritise addressing 14 issues in order to maximise combat effectiveness. Very few UKTAP gave any issues a low priority, whereas recruits were more prepared to allocate low priorities. Few issues were prioritised differently by men and women.

26. Both UKTAP and recruits give high priority to ensuring equality of treatment and ability in order to improve the working relationship between men and women. At least seven out of ten UKTAP and half of recruits thought that equal standards of discipline and equal physical standards should be a top priority. Similarly, equal distribution of tasks between men and women is prioritised highly by UKTAP and recruits.

27. UKTAP gave the least priority to ensuring the absence of sexual relationships within units, and the second least priority to the maintenance of standards of decency. Recruits gave least priority to the need for separate physical training and the second least priority to the need for firmer leadership.

Appendix:

1. Characteristics of Respondents.

CHARACTERISTICS OF RESPONDENTS

UKTAP RESPONDENTS

1. Responses were received and analysed from 2112 male UKTAP and 619 female UKTAP. The following table summarises the profile of male and female UKTAP:

| | Male (2112) | Female (619) |
|--------------------------------------|-------------|--------------|
| 25 years or under | 14% | 33% |
| Over 25 years | 86% | 67% |
| Married | 68% | 33% |
| Not married | 32% | 67% |
| Served 10 years or under | 31% | 62% |
| Served over 10 years | 69% | 38% |
| Soldiers | 63% | 74% |
| Officers | 36% | 26% |
| Work in mixed sex unit | 73% | 100% |
| Work in single sex unit | 27% | 0% |
| Experience of deployment overseas | 91% | 71% |
| No experience of deployment overseas | 9% | 29% |

Male UKTAP were :

- Four fifths over 25 years of age
- Two thirds married (generally to a civilian)
- Two thirds served more than 10 years
- Two thirds are soldiers
- Three quarters work in mixed sex units
- Almost all have deployed on operations overseas

Female UKTAP were :

- Two thirds over 25 years of age
- Two thirds not married (husbands tend to be in the Armed Forces)
- Two thirds served 10 years or less
- Three quarters are soldiers
- 15% are the only female in their unit
- Most have deployed on operations overseas

RECRUIT RESPONDENTS

2. Responses were received and analysed from 1731 male recruits and 329 female recruits, their profiles are shown below:

| | Male (1731) | Female (329) |
|----------------------------|-------------|--------------|
| Under 18 years of age | 50% | 47% |
| 18-20 years of age | 23% | 21% |
| Over 20 years of age | 27% | 32% |
| Single | 93% | 98% |
| Served less than 12 weeks | 85% | 71% |
| Served 3 months or more | 15% | 29% |
| Soldier in training | 94% | 88% |
| Officer cadet | 5% | 9% |
| Mixed sex training course | 65% | 98% |
| Single sex training course | 35% | 2% |

Male recruits were:

- Half under 18 years of age
- Almost all single
- Most served less than 12 weeks
- Almost all soldiers in training
- Two thirds on mixed sex training course

Female recruits were:

- Half under 18 years of age
- Almost all single
- Most served less than 12 weeks
- Almost all soldiers in training
- Almost all on mixed sex training course

SPOUSE RESPONDENTS

3. Responses were received and analysed from 164 husbands and 387 wives of serving UKTAP. The table below shows the profile of husbands and wives of UKTAP:

| | Husbands (164) | Wives (387) |
|-------------------------------------|----------------|-------------|
| 30 years of age or under | 23% | 30% |
| Over 30 years of age | 77% | 70% |
| Children under 16 years of age | 48% | 63% |
| No children under 16 years of age | 47% | 31% |
| Also serve in the Armed Forces | 40% | 16% |
| Do not serve in the Armed Forces | 60% | 84% |
| Spouse is a soldier | 62% | 54% |
| Spouse is an officer | 23% | 39% |
| Spouse works in mixed sex unit | 85% | 80% |
| Spouse works in single sex unit | 7% | 13% |
| Spouse served on unaccompanied tour | 52% | 87% |
| Spouse not served unaccompanied | 49% | 13% |

Husbands were:

- Three quarters aged 30 or over
- Half have children under 16
- Two fifths serve in the Armed Forces
- A quarter of spouses are officers (almost as many do not know spouse's rank)
- Most spouses work in mixed sex unit
- Half of spouses have served on an unaccompanied tour

Wives were:

- Majority aged 30 or over
- Two thirds have children under 16
- Most do not serve in the Armed Forces
- Two fifths of spouses are officers (almost all know spouse's rank)
- Most spouses work in mixed sex unit
- Most spouses have served on an unaccompanied tour

EXECUTIVE SUMMARY OF FIELD EXPERIMENT – THE IMPACT OF MIXED GENDER SECTIONS ON COHESION AND MILITARY PERFORMANCE; HUMAN SCIENCES (ARMY), JANUARY 2001

BACKGROUND

1. The Army is under ministerial remit to examine the continuing need for the combat exclusion policy, under which 30% of posts (essentially those in direct combat roles in the Infantry and H Cav/RAC) remain closed to women. Recommendations are due to the Army Board in 2001.

AIM

2. *Aim of the study was to:*

- a. Assess cohesion in mixed gender sections.
- b. Assess military performance in mixed gender sections.
- c. Assess military performance of male / female section commanders.

METHOD

3. **A total of 53 soldiers mostly from the Royal Artillery (RA) were employed over a two-week training period followed by a two-week exercise that consisted of seven phases. The soldiers were placed into six sections, one all male and five mixed gender sections. Objective and subjective assessments were made after each phase. These included measures of military performance and cohesion.**

RESULTS

4. A series of statistical analysis were applied to the data. The analysis revealed that cohesion consisted of five factors; Leadership, Teamwork, Group Membership, Team Bonding and Group Stability. Cohesion was analysed for each section comparing the objective DS rating with the subjective student assessment. These ratings agreed that two of the sections containing females demonstrated greater leadership. Overall, these same two sections were polarised towards the higher end of the subjective ratings for cohesion and received higher military performance assessments. The all male section was polarised towards the lower end of cohesion and military assessments.

CONCLUSIONS

5. Mixed gender sections produced different levels of cohesion. These varied both in the subjective rating of cohesion (student self-ratings) and the objective measure of cohesion from the DS. The two consistently highest rated sections contained females. There is nothing to suggest that the presence of females either harmed or enhanced cohesion. It is not possible to ascertain the optimal gender formation for cohesion to be maintained or enhanced.

6. The exercise phases produced differences, between sections, in the level of cohesion experienced. These were mainly seen when perceived stress, fatigue and task demands were high.

7. There were clear differences in the performance of the section commanders. This was reflected in both the subjective rating from the students on cohesion and the DS objective rating of military performance. There is nothing to suggest from these ratings that females could command better than or worse than males.

8. From reviewing the objective measures of military performance from the DS, it can be seen that those sections with a consistently higher cohesion rating also received a higher military performance assessment. There were differences between mixed gender sections on military performance. Whilst performance varied between the sections, leadership and teamwork from both the objective and subjective ratings, were more important in explaining variation than any gender mix.

9. Both males and females were tested beyond their limits of physical ability and skill level. It is not possible to draw any conclusions comparing the performance or cohesion of the all male section compared to the mixed gender sections. There exists no benchmark against which comparisons can be made to a typical all male infantry section. It may be the case that all the sections in the study were at an acceptable level of cohesion for their own units but not an acceptable level for a close combat unit.

IMPLICATIONS AND RECOMMENDATIONS

10. The findings of this study are confined to the environment in which they were found. It is not possible to apply the results to the rest of the field army due to the number of constraints reported in the Discussion (para 4.5). The results presented in this study are not able to predict the impact of mixed gender sections (if fully trained) in the harshest of Infantry operating conditions.

11. At present there is no formally recognised objective measure of cohesion that is systematically used in the British Army. Cohesion is seen to be important for effective unit operation with a clear requirement to monitor and evaluate cohesion in combat units. In order to assess and understand cohesion we must be clear on what cohesion is. The research shows that cohesion is a multi-dimensional concept. The measure of cohesion used in this research identified five factors. This must be further developed to ensure that all aspects of cohesion have been identified.

12. The use of focus groups will provide a method of identifying those aspects of cohesion not already established in this report. This potential work can be supported by observations from Infantry / RAC exercises. The revised measure of cohesion must be piloted and tested on field exercises. This will provide a measure that can be used with the infantry and RAC to identify the components of cohesion that are associated with effective performance in the field Army. In this way a quantitative standard of cohesion can be ascertained for specific units.

13. The level of analysis for cohesion should focus on the lowest formed team which is at section level. (The reason why the level of analysis should concentrate at the section level is that they are most likely to operate in isolation within in a hostile environment).

14. By stating that cohesion is a prerequisite for effective combat performance the Army judges that there is a link between these two factors. Assessments of cohesion must be supported with measures of military performance. This will provide an objective method of assessing and evaluating the relationship between cohesion and effective performance.