Study of
Women In Combat – Investigation of Quantitative Data

By Berkshire Consultancy Ltd

June 2010

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INVESTOR IN PEOPLE

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1. Executive Summary

This report forms part of one work strand towards the 2009/2010 review of the exclusion of women from ground close combat roles in the British Armed Forces. Berkshire Consultancy Ltd (BCL) was commissioned by DCDS Pers to undertake a piece of quantitative research to explore the impact of mixed gender small team/sections (hereafter referred to as 'sections') on cohesion during ground close combat[1]. This is a unique study; no previously reported literature in this area has been identified.

This report presents the analysis of the data collected, specifically to include responses from individuals who had been on operations but had not experienced a combat incident (referred to as a non-combat situation). This additional analysis furthers our understanding of the effect of mixed gender teams on cohesion during ground close combat.

Section cohesion was assessed using a measure based on the US Army measure of cohesion in platoons. The measure was included in a questionnaire, which enabled two outcomes: firstly an assessment of section cohesion and secondly identifying the number/percentage of women involved in ground close combat.

The questionnaire was sent out during September and October 2009, to all women who had been deployed to Iraq and Afghanistan since 2002 (approx 8700) and a sample of 6,000 men from the ranks and cap badges most likely to have been involved in ground close combat incidents with women present. 800 (13.7%) men and 1728 (20.5%) women responded. From the returned questionnaires, 607 (76%) male and 433 (25%) female respondents had been involved in ground close combat incidents. Additionally, 177 (22%) men and 1277 (74%) women had experienced other, non-combat situations.

1.1 Analysis and Approach

The central focus of the research was to examine the impact of mixed-gender teams on cohesion during ground close combat. Additionally, analysis was carried out on questionnaires returned by men and women who had experienced non-combat situations on operations, to broaden our understanding of cohesion on operations, and specifically to understand a) whether different factors appear to affect cohesion in combat and non-combat situations and b) the impact on cohesion of being in combat incidents. These findings are summarised below in four parts:

1. Facts about respondents and sections;
2. Factors associated with cohesion in combat incidents;
3. The impact of women on cohesion in combat incidents;
4. Cohesion in combat and non-combat situations on operations.

Analysis of the data was conducted using t-tests, ANOVA and linear regression in order to establish statistically significant findings.

The cohesion measure contains sub-scales which constitute cohesion. These are: Horizontal (relationships with peers), Vertical (relationships between leaders and subordinates) and Organisational (relating to the overall group). Each of these can be split into 2 aspects: Affective (emotional), and Instrumental (task-based). This is summarised below:

[1] Although women are excluded from employment in ground close combat units (that is those whose primary role is to engage and kill the enemy at close quarters), they may nevertheless become involved in ground close combat incidents in a support role.

	Affective	**Instrumental**
Horizontal Bonding	Peer Bonding	Teamwork
Vertical Bonding	Leader Caring	Leader Competence
Organisational Bonding	Values & Pride	Rules & Norms

1.2 Facts about Respondents and Sections

Combat incidents

17% of males had been attachments to their sections during combat incidents, whereas 46% of females had been attachments. 53% of the males had been the IC or 2IC of the section, whereas only 18% of the females had. Most questionnaire responses were from the Army (80% of men, 74% of women), followed by RAF (8% of men, 19% of women), Marines (12% of men) and Navy (<1% of men, 7% of women).

Most women had experienced 1-3 ground close combat incidents in total. The average sections consisted of 12 individuals, with 65% of incidents involving at least one attachment to the section.

Female questionnaire responses differed from males' responses in a number of respects. The sections in incidents recalled by women tended to have:

- More females and attachments (with female ICs and 2ICs much more common);
- Operated together on fewer occasions; and
- Operated together over a shorter span of time.

In addition, the females themselves were:

- More likely to have a shorter length of service;
- More likely to know the other section members less well; and
- Less likely to be the leader of the section.

Non-combat Situations

15% of males and 17% of females had been attachments to their sections. 51% of the males had been the IC or 2IC of the section, whilst 32% of the females had. Most questionnaire responses were from the Army (75% of men, 54% of women), followed by RAF (23% of men, 36% of women), Marines (2% of men) and Navy (<1% of men, 9% of women).

Female questionnaire responses differed from males' responses in a number of respects. The sections in incidents recalled by women tended to have:

- More females, with female ICs and 2ICs much more common;
- Operated together on fewer occasions; and
- Operated together over a shorter span of time.

In addition, the females themselves were:

- More likely to have a shorter length of service and be younger;
- More likely to know the other section members less well;
- Less likely to be the leader of the section; and
- More likely to be of higher rank.

1.3 Factors Associated with Cohesion in Combat Incidents

Simple comparisons between those who rated section cohesion in ground close combat incidents high and those who rated it low indicated that a number of non-gender-related factors seem to contribute to cohesion in these situations. Individuals reported higher cohesion when:

- They knew the other small team/section members better;
- The small team/section had operated together on more occasions in the past and over a longer span of time;
- The team was slightly smaller;

and when the individual themselves:

- Was more senior;
- Was in a leadership role; and
- Had longer length of service (which seems particularly to link with Pride in their section and in the Armed Forces).

Additionally, there was some difference in reported cohesion between Services, with females in the Army rating cohesion higher than females in the RAF. One possible explanation for this is that a small number of RAF females reported particularly low cohesion in respect of leaders' relationships with each other and leader competence.

Other factors that were hypothesised as potentially contributing to cohesion in ground close combat did not have any impact, including age and gender of leaders.

1.4 Impact of Women on Cohesion in Combat Incidents

The data shows that:

- Female respondents experienced lower overall cohesion in their ground close combat incidents than males. This is true for all of the many facets of cohesion as measured in the sub-scales in the questionnaire, except for Values and Pride in the Organisation, where there was no difference between men and women.
- Focusing specifically on mixed gender teams only, women overall perceived cohesion to be lower than men, particularly in terms of the team leadership and the application and understanding of rules.
- A comparison of cohesion reported by men in mixed gender teams with those in all-male teams showed no differences for either overall cohesion or any of the cohesion sub-scales.

A straightforward interpretation of these results is that the presence of women does not reduce cohesion in small teams/sections in combat situations, as perceived by men – but that when women are present they will tend to experience lower cohesion than the men.

Further analyses however suggest that the lower cohesion experienced by females could be the result of the following factors:

- Not knowing section members so well;
- Not having operated with them so many times before;
- The women's lower seniority/rank; and
- Cohesion being specifically lowered when there are 3 or more women in a section.

Separate analysis of male and female responses showed that the relationship between cohesion and how well the individual knows the other section members applied only to

women; conversely, having a high rank/leadership role was a driver of cohesion among men only. However, the number of times the team has operated together and the number of women present was a significant factor driving cohesion for both men and women, and these therefore appear to be important determinants of cohesion for all.

1.5 Cohesion in Combat and Non-Combat Situations on Operations

Many of the above findings for respondents involved in combat incidents were replicated for those who had been involved in non-combat situations. In particular:

- Women experienced lower cohesion than men;
- Individuals with higher rank/leadership roles reported higher cohesion;
- Respondents from the RAF experienced lower cohesion than those from the Army, especially in terms of perceived peer bonding among leaders and leader competence;
- Cohesion was higher in smaller teams;
- Cohesion was lower when more females were present;
- Cohesion was higher in teams that had operated together on more occasions;
- Cohesion was higher for individuals who knew their fellow team members better.

The key differences were that *in combat situations only,* cohesion was higher where:

- There were fewer attachments;
- The team had worked together for longer;
- The individual respondent had longer length of service.

Conversely, *in non-combat situations only*, cohesion was higher where:

- There was a female IC.

It was found that both men and women who were in combat incidents reported higher cohesion than those in non-combat situations. Whilst this suggests that being in ground close combat might lead to higher cohesion, the combat and non-combat groups were very unbalanced in terms of gender, the former being primarily male and the latter primarily female and further analyses were required to unpick these factors.

These found that, overall, across all incidents, *cohesion was higher* where:

- Respondents were themselves more senior/a leader – and in particular where the respondent was a female leader;
- Respondents were attachments;
- Respondents knew the other section members better;
- The section had operated together on more occasions.

Cohesion is reported lower where:

- There are more females in the team (with a steady impact up to 3);
- The respondent is female AND is *not* the leader.

It is crucial to note that neither the gender of the respondent nor whether the incident involved combat was a driver of differences in levels of cohesion once these other factors have been taken account of.

Additionally it is interesting to note that after adjusting for how well people are known, among the non-leaders being an attachment was in fact linked with higher levels of cohesion, especially among females.

When interpreting the above findings it is worth remembering that:

- Much of the data came from female respondents (there being many more questionnaire responses from women than men). This smaller sample size limited some of the analyses that could be carried out.
- The study was reliant on respondents' memory of events which may have occurred sometime in the past.

1.6 Overall Conclusions

The findings show that:

- Women rated cohesion lower than men;
- Men did not rate cohesion lower when women were present;
- RAF respondents reported lower cohesion than Army respondents (especially women);
- Those involved in combat incidents reported higher cohesion than those involved in non-combat situations on operations.

However, when analysing the drivers of cohesion across all respondents and incidents, gender, Service and whether being in a combat incident did not have an impact. Rather, cohesion was higher where:

- Respondents were more senior/a leader – especially a female leader;
- Respondents were attachments;
- There were fewer women present;
- Respondents knew the other section members better and the section had operated together on more occasions.

2. Introduction

This work was carried out by Berkshire Consultancy Ltd (BCL), an independent civilian contractor, on behalf of DCDS Pers. The task comprised a quantitative piece of research, being part of one work strand towards reviewing existing policies on the exclusion of women from ground close combat roles.

The Ministry of Defence is obliged to assess whether the justification for excluding women from ground close combat roles can be maintained and to notify the European Commission of the results of the assessment. The policy was last reviewed in 2002. On the advice of the Ministry of Defence's Legal Advisers, the Secretary of State has agreed that a review of this policy should be carried out in 2009-10.

The focus of the review will be on the exclusion of women from ground close combat roles. Other roles, such as the exclusion of women from service in submarines, will not be considered. It is not the intention to re-evaluate the work carried out as part of the previous review in 2002, but to build upon it.

The review will comprise:

1. A review of recent literature (published since 2002) on the effectiveness of mixed gender teams in a combat environment;
2. An assessment of women's roles in recent operations;
3. Consideration of the experience of other nations in employing women in ground close combat roles.

This report addresses strand 2 only. For this strand, BCL were commissioned in September 2009 to undertake both quantitative and qualitative research to investigate the impact of mixed gender teams on small team cohesion during ground close combat incidents in Iraq and Afghanistan since 2002. This report focuses on the quantitative research; full findings from the qualitative research are reported in a separate document. The Discussion section of this document does however refer to the qualitative research findings where relevant.

3. Background

The role played by women in the UK Armed Forces was formally recognised after World War II with the permanent establishment of Women's Services. Further significant changes took place in the 1990s, and from 1998 onwards women were allowed to serve in the front line onboard ships, as pilots of combat aircraft, and in combat support roles in the Royal Artillery and Royal Engineers. However, women remain excluded from serving in ground close combat roles whose primary function is to close with and kill the enemy. Such roles are currently required of the Royal Marines General Service (RMGS) the Household Cavalry and Royal Armoured Corps (H Cav/RAC), the Infantry, and the Royal Air Force Regiment. (In addition, women do not serve on submarines or as mine clearance divers due to medical reasons.) (Women in Armed Forces. May 2002).

The exclusion of women from specific male roles in the military is covered under Section 85(4) of the Sex Discrimination Act 1975 (Application to Armed Forces etc.) Regulations 1994, which states that "Nothing in this Act shall render unlawful an act done for the purpose of ensuring the combat effectiveness of the naval, military or air forces of the Crown". An unsuccessful challenge to this regulation was mounted in the European Court of Justice (ECJ) in 1999, whose ruling was 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.

Under the European Community Equal Treatment Directive, a review of the role of women in such combat environments is required every eight years, in order to determine whether maintaining such derogation from the Act is still justifiable. The last review was carried out in 2002, and the decision was taken to retain the existing policy of employing only male personnel in certain combat roles.

Reasons for Decision taken in 2002

The Secretary of Stale is satisfied that as some women will certainly be able to meet the standard required of personnel performing in close combat roles, the evidence of women’s lower physical capacity should not, in itself, be a reason to maintain the restrictions. Nor are the identified psychological differences between men and women, or the gap in the capacity for aggression, compelling evidence that women would perform less well in close combat.

The key issue is the potential impact of gender mixing in the small teams essential to success in the close combat environment. The small size of the basic unit in ground combat, coupled with the unrelenting mental and physical pressure extending over days or weeks, sets them apart from other military roles. Even small failures in a high-intensity close combat environment can lead lo loss of life or the failure of the team to meet its objectives. None of the work that either has been, or could be, done can illuminate the key question of the impact of gender mixing on the combat team in close combat conditions.

Given the lack of direct evidence, from either field exercises or from experience of other countries, the Secretary of State concluded that military judgement must form the basis of any decision. The military viewpoint was that under the conditions of a high intensity close-quarter battle, group cohesion becomes of much greater significance to team performance and, in such an environment, the consequences of failure can have far-reaching and grave consequences. To admit women would, therefore, involve a risk with no gains in terms of combat effectiveness to offset it.

The above arguments have been considered in relation to each of the units and roles in question - the Royal Marines General Service, Household Cavalry and Royal Armoured

Corps, Infantry and the RAF Regiment - to decide whether or not they apply equally to them all. As all the roles necessitate individuals working together in small teams which have to face and engage the enemy at close range, the Secretary of State for Defence concluded that the case for lifting the current restrictions on women serving in combat roles has not been made for any of the units in question. Taking the risk that the inclusion of women in close combat teams could adversely affect those units in the extraordinary circumstances of high intensity close combat cannot be justified.

The next review is due in 2009/2010, and the findings of the present study will form part of the evidence base towards informing future policy decisions relating to this issue.

Since 2002, the UK has entered two significant conflicts in Iraq and Afghanistan, where there have been a high incidence of ground close combat incidents. Women have often been involved in these incidents, whilst fulfilling various roles. This allows us now to investigate the impact on small team cohesion of having women present during ground close combat, by analysing these incidents and comparing them with reported cohesion during ground close combat in all-male small teams and with cohesion in small teams during other (non-combat) incidents on operations.

Research Aim

The aim of this piece of quantitative research is:

To measure small team/section cohesion in mixed gender teams during ground close combat incidents in Iraq and Afghanistan since 2002, using a survey methodology. This will provide objective evidence of the impact of mixed gender teams on small team/section cohesion during ground close combat.

4. Methodology

4.1 Overview of Methodology

The following sections outline how questionnaire recipients were selected, how the questionnaire was developed and trialled, and how overall ratings of cohesion were derived from the raw data for use in the analysis. Also included is a summary of the advantages and disadvantages of the methodology.

4.2 Selection of Participants

Selection of participants was carried out by DASA on behalf of DCDS Pers, in September 2009.

Women
Questionnaires were sent to 8718 women, across all 3 Services, who had been deployed to Afghanistan and Iraq since 2002. This ensured that all women who might have been involved in ground close combat, and who could be contacted, were given the opportunity to rate small team/section cohesion during ground close combat incident(s). It also allowed an assessment to be made, from the responses received, of the proportion of women who had been involved in ground close combat.

Men
Questionnaires were also sent to a sample of men across all 3 Services who had been deployed to Afghanistan and Iraq since 2002. This was to enable comparisons to be made between the experiences of men and women in mixed gender teams, and to allow comparisons between mixed-gender and all-male teams (see below).

It was decided to narrow the selection of participants to the following pool, on the basis that these were the most likely to have been physically present with women during ground close combat incidents:

1. Personnel below the rank of Lieutenant Colonel.

2. Personnel in the following trades (supplied by DM (A) and agreed by the single Services)

- **RN:** RN Royal Marines GS, RN Royal Marines GS (OF), RMR, RMR(OF)
- **Army:** Infantry, Royal Engineers, Signals, Royal Armoured Corps, Artillery, Household Cavalry
- **RAF**: Security, Mechanical transport, Medical, Operations Support (Regiment), Photography, Operations Support (Provost Security), Medical Support, Ops Support (Royal Auxiliary Air Force).

3. Trained Regulars and Ghurkhas who had address data on MISR 80 (Supplied by BIC) as at 1 September 2009.

A simple random sample of 6000 was taken from all the 46838 eligible personnel with no stratification by Service or Rank.

4.3 Questionnaire Design

The survey was designed to measure the respondent's experiences of cohesion within their small team/section during ground close combat. It was developed in consultation with Occupational Psychologists from DCDS Pers and DAPS Science. The questionnaire comprised two key parts: background demographics and the core of the questionnaire, a measure of cohesion. These are described below, in 4.3.2 and 4.3.3 respectively.

The research design was to focus respondents on a specific ground close combat incident, in order to gain as accurate and relevant information as possible. Directions for this were included as the first question in the background demographics section, as described in 4.3.1 below.

The questionnaire and covering letter were reviewed by the Scientific Advisory Committee, and ethically reviewed by Ministry of Defence Research Ethics Committees.

4.3.1 Selection of Incident

Females were directed to think about the most recent 'ground close combat incident'[2] in which they had been involved.

It was recognised that male respondents were likely to have been involved in a number of incidents, some including women and others not. In order to try and ensure sufficiently large sample sizes in each comparative group for analysis, men were asked a sequence of questions to direct them as follows:

1. If they had experienced a ground close combat incident/incidents involving a woman, to use the most recent of those, otherwise:
2. If they had experienced a ground close combat incident involving a temporary male attachment to the small team/section, to use the most recent of those, otherwise:
3. To use the most recent other ground close combat incident.

Reasons for this direction:

1. The focus of the research was on cohesion in mixed gender teams, so it was essential that as many men as possible responded in connection with such incidents;
2. We anticipated that many females would identify themselves as attachments to their small team/section, so men were guided in this way in an attempt to make the composition of small teams/sections in male responses as similar as possible to the female responses;
3. More recent events are likely to be more accurately remembered than older ones.

In all cases, if the respondent had never experienced a ground close combat incident they were asked to nevertheless complete the questionnaire about a "recent incident on operations (since 2002) when you've had to work with a group of others to accomplish a task." These responses ("non combat situations") were included in the analysis as they provide a further contribution to our understanding of cohesion in mixed gender teams on operations, and also enable exploration of the impact on cohesion of being in a combat situation. Additionally, by encouraging all questionnaire recipients to return the questionnaire we could get some idea of the proportion of individuals, particularly women, that had experienced ground close combat incidents.

[2] defined as "an incident where you have come under enemy fire (with small arms over short range on the ground) and a response was required")

The male and female versions of the questionnaire were identical save for the questions that directed them to the choice of an incident as described above.

4.3.2 Demographic Information

The survey also contains questions designed to collect generally-useful demographic information (Service, rank, age, length of service), as well as questions relating to factors which military cohesion research has found to be related to cohesion, namely:

- Role in small team/section (IC/2IC/attachment/section member)
- The size of the team
- The presence/number of 'attachments'* in the team
- The number of women in the team and whether the IC/2IC were female
- How well the respondent knew the other members of the section (asked in the form of stating how many of the section they knew 'very well', how many they knew 'fairly well' and how many they knew 'not at all well')
- How long the team had operated together (as time or as number of occasions operating together).

*Attachments are defined as individuals seconded, or "attached" on a temporary basis to a permanent core team/section. It was expected that most females involved in combat incidents would have been attached to core teams/sections (e.g. a medical assistant working alongside an Infantry section), since females are currently excluded from ground close-combat roles.

4.3.3 Cohesion Measure

The core part of the questionnaire was based on the Armed Forces Cohesion Questionnaire (AFCQ), a well-established measure of cohesion developed by Siebold & Kelly (1988) for evaluation of cohesion in platoons in the US army.

The AFCQ separates cohesion into 3 main types:

- Horizontal Bonding cohesion (relationships with peers),
- Vertical Bonding cohesion (relationships between leaders and subordinates), and
- Organisational Bonding cohesion (relationships between group members and with the group as a whole).

Each of these is in turn divided into two aspects:

- Affective (feeling or emotional/reactive) and
- Instrumental (action or task/pro-active) components

These can be conceptualised as shown in the diagram below, with more natural terms that one might use to describe each sub-scale:

	Affective	**Instrumental**
Horizontal Bonding	Peer Bonding *	Teamwork
Vertical Bonding	Leader Caring	Leader Competence
Organisational Bonding	Values & Pride	Rules & Norms

* The Horizontal Bonding Affective sub-scale is in turn split into two parts, one relating to general peer bonding within the section, and the other relating to peer bonding amongst the leaders/commanders of the group.

We adapted the original measure to meet the needs of the present study. These changes were agreed in consultation with Occupational Psychologists from DCDS Pers and DAPS Science, in the following respects:

- To adjust language and words used to be suitable for the UK Armed Forces rather than the US military.
- To ensure that the questionnaire would work in any of the Services and not just in the Army.
- To adapt the questions so that they would apply to a single combat incident in the past, rather than to the general situation in the present. (This required the removal of several questions which did not apply, all being from the Organisational Bonding sub-scales.)
- To ensure the questions worked for a small team/section rather than a platoon.
- To distinguish between 'core' members of a small team/section and temporary attachments to that team (as the women's roles often are); the original questionnaire differentiated existing and new recruits to a group.

These changes involved removing 44 of the 79 questions in the original measure; this still left each of the sub-scales intact. The structure, sequence and details of the rating scales used remained identical to the original questionnaire. The mapping of each question to the scales is defined in Annex F - .

4.4 Trial of Questionnaire

The questionnaire was piloted with 10 NCOs and other ranks from an Infantry unit (Sergeant to Private). These included one female. They were asked to assess the definition of cohesion; they liked the definition, and it was a familiar concept to them. They then reviewed all the questions in the draft questionnaire and gave feedback on how well they:

1. understood them
2. could answer them
3. found them to be applicable/relevant

This also enabled us to ascertain if the questions would yield useful data (i.e. would everyone come up with the same answer?)

As a result of their feedback the language in some of the questions was changed, and other questions were deleted.

The covering letter was similarly reviewed for ease of understanding and language.

A copy of the final questionnaires used for both men and women are included in Annexes B and C.

4.5 Generation of Cohesion Scores from Individual Responses

The cohesion measure includes a number of questions relating to each sub-scale. A mean score for cohesion overall and for each of the sub-scales was generated for each questionnaire respondent, to be used in the analysis.

For the sub-scales, a minimum of half of the questions had to have been answered for a mean to be generated on a sub-scale, to ensure it was a reliable representative single score. For the overall scale, at least 30 of the 35 questions had to have been answered.

In all but one of the sub-scales the questions had 7 options (7 = most cohesion and 1 = least cohesion), whereas the Horizontal Bonding (Instrumental) sub-scale had 5 options. In order to ensure that the incidence of blank responses to these questions did not skew any aggregated results, the values from these questions were scaled such that the lowest choice would have a value of 1 and the highest choice would have a value of 7, as with the 7-point scale of the other questions.

4.6 Methodology Evaluation

4.6.1 Advantages of the Methodology

The advantages of the survey methodology used were:

- It enabled a large number of men and women to rate cohesion using a consistent measure;
- The measure of cohesion was based on an existing measure that had been tried and tested, and had been found to be valid and reliable;
- It generated numbers for statistical analysis to provide objective evidence about men and women's experiences of cohesion in ground close combat;
- It generated numbers for statistical analysis to provide objective evidence about men and women's experiences of cohesion in non-combat situations, and to explore whether these were different from their experiences in combat incidents;
- The survey was sent directly to individuals from an independent third party;
- It provided an opportunity to assess the incidences of women involved in ground close combat (from returned questionnaires – clearly we cannot be certain that the proportions/rates would be the same across all respondents and non-respondents).
- It made it possible to evaluate, by statistical means, which factors account for variation in cohesion levels between different situations, rather than relying on what individuals believe are the factors that influence cohesion.

4.6.2 Disadvantages of the Methodology

The disadvantages of the survey methodology used were:

- It relied on individuals actually completing and returning the questionnaire;
- Unless individuals contacted the researchers for clarification (which a small number did), there was no guarantee that respondents would all consistently interpret the context of the incidents in the same way, especially in terms of how they interpreted "combat incidents" and "section", even though these were defined at the top of the questionnaire;
- It relied on individuals' memories of events which may have occurred up to 7 years ago.

5. Analysis

This section describes the analyses that were carried out on the data. Findings from these analyses are included in the next five sections:

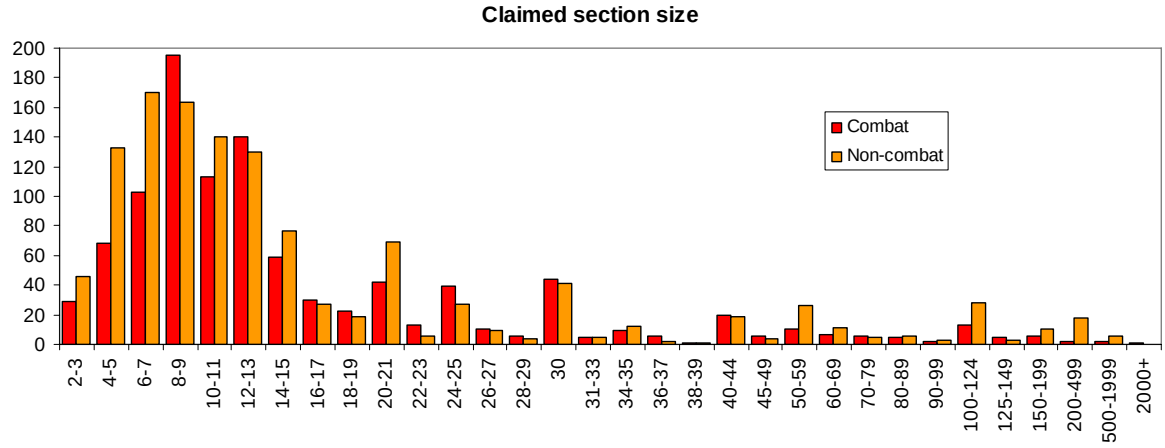
- Section 6 includes findings about respondents and team members during combat incidents and non-combat situations, focusing on the background demographics;
- Section 7 includes findings about cohesion in combat incidents;
- Section 8 includes findings about cohesion in other non-combat situations;
- Section 9 includes comparisons between cohesion in combat and non-combat situations;
- Section 10 includes findings about differences in cohesion amongst the different services.

Unless stated otherwise, all analyses, findings and conclusions in this report are based only on questionnaires from individuals who had experienced an incident in small teams/sections of 30 persons or less in size (see 5.1 below).

5.1 Exclusion of Responses with Large Section Sizes

Several questionnaires had responses relating to 'sections' with sizes in excess of the size of a company (200+), especially among non-combat responses. Given that the purpose of this study was to understand cohesion during close combat in small teams it was deemed appropriate to exclude responses from individuals who were answering about very large groups. It was not clear why some individuals chose to view their team in this way.

Below is shown the range of section sizes recorded from all respondents who had experienced a combat incident.



It was decided to exclude from further analysis all questionnaire responses with a 'section' size of greater than 30 persons, on the basis that the pattern of cohesion scores was found to be different above this level, and thus the inclusion of such responses would skew conclusions about the relationships between cohesion and other factors – see Annex H - for details. In addition, this cut-off aligns with the approximate size of a platoon.

5.2 Plan of Analysis

The following analyses were carried out on the data. Comparisons of cohesion were made using ANOVA ($p<.05$), which equated to t tests where only 2 groups were being compared. The table below show which analyses were carried out for combat incidents and non-combat situations, along with section references.

Analysis	Combat incidents	Non-Combat situations
• Response rates for men and women, and the percentages of respondents who had been in ground close combat incidents	Section 6.1	Section 6.1
• Summarising individual and team background demographic data to understand the range of contexts within which respondents experienced cohesion during incidents: 1. Whether the respondent had experienced ground close combat, and if so, how many incidents they had been involved in. 2. Respondent's rank 3. Length of service of respondent 4. Respondent's age 5. Size of team/section 6. Presence of attachments 7. Number/proportion of females in the team/section 8. Number/proportion of team/section members the respondent knew very well, fairly well and not at all well 9. Gender of the IC and 2IC 10. Number of women in the section 11. Whether the respondent was an attachment 12. Whether the respondent was a leader, the IC or the 2IC 13. How long the section operated together (exactly as formed at the time of the incident) 14. How many times the section had previously carried out tasks together (exactly as formed at the time of the incident)	Section 6.2	Section 6.3
• Comparison of individual and team background demographic data by gender to understand the similarities and differences between the contexts within which men and women experienced cohesion during ground close combat. These comparisons were on the same factors listed above.	Section 6.4	Section 6.5
• Assessment of the effectiveness of the adapted cohesion measure. This was assessed in terms of the measure's reliability (using Cronbach's alpha) and validity (correlating items with scale-specific and overall cohesion questions specifically included within the original questionnaire to assess validity).	Section 7.1	N/A (not repeated for this smaller group)

• Comparisons of cohesion between different groups of respondents, namely the following groups: 1. Service 2. Gender 3. Section size	Section 7.2	Section 8.2
• Comparisons of cohesion associated with different individual and team background demographic factors to identify those which might affect cohesion. Again, the comparisons were made for all the demographic categories listed above.	Section 7.3	Section 8.3
• Comparisons of cohesion: 1. In male-only and mixed-gender teams in order to isolate the impact of the presence of women; and 2. In mixed gender teams between male and female responses, to identify any impact resulting from the gender of the respondent.	Section 7.4	Not repeated for this group due to small number of male responses
• Regression modelling to identify those factors that appear to directly influence, or determine, cohesion. This was carried out on the whole sample, and then for men and women separately.	Section 7.5	Not repeated for this group, as this analysis is most relevant to the central research question about combat situations, and also due to small number of males in this group

NB Cohesion comparisons included both overall and subscale measures. Sub-scale measures are only reported separately in the findings where they showed different patterns to the overall measures.

6. Findings About Respondents and Team Members During Incidents

This section of the report presents the background demographic information gathered about respondents and their teams during the ground close combat incidents and non-combat situations on operations.

6.1 Questionnaire Response Rates

Response rates for men and women are shown below.

	Male	**Female**
Total Questionnaires sent	6000	8718
Total Questionnaires delivered	5819	8442
Total responses received (response rate)	800 (13.7% of delivered)	1728 (20.5% of delivered)
Total responses who had experienced ground close combat	607 (76% of responses)	433 (25% of responses)
Total responses who had not experienced ground close combat	177 (22% of responses)	1277 (74% of responses)

Note that the number of responses who had and who had not experienced combat does not equal the total responses, as some questionnaires were only part-completed and so we cannot say whether they experienced combat or not.

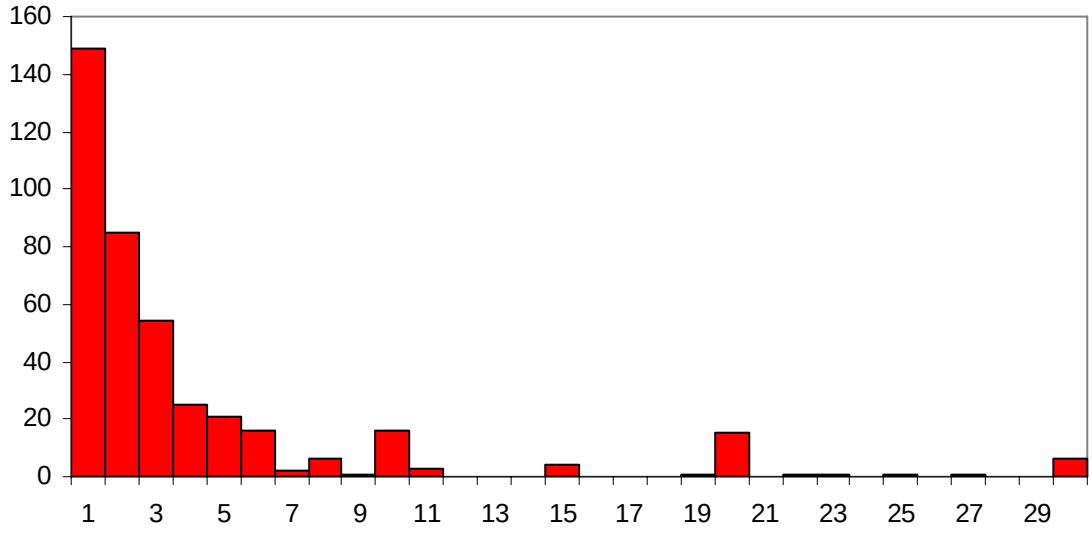
6.2 Background Demographic Data – Combat Incidents

Of those who had experienced ground close combat, the background demographic data showed the following splits in terms of demographic data:

	Male	**Female**
of Close Combat responses:		
Navy	2	29 (7%)
Marines	68 (12%)	2
Army	474 (80%)	306 (74%)
RAF	46 (8%)	78 (19%)
Attachments present	382 (64%)	274 (73%)
Respondent was attachment	103 (17%)	197 (46%)
Respondent was IC	209 (35%)	45 (11%)
Respondent was 2IC	105 (18%)	31 (7%)

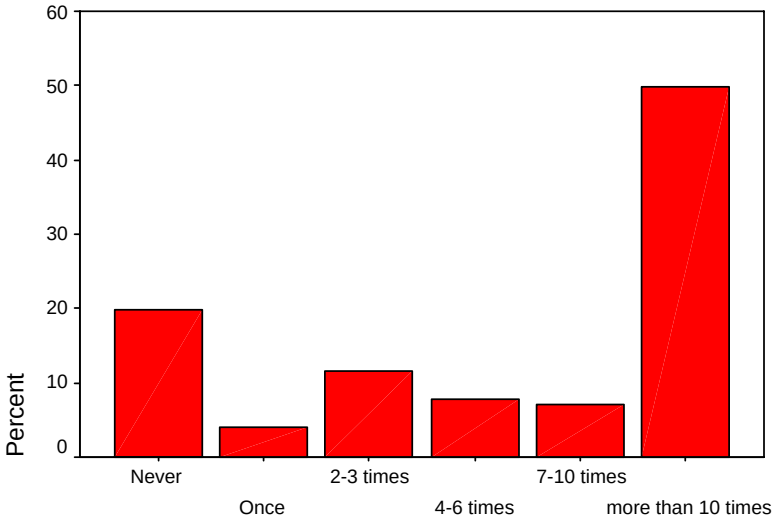
Annex E - Full Scores & Distributions of Ratings: Background Factual Information summarises the mean scores and distributions for all of the background factual data, about respondents and their teams at the time of the incident(s). Key points of interest from these variables are as follows:

- Of those females who had experienced any combat incidents, most had experienced 1-3 incidents, with one individual claiming to have experienced several hundred. The chart below shows the range of answers given by females up to 20:



Number of combat incidents (females)

- The average section size was 12.
- 65% of incidents involved at least one attachment to the section.
- A large number of question respondents chose the top available option in the questions relating to the number of times the section had operated together before and the length of time the section had existed as formed at the time of the incident. Evidently many sections had existed in a stable form for far longer than we had anticipated when designing the questionnaire. This can be clearly seen in the chart below, showing the distribution of responses for one of these questions (based on both male & female responses):



Before the time of the incident how many times had that section (exactly as formed during the incident) carried out tasks together?

Annex E also shows full breakdowns of completions by Service and gender, and by role in the small team/section.

6.3 Background Demographic Data – Non-Combat Situations on Operations

Of those who had NOT experienced ground close combat, the background demographic data showed the following splits in terms of demographic data:

	Male	**Female**
Total Responses	177	1277
of Non-Combat responses:		
Navy	1	98 (9%)
Marines	3 (2%)	7 (1%)
Army	106 (75%)	570 (54%)
RAF	32 (23%)	383 (36%)
Attachments present	46%	52%
Respondent was attachment	15%	17%
Respondent was IC	37%	19%
Respondent was 2IC	14%	13%

6.4 Gender Differences in Team and Demographic Factors – Combat Incidents

In order to understand general differences between responses from men and women, t-tests was used to identify where these were significant. Where there was a significant difference ($p<0.05$) this is shown in the table below:

	Mean value of factor		
Factor	**Male Respondents**	**Female Respondents**	**Difference (female – male)**
Length of service (years)	6.23	5.98	-0.25
Number of females	10.1	7.2	–2.9
Mixed group	0.3	1.8	+1.5
Female proportion	24%	100%	+76%
2+ females	3%	18%	+15%
3+ females	5%	36%	+31%
Proportion very well known	2%	15%	+13%
Proportion fairly well known	65%	38%	–28%
Proportion not well known	21%	31%	+10%
Known profile†	14%	31%	+18%
Respondent is leader	+0.52	+0.09	–0.43
Respondent is IC	51%	19%	–32%
Respondent is 2IC	33%	11%	–22%
Female IC	18%	8%	–10%
Female 2IC	1%	15%	+14%
Any attachments?	1%	12%	+11%
Number of attachments	62%	72%	+10%
Respondent is attachment	1.8	2.3	+0.5
Time operated together*	17%	46%	+29%
Number of times operated together*	6.5	5.2	–1.3

* - these questions had multiple options, and the statistics quoted here reflect the difference in the codes assigned to these options.
† - this measure combines the responses from the three 'proportion known' questions into one overall measure of how well the individual knows the members of the small team/section, where -1 is the score when everyone is 'not well known' and +1 is the score when everyone is 'very well known'.

The general themes of these differences are that the ***sections commented on by females*** tended to have:

- More females and attachments (with female ICs and 2ICs much more common);
- Operated together on fewer occasions; and
- Operated together over a shorter span of time.

In addition, the ***female respondents were***:

- More likely to have a shorter length of service;
- More likely to know the other section members less well; and
- Less likely to be the leader of the section.

6.5 Gender Differences in Team and Demographic Factors – Non-Combat Situations on Operations

In order to understand general differences between responses from men and women, t-tests were used to identify where these were significant. Where there was a significant difference ($p<0.05$) this is shown in the table below:

Factor	Mean value of factor		Difference (female – male)
	Male Respondents	Female Respondents	
Length of service (years)	12.5	8.4	–4.1
Number of females	0.4	2.4	+1.9
Mixed group	29%	99%	+70%
Female proportion	6%	28%	+23%
2+ females	10%	46%	+36%
3+ females	4%	29%	+25%
Proportion very well known	55%	35%	–20%
Proportion not well known	14%	29%	+16%
Known profile†	+0.41	+0.06	–0.35
Respondent is leader	51%	34%	–17%
Respondent is IC	36%	20%	–16%
Female IC	2%	29%	+26%
Female 2IC	4%	26%	+22%
Time operated together ‡	6.6	6.0	–0.5
Number of times operated together ‡	4.6	3.9	–0.6
Age ‡	4.0	3.6	–0.4
Rank ‡	4.5	5.2	+0.7

‡ These questions had multiple options, and the statistics quoted here reflect the difference in the codes assigned to these options.
† This measure combines the responses from the three 'proportion known' questions into one overall measure of how well the individual knows the members of the small team/section, where -1 is the score when everyone is 'not well known' and +1 is the score when everyone is 'very well known'.

The general themes of these differences are that the ***sections commented on by females*** tended to have:

- More females, with female ICs and 2ICs much more common;
- Operated together on fewer occasions; and
- Operated together over a shorter span of time.

In addition, the ***female respondents were***:

- More likely to have a shorter length of service and be younger;
- More likely to know the other section members less well; and
- Less likely to be the IC of the section
- More likely to be of higher rank

Broadly speaking, these gender differences are very similar to those seen between male and female respondents who had been in ground close combat. One difference is that in non-combat situations, female and male respondents were equally likely to be the 2IC, whereas in combat incidents female respondents were less likely than male respondents to be the 2IC – this may reflect the different roles they were given in different situations.

7. Findings About Cohesion – Combat Incidents

7.1 Assessment of the Effectiveness of the Cohesion Measure

7.1.1 Reliability of Cohesion Scales

Each of the cohesion sub-scales was evaluated for reliability using Cronbach's alpha, a measure of the internal consistency of the individual variables contributing to each sub-scale. This analysis was conducted using only combat responses, as this was the primary focus of the study.

Each of the scales had an alpha score of between 0.79 and 0.93, which is high and confirms that the different questions asked relate to the same underlying concepts by which they are being grouped.

Only one of questions would have improved its scale's reliability if it were removed from the scale, that being Q16A "In this section people really cared about what happened to each other" in Horizontal Bonding Affective.

Full details of the SPSS outputs of this analysis are shown in Annex G - .

7.1.2 Validity of Cohesion Scales

The questionnaire contained a number of questions designed to test the validity of the core cohesion questions. The results of correlation between the scales and these items is shown in Annex G - . These all show an acceptable level of correlation between the scale-specific items and their associated sub-scales.

The table below summarises the levels of correlation between each of the cohesion sub-scales and the 'general cohesion' validation question (Q25A), which asked if "This section was very cohesive."

Cohesion Scale	**Correlation with Q25A**
HB-A	0.65
HB-A leaders	0.599
HB-I	0.615
HB overall	*0.722*
VB-A	0.627
VB-I	0.579
VB overall	*0.626*
OB-A	0.611
OB-I	0.583
OB overall	*0.65*
Overall Cohesion	*0.734*

It is interesting to note that the highest sub-scale correlation is with Horizontal Bonding Affective ('Peer Bonding'), which is evidently the element of cohesion that most closely chimes with respondents' concept of what cohesion is. However, more important is that the 'overall cohesion' measure (based on an average of all of the cohesion items in the questionnaire) is better correlated with Q25A than any individual subscale. This demonstrates that individuals' concept of cohesion encompasses the combination of all the different aspects of cohesion measured in the questionnaire, and is further affirmation of its validity.

7.2 Comparisons of Cohesion Among Different Groups of Respondents

7.2.1 Cohesion by Gender

Below is shown a breakdown of the overall difference in cohesion scores between male and female respondents.

	Cohesion Score		
Cohesion Scale	**Male**	**Female**	**Difference**
HB-A ('Peer Bonding')	6.20	5.93	** 0.27
HB-AL ('Leaders Peer Bonding')	6.28	5.95	** 0.32
HB-I ('Teamwork')	6.33	6.18	** 0.14
HB overall	6.26	6.04	** 0.23
VB-A ('Leader Caring')	6.15	5.88	** 0.28
VB-I ('Leader Competency')	6.23	5.86	** 0.38
VB overall	6.19	5.87	** 0.32
OB-A ('Values & Pride')	6.22	6.15	0.08
OB-I ('Rules & Norms')	6.24	5.98	** 0.26
OB overall	6.23	6.06	** 0.17
Overall Cohesion	6.23	5.98	** 0.25

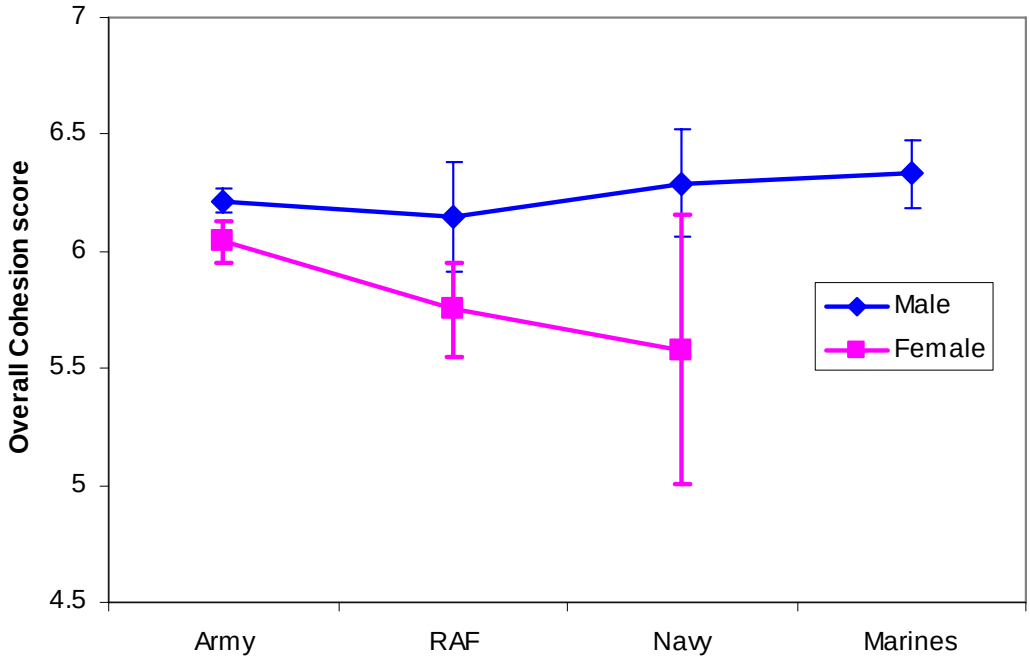
** Difference significant at p<0.01 level
* Difference significant at p<0.05 level

As can be clearly seen, females gave lower cohesion scores in all areas apart from Organisational Bonding Affective ('Values & Pride'), where there is no significant difference.

These differences reflect both differences in the composition of small teams/sections (with all females but only some males operating in mixed-gender small teams/sections) and in the gender of the questionnaire respondent. Section 7.4 shows a repeat of this analysis that attempts to separate these two factors.

7.2.2 Cohesion by Service and Gender

Below is shown the pattern of overall cohesion scores by Service, with each gender's responses shown separately. As the number of questionnaire responses varies hugely by Service, the chart shows error bars for the 95% confidence range of the estimated mean cohesion.



ANOVA analysis shows that there are no significant differences between the Services in the measures of cohesion among males. However, among females cohesion is significantly lower in the RAF than in the Army. The sample size for the Navy responses was too small to show any significant effects.

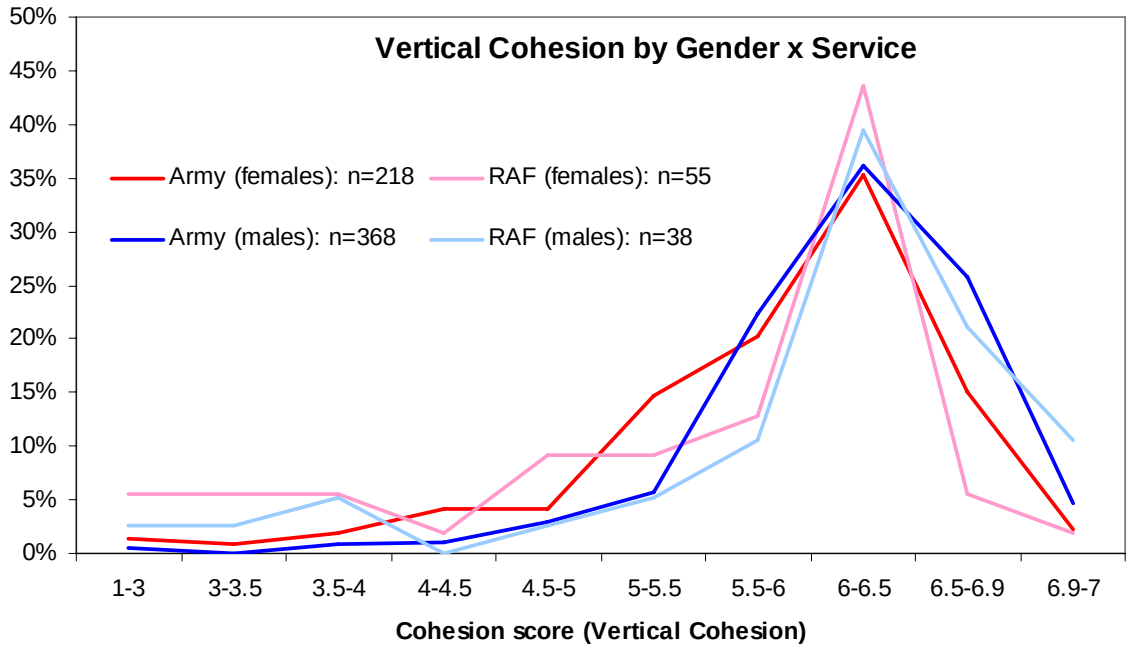
The table below shows a detailed analysis of the cohesion differences among females between RAF and Army respondents. Demographic factors are also shown where there is a significant difference, and are omitted otherwise.

Factor (Combat Females only)	Mean Value		Difference	Sig
	Army	RAF		
Cohesion – Overall	6.04	5.75	-0.29	**
Cohesion – Horizontal	6.09	5.81	-0.29	**
- Horizontal Affective (Peer Bonding)	*5.98*	*5.72*	*-0.26*	
- Horizontal Affective among Leaders	*6.06*	*5.57*	*-0.49*	**
- Horizontal Instrumental (Teamwork)	*6.21*	*6.07*	*-0.14*	
Cohesion – Vertical	5.96	5.52	-0.44	**
- Vertical Affective (Leader Caring)	*5.95*	*5.62*	*-0.33*	*
- Vertical Instrumental (Leader Competence)	*5.96*	*5.41*	*-0.55*	**
Cohesion – Organisational	6.09	6.00	-0.09	
- Organisational Affective (Values/Pride)	*6.17*	*6.04*	*-0.13*	
- Organisational Instrumental (Rules & Norms)	*6.01*	*5.95*	*-0.06*	
Respondent is 2IC	6%	16%	+10%	**
Female 2IC	9%	21%	+12%	**
Any attachments?	74%	61%	–13%	*
Respondent is attachment	51%	26%	–24%	**
Age ‡	3.0	3.4	+0.3	*
Rank ‡	3.8	4.7	+0.8	*

** Difference significant at p<0.01 level
* Difference significant at p<0.05 level

The overall difference in cohesion is reflected in overall horizontal and vertical cohesion differences, but not organisational cohesion. The biggest differences are that RAF respondents perceive lower peer bonding amongst leaders and lower levels of leader competence than do the Army respondents. This suggests that the relationship amongst leaders and their perceived competence is the driver of the lower cohesion scores in RAF.

In order to better understand what lies beneath the mean score, the chart below shows the *distribution* of Vertical Cohesion scores split by Army/RAF and by gender.



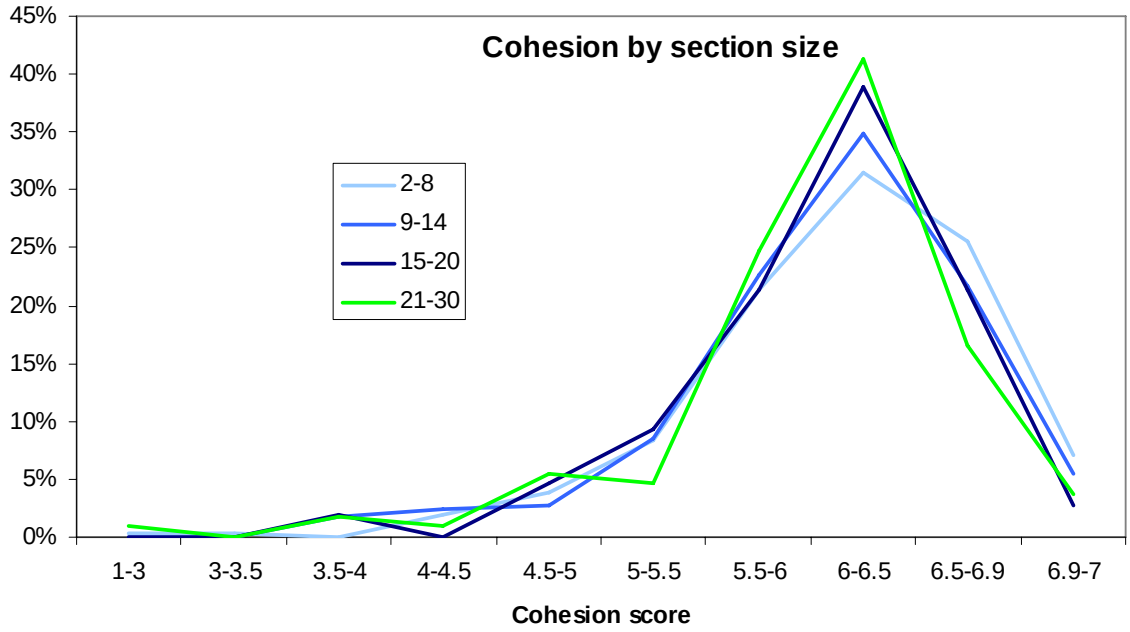
This clearly shows that for all groups the most commonly-seen cohesion scores is in the range 5-7 (especially 6-6.5), but there are many more very low scores seen in the RAF than in the Army. For example, 16% of females in the RAF had a Vertical Cohesion score of less than 4, whereas only 4% of females in the Army had such a low score. Among males, 11% in the RAF had scores less than 4, compared to only 1% in the Army. The questionnaire scale was such that 4 was the mid-point of the scale, which means that an average score of less than 4 is definitively in the 'bad' part of the range, with respondents frequently stating that they disagreed with the statements.

If the proportion of very low scores in the RAF were the same as seen in the Army, the large differences in average cohesion between the services would disappear. In other words, the lower average cohesion scores in the RAF are caused by the impact of the left-hand 'tail' of the cohesion scores distribution; by the very low ratings given by the small number (9 out of 55 female, 4 out of 38 male) RAF respondents about the relationship between leaders and their followers.

These findings need to be treated with caution due to the relatively small RAF sample sizes.

7.2.3 Cohesion by Size of Section

The chart below shows the pattern of cohesion scores, with the sample broken up into sub-samples on the basis of the size of the section.



The pattern of cohesion scores is very similar across all sizes of section, and there is no significant relationship between section size and cohesion.

7.3 Comparisons of Cohesion by Individual and Small Team/Section Factors

In order to highlight the factors that may contribute to higher or lower cohesion, the sample was split into 3 groups: high, medium and low cohesion based on their overall cohesion score tertile. (I.e. into the top-scoring third, the middle-scoring third and the bottom-scoring third.)

Below are shown all the factors which showed a significant (at $p<0.05$) difference between the highest and lowest groups:

Factor	Mean Value of Factor		Difference in mean value (high cohesion – low cohesion)
	Low Cohesion	High Cohesion	
Length of service (years)	8.10	9.82	+1.7
Number of females	1.2	0.6	–0.6
Female respondent	51%	34%	–17%
Mixed group	65%	46%	–19%
Female proportion	11%	7%	–4%
2+ females	23%	9%	–14%
3+ females	13%	1%	–12%
Section size	12.4	11.0	–1.3
Proportion very well known	42%	67%	+25%
Proportion fairly well known	28%	20%	–8%
Proportion not well known	30%	13%	–17%

Factor	Mean Value of Factor		Difference in mean value (high cohesion – low cohesion)
	Low Cohesion	High Cohesion	
Known profile †	+0.13	+0.56	+0.43
Respondent is leader	27%	50%	+23%
Respondent is IC	16%	34%	+18%
Any attachments?	70%	62%	–8%
Number of attachments	2.3	1.7	–0.6
Respondent is attachment	34%	25%	–9%
Time operated together*	5.5	6.4	+0.9
Number of times operated together*	3.9	4.9	+1.0

* these questions had multiple options, and the statistics quoted here reflect the difference in the codes assigned to these options.
† this measure combines the responses from the three 'proportion known' questions into one overall measure of how well the individual knows the members of the small team/section, where -1 is the score when everyone is 'not well known' and +1 is the score when everyone is 'very well known'.

The general themes of these differences are that the ***sections with higher cohesion*** tended to:

- Be slightly smaller;
- Have fewer females and attachments; and
- Have operated together on more occasions and over a longer span of time.

In addition, the ***individual respondents who rated cohesion higher*** were more likely to:

- Have a longer length of service;
- Be male;
- Know the other section members better; and
- Be the leader of the section (especially as the IC).

7.4 Comparison of Male-Only and Mixed-Gender Teams

7.4.1 Introduction

Section 7.2.1 showed that cohesion scores from females were significantly lower than from males. Two possible reasons for this apparent difference can be put forward:

- Females experience small team/section cohesion to be lower than males experience it to be;
- The presence of females in a small team/section actually lowers cohesion for all members.

One or both of these factors is assumed to be driving the results seen in section 7.2.1. In an attempt to distinguish these two factors, the entire sample was split into three groups, as shown below:

Group	Description	n
'All-male'	All-male sections (male respondents)	416
'Mixed (male)'	Mixed-gender sections (male respondents)	135
'Mixed (female)'	Mixed-gender sections (female respondents)	361

The contrast between Mixed (male) and the All-male group ought to reflect *the impact of the presence of women*, whereas the contrast between Mixed (female) and Mixed (male) tells us more about *the personal experience of women*. As such the Mixed (male) survey responses are highly valuable in making these comparisons, and the relatively small number in this group is a key limitation of the statistical strength of this analysis.

7.4.2 Findings

The table below summarises the overall levels of cohesion (for each of the sub-scales) for each of these groups, as well as the differences between the Mixed (male) group and the other two groups.

	Average			All-male vs	Mixed(M) vs
Cohesion Scale	**All-male**	**Mixed (M)**	**Mixed (F)**	**Mixed(M)**	**Mixed(F)**
HB-A ('Peer Bonding')	6.24	6.09	5.93	0.15	0.16
HB-AL ('Peer Bonding among Leaders')	6.29	6.22	5.95	0.08	* 0.26
HB-I ('Teamwork')	6.34	6.28	6.18	0.06	0.10
HB overall	*6.29*	*6.19*	*6.04*	*0.09*	*0.16*
VB-A ('Leader Caring')	6.19	6.05	5.88	0.14	0.17
VB-I ('Leader Competency')	6.25	6.17	5.86	0.08	** 0.32
VB overall	*6.22*	*6.11*	*5.87*	*0.11*	** 0.24*
OB-A ('Values & Pride')	6.24	6.18	6.15	0.06	0.03
OB-I ('Rules & Norms')	6.25	6.21	5.98	0.04	* 0.22
OB overall	*6.25*	*6.19*	*6.06*	*0.05*	*0.13*
Overall Cohesion	***6.25***	***6.17***	***5.98***	***0.08***	**** 0.19***

** Difference significant at p<0.01 level

* Difference significant at p<0.05 level

The contrast of Mixed (Male) vs. Mixed (Female) – which all consist of sections containing females, but contrasts the gender of the questionnaire respondent – shows that overall cohesion levels are reported as lower by females than by males. This seems to be most apparent with regard to aspects of cohesion relating to leaders (Horizontal Bonding Affective among Leaders, Vertical Bonding) as well as Organisational Bonding Instrumental (which mainly relates to the application and understanding of rules). I.e. in these aspects of cohesion, women experienced lower cohesion than men in mixed gender teams.

The contrast of Mixed (Male) vs. All-male – which all consist of questionnaire responses from males, but contrasts whether females were present in the group or not – shows that there is *not* a significant difference in overall levels of cohesion, nor for any of the sub-scales. I.e. there is no evidence here that men in all-male teams experienced cohesion any differently than did men in mixed gender teams.

Overall, the results generally show a pattern of cohesion being lower in mixed groups than in all-male groups, but these differences are not statistically significant for overall cohesion.

7.5 Identifying Factors that Influence Cohesion Using Regression Analysis

7.5.1 Introduction

Linear regression can be a uniquely powerful technique for disentangling the effect of multiple factors on a variable of interest. In the findings described above, it is clear that there is some sort of relationship between several of the attributes in the data and cohesion. These include gender of respondent and the number of females in the section, but also several other factors such as how well people are known and how often they have operated together.

Furthermore, section 7.4 suggests that there appears to be a mild impact on overall cohesion from the presence of females, but that this impact is not strong enough to result in a statistically significant result. Linear regression offers a possible solution to this problem by identifying and isolating the effect of other cohesion factors (how well people are known, etc.) and thus giving a clearer picture of the specific impact of the presence of women. There are potential disadvantages of regression as a technique. There are multiple different methods by which variables can be selected for inclusion in any single regression model, which can sometimes result in quite different 'answers' from the same input data. This tends to be a particular issue when there are high levels of correlation between the variables being analysed. The statistical tests used in regression also make certain assumptions about the data such as that it is normally-distributed and linearly related to the output ('dependent') variable. However, real-world data sometimes cannot fit with such assumptions.

7.5.2 Regression Analysis

In order to understand how the various factors affect the different measures of cohesion, linear regression analysis was run for each of the cohesion scales and sub-scales. In every case the dependent (response) variable was the cohesion scale and all of the other non-cohesion variables were offered as independent (explanatory) variables. Each resulting regression model was then studied to understand which independent variables had been selected as predictive of the dependent variable. The Stepwise variable selection algorithm was used, with $p>0.1$ causing removal of a variable and $p<0.01$ required to enter a variable.

The table below shows a summary of the variables which were identified by the analysis as being predictive for each of the cohesion scales and sub-scales.

Measure of cohesion	**Overall**	**Coeff**	**Horizontal**				**Vertical**			**Organisational**		
Variable			**Overall**	Affective	Instrumental	Aff (leaders)	**Overall**	Affective	Instrumental	**Overall**	Affective	Instrumental
Known Profile*	+	0.209	**+**	+	+	+	**+**	+		**+**	+	+
Times operated together	+	0.056	**+**	+	+		**+**	+	+	**+**	+	+
Combined rank	+	0.03	**+**		+	+				**+**	+	
R is IC?						+	**+**	+	+			
R is attachment?					+	+	**+**	+				
3+ women	–	-0.489	**–**	–	–					**–**	–	–
No. of women (capped at 3)						–	**–**	–	–			
Length of service												+

+ = Variable identified as predictive of higher cohesion
– = Variable identified as predictive of lower cohesion

* this measure combines the responses from the three 'proportion known' questions into one overall measure of how well the individual knows the members of the small team/section, where -1 is the score when everyone is 'not well known' and +1 is the score when everyone is 'very well known'.

There is a reliable pattern apparent, that cohesion scores are explained by a combination of:

- How well the respondent knows the other members of the section.
- How many times the section had operated together.

- Seniority of the respondent (with higher-ranking / leadership individuals rating cohesion better)
- Cohesion being lower if there are several women in the group, with 3 appearing to be a significant threshold.

In addition, certain other factors come into play for some of the cohesion sub-scales:

- Being the leader of the section links with higher scores for Vertical cohesion and Horizontal cohesion among the leaders
- Being an attachment to a section links to higher Horizontal Instrumental cohesion and Vertical Affective cohesion
- Organisational Instrumental cohesion (i.e. relating to rules) is increased for people with long service.

Interestingly, once the variables described above are used to explain variations in cohesion, the gender of the respondent completely ceases to show a relationship with cohesion. In other words, the clear link between gender of respondent and cohesion described earlier in the report (sections 7.2.1, 7.4) seems to disappear once one accounts for the fact that females generally know people less well, have operated with the section fewer times previously, and are generally less senior. There nevertheless remains a reliable link between cohesion and the presence of 3 or more females.

In order to understand the overall impact of the presence of women, the regression analysis was repeated but with various restrictions, such as allowing the algorithm to choose any variables and comparing this with the result when the gender-related variables are excluded, or when only gender-related variables are available. The details of this analysis are shown in Annex J - .

Overall, this analysis shows that:

- Approximately three-quarters of the apparent negative impact from women on cohesion is a reflection of their not knowing section members so well, not having operated with them before and their lower seniority, and
- The remaining impact appears to be due to cohesion being lowered specifically when there are 3 or more women in a section.

7.5.3 Regression Analysis Separated by Gender

In order to check how universal the above findings are, the regression analysis was also run separately using just the male questionnaire responses, then again with just the female responses. These analyses would thus demonstrate which factors drive variations in cohesion scores just among men or just among women. This analysis focused on Overall Cohesion as the dependent variable. The results are shown below:

Independent Variables Predictive of Overall Cohesion

Respondent Group	All	Males	Females
Variable			
Known Profile	+		
Proportion known very well			+
Times operated together	+	+	+
Combined rank	+		
Respondent is leader?		+	
3+ women	–		–
Number of women		–	

+ = Variable identified as predictive of higher cohesion
– = Variable identified as predictive of lower cohesion

Some factors are seen in both sub-group analyses (number of times operated together, quantity of women), which suggests that these are drivers of cohesion among all types of section member and not unduly connected to one particular gender's personal experience of cohesion.

However, some factors appear to be particular to one or the other gender. It seems that how well an individual knows the other members of the section is only a significant driver of cohesion for women, and not for men. Conversely, having a high rank and/or leadership role in the section seems to be more important as a driver of cohesion scores among men but not among women.

8. Findings About Cohesion – Non-Combat Situations on Operations

8.1 Introduction

Although the main research question is concerned with cohesion in mixed gender groups in close combat situations, we have also analysed the responses from individuals who were involved only in non-combat situations, in order to provide us with more information about cohesion during operations. The main analyses carried out on combat situations have been repeated for non-combat situations, and the results are reported in the following sections. Section 9 then summarises the similarities and differences observed between combat and non-combat situations.

8.2 Comparisons of Cohesion Among Different Groups of Respondents

8.2.1 Cohesion by Gender

Below is shown a breakdown of the overall difference in cohesion scores between male and female respondents.

Factor	Mean value of factor		Difference (female – male)	Sig
	Male	Female		
Cohesion – Overall	6.00	5.74	-0.25	**
Cohesion – Horizontal	5.97	5.69	-0.28	**
- Horizontal Affective (Peer Bonding)	*5.92*	*5.59*	*-0.33*	**
- Horizontal Affective among Leaders	*6.01*	*5.70*	*-0.31*	**
- Horizontal Instrumental (Teamwork)	*6.00*	*5.80*	*-0.20*	*
Cohesion – Vertical	5.99	5.65	-0.34	**
- Vertical Affective (Leader Caring)	*5.98*	*5.67*	*-0.31*	**
- Vertical Instrumental (Leader Competence)	*5.99*	*5.62*	*-0.36*	**
Cohesion – Organisational	6.08	5.96	-0.12	
- Organisational Affective (Values/Pride)	*6.05*	*6.00*	*-0.05*	
- Organisational Instrumental (Rules & Norms)	*6.10*	*5.92*	*-0.19*	*

** Difference significant at p<0.01 level
* Difference significant at p<0.05 level

The general themes of these differences are that the ***sections commented on by females*** tended to have lower levels of cohesion (except for Affective Organisational cohesion (Values/Pride) which is not significantly different from male responses). This is consistent with the findings from analysis of combat incidents, suggesting that regardless of whether they have been in combat incidents or not, females perceive cohesion as lower than do males.

As with the combat responses, these differences reflect both gender differences as well as other differences that happen to correlate with gender, such as role, how well people are known, etc.

8.2.2 Cohesion by Service

Among non-combat responses, the only two services with sufficient questionnaire responses for detailed analysis are those from the Army and the RAF. Given that the bulk of non-combat questionnaire responses were from women, these averages are therefore mainly a

reflection of differences among female questionnaire responses. The table below shows the breakdown of the different elements of cohesion by Army and RAF.

Factor (All respondents)	Average		Difference	Sig
	Army	RAF		
Cohesion – Overall	6.15	5.92	-0.23	**
Cohesion – Horizontal	6.18	5.97	-0.21	**
- Horizontal Affective (Peer Bonding)	*6.10*	*5.91*	*-0.18*	*
- Horizontal Affective among Leaders	*6.20*	*5.77*	*-0.43*	**
- Horizontal Instrumental (Teamwork)	*6.26*	*6.18*	*-0.07*	
Cohesion – Vertical	6.10	5.74	-0.36	**
- Vertical Affective (Leader Caring)	*6.06*	*5.81*	*-0.26*	**
- Vertical Instrumental (Leader Competence)	*6.14*	*5.68*	*-0.46*	**
Cohesion – Organisational	6.17	6.07	-0.10	
- Organisational Affective (Values/Pride)	*6.19*	*6.09*	*-0.09*	
- Organisational Instrumental (Rules & Norms)	*6.16*	*6.05*	*-0.11*	

** Difference significant at p<0.01 level
* Difference significant at p<0.05 level

The pattern of responses here is very similar to that of Army and RAF respondents who had experienced combat, with the largest differences being for Horizontal Cohesion among leaders and Vertical Instrumental Cohesion (perceived competence of leader). Again, this suggests that the perception of lower bonding between leaders and lower leader competence is responsible for the lower cohesion reported by females in the RAF compared with the Army.

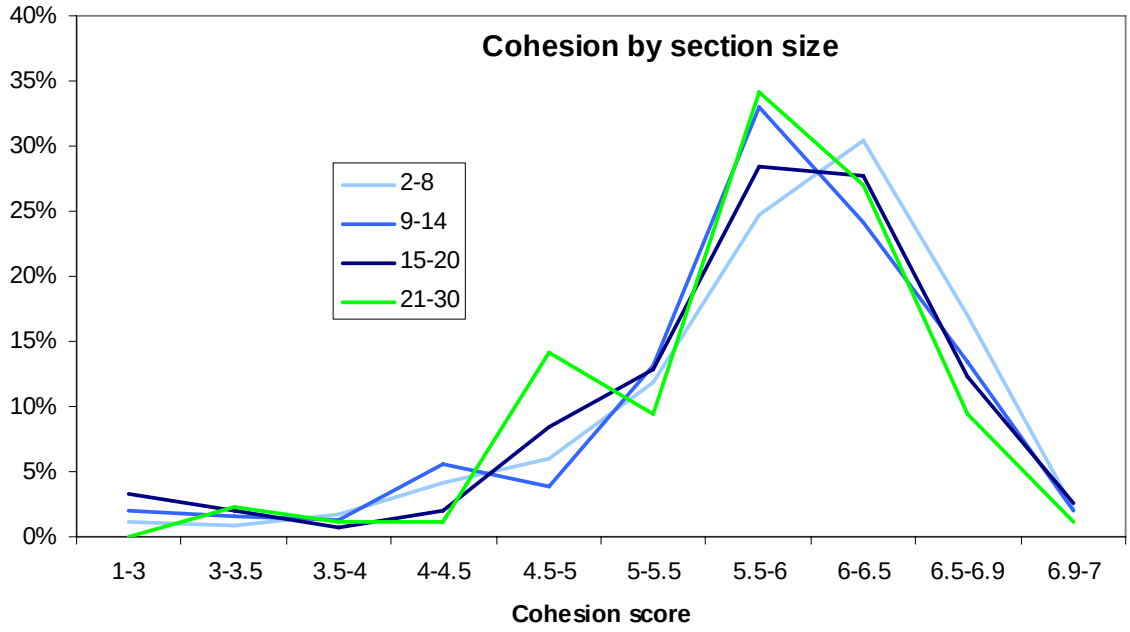
The table below shows the demographic differences between Army and RAF responses; where there is a significant difference (non-significant differences are omitted).

Factor (All respondents)	Average		Difference	Sig
	Army	RAF		
Female Respondent	38%	58%	+20%	**
Length of service (years)	8.7	10.4	+1.7	**
Number of females	0.8	1.7	+0.8	**
Mixed group	53%	71%	+19%	**
Female proportion	8%	16%	+8%	**
2+ females	15%	32%	+17%	**
3+ females	6%	17%	+11%	**
Proportion very well known	58%	34%	–24%	**
Proportion fairly well known	24%	31%	+8%	*
Proportion not well known	19%	35%	+16%	**
Known profile†	+0.40	+0.03	–0.36	**
Respondent is leader	39%	27%	–12%	*
Respondent is IC	25%	14%	–11%	*
Female IC	6%	18%	+12%	**
Female 2IC	4%	16%	+12%	**
Age ‡	3.2	3.7	+0.5	**
Rank ‡	3.8	4.4	+0.6	*

Sig ** = p<0.01; *: p = 0.01-0.05.
‡ these questions had multiple options, and the statistics quoted here reflect the difference in the codes assigned to these options.
† this measure combines the responses from the three 'proportion known' questions into one overall measure of how well the individual knows the members of the small team/section, where -1 is the score when everyone is 'not well known' and +1 is the score when everyone is 'very well known'.

Compared with the Army respondents, RAF sections tended to include proportionally more females and to be more likely to have a female leader (IC and 2IC), and the respondents tended to know each other less well.

8.2.3 Cohesion by Size of Section



As with combat respondents, there are no significant patterns here.

8.3 Comparison of Cohesion by Individual and Small Team/Section Factors

In order to highlight the factors that may contribute to higher or lower cohesion, the sample was split into 3 groups: high, medium and low cohesion based on their overall cohesion score tertile. (i.e. into the top-scoring third, the middle-scoring third and the bottom-scoring third.)

Below are shown all the factors which showed a significant (at $p<0.05$) difference between the highest and lowest groups:

Factor	Mean Value		Difference (High – Low)	Sig
	High Cohesion	Low Cohesion		
Female Respondent	84%	91%	+6%	**
Number of females	2.0	2.7	+0.6	*
Mixed group	85%	93%	+8%	**
2+ females	44%	59%	+14%	**
3+ females	24%	37%	+13%	**
Proportion very well known	61%	29%	–32%	**
Proportion fairly well known	27%	38%	+11%	**
Proportion not well known	12%	33%	+22%	**
Known profile†	+0.50	–0.05	–0.55	**
Respondent is leader	49%	27%	–22%	**
Respondent is IC	34%	16%	–17%	**
Respondent is 2IC	15%	11%	–4%	**

Factor	Mean Value		Difference (High – Low)	Sig
	High Cohesion	Low Cohesion		
Female IC	34%	23%	–11%	**
Number of times operated together ‡	4.3	3.9	–0.5	*
Section Size	9.6	11.4	+1.9	**
Rank ‡	5.5	4.9	–0.7	**

Sig: ** = p<0.01; *: p = 0.01-0.05.
‡ these questions had multiple options, and the statistics quoted here reflect the difference in the codes assigned to these options.
† this measure combines the responses from the three 'proportion known' questions into one overall measure of how well the individual knows the members of the small team/section, where -1 is the score when everyone is 'not well known' and +1 is the score when everyone is 'very well known'.

The general themes of these differences are that the ***sections with higher cohesion*** tended to:

- Be smaller;
- Have fewer females;
- Be more likely to have a female IC (although women were still the minority of leaders);
- Have operated together on more occasions.

Additionally the ***individual respondents who rated cohesion higher*** were more likely to:

- Be male;
- Be more senior;
- Be the leader of the section (especially as the IC);
- Know the other section members better.

Overall, these findings are very similar to those for combat incidents, although the differences are also interesting.

In both combat and non-combat situations, cohesion was higher in smaller teams with fewer females and that had operated together on more occasions; having fewer attachments and having worked together for less time was associated with lower cohesion in combat situations but not in non-combat situations. In non-combat situations, having a female IC was associated with higher rather than lower cohesion, although this was not the case in combat situations.

Individuals reporting higher levels of cohesion in both combat and non-combat situations were more likely to be male, be the leader and know other sections members well. Length of service was associated with higher cohesion in combat but not in non-combat situations.

A more rigorous comparison of combat and non-combat situations follows in the next section.

9. Comparison of Combat vs. Non-Combat Situation Responses

This section reports the results of analyses comparing cohesion and demographics reported by those in combat incidents and non-combat situations. These analyses were carried out to understand what appears to affect cohesion in these two types of situation, and to identify the extent to which the drivers might be different. Additionally, we were interested in looking at the extent to which being involved in combat itself affects cohesion.

9.1 Factors Affecting Cohesion in Combat and Non-Combat Situations

Annex H - shows the full set of results comparing responses from combat and non-combat situations. This table shows that cohesion, and all its sub-components (with horizontal and vertical cohesion showing the most difference), was higher for those who had been in combat situations than those who had not.

However, the differences between these two groups are highly confounded with the gender of the respondent: the vast majority of non-combat respondents were female, and the majority of combat respondents were male, and as already noted, women tended to report lower cohesion than men. Therefore, it is also sensible to look at the differences between combat and non-combat responses for each gender separately. Again, the full tables of results for each gender are included in Annex H - . The table below shows all the statistically significant differences between respondents who experienced combat incidents and non-combat situations, both overall and for men and women separately.

	Difference (Non-Combat – Combat) [only where p<0.05]		
Factor	**Overall**	**Males**	**Females**
Cohesion - Overall	-0.36	-0.23	-0.24
Cohesion - Horizontal	-0.45	-0.29	-0.35
- Horizontal Affective (Peer Bonding)	*-0.46*	*-0.28*	*-0.34*
- Horizontal Affective among Leaders	*-0.41*	*-0.27*	*-0.26*
- Horizontal Instrumental (Teamwork)	*-0.44*	*-0.33*	*-0.38*
Cohesion - Vertical	-0.37	-0.20	-0.22
- Vertical Affective (Leader Caring)	*-0.33*	*-0.18*	*-0.21*
- Vertical Instrumental (Leader Competence)	*-0.41*	*-0.25*	*-0.23*
Cohesion - Organisational	-0.19	-0.15	-0.10
- Organisational Affective (Values/Pride)	*-0.18*	*-0.17*	*-0.14*
- Organisational Instrumental (Rules & Norms)	*-0.20*	*-0.14*	
Length of service (years)		+2.4	+1.2
Number of females	+1.2		+0.5
Mixed group	+36%		
Female proportion	+16%	+3%	+10%
2+ females	+24%	+5%	+11%
3+ females	+19%		+14%
Proportion very well known	–17%	–10%	
Proportion fairly well known	+10%	+11%	
Proportion not well known	+7%		
Known profile†	–0.25	–0.11	
Respondent is leader			+15%
Respondent is IC			+9%
Respondent is 2IC			+6%
Female IC	+18%		+14%

Factor	Difference (Non-Combat – Combat) [only where p<0.05]		
	Overall	**Males**	**Females**
Female 2IC	+17%		+14%
Any attachments?	–18%	–21%	–24%
No. of attachments	–0.5		–0.8
Respondent is attachment	–12%		–29%
Time operated together ‡			+0.8
Number of times operated together ‡	–0.4		
Age ‡	+0.4	+0.6	+0.5
Section Size	–3.3	–3.9	–3.4
Rank ‡	+1.3	+0.7	+1.2

It can be seen from this table that, looking at each gender separately:

- Both men and women in combat incidents report higher cohesion than do those involved in non-combat situations, although the difference is reduced by looking at each gender separately;
- Some of the other overall differences remain for men and women respondents separately, although most of the effects are again smaller than in the whole non-combat group;
- Number of females present and having a female leader (overall more likely in non-combat situations than in combat incidents) are much less important differentiators, or cease to be significant at all, when looking at just male responses, whilst they remain important differentiators for female respondents;
- Female respondents were more likely to be an attachment in combat than non-combat situations, although this difference was not replicated for male respondents;
- Male respondents in combat incidents knew their team members better than those in non-combat situations, but this was not a significant differentiator for female respondents.

9.2 Analysis of Cohesion for All Respondents (Combat and Non-Combat Situations on Operations)

The previous section clearly highlights the issues in understanding the factors influencing cohesion, as apparently simple factors are highly confounded. For example, non-combat individuals are more often female, females tend to know their team-mates less well and less often be leaders, female respondents are more often in teams with larger numbers of females, etc.

In order to fully understand which factors (including whether or not there was a combat incident) are significant drivers of cohesion and which are not, we have used multi-way ANOVA on the full data set. This technique allows us to see both which categorical factors are associated with significant variations in cohesion, but also to control for the influence of other continuous variables. It also allows the discovery of the influence of specific combinations of variables ("interactions").

Given the findings from the previous pieces of analysis, including the regression analysis of the combat-only respondents, the following variables were selected for inclusion in the analysis, on the grounds that none are too highly correlated with each other, and all appear to be related to cohesion:

Attributes of the respondent	Attributes of the group	Relationship between respondent and group
• Respondent is Female • Respondent experienced a combat incident • Rank of respondent*	• Mixed group • No. of females in group (capped at 3)* • No. of times group has operated together*	• Respondent is Leader (IC/2IC) • Respondent is an Attachment • Known Profile*

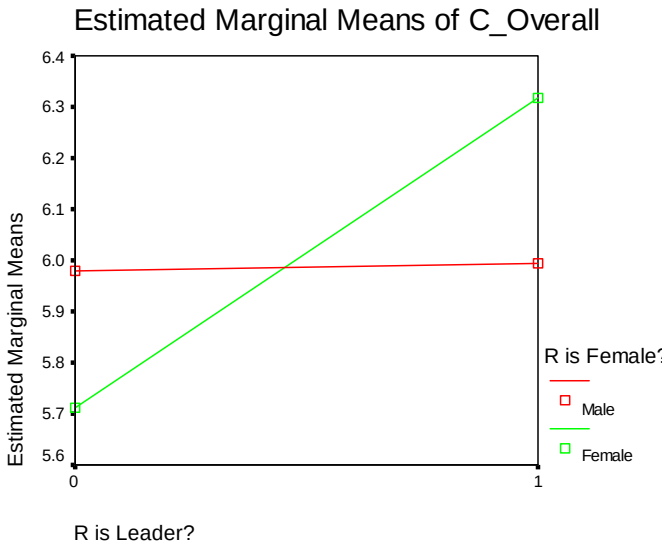
* indicates continuous variable treated as a 'covariate' in the ANOVA, rather than being a fixed factor.

The table below summarises the result of this analysis, based on significance at $p<0.05$:

Significant positive impact on cohesion	Significant negative impact on cohesion	No impact on cohesion
• Known Profile* • Rank of respondent* • No. of times group has operated together* • Respondent is Leader (IC/2IC) • Respondent is an Attachment	• No. of females in group (capped at 3)*	• Respondent is Female • Respondent experienced a combat incident • Mixed group
• (Respondent is Female) AND (Respondent IS Leader)	• (Respondent is Female) AND (Respondent is NOT Leader)	

What is very interesting to see here is that the two apparently-important factors (gender and combat) seen in the preceding sections of this report cease to show a relationship with cohesion when the other factors (no. of females, how well known people are, how many times operated together, whether leader/attachment, rank of respondent) are also taken account of.

However, gender of respondent does show through as a significant factor as part of the interaction of gender AND whether the respondent is a leader, as shown in the chart below:



10. Conclusions

10.1 Overview

This study set out to assess the impact of mixed-gender teams on cohesion in ground close combat, by asking individuals to give detailed information and ratings about cohesion in specific recalled combat incidents (or non-combat situations).

This is a unique study and we have not been able to find this study elsewhere in research literature. The questionnaire withstood statistical analysis and provides a robust measure of cohesion. The analysis conducted on the data has shown a number of significant and note-worthy findings. As such, this study merits replication.

The findings are summarised in the following 3 sections.

10.2 Factors Associated with Cohesion in Combat Incidents

Simple comparisons between those who rated section cohesion in ground close combat incidents high and those who rated it low indicated that a number of non-gender-related factors seem to contribute to cohesion in these situations. Individuals reported higher cohesion when:

- They knew the other small team/section members better;
- The small team/section had operated together on more occasions in the past and over a longer span of time;
- The team was slightly smaller;

  and when the individual themselves:
- Was more senior;
- Was in a leadership role; and
- Had longer length of service (which seems particularly to link with Pride in their section and in the Armed Forces).

Additionally, there was some difference in reported cohesion between Services, with females in the Army rating cohesion higher than females in the RAF. One possible explanation for this is that a small number of RAF females reported particularly low cohesion in respect of leaders' relationships with each other and leader competence.

Other factors that were hypothesised as potentially contributing to cohesion in ground close combat did not have any impact, including age and gender of leaders.

10.3 Impact of Women on Cohesion in Combat Incidents

The data shows that female respondents experienced lower overall cohesion in their ground close combat incidents than males. This is true for all of the many facets of cohesion as measured in the sub-scales in the questionnaire, except for Values and Pride in the Organisation, where there was no difference between men and women.

Focusing specifically on *mixed gender teams only*, women overall perceived cohesion to be lower than men, and in particular this was reflected in aspects of cohesion related to leaders (peer bonding among leaders and leader competence) as well as Organisational Bonding Instrumental (which mainly relates to the application and understanding of rules).

A comparison of cohesion reported by men in mixed gender teams with those in all-male teams showed no differences for either overall cohesion or any of the cohesion sub-scales.

A straightforward interpretation of this result is that the presence of women does not reduce cohesion in small teams/sections in combat situations, as perceived by men – but that when women are present they will tend to experience lower cohesion than the men, particularly in terms of the team leadership and the application and understanding of rules. The critical question is whether this is fundamentally due to the fact of them being female, or a reflection of other impediments to cohesion that happen to be generally true for females – they tend to have shorter lengths of service, know other team members less well, have operated less often and over a shorter time period with their small team/section and to be less likely to be a leader (IC or 2IC). Additionally, the small teams/sections reported on by women tended to have more women and attachments in them.

The list of facts about individuals and sections which link with lower cohesion (section 7.3) are almost identical to the equivalent list of factors that tended to be true of females (section 6.4). This makes it difficult to separate the impact on cohesion of gender from the impact on cohesion from other factors, and so poses a critical 'chicken and egg' challenge to interpreting the findings in this study. For example, women report lower cohesion than men, cohesion is lower when the group has operated together fewer times, and women tend to have operated with their group fewer times than men. Is the fact that women experience lower cohesion because they are female or because they have operated with their section fewer times than men have?

In an attempt to resolve this issue, regression analysis was used to tease apart the influence of all the various possible drivers of cohesion measured in this study. This showed that approximately three-quarters of the apparent reduction in cohesion experienced by women is in fact a reflection of their knowing the other section members less well, having operated with the section less often, and their being less senior. The remaining impact appears to be related to cohesion being lowered specifically when there are 3 or more women in the section.

Regression analysis applied to just male and just female respondents shows that the relationship between cohesion and how well the individual knows the other section members applies only to women, and not to men. Conversely, having a high rank / leadership role is a driver of cohesion among men but not among women.
However, the number of times the team has operated together and the number of women present was a significant factor driving cohesion for both men and women, and these therefore appear to be important determinants of cohesion for all.

In summary, the overall evidence is that women tend to rate cohesion lower than men, and that this may be due in part to the fact that they do not know their fellow section members as well as the men, have not operated with the sections so often before, have shorter lengths of service and because they are less likely to be the leaders of the group and/or of senior rank. Whilst men in mixed teams do not report lower cohesion than men in all-male teams, having a larger number of females present does appear to reduce cohesion for both men and women, in particular when there are 3 or more women present.

10.4 Cohesion in Combat and Non-Combat Situations on Operations

Many of the above findings for respondents involved in combat incidents were replicated for those who had been involved in non-combat situations. In particular:

- Women experienced lower cohesion than men;
- Individuals with higher rank/leadership roles reported higher cohesion;

- Respondents from the RAF experienced lower cohesion than those from the Army, especially in terms of perceived peer bonding among leaders and leader competence;
- Cohesion was higher in smaller teams;
- Cohesion was lower when more females were present;
- Cohesion was higher in teams that had operated together on more occasions;
- Cohesion was higher for individuals who knew their fellow team members better.

The key differences were that *in combat situations only,* cohesion was higher where:

- There were fewer attachments;
- The team had worked together for longer;
- The individual respondent had longer length of service.

Conversely, *in non-combat situations only*, cohesion was higher where:

- There was a female IC.

It was found that both men and women who were in combat incidents reported higher cohesion than those in non-combat situations.

The samples for combat and non-combat situations were, however, different, in that there were many more women in the non-combat group and many more men in the combat group, and as already noted, women tended to report lower cohesion than men. Similarly, in the non-combat situations reported, there was a significantly higher proportion of women in the teams, and of female leaders (IC and 2IC), as well as fewer attachments.

Further analysis of all respondents (combat and non-combat) was able to unpick these factors, and found that overall, across all responses, *cohesion is reported higher* where:

- Respondents are themselves more senior/a leader – and in particular where the respondent is a female leader;
- Respondents are attachments;
- Respondents know the other team members better;
- The team has operated together on more occasions.

Cohesion is reported lower where:

- There are more females in the team (with a steady impact up to 3);
- The respondent is female AND is *not* the leader.

It is crucial to note that neither the gender of the respondent nor the fact of whether the incident involved combat is a driver of differences in levels of cohesion once these other factors have been taken account of.

11. Discussion

11.1 Overview

This section brings together the findings from the present study, and in particular links them with:

- Our qualitative research, which involved interviews with a number of men and women who had been involved in ground close combat incidents in Iraq and Afghanistan since 2002; and
- A review of the research literature pertaining to our key findings.

11.2 Factors Associated with Cohesion in Combat Incidents

The findings that individuals reported higher cohesion where they knew their fellow team members better and had operated together on more occasions/for longer were completely supported by the interview data. In the interviews, cohesion was rated as excellent for reasons around knowing each other well, working as a team and supporting and trusting each other to do what they had to do well.

It seems entirely logical that peer bonding would be higher when people know each other better and effective teamwork would be improved by accumulated experience of working together in previous operations, and this came through in the interviews. Essentially, the interviews showed that cohesion builds over time, being fundamentally about trust and confidence in other team members to do their job. The most important contributory factors are time spent together, before and during operations – shared experiences, shared and adequate training, and to some extent, previous incidents. This was about building confidence in others' capabilities as well as developing social/emotional bonds, i.e. both the instrumental and affective elements of cohesion as measured in the questionnaire. Other research also supports these findings, for example Zeidner and Drucker (1988) found that continual movement of personnel could lead to poor group cohesion, whilst Levine et al (2005) found that new team members bringing different ways of thinking, that were new to the group, could disrupt cohesion.

Much of the research literature demonstrates the benefits of close contact among group members. Ellison and Powers (1994) reported that time spent within a group allows the team to form closer relationships and bond with one another. Harrison et al (1998) found that the richness of interactions and the more information which is relayed and shared impacts upon levels of cohesion. The acquisition of interpersonal information among group members serves as a function of length of shared experience for group members, the breadth of group activities, task interdependence etc and allows group members to gain deeper level understanding of each other's similarities and differences. Interpersonal interactions, occurring over a period of time within groups reduce the occurrence of stereotypical judgements of one another (Harrisson, 1998). In support of this, Hertel, Konradt and Orlikowski (2005) found that the amount of non-task related communication correlated positively with team satisfaction and effectiveness, which subsequently impacted upon perceptions of cohesion among virtual teams.

The importance of individual competence came through strongly in the interviews – cohesion was higher where individuals had confidence that everyone knew their job, and there was a strong sense that capability/"knowing the drills" overrode other concerns/fears about individuals during contact. The more opportunities teams have had to operate together, the more opportunities there have been to observe, and build trust in, team members' competence. One piece of potentially relevant literature is around "task interdependence", which describes the degree or requirement of task-driven interaction among group members

(Shea and Guzzo, 1987). High task interdependence is created when team members have to coordinate activities frequently. High task interdependence positively impacts upon trust cohesion and a sense of indispensability of personal contributions to the team (Hertel et al. 2005); furthermore, such interdependence has been demonstrated to improve communication among group members due to the increased requirement of coordination among the group. We can assume that on operations in theatre a high degree of task interdependence is present, which would support the emphasis on trusting people to do their part in the team effort – and again, this is built up over time through experience.

Other findings from the present study, for example that more senior ranks and leaders rated cohesion higher, were not specifically highlighted from the interviews as this was not their purpose. However, these findings again seem logical, and may reflect the following:

- More senior individuals may be expected to know others better as they will have interacted with a wider group of people; they might also be more effective working with others, and this may have been among reasons for their reaching the rank that they have.
- It is understandable that individuals with a leadership role in the section should feel cohesion is higher, though the reasons for this difference could be due to the reality of the social/team dynamics or could equally be due to their perspective of the group (and their view of those dynamics).

Length of service was linked in the present study with cohesion, particularly pride in the section and the Armed Forces. This Pride and Values element of cohesion was also mentioned by a couple of interviewees as increasing cohesion, and it is reasonable to expect people's pride in their group and the armed forces to grow the greater their time in the military.

11.3 Impact of Women on Cohesion in Combat Incidents

The finding that women rated cohesion lower than men in their questionnaire responses was not supported by interview reports. In the interviews, both men and women tended to rate cohesion highly; those few who rated it "poor" or "very poor" were all men, and the rating was related to lack of capability/competence in the team.

The interviews supported the view that the nature of women's roles and the fact that many of them were attachments, did have a negative impact in the sense that they had spent less time with the team/worked with them on fewer occasions, identified as a key factor in developing cohesion. Women were often attached to the section/company at the start of an operation, for example, and many had not trained with the men even for Pre-Deployment Training. There is evidence from research that training as a team develops greater cohesion. Team cohesion can be developed and enhanced through team building, which is essentially about encouragement of a sense of unity among the group (Newman, 1984); this is a key element of military training. Research in organisational settings/environments has shown that cohesion and collaboration are higher and collaboration where team-skills training and team development programmes have been applied (e.g. Deep et al, 1976, cited in Pricard et al, 2006).

Whilst the interviews overall also supported the current finding that men did not rate mixed gender incidents lower than all-male incidents, less time together on training and operations was mentioned by those men who *did* identify differences in cohesion between these two types of team. The interviews enabled us to link this to the importance of perceived competence in cohesion – it was recognised that women need to have time and opportunity to prove themselves, particularly as some men's pre-existing attitudes and expectations of

women were more pessimistic than optimistic about their capabilities (especially where they were unused to working with women). There was some (limited) evidence from the interviews that cap badges that were "used to" women (such as the Royal Artillery) were initially more accepting, and more generally, that women did often need to "win people over" – which could happen very quickly where the woman proved herself to be competent and/or "one of the lads".

The influence of the number of women present on cohesion came through strongly in the present study. This was mentioned in the interviews by only a small number of people, but the comments were interesting. For example, one serving man reported that "one medic mixed in on the ground then left the boys and mixed with the other girls at camp; our Med Sergeant stayed with us – it made a lot of difference".

Much of the research literature demonstrates that the gender diversity of a team can affect how a team interacts with each other. There are mixed findings related to developing cohesion. For example, Pelled (1996) found that gender dissimilarities were associated with perceived intragroup emotional conflict and Thompson & Goolerman (1996) found that gender diversity within groups can cause difficulties in establishing commonalities between group members, which inherently impacts upon group cohesion. It has also been argued that perceptions of cohesion may differ due to differing beliefs rather than differing gender; this has been demonstrated among sporting teams where interdependence is high (as it is in military teams on operations), such as basketball and volleyball. Research has illustrated the importance of shared beliefs among interdependent teams (Carron, Brawley, Eys, Bray, Colman et al. 2002), and this would seem to be related to cohesion in military teams, particularly Organisational Cohesion. Linking this to the findings in this report, it is to be expected that group norms/beliefs and identity take time to develop, which again links in with the finding that time spent together and shared experiences appears more important than gender in determining perceptions of cohesion.

The issue of communication is a common theme in the research about gender and cohesion. In line with these findings, Elass and Graves (1997) stated that the alignment of group members along subgroup identities (such as gender) may lead to communication within a subgroup that purposefully excludes members of other subgroups and even leads to biased information exchange. Pearsall, Ellis and Evans (2008) stated that activation of such a subgroup within a wider group may cause friction between the groups subsequently reducing in-group communication. The relevance of this to the present study may be that the presence of more women may have encouraged all-female, different conversation. Furthermore, research has demonstrated that gender composition in a group can interrupt communication among the group. There was some evidence from the interviews that gender mix did affect communication, and that this might impact cohesion; for example men having to "tone down" their language with women, women having to listen to men "chat, degrading women", men reacting negatively to being "told off" by a woman more than by a man. Another piece of research (Broody, 1989) found that men are more likely to interrupt women and yield to interruptions by men, which could also impact on cohesion.

In some cases communication can be enhanced by gender mix, for example, Cox (1993) found that such diversity encourages and promotes more critical thinking within the group, thus, presenting a variety of methods to evaluate solutions to a given problem. In terms of mixed gender teams on operations, this diversity was welcomed by some interviewees, one male commenting "She sometimes thought about things differently, which we needed – e.g. thinking about the people that would be coming back to a deserted town when we were recce'ing it during training". A couple of interviewees also mentioned how men were more likely to talk about personal issues and problems with a woman, who is typically perceived as more sympathetic, and that they welcomed this opportunity.

11.4 Cohesion in Combat and Non-Combat Situations on Operations

The present study reached an interesting conclusion about the positive effect on cohesion amongst non-leaders (especially women) of being an attachment (after controlling for how well they know the rest of the team). This may well reflect the specialist roles many of the attached women have in theatre when attached to an existing team or section. We have not found anything in the research literature that sheds any light on this finding, nor was there anything specific from the interviews that helps explain it.

11.5 Limitations

There are some limitations to the above findings:

- Much of the data came from female respondents (there being many more questionnaire responses from women than men). This smaller sample size limited some of the analyses that could be carried out.
- The study was reliant on respondents' memory of events which may have occurred sometime in the past.

Annex A - Original Siebold & Kelly Questionnaire Items

Based on your observations, how important is each of the following to the first-term soldiers in your platoon?

Scale: 7-point from 'not at all important' to 'extremely important'

- Loyalty to the United States Army
- Loyalty to the unit or organisation
- Taking responsibility for their actions and decisions
- Accomplishing all assigned tasks to the best of their ability
- Putting what is good for their fellow soldiers and mission accomplishment ahead of personal desires
- Dedication to serving the United States, even to risking their lives in its defence
- Having high moral and personal standards
- Commitment to working as members of a team
- Dedication to learning their job and doing it well
- Personal drive to succeed in the Army and advance
- Being honest, open and truthful
- Taking responsibility to ensure the job gets done
- Being disciplined and courageous in battle
- Standing up for what they firmly believe is right
- Building and maintaining physical fitness and stamina

Based on your observations, how important is each of the following to the leaders (NCO and Officer) in your platoon?

Scale: 7-point from 'not at all important' to 'extremely important'

- Loyalty to the United States Army
- Loyalty to the unit or organisation
- Taking responsibility for their actions and decisions
- Accomplishing all assigned tasks to the best of their ability
- Putting what is good for their fellow soldiers and mission accomplishment ahead of personal desires
- Dedication to serving the United States, even to risking their lives in its defence
- Having high moral and personal standards
- Commitment to working as members of a team
- Dedication to learning their job and doing it well
- Personal drive to succeed in the Army and advance
- Being honest, open and truthful
- Taking responsibility to ensure the job gets done
- Being disciplined and courageous in battle
- Standing up for what they firmly believe is right
- Building and maintaining physical fitness and stamina

These statements are all about the first-term soldiers in your platoon.

Scale: 5-point from 'strongly agree' to 'strongly disagree'

- In this platoon the first-termers really care about what happens to each other
- Soldiers here can trust one another
- First-termers in this platoon feel very close to each other
- Soldiers like being in this platoon
- First-termers in this platoon really respect one another
- Soldiers in this platoon like one another

Scale: 5-point from 'very little' to 'very much'

- Do the people in your platoon make each other feel like doing a good job?

Scale: 5-point from 'very well' to 'very poorly'
How well do the soldiers in your platoon work together?

Scale: 5-point from 'very little' to 'to a great extent'
To what extent do members of your platoon help each other to get the job done?
To what extent do members of your platoon encourage each other to succeed when in the field or at competitions?
To what extent do the members of your platoon pull together and share the load while in the field?

Scale: 5-point from 'always' to 'never'
Do the members of your platoon work hard to get things done?

These items concern the Leaders in your platoon (NCO and Officers)

Scale: 7-point from 'strongly agree' to 'strongly disagree'
First-term soldiers respect the leaders in this platoon
When a soldier in this platoon goes for help, his leaders listen well and care about what the soldier says
Leaders trust the first-term soldiers in this platoon
Leaders really understand the soldiers in this platoon
When asked for help in solving a personal problem, leaders in this platoon do their best to help out
When a soldier wants to talk, his leaders make themselves available
Leaders like being in this platoon
Leaders in this platoon respect each other
Leaders in this platoon care about one another as individuals
The leaders in this platoon are the kind that soldier want to serve under in combat
The leaders in this platoon can really apply their knowledge to solve problems in the field
The chain of command works well around here
The leaders keep their soldier well informed about what is going on
Leaders keep themselves informed about the progress soldier are making in their training
The leaders in this platoon are experts and can show the soldier how best to perform a task
The leaders work right along with their soldier under the same hardships in the field

These are statements about the environment in your platoon.

Scale: 7-point from 'strongly agree' to 'strongly disagree'
The people in this platoon know what is expected of them
Rules are consistently enforced
The reasons for being rewarded or promoted are well known
The behaviours that will get you in trouble or punished are well known
The priorities of this platoon are clear

These statements about the First-term soldiers in your platoon.

Scale: 7-point from 'strongly agree' to 'strongly disagree'
The soldiers in this platoon feel they play an important part in accomplishing the platoon’s mission
soldiers here are proud to be in this platoon
First-term soldiers feel this platoon’s wartime mission is very important
The soldiers in this platoon are proud to be in the Army
First-term soldiers feel the Army has an important job to do in defending the United States in today’s world

How satisfied are the First-term soldiers in your platoon with the following aspects of platoon life?

Scale: 7-point from 'completely satisfied' to 'completely dissatisfied'
The food served in the platoon dining facility

The quality of the barracks or other on-post housing
The availability of good offpost housing
The time available for personal needs like going to the PX, cleaners, bank or barber shop etc.
The time available to spend with friends or family
The quality and frequency of platoon parties and social gatherings

Next are some more statements about the First-term soldiers in your platoon

Scale: 7-point from 'strongly agree' to 'strongly disagree'
All in all, the duties soldiers perform in this platoon make them feel like they are serving their country
Soldiers in this platoon have opportplatoonies to better themselves
Soldiers in this platoon can make progress toward achieving their educational goals
Around here you can get the skills and training you want
Soldiers assigned to this platoon can maintain a good standard of living

For these general statements about your platoon, use the scale below to select your response to each statement

Scale: 7-point from 'strongly agree' to 'strongly disagree'
This platoon is very cohesive
There is a very high degree of platoon work and cooperation among first-term soldiers in this platoon
The first-term soldiers in this platoon get along very well with one another
In this platoon, the leaders really care about what happens to the first-term soldiers
Overall the leaders in this platoon are very good
Even if this platoon was under a great deal of stress or difficulty, it would pull together to get the job done
This is a very high performing platoon
The leaders in this platoon appreciate the contributions of the first-term soldiers
The first-term soldiers appreciate the contributions of the leaders in the platoon

For each of the next statements, ABOUT YOUR PLATOON, use the scale printed below to select your response to each statement

Scale: 7-point from 'extremely high' to 'extremely low'
In the event of combat, describe the confidence first-term soldiers would have in each other
In the event of combat, describe the confidence first-term soldiers would have in their platoon leaders
In the event of combat, describe the confidence platoon leaders would have in their soldiers
In the event of combat, describe the confidence platoon leaders would have in each other
Describe the confidence people in your platoon have in their weapons and equipment
How high is the morale in your platoon?
Describe the state of your platoon’s readiness
Describe the state of discipline in your platoon
How high is the determination or “will” to win in combat in your platoon?
Describe the degree of confidence members of this platoon have that it would perform well in combat

Annex B - Questionnaire (males)

Please do not put your name anywhere on the questionnaire
Answer ALL the questions
Read each question and all of its responses carefully before selecting your answer
Choose only one answer to each question
Where there are multiple options, fill in the box with a tick as in the example below:

Question with multiple options | | | | | | | |

Where the question requires you to state a number, write the answer in as in the example below:

Question with single numerical answer | 3 | *(please write in a number)*

When you have finished, please check that you have answered all the questions
Please note that the scale used in this questionnaire frequently changes, so pay careful attention to how to answer each part
Once completed, please return this questionnaire in the envelope provided.

The following questions refer to **'combat incidents'**. In this questionnaire, a 'combat incident' is defined as an incident where you have come under enemy fire (with small arms over short range on the ground) and a response was required.

*The questionnaire also refers to a '**section**'. This is a section or small team, including any attachments.*

1a Have *you* ever been involved in a 'combat incident'? | Yes | No |

- If 'Yes', please answer the following questions **thinking about the incident(s) you were involved in.**
- If 'No', please answer the following questions thinking about a recent incident on operations (since 2002) when you've had to work with a group of others to accomplish a task. ***Skip to Question 2***

1b Have you been involved in a combat incident involving a *female* attached to the operational section? | Yes | No |

- If 'Yes', please answer the following questions thinking about that section (including attachments) that were involved in the incident involving a female attachment. ***Skip to Question 2***

1c Have you been involved in a combat incident involving a *male* attached to the operational section? | Yes | No |

- If 'Yes', please answer the following questions about your **most recent combat incident** involving a section including an attachment (the attachment could be yourself).
- If 'No', please answer the following questions about your **most recent combat incident**.

Please remember that you should answer all of the following questions about the section (including any attachments) involved in the incident for the duration of time in which that group of people operated together. i.e. the section/small team commander (who may or may not be you), and the

section members who were involved in the incident including any attachments.

2 What was your rank at the time of the incident?

Army	**Royal Navy**	**RAF**	**Royal Marines**
Pte	Able Rate	AC	Mne
LCpl/LBdr	Leading Hand	SAC	LCpl
Cpl/Bdr	PO	Cpl	Cpl
Sgt	CPO	Sgt	Sgt
WO2	WO2	Flt Sgt	CSgt
WO1	WO1	WO	WO2
Lt	Midshipman	PO	WO1
Capt	Lt	FO	Lt
Maj	Lt Cdr	Flt Lt	Capt
		Sqn Ldr	Maj

3 What was your length of service at the time of the incident? | | *Years* | | *Months* *(please write in numbers)*

4 Please indicate your age at the time of the incident

18-19	*20-24*	*25-29*	*30-34*	*35-39*	*40-44*	*45-49*	*50+*

5 What was the size of the section, including the section commander and attachments? | | *(please write in a number)*

6 In total how many females were in the section? | | *(please write in a number)*

7 How many attachments were there to the section? | | *(please write in a number)*

How many of the people in the section would say you knew…

8 very well | | *(please write in a number)*

9 fairly well | | *(please write in a number)*

10 not at all well | | *(please write in a number)*

11 Was the IC…

Male	*Female*

12 Was the 2IC…

Male	*Female*

13 What was your role in the section?

IC	*2IC*	*section member*	*attachment*

14 How long did the section operate together exactly as formed at the time of the incident?

1-2 hours	*Half a day*	*1 day*	*2 days*	*3-6 days*	*1-2 weeks*	*3-4 weeks*	*more than 1 month*

15 Before the time of the incident, how many times had that section (exactly as formed during the incident) carried out tasks together?

Never	*Once*	*2-3 times*	*4-6 times*	*7-10 times*	*more than 10 times*

		Strongly Agree	Agree	Slightly Agree	Border-line	Slightly Disagree	Disagree	Strongly Disagree
16	*These statements are about ALL THE PEOPLE IN THE SECTION, including attachments*							
a	In this section people really cared about what happened to each other							
b	People could trust one another							
c	People in this section felt very close to each other							
d	People liked being in this section							
e	People in this section really respected one another							
f	People in this section liked one another							

	Very well	Pretty well	Border-line	Poorly	Very poorly
17 How well did the people in the section work together?					

	To a great extent	To a large extent	To some extent	A little	Very little
18 To what extent did members of the section *help* each other to get the task done?					
19 To what extent did members of the section *encourage* each other to succeed during the incident?					
20 To what extent did the members of your section pull together and share the load while in the field?					

	Always	Most of the time	Some-times	Seldom	Never
21 Did the members of the section work hard to get things done?					

22	*These statements concern the COMMANDERS OF THE SECTION*	Strongly Agree	Agree	Slightly Agree	Border-line	Slightly Disagree	Disagree	Strongly Disagree
a	People in this section respected the commanders in the section							
b	When a person in this section sought help, their commanders listened well and cared about what the person said							
c	Commanders trusted the people in this section							
d	Commanders really understood the people in this section							
e	When asked for help in solving a personal problem, commanders in this section did their best to help out							
f	When a person wanted to talk, their commanders made themselves available							
g	Commanders liked being in this section							
h	Commanders in this section respected each other							
i	Commanders in this section cared about one another as individuals							
j	The commanders in this section were the kind that people wanted to serve under in combat							
k	The commanders in this section could really apply their knowledge to solve problems in the field							
l	The chain of command worked well at the time of the incident							
m	The commanders kept their people well informed about what was going on							
n	The commanders in this section were experts and could show the people how best to perform a task							
o	The commanders worked right along with their people under the same hardships in the field							

		Strongly Agree	Agree	Slightly Agree	Border-line	Slightly Disagree	Disagree	Strongly Disagree
23	*These statements concern the WORKING ENVIRONMENT IN THE SECTION*							
a	The people in this section knew what was expected of them							
b	Rules were consistently enforced							
c	The reasons for being rewarded were well known							
d	The behaviours that would get you in trouble or punished were well known							
e	The priorities of this section were clear							
24	*These statements concern the PEOPLE IN THE SECTION at the time of the incident*	Strongly Agree	Agree	Slightly Agree	Border-line	Slightly Disagree	Disagree	Strongly Disagree
a	The people in this section felt that they played an important part in accomplishing the section's mission							
b	People were proud to be in the section							
c	People felt that section's operational mission was very important							
d	The people in this section were proud to be in the military							
e	People felt the military has an important job to do in defending the UK in today's world							
25	*Please answer these questions about THE SECTION*	Strongly Agree	Agree	Slightly Agree	Border-line	Slightly Disagree	Disagree	Strongly Disagree
a	This section was very cohesive							
b	There was a very high degree of teamwork and cooperation among people in this section							
c	The attachments in this section got along very well with the rest of the section members							
d	In this section, the commanders really cared about what happened to the attachments							

e	Overall the commanders in this section were very good							
f	When this section was in contact, it pulled together to respond effectively							
g	This was a very high performing section							
h	The commanders in this section appreciated the contributions of the people in the section							
i	The people appreciated the contributions of the commanders in the section							
26	*Please answer these questions about THE SECTION*	Extremely High	Very High	High	Moderate	Low	Very Low	Extremely Low
a	In contact, describe the confidence the people in this section had in each other							
b	In contact, describe the confidence the members of this section had in their section commanders							
c	In contact, describe the confidence the commanders in this section had in their section members							
d	In contact, describe the confidence the commanders in this section had in each other							
e	Describe the confidence people in the section had in their weapons and equipment							
f	How high was the morale in the section?							
g	Describe the state of the section's readiness							
h	Describe the state of discipline in the section							
i	How high was the determination or “will” to win in combat in the section?							
j	Describe the degree of confidence members of this section had that it would perform well in contact							

Annex C - Questionnaire (females)

Females completed exactly the same questionnaire as males, except the 2nd page took the form shown below:

The following questions refer to **'combat incidents'**. In this questionnaire, a 'combat incident' is defined as an incident where you have come under enemy fire (with small arms over short range on the ground) and a response was required.

The questionnaire also refers to a '**section**'. This is a section or small team, including any attachments.

1a Have *you* ever been involved in a 'combat incident'?

Yes	No

- If 'Yes', please answer the following questions **thinking about the incident(s) you were involved in.**
- If 'No', please answer the following questions thinking about a recent incident on operations (since 2002) when you've had to work with a group of others to accomplish a task. ***Skip to Question 2***

1b *How many* combat incidents have you been involved in? ☐ *(please write in a number)*

- If more than one, please answer the following questions about your **most recent combat incident**.

2 What was your rank at the time of the incident?

Army	Royal Navy	RAF	Royal Marines
Pte	Able Rate	AC	Mne
LCpl/LBdr	Leading Hand	SAC	LCpl
Cpl/Bdr	PO	Cpl	Cpl
Sgt	CPO	Sgt	Sgt
WO2	WO2	Flt Sgt	CSgt
WO1	WO1	WO	WO2
Lt	Midshipman	PO	WO1
Capt	Lt	FO	Lt
Maj	Lt Cdr	Flt Lt	Capt
		Sqn Ldr	Maj

Annex D - Question Response Rates: Cohesion Items

This shows response rates and mean scores on each cohesion question, for all respondents involved in ground close combat incidents in teams of 30 or less.

Question - cohesion measure items	Valid Responses	Blank Responses	Mean Score
HB-A:ALL THE PEOPLE IN THE SECTION...a. In this section people really cared about what happened to each other?	818	2	5.30
HB-A:ALL THE PEOPLE IN THE SECTION...b. People could trust one another?	815	5	5.39
HB-A: ALL THE PEOPLE IN THE SECTION...c. People in this section felt very close to each other?	818	2	4.88
HB-A: ALL THE PEOPLE IN THE SECTION...d. People liked being in this section?	818	2	5.04
HB-A: ALL THE PEOPLE IN THE SECTION...e. People in this section really respected one another?	818	2	4.97
HB-A: ALL THE PEOPLE IN THE SECTION...f. People in this section liked one another?	818	2	4.94
HB-I: How well did the people in the section work together?	819	1	5.03
HB-I:To what extent did members of the section help each other to get the task done??	818	2	4.83
HB-I:To what extent did members of the section encourage each other to succeed during the incident??	817	3	4.80
HB-I:To what extent did the members of your section pull together and share the load while in the field??	816	4	4.84
HB-I:Did the members of the section work hard to get things done?	818	2	5.05
VB-A:COMMANDERS OF THE SECTION...a. People in this section respected the commanders in the section?	795	25	5.23
VB-A:COMMANDERS OF THE SECTION...b. When a person in this section sought help their commanders listened well and cared about what the person said?	791	29	5.08
VB-A:COMMANDERS OF THE SECTION...c. Commanders trusted the people in this section?	794	26	5.16
VB-A:COMMANDERS OF THE SECTION...d. Commanders really understood the people in this section?	793	27	4.80
VB-A:COMMANDERS OF THE SECTION...e. When asked for help in solving a personal problem commanders in this section did their best to help out?	782	38	5.02
VB-A:COMMANDERS OF THE SECTION...f. When a person wanted to talk their commanders made themselves available?	790	30	4.98
HB-A leaders: COMMANDERS OF THE SECTION...g. Commanders liked being in this section?	791	29	5.20
HB-A leaders: COMMANDERS OF THE SECTION...h. Commanders in this section respected each other?	790	30	5.18
HB-A leaders: COMMANDERS OF THE SECTION...i. Commanders in this section cared about one another as individuals?	791	29	5.07
VB-I:COMMANDERS OF THE SECTION...j. The commanders in this section were the kind that people wanted to serve under in combat?	790	30	5.10
VB-I:COMMANDERS OF THE SECTION...k. The	791	29	5.16

Question - cohesion measure items	Valid Responses	Blank Responses	Mean Score
commanders in this section could really apply their knowledge to solve problems in the field?			
VB-I:COMMANDERS OF THE SECTION...l. The chain of command worked well at the time of the incident?	794	26	5.14
VB-I:COMMANDERS OF THE SECTION...m. The commanders kept their people well informed about what was going on?	791	29	5.01
VB-I:COMMANDERS OF THE SECTION...n. The commanders in this section were experts and could show the people how best to perform a task?	792	28	4.83
VB-I:COMMANDERS OF THE SECTION...o. The commanders worked right along with their people under the same hardships in the field?	795	25	5.26
OB-I anomie: WORKING ENVIRONMENT IN THE SECTION...a. The people in this section knew what was expected of them?	808	12	5.40
OB-I anomie: WORKING ENVIRONMENT IN THE SECTION...b. Rules were consistently enforced?	802	18	5.06
OB-I anomie: WORKING ENVIRONMENT IN THE SECTION...c. The reasons for being rewarded were well known?	795	25	4.75
OB-I anomie: WORKING ENVIRONMENT IN THE SECTION...d. The behaviours that would get you in trouble or punished were well known?	802	18	5.18
OB-I anomie: WORKING ENVIRONMENT IN THE SECTION...e. The priorities of this section were clear?	807	13	5.30
OB-A pride: the PEOPLE IN THE SECTION ...a. The people in this section felt that they played an important part in accomplishing the sections mission?	807	13	5.35
OB-A pride: the PEOPLE IN THE SECTION ...b. People were proud to be in the section?	807	13	5.26
OB-A pride: the PEOPLE IN THE SECTION ...c. People felt that sections operational mission was very important?	805	15	5.02
OB-A pride: the PEOPLE IN THE SECTION ...d. The people in this section were proud to be in the military?	806	14	5.12

Question - validity testing items	Valid Responses	Blank Responses	Mean Score
Cohesion (construct):...THE SECTION ...a. This section was very cohesive?	804	16	5.13
HB-I (validity):...THE SECTION ...b. There was a very high degree of teamwork and cooperation among people in this section?	811	9	5.30
HB-A (validity):...THE SECTION ...c. The attachments in this section got along very well with the rest of the section members?	755	65	5.04
VB-A (validity):...THE SECTION ...d. In this section the commanders really cared about what happened to the attachments?	763	57	5.03
VB-I (validity):...THE SECTION ...e. Overall the commanders in this section were very good?	806	14	5.20

Question - validity testing items	Valid Responses	Blank Responses	Mean Score
Stress Resistance (criterion):...THE SECTION ...f. When this section was in contact it pulled together to respond effectively?	808	12	5.51
Performance (criterion):...THE SECTION ...g. This was a very high performing section?	809	11	5.30
VB-A (validity):...THE SECTION ...h. The commanders in this section appreciated the contributions of the people in the section?	809	11	5.22
VB-A (validity):...THE SECTION ...i. The people appreciated the contributions of the commanders in the section?	806	14	5.13
Confidence (construct):...THE SECTION ...a. In contact describe the confidence the people in this section had in each other?	808	12	4.96
Confidence (construct):...THE SECTION ...b. In contact describe the confidence the members of this section had in their section commanders?	806	14	4.98
Confidence (construct):...THE SECTION ...c. In contact describe the confidence the commanders in this section had in their section members?	808	12	4.98
Confidence (construct):...THE SECTION ...d. In contact describe the confidence the commanders in this section had in each other?	805	15	5.00
Confidence (construct):...THE SECTION ...e. Describe the confidence people in the section had in their weapons and equipment?	811	9	4.38
Morale (criterion):...THE SECTION ...f. How high was the morale in the section??	803	17	4.73
Readiness (criterion):...THE SECTION ...g. Describe the state of the sections readiness?	807	13	5.02
Discipline (criterion):...THE SECTION ...h. Describe the state of discipline in the section?	807	13	4.98
Soldier Will (construct):...THE SECTION ...i. How high was the determination or WILL to win in combat in the section??	810	10	5.39
Confidence (construct):...THE SECTION ...j. Describe the degree of confidence members of this section had that it would perform well in contact?	809	11	5.05

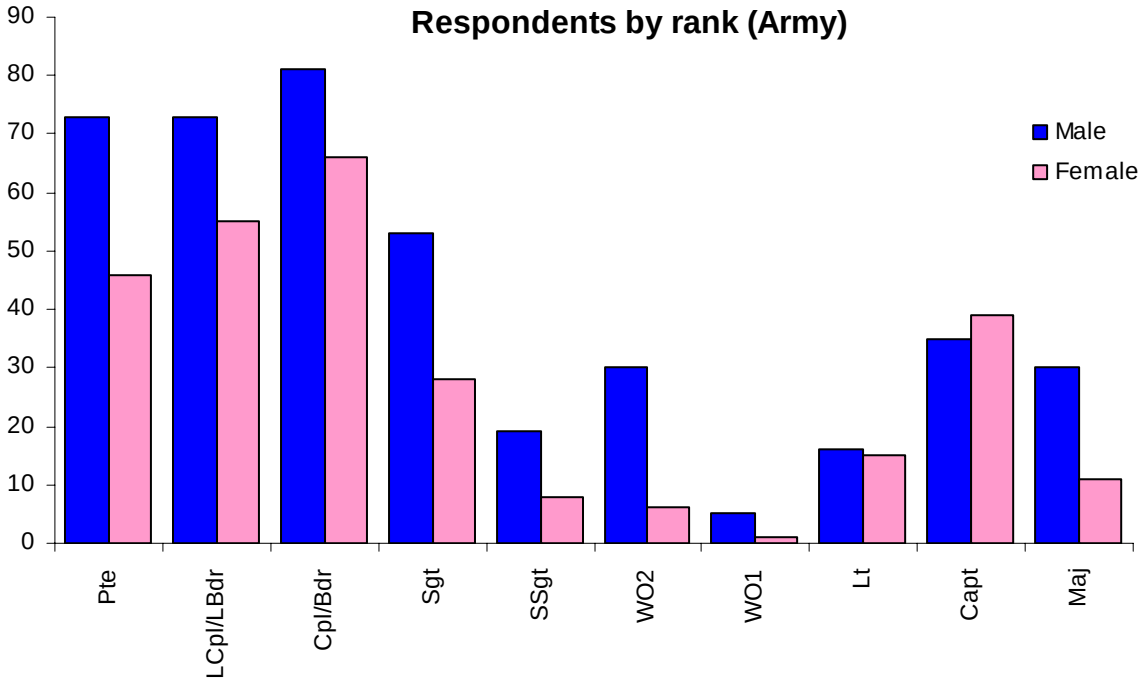
Annex E - Full Scores & Distributions of Ratings: Background Factual Information

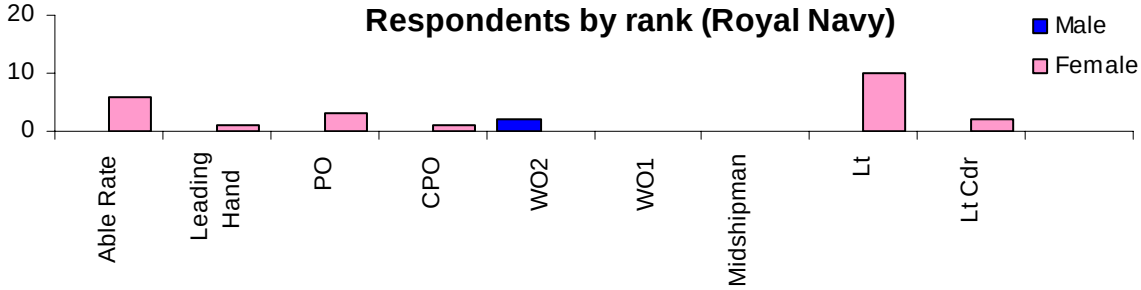
Below are shown the key statistics on all the background factual questions, based just on respondents who had experienced combat and who had stated their section size as 30 or less.

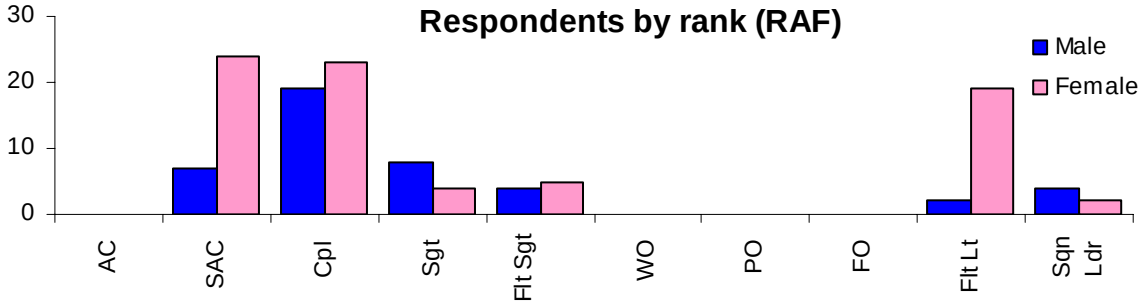
Original items in the questionnaire

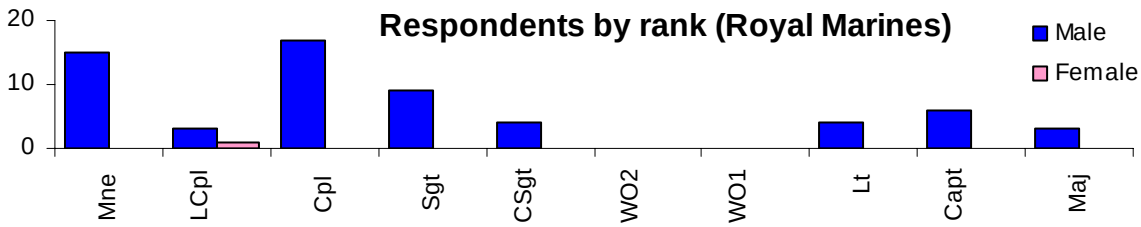
	N			Std.		
Variable / Question	**Valid**	**Missing**	**Mean**	**Deviation**	**Min**	**Max**
How many combat incidents have you been involved in? [Asked of females only, mean skewed by one individual's very high score]	317	503	8.90	49.5	0	624
Have you been involved in a Combat incident involving a FEMALE attached to the operational section? [Asked of males only]	477	343	1.76	0.43	1	2
Have you been involved in a Combat incident involving a MALE attached to the operational section? [Asked of males only]	401	419	1.11	0.31	1	2
ARMY - What was your rank at the time of the incident?*	615	205	3.88	2.76	1	10
ROYAL NAVY - What was your rank at the time of the incident?*	17	803	3.94	3.01	1	8
RAF - What was your rank at the time of the incident?*	103	717	4.42	2.78	2	10
ROYAL MARINES - What was your rank at the time of the incident?*	58	762	3.81	2.81	1	10
YEARs - What was your length of service at the time of the incident?	795	25	8.87	6.18	0	35
MONTHs - What was your length of service at the time of the incident?	675	145	4.76	3.10	0	14
Please indicate your age at the time of the incident?	812	8	3.33	1.30	1	8
What was the size of the section including the section commander and attachments?	809	11	12.0	6.87	0	30
In total how many females were in the section?	815	5	0.93	1.76	0	25
How many attachments were there to the section?	770	50	1.97	2.91	0	24
How many of the people in the section would say you knew…VERY WELL	634	186	7.01	5.48	0	30
How many of the people in the section would say you knew…FAIRLY WELL	484	336	4.79	5.30	0	30
How many of the people in the section would say you knew…NOT AT ALL WELL	409	411	5.01	5.99	0	29
Was the IC… (1=male, 2=female)	813	7	1.07	0.26	1	2
Was the 2IC… (1=male, 2=female)	803	17	1.06	0.24	1	2
What was your role in the section?	811	9	2.66	1.14	1	4
How long did the section operate together exactly as formed at the time of the incident?	813	7	5.99	2.59	1	8
Before the time of the incident how many times had that section (exactly as formed during the incident) carried out tasks together?	812	8	4.45	1.96	1	6
What was your length of service at the time of the incident?	807	13	9.07	6.21	0.17	35

*Actual distributions of ranks for each service are shown below.





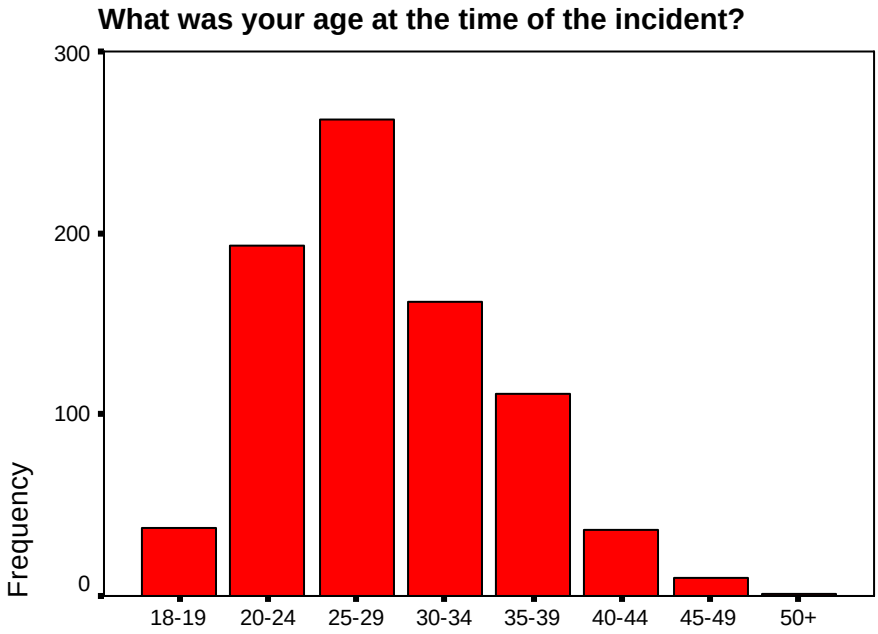




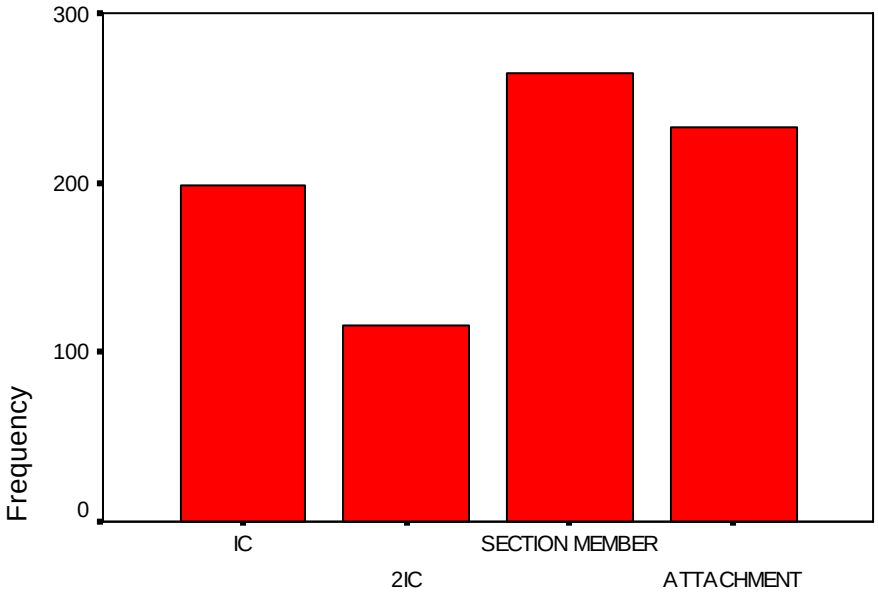
Derived measures

Derived Variables	**N**			**Std.**		
Variable / Question	**Valid**	**Missing**	**Mean**	**Deviation**	**Min**	**Max**
Adjusted Females	820	0	0.95	1.75	0	25
Adjusted Section size	820	0	12.1	6.88	2	30
R is Female?	820	0	0.41	0.49	0	1
Mixed?	809	11	0.53	0.50	0	1
Any attachments?	770	50	0.65	0.48	0	1
Propn Female	820	0	0.09	0.15	0	1
Minority propn	820	0	0.08	0.11	0	0.5
Propn Very Well Known	750	70	0.54	0.41	0	1
Propn Fairly Well Known	750	70	0.25	0.33	0	1
Propn Not Well Known	750	70	0.20	0.32	0	1
Known profile	757	63	0.34	0.66	-1	1
R is Attachment?	811	9	0.29	0.45	0	1
R is Leader?	811	9	0.39	0.49	0	1
Cohesion Group	791	29	2.00	0.82	1	3
Size Group	809	11	3.36	0.99	1	5
Service	792	28	1.50	0.98	1	4
Combined Rank	791	29	3.95	2.77	1	10
Adjusted Females capped	820	0	0.79	0.89	0	3
R is IC?	811	9	0.24	0.43	0	1
R is 2IC?	811	9	0.14	0.35	0	1
2+ females	820	0	0.18	0.38	0	1
3+ females	820	0	0.07	0.25	0	1

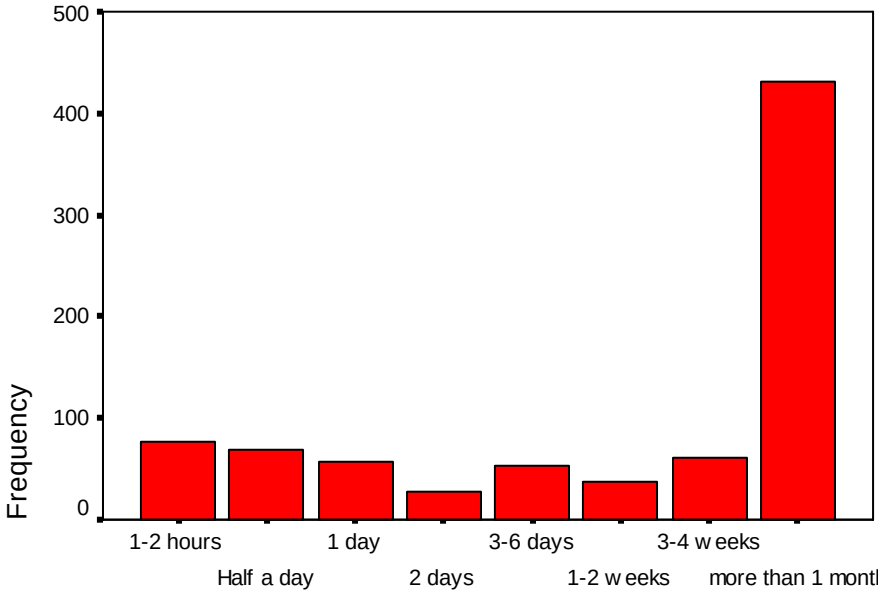
Some of the above questions required the individual to choose from a range of options. Where this is the case, the charts below show the distribution of choices made:



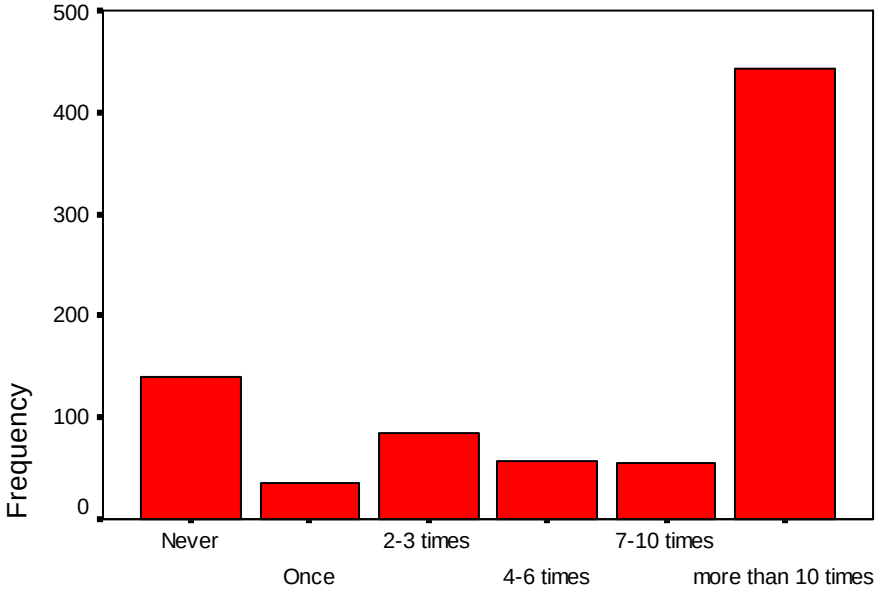
What was your role in the section?



How long did the section operate together exactly as formed at the time of the incident?

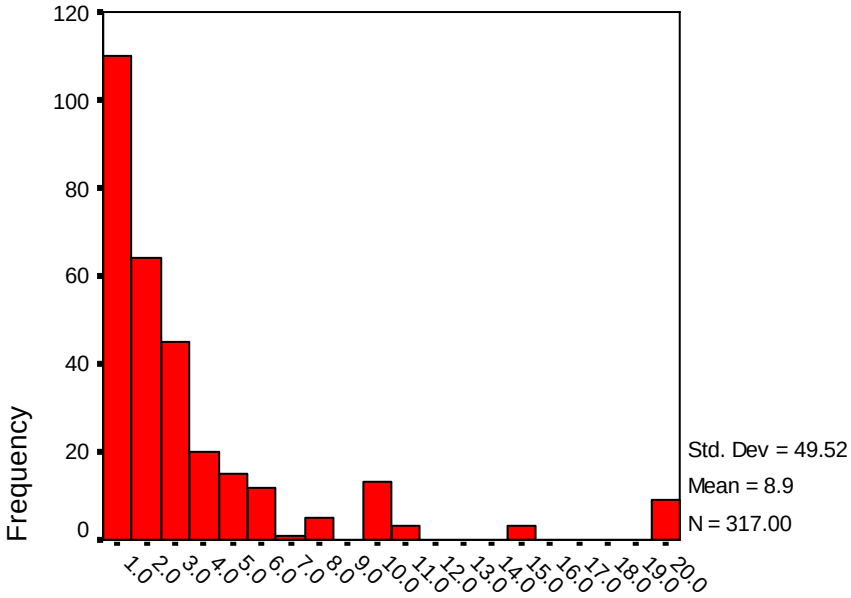


Before the time of the incident how many times had that section (exactly as formed during the incident) carried out tasks together?

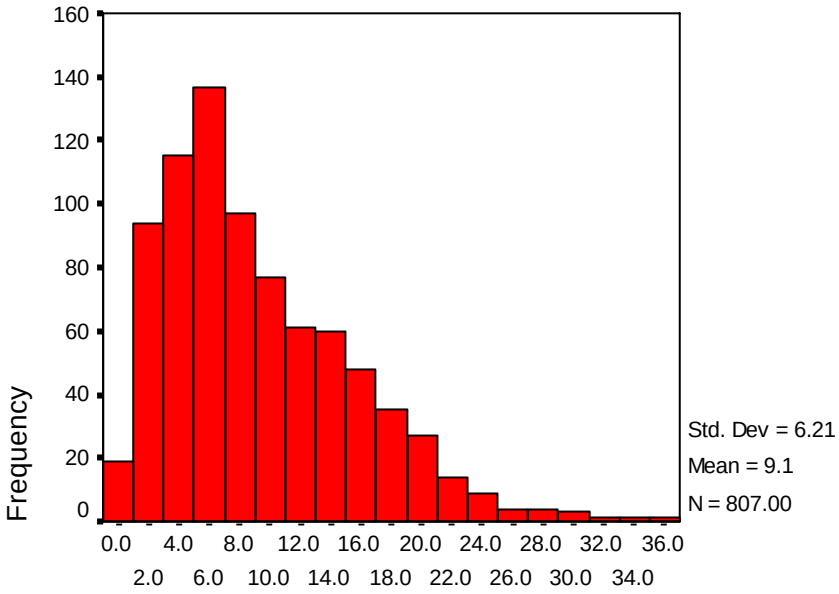


And below are displays showing the distribution of values for some of the derived measures:

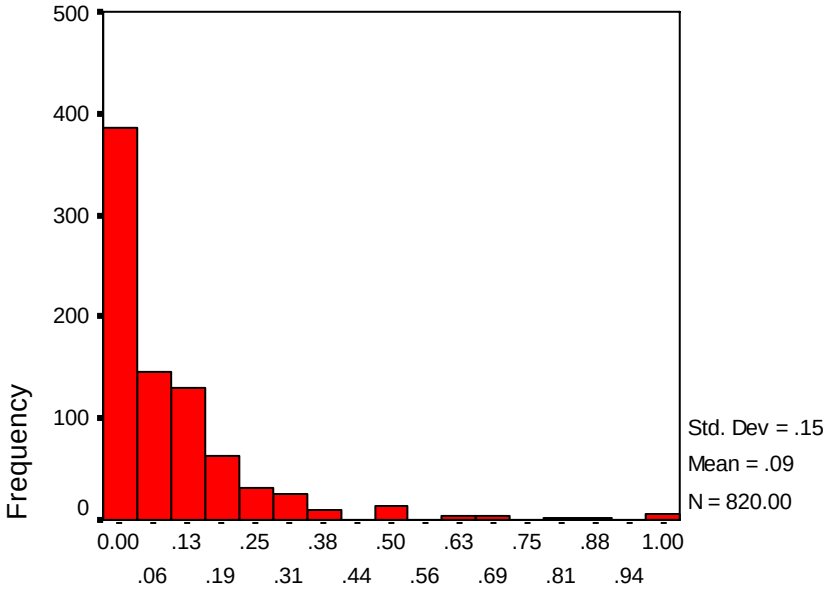
How many combat incidents have you been involved in?



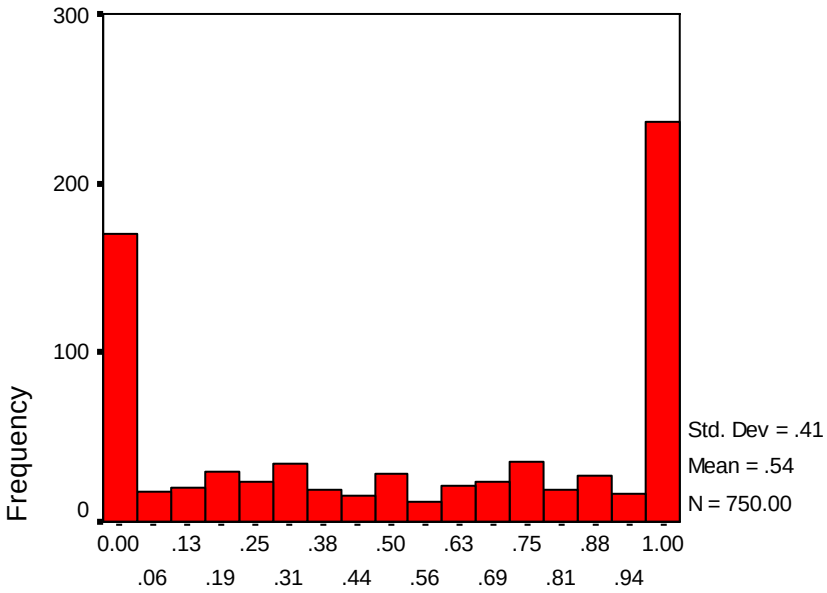
What was your length of service (in years) at the time of the incident?



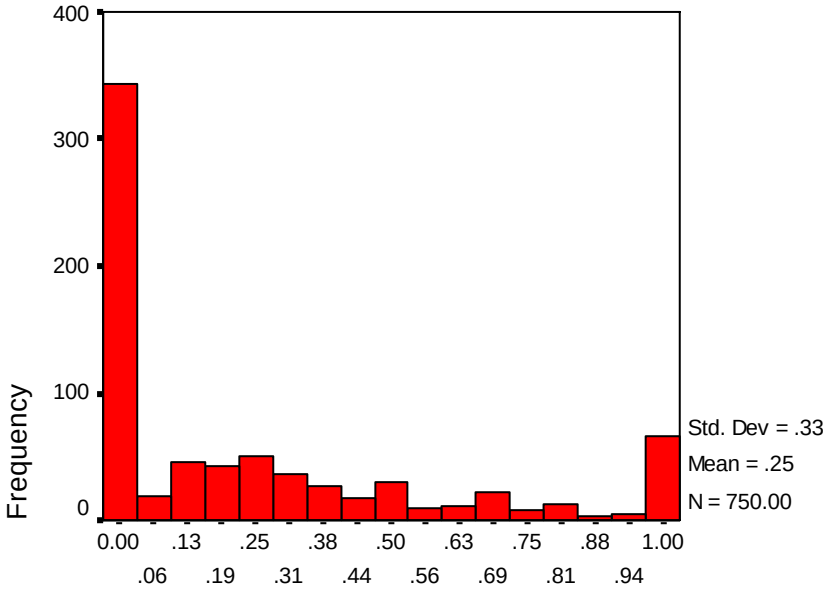
Proportion Females



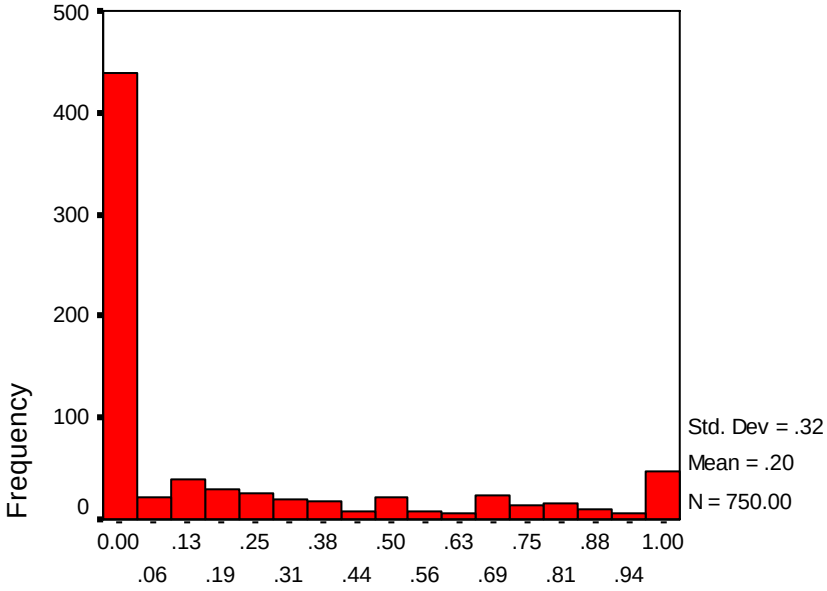
Proportion Very Well Known



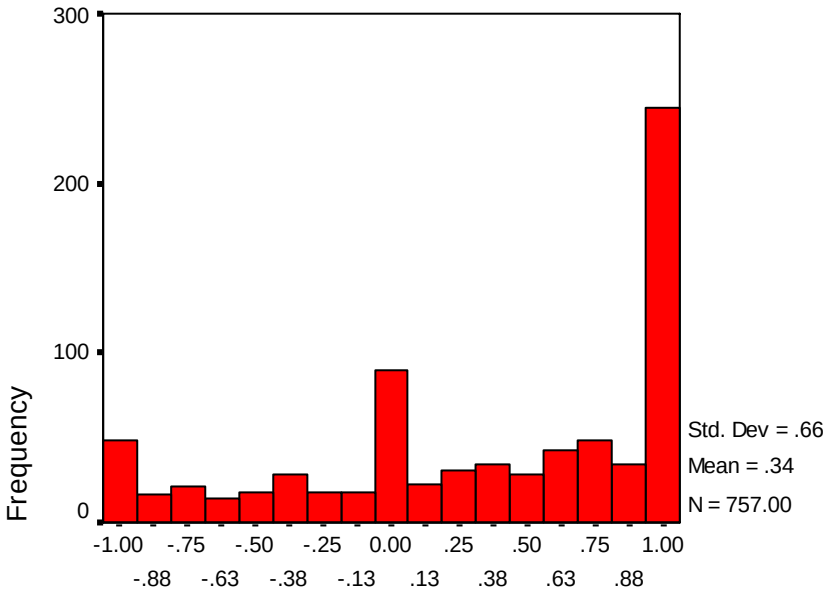
Proportion Fairly Well Known

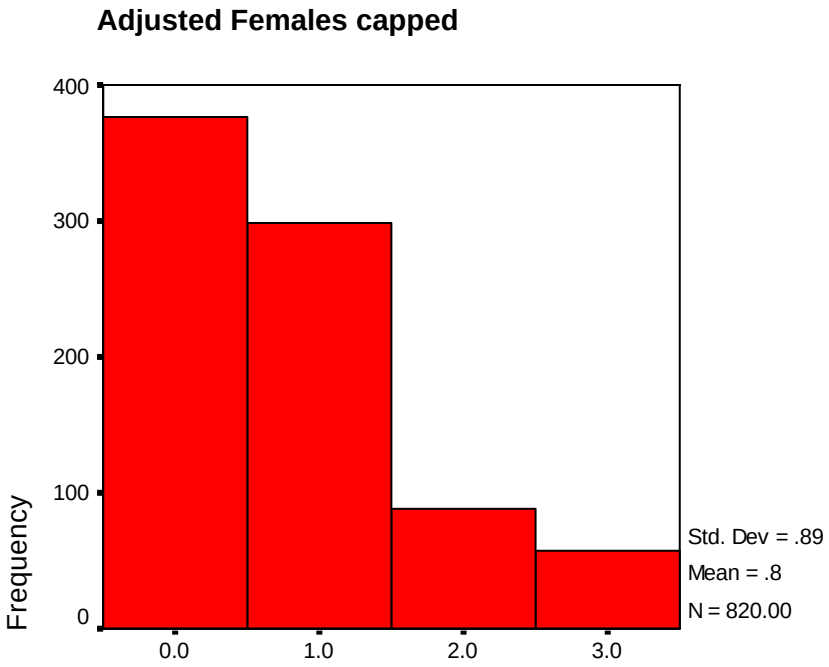


Proportion Not At All Well Known



Known profile




Adjusted Females capped
Frequency
400
300
200
100
0
0.0
1.0
2.0
3.0
Std. Dev = .89
Mean = .8
N = 820.00

Annex F - Scale Definitions

Cohesion Sub-scale	Cohesion items	Validation items
Horizontal Bonding - Affective	16A-16F	25A,C
Horizontal Bonding - Instrumental	17-21	25A,B
Horizontal Bonding - Affective (leaders)	22G-22I	25A
Vertical Bonding - Affective	22A-22F	25A,D,H,I
Vertical Bonding - Instrumental	22J-22O	25A,E
Organisational Bonding - Affective	24A-24D	25A
Organisational Bonding - Instrumental	23A-23E	25A

Annex G - Scale Evaluation Details

Below is shown the SPSS output summarising the results of Reliability analysis.

```
****** Method 2 (covariance matrix) will be used for this analysis ******

                        R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (H B - A)

       N of Cases =       666.0

                                                    N of
Statistics for       Mean   Variance    STD Dev  Variables
      Scale       11.5796    23.9794     4.8969          6

Inter-item
Correlations         Mean    Minimum    Maximum      Range    Max/Min   Variance
                    .5244      .2559      .6963      .4404     2.7214      .0246


Item-total Statistics

              Scale          Scale      Corrected
              Mean         Variance       Item-         Squared          Alpha
            if Item        if Item        Total        Multiple        if Item
            Deleted        Deleted    Correlation    Correlation       Deleted

Q16A          9.8529        18.0956        .3803         .1791          .8924
Q16B          9.9595        18.5623        .6641         .4563          .8340
Q16C          9.4565        15.9357        .7341         .5946          .8151
Q16D          9.5901        16.7505        .7362         .6002          .8164
Q16E          9.5270        16.1354        .7700         .6290          .8087
Q16F          9.5120        17.2999        .7021         .5770          .8235


Reliability Coefficients     6 items

Alpha =   .8566           Standardized item alpha =   .8687




                        R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (H B - A)

       N of Cases =       666.0

                                                    N of
Statistics for       Mean   Variance    Std Dev  Variables
      Scale        5.5375     6.2730     2.5046          3

Inter-item
Correlations         Mean    Minimum    Maximum      Range    Max/Min   Variance
                    .7428      .6856      .7848      .0992     1.1446      .0021


Item-total Statistics

              Scale          Scale      Corrected
              Mean         Variance       Item-         Squared          Alpha
            if Item        if Item        Total        Multiple        if Item
            Deleted        Deleted    Correlation    Correlation       Deleted

Q22G          3.7267         3.0831        .7631         .5961          .8787
Q22H          3.7267         2.8756        .8407         .7072          .8125
Q22I          3.6216         2.8401        .7845         .6353          .8623


Reliability Coefficients     3 items

Alpha =   .8960           Standardized item alpha =   .8965




                        R E L I A B I L I T Y   A N A L Y S I S   -   S C A L E   (H B - I)

       N of Cases =       666.0

                                                    N of
Statistics for       Mean   Variance    Std Dev  Variables
      Scale        7.4444     6.0759     2.4649          5
```

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5157	.4294	.6227	.1934	1.4504	.0047

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
Q17	6.0240	4.4024	.5916	.3753	.8231
Q18	5.8859	3.8997	.7145	.5133	.7892
Q19	5.9009	3.7676	.6545	.4603	.8079
Q20	5.9159	3.7403	.6978	.5054	.7937
Q21	6.0511	4.4064	.5841	.3558	.8248

Reliability Coefficients 5 items

Alpha = .8408 Standardized item alpha = .8419

R E L I A B I L I T Y A N A L Y S I S - S C A L E (V B - A)

N of Cases = 666.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	11.7387	24.8429	4.9843	6

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6652	.4809	.7915	.3106	1.6458	.0068

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
Q22A	9.9730	19.0429	.6947	.5703	.9185
Q22B	9.8258	17.0222	.8532	.7351	.8972
Q22C	9.8949	18.5483	.7367	.5661	.9133
Q22D	9.5150	16.2321	.8261	.6970	.9014
Q22E	9.7658	17.1240	.8083	.7109	.9033
Q22F	9.7192	17.1586	.7569	.6759	.9109

Reliability Coefficients 6 items

Alpha = .9219 Standardized item alpha = .9226

R E L I A B I L I T Y A N A L Y S I S - S C A L E (V B - I)

N of Cases = 666.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	11.4700	33.1938	5.7614	6

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.6721	.5819	.8278	.2460	1.4227	.0045

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
Q22J	9.5856	23.2987	.7943	.7217	.9085
Q22K	9.6396	23.8218	.8220	.7510	.9057
Q22L	9.6111	24.2891	.7039	.5404	.9203
Q22M	9.4730	23.1068	.7983	.6834	.9079
Q22N	9.3198	22.1968	.8073	.6825	.9072
Q22O	9.7207	23.6933	.7714	.6066	.9116

Reliability Coefficients 6 items

Alpha = .9241 Standardized item alpha = .9248

R E L I A B I L I T Y A N A L Y S I S - S C A L E (O B - A)

N of Cases = 666.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	7.3093	9.8350	3.1361	4

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5250	.4461	.7522	.3061	1.6861	.0121

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
Q24A	5.6366	6.4873	.6918	.5926	.7308
Q24B	5.5435	5.7432	.7029	.6123	.7077
Q24C	5.3378	5.4511	.5611	.3204	.7881
Q24D	5.4099	5.9204	.5591	.3230	.7782

Reliability Coefficients 4 items

Alpha = .8003 Standardized item alpha = .8156

R E L I A B I L I T Y A N A L Y S I S - S C A L E (O B - I)

N of Cases = 666.0

Statistics for Scale	Mean	Variance	Std Dev	N of Variables
	9.3288	13.8661	3.7237	5

Inter-item Correlations	Mean	Minimum	Maximum	Range	Max/Min	Variance
	.5311	.4393	.5768	.1374	1.3128	.0023

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
Q23A	7.7237	10.5341	.6187	.4134	.8266
Q23B	7.4039	9.0562	.6784	.4717	.8048
Q23C	7.0931	8.0906	.6816	.4734	.8091
Q23D	7.4835	9.3087	.6282	.4012	.8185
Q23E	7.6111	9.1102	.6933	.4898	.8011

Reliability Coefficients 5 items

Alpha = .8442 Standardized item alpha = .8499

Below is shown a summary of the correlations between the scales and the validation questions:

Cohesion Scale	Validation Question	r
HB-A	25A	0.65
	25C	0.507
HB-I	25A	0.61
	25B	0.659
VB-A	25A	0.627
	25D	0.606
	25H	0.718
	25I	0.764
VB-I	25A	0.579
	25E	0.798

NB. All correlations are significant at $p<0.01$ level.

25A: This section was very cohesive?
25B.There was a very high degree of teamwork and cooperation among people in this section?
25C.The attachments in this section got along very well with the rest of the section members?
25D.In this section the commanders really cared about what happened to the attachments?
25E.Overall the commanders in this section were very good?
25H.The commanders in this section appreciated the contributions of the people in the section?
25I.The people appreciated the contributions of the commanders in the section?

Annex H - Detailed Comparisons of Combat vs Non-Combat Responses

The table below shows the cohesion scores given by all respondents in combat and non-combat situations, and the comparative demographics.

Factor (All respondents)	Mean Value		Difference	Sig
	Combat	Non-Combat		
Cohesion – Overall	6.13	5.78	-0.36	**
Cohesion – Horizontal	6.17	5.73	-0.45	**
- Horizontal Affective (Peer Bonding)	*6.09*	*5.63*	*-0.46*	**
- Horizontal Affective among Leaders	*6.15*	*5.74*	*-0.41*	**
- Horizontal Instrumental (Teamwork)	*6.27*	*5.83*	*-0.44*	**
Cohesion – Vertical	6.07	5.69	-0.37	**
- Vertical Affective (Leader Caring)	*6.04*	*5.71*	*-0.33*	**
- Vertical Instrumental (Leader Competence)	*6.09*	*5.67*	*-0.41*	**
Cohesion – Organisational	6.17	5.98	-0.19	**
- Organisational Affective (Values/Pride)	*6.19*	*6.01*	*-0.18*	**
- Organisational Instrumental (Rules & Norms)	*6.14*	*5.94*	*-0.20*	**
Female Respondent	40%	87%	+48%	**
Length of service (years)	8.9	8.9	+0.0	
Number of females	0.9	2.1	+1.2	**
Mixed group	53%	89%	+36%	**
Female proportion	9%	25%	+16%	**
2+ females	17%	42%	+24%	**
3+ females	7%	26%	+19%	**
Proportion very well known	55%	38%	–17%	**
Proportion fairly well known	25%	35%	+10%	**
Proportion not well known	20%	27%	+7%	**
Known profile†	+0.36	+0.11	–0.25	**
Respondent is leader	38%	36%	–2%	
Respondent is IC	24%	22%	–2%	
Respondent is 2IC	14%	14%	+0%	
Female IC	7%	25%	+18%	**
Female 2IC	6%	23%	+17%	**
Any attachments?	66%	48%	–18%	**
No. of attachments	2.0	1.5	–0.5	**
Respondent is attachment	29%	17%	–12%	**
Time operated together ‡	6.0	6.1	+0.1	
Number of times operated together ‡	4.5	4.0	–0.4	**
Age ‡	3.3	3.7	+0.4	**
Section Size	12.1	8.8	–3.3	**
Rank ‡	3.9	5.1	+1.3	**

Sig – ** = p<0.01; *: p = 0.01-0.05.

‡ - these questions had multiple options, and the statistics quoted here reflect the difference in the codes assigned to these options.

† - this measure combines the responses from the three 'proportion known' questions into one overall measure of how well the individual knows the members of the small team/section, where -1 is the score when everyone is 'not well known' and +1 is the score when everyone is 'very well known'.

Combat vs Non-Combat Responses – Males only

Factor (Males only)	Mean Value		Difference	Sig
	Combat	Non-Combat		
Cohesion – Overall	6.23	6.00	-0.23	**
Cohesion – Horizontal	6.26	5.97	-0.29	**
- Horizontal Affective (Peer Bonding)	*6.20*	*5.92*	*-0.28*	**
- Horizontal Affective among Leaders	*6.28*	*6.01*	*-0.27*	**
- Horizontal Instrumental (Teamwork)	*6.33*	*6.00*	*-0.33*	**
Cohesion – Vertical	6.19	5.99	-0.20	**
- Vertical Affective (Leader Caring)	*6.15*	*5.98*	*-0.18*	*
- Vertical Instrumental (Leader Competence)	*6.23*	*5.99*	*-0.25*	**
Cohesion - Organisational	6.23	6.08	-0.15	**
- Organisational Affective (Values/Pride)	*6.22*	*6.05*	*-0.17*	*
- Organisational Instrumental (Rules & Norms)	*6.24*	*6.10*	*-0.14*	*
Length of service (years)	10.1	12.5	+2.4	**
Number of females	0.3	0.4	+0.1	
Mixed group	24%	29%	+5%	
Female proportion	3%	6%	+3%	**
2+ females	5%	10%	+5%	*
3+ females	2%	4%	+2%	
Proportion very well known	65%	55%	–10%	**
Proportion fairly well known	21%	32%	+11%	**
Proportion not well known	14%	14%	–0%	
Known profile†	+0.52	+0.41	–0.11	*
Respondent is leader	51%	51%	–0%	
Respondent is IC	33%	36%	+2%	
Respondent is 2IC	18%	15%	–3%	
Female IC	1%	2%	+1%	
Female 2IC	1%	4%	+2%	
Any attachments?	62%	42%	–21%	**
No. of attachments	1.8	1.3	–0.5	
Respondent is attachment	17%	14%	–3%	
Time operated together ‡	6.5	6.6	+0.1	
Number of times operated together ‡	4.8	4.6	–0.2	
Age ‡	3.4	4.0	+0.6	**
Section Size	12.0	8.1	–3.9	**
Rank ‡	3.8	4.5	+0.7	**

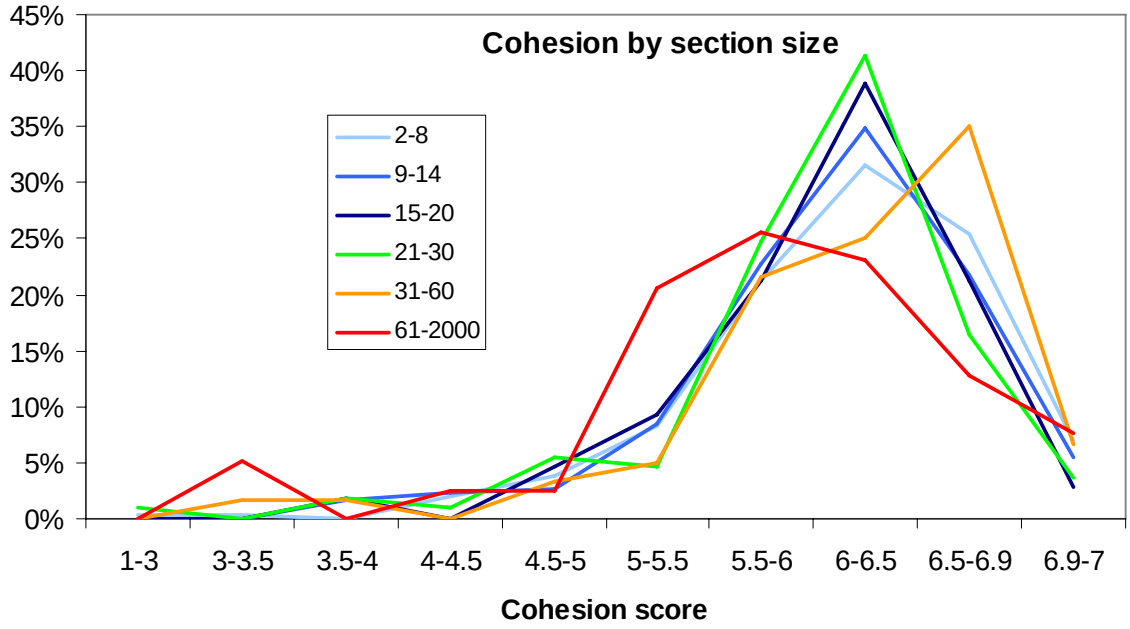
Combat vs Non-Combat Responses – Females only

Factor (Females only)	Mean Value		Difference	Sig
	Combat	Non-Combat		
Cohesion - Overall	5.98	5.74	-0.24	**
Cohesion - Horizontal	6.04	5.69	-0.35	**
- Horizontal Affective (Peer Bonding)	*5.93*	*5.59*	*-0.34*	**
- Horizontal Affective among Leaders	*5.95*	*5.70*	*-0.26*	**
- Horizontal Instrumental (Teamwork)	*6.18*	*5.80*	*-0.38*	**
Cohesion - Vertical	5.87	5.65	-0.22	**

Factor (Females only)	Mean Value		Difference	Sig
	Combat	Non-Combat		
- Vertical Affective (Leader Caring)	*5.88*	*5.67*	*-0.21*	**
- Vertical Instrumental (Leader Competence)	*5.86*	*5.62*	*-0.23*	**
Cohesion - Organisational	6.06	5.96	-0.10	*
- Organisational Affective (Values/Pride)	*6.15*	*6.00*	*-0.14*	*
- Organisational Instrumental (Rules & Norms)	*5.98*	*5.92*	*-0.07*	
Length of service (years)	7.2	8.4	+1.2	**
Number of females	1.8	2.4	+0.5	**
Mixed group	99%	99%	–1%	
Female proportion	18%	28%	+10%	**
2+ females	36%	46%	+11%	**
3+ females	15%	29%	+14%	**
Proportion very well known	38%	35%	–3%	
Proportion fairly well known	31%	35%	+4%	
Proportion not well known	30%	29%	–1%	
Known profile†	+0.09	+0.06	–0.03	
Respondent is leader	19%	34%	+15%	**
Respondent is IC	11%	20%	+9%	**
Respondent is 2IC	8%	14%	+6%	**
Female IC	15%	29%	+14%	**
Female 2IC	12%	26%	+14%	**
Any attachments?	72%	49%	–24%	**
No. of attachments	2.3	1.6	–0.8	**
Respondent is attachment	46%	18%	–29%	**
Time operated together ‡	5.2	6.0	+0.8	**
Number of times operated together ‡	4.0	3.9	–0.0	
Age ‡	3.1	3.6	+0.5	**
Section Size	12.3	8.9	–3.4	**
Rank ‡	4.0	5.2	+1.2	**

Annex I - Cohesion by Section Size (including larger sections)

The graph below shows the distribution of cohesion scores split by section size *including sections larger than 30*, among combat respondents. Note that these larger sections were excluded from all of the analyses described in this report, but this information is shown here to illustrate why the decision was made to exclude responses for sections larger than 30.



Annex J - Details of Constrained Regression Models

- A1: Model with free selection from all available variables (i.e. as in section 7.5.1)
- A2: As A1, but with 'Mixed' being the only factor available relating to the presence of females in the section.
- A3: As A1, but with no gender-related variables available.
- B: Best model from all available gender-related variables

UPDATED

Model coefficients for various regression models of Overall Cohesion

	Model			
Variable	**A1**	**A2**	**A3**	**B**
Constant	*5.727*	*5.682*	*5.593*	*6.263*
Known Profile	0.209	0.239	0.253	
Times operated together	0.056	0.500	0.055	
Combined rank	0.030	0.017	0.016	
3+ women	-0.489			-0.477
Mixed section		-0.117		-0.180
R is Attachment?		0.233	0.225	
R is Leader?		0.193	0.216	
Adjusted r^2	12.7%	11.8%	11.2%	5.9%

* - Inclusion of 'Mixed' into model was only possible by relaxing entry rule to p<0.1.

One can conclude the following from the above results:

1. No model can explain more than 13% of the total variance in cohesion scores. This is likely to be due to a mixture of limitations in the data, absence of data about other factors that also contribution towards cohesion, the inherent complexity of cohesion itself (being reflective of the interpersonal dynamics of multiple individuals), and 'noise' in the data due to inevitable limitations of gathering information in a questionnaire and issues of memory due to the passage of time.
2. (A3): One can explain 11% of the cohesion variance without any gender-related information.
3. (A1 – A3): Knowing information about the presence of females in a section allows a model to explain an additional 1.5% of cohesion variance.
4. (B): One can explain 5.9% of the cohesion variance with only gender-related information.
5. B vs. (A1 – A3): Approximately a quarter (1.5%/5.9%) of the apparent impact on cohesion from the presence of women is actually due to the presence of women, with other cohesion-impairing things that happen to be true of women explaining the rest.
6. (A2 – A3) vs. (A1 – A3): The presence of women in a section does not appear to help explain much variation in cohesion, whereas the presence of 3 or more women explains more.

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