

# WOMEN IN WARGAMING PROJECT

Sponsor: SONAC, Cabinet Office, UK

Tess Butler, Ruddy Nice Ltd & Dr John Curry, Bath Spa University

WiW Project Co-Leads



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## BACKGROUND

The Secretary of State's Office of Net Assessment and Challenge (SONAC) sponsored this research to use wargaming as a tool to analyse the role that gender plays in strategic decision making in the security environment.

By 2024, women remained under-represented in the UK's defence and national security sectors. Just 1% of professional wargamers are women. In January of that year, SONAC conducted a pilot study to examine how gender influences strategic decision-making in wargaming. The study found that when games were played with participants of the same gender, men and women demonstrated distinct approaches to structuring decisions and selecting courses of action. Conversely, in mixed-gender games, these differences diminished, resulting in different decision-making outcomes. However, the study's small scale limited the validity of its findings. Further research was proposed to collect a larger dataset, aiming to produce more comprehensive insights. These findings would serve as an evidence base to inform policy decisions, improve strategic decision-making processes within the national security community and discover if there were any advantages to our National Security and Defence by using different gender balances in teams.

The Foreign, Commonwealth and Development Office funded this research from its *Women, Peace and Security* fund. The research itself was sponsored and overseen by SONAC.

### **Limitations of this Report**

This work was carried out within a tight constraints. The research team had to deliver the games, starting in January 2025, analyse the results, carry out interviews and write up the report (including data visualisation) by the end of March 2025. The final report should be read with these deadlines in mind, however the research team have confidence in the research methodology, the conclusions and recommendations.

## RESEARCH TEAM

Due to the short time scale for the research, five months from contract to delivery of report, and the scale of the number games required, a wide ranging multi-disciplinary team was involved to design, run the game and analyse the results.

Co-Lead of Project: Tess Butler, Ruddy Nice Ltd, PhD Candidate Bath Spa University, is a lead figure in UK Defence training, simulation and wargaming. She owns and delivers the DSET conference that is an important focus for both military simulation, education and training and the professional wargaming conference.

Co-Lead of Project: Dr John Curry Bath Spa University is a well-known academic wargamer with an international reputation. The most prolific published author of wargaming globally, he has an extensive portfolio of professional wargaming including for organisations in the UK and Washington.

Analytics: David Burden, Daden Ltd, PhD Candidate Bath Spa University, has extensive wargaming experience and has delivered multiple DSTL funded projects in the security space.

Gender Advisor: Dr Rebecca Feasey, Bath Spa University, is an academic who has conducted extensive wide-ranging research in gender studies.

Wargaming Facilitator: Lt Col Ant Sharman CO 1 Wessex Yeomanry has extensive experience of delivery military wargames.

Wargaming Facilitator: Professor David Manley, UCL, is key academic with their professional wargaming experience being focussed on supporting the Royal Navy and other NATO navies.

Wargaming Facilitator: Jess Viccars MSc, Analyst, Wargaming Advice, Research and Design Team (WARD), Future Concepts and Evaluation Group: Exploration Division, DSTL

Wargaming Observer: Lt Col Sofia Hargreaves British Army Royal Signals veteran, has wide ranging experience in managing multi-stake holder projects within defence.

Wargaming Observer: Erica Mears, British Army RMP Veteran, UK Civil Police veteran – has a wide-ranging experience of delivering training in complex and multi-agency environments.

## METHODOLOGY

Bath Spa University led the experimental research using a structured process that it has used on many projects before. The aim was to ensure the results were valid, reliable, and reproducible:

1. **Identify the Research Problem:** The question to be investigated was set by project sponsor.
2. **Conduct a Literature Review:** The existing research was examined to understand what had been previously studied, identify gaps, and refine the focus of the project.
3. **Formulate Hypotheses:** We then developed a clear and testable hypothesis that predicted the relationship between variables.
4. **Define Variables:** The independent variables that could be controlled by the project team were identified
5. **Dependent variable(s):** The outcomes the project would measure were identified
6. **Control variable(s):** The team identified the factors that would be kept constant to avoid influencing their effects.
7. **Design the Experiment:** The research team created a detailed plan of how the research would be conducted. This included: Participants: Defining the target population, sampling method, and sample size.
8. **Ethical Approval:** The project involved people making in-game decisions that, if taken out of the context of a game, could be misinterpreted as reflecting their personal beliefs system. Therefore, a standard ethical research plan was developed that required informed consent by the participants and anonymised outputs from the games and post-game surveys.
9. **Conduct the games:** Implement the research design while maintaining consistency and minimizing any potential bias.
10. **Collect and Analyse Data:** The data was gathered and appropriately to test the hypothesis.
11. **Draw Conclusions:** The results were interpreted , the considered whether they supported or rejected the hypothesis.
12. **Report Findings:** The plan was to communicate the results in a clear and transparent way, through (a) a research report, (b) presentations at key professional conferences (including Connections UK, Connections USA, DSET), UK government departments (as required by the sponsor) and a published refereed journal article in order to

ensure the work becomes part of the academic record and informs future work in this space.

- 13. Replicate and Refine:** Suggest how others could conduct follow-up studies to validate the findings or explore new related questions.

The main wargame used to answer the research question was Dstl's CONTESTED. The Defence Science and Technology Laboratory (Dstl) developed the CONTESTED wargame to simulate strategic competition in a concise and accessible way. It is designed to explore decision-making processes and analyse complex issues related to defence and security. The game has been adapted for various contexts, including nuclear deterrence scenarios, as seen in events like the UK PONI-Dstl collaboration.<sup>1</sup>

The output from the CONTESTED game was cross referenced to:

- a) the SONAC pilot study using CONTESTED in 2024
- b) an operational board game MOSUL conducted by Tess Butler at NATO ACT, GENAD Conference, delivered as a workshop in Norfolk, VA, USA (2024)
- c) a staff college problem, ARTICLE 5
- d) a sample of the relevant gender studies peer reviewed academic literature
- e) interviews of female professional wargamers.

Integrating the research findings from the main study, CONTESTED, with four smaller-scale studies has given the team an opportunity to cross-reference findings to counter any potential bias in game design. The research team noted anecdotally that the subject of gender issues in professional wargaming elicited strong reactions. There appeared to be concerns that the findings of this research could impact the awarding and execution of professional wargaming contracts, potentially diverging from established practices of the last decade.

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<sup>1</sup> RUSI (2025) Introduction to Nuclear Deterrence Wargaming, UK PONI-DSTL <https://my.rusi.org/events/introduction-to-nuclear-deterrence-wargaming-uk-poni-dstl.html?form=MG0AV3&form=MG0AV3> accessed on 10 March 2025.

The focus of this research was on the role that gender plays in strategic decision making in the security environment. This section includes a summary of the most relevant academic literature in order to place the outcomes of this study into the wider perspective. Much of this research is focussed on business operation.<sup>2</sup>

### Impact of Gender on Group Decisions

There is an extensive multi-disciplinary literature examining gender and decision making. Social psychology research demonstrates that group outcomes preferred by individuals are partially determined by gender composition of groups. Gender can play a role in decision-making, but it is influenced by a complex interplay of biological, social, and cultural factors. Research indicates some differences in decision-making styles across genders, but it is important to approach these findings with nuance, as individual differences often outweigh group tendencies.

- Men in all male groups systematically behave differently from men in mixed groups (even when all other factors are controlled). In all female or female dominated groups, the tendency is for the group to encourage individuals to adopt a median strategy.<sup>3</sup>
- Men, on average, are more risk tolerant; women on average, approach decisions more cautiously.<sup>4 5</sup>
- Women are more likely to collaborate and build consensus in group decisions, probably based on society expectations and communication styles.<sup>6</sup>
- The presence of female members in a group help members share opinions and information with each other.<sup>7</sup>

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<sup>2</sup> See appendix 2 and 3 for a summary.

<sup>3</sup> Hannagan, R., Larimer, C. (2010) Does Gender Composition Affect Group Decision Outcomes? Evidence from a Laboratory Experiment *Publication Political Behavior* Vol 32, Issue 1, pp 51-68.

<sup>4</sup> Harris C., Jenkins M. Gender Differences in Risk Assessment: Why do Women Take Fewer Risks than Men? (2006) *Judgment and Decision Making* 1(1):48-63. doi:10.1017/S1930297500000346

<sup>5</sup> Rosetto, P., Filippin, A. (2023). Safe options and gender differences in risk attitudes. *Risk Uncertain* 66, pp19–46 <https://doi.org/10.1007/s11166-022-09400-0>

<sup>6</sup> Tran, T., Felfernig, A. & Le, V.. (2024) An overview of consensus models for group decision-making and group recommender systems. *User Model User-Adap Inter* 34, 489–547. <https://doi.org/10.1007/s11257-023-09380-z>

<sup>7</sup> Steffen K., Wenjie T. Gender Composition and Group Confidence Judgment: The Perils of All-Male Groups *MANAGEMENT SCIENCE* Vol. 64, No. 12, December 2018, pp. 5877–5898

- Women rely more on empathy, men more on logic.<sup>8</sup> However, these distinctions are overly simplistic. Both genders use a mix of emotional and analytical reasoning depending on the situation.

### **Diversity of Perspective:**

The presence of women on boards of directors has increased significantly in recent years<sup>9</sup> which has focussed corporate and academic attention on the impact of their presence on corporate performance.<sup>10</sup> It has been widely established that gender diversity in decision-making groups within business often leads to more comprehensive and innovative solutions. Women and men may bring different perspectives, experiences, and approaches to problem-solving, enriching the strategic process.

A topical example is the impact of board diversity on environmental violations. The conclusion that gender diversity reduced environmental breaches is not supported by the academic research.<sup>11</sup> It is not possible to know if the presence of women on boards changed business practise or businesses which are more likely to minimise environmental impact also employ more women at board level as they are more socially inclusive. However, results suggest that female directors help mitigate environmental misconduct by improving oversight, enhancing the firm's public image, and facilitating access to essential resources. In addition, board gender diversity improves decision-making and fosters a culture of sustainability by integrating diverse perspectives and approaches<sup>12</sup>.

An example of gender apparently having an impact in a difficult area, is found in the unlikely area of firms disclosing historical links to slavery. Stating the obvious, this is an emotive subject. Research published in 2024 found that female board members may challenge groupthink and introduce diverse perspectives that could alter the board's dynamics and change a firm's stance to conceding historical links to slavery.<sup>13</sup>

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<sup>8</sup> Löffler, C., Greitemeyer, T. (2023) Are women the more empathetic gender? The effects of gender role expectations. *Current Psychology* 42, 220–231 <https://doi.org/10.1007/s12144-020-01260-8>

<sup>9</sup> Spencer S. (2022) *2022 Spencer Stuart Board Index: Board Trends and Practices of Leading European Companies*. Spencer Stuart.

<sup>10</sup> There are many such studies e.g. Laique U, Abdullah F, Rehman IU, et al. (2023) Two decades of research on board gender diversity and financial outcomes: Mapping heterogeneity and future research agenda. *Corp Soc Responsible Environmental Management* 30: 2121–2144. <https://doi.org/10.1002/csr.2510> and Mumu J., Saona P., Haque M., et al. (2022) Gender diversity in corporate governance: A bibliometric analysis and research agenda. *Gender Management International J* 37: 328–343. <https://doi.org/10.1108/GM-022021-0029>

<sup>11</sup> Fleitas-Castillo, G, Pena-Martel, D.; Perez-Aleman, J., Santana-Martin, D. (2025).

Gender diversity on boards and environmental violations in European firms Vol 7, Issue 1, pp 117-146

<sup>12</sup> *ibid*

<sup>13</sup> Allam, A.; Moussa, T., Elmarzouky, M. (2024) Examining the relationship between CEO power and modern slavery disclosures: The moderating role of board gender diversity in UK companies

Generally increasing women at board level was seen to enhance a firm's legitimacy by increasing trust, transparency, and ethical reputation, therefore attracting investors, customers, and employees<sup>14</sup>. US tech and financial firms often experienced a short term surge in investment value when figures were released about diversity and gender workforce numbers.<sup>15</sup> However, not all companies found that stakeholders, typically investors, valued diversity. For example, research on risk taking in the finance sector of Tehran published in 2025 found that boards with women were more conservative when it came to borrowing, which may not be best current business practise in a developing country<sup>16</sup>.

**Impact on Outcomes:** *Does gender balance contribute to improved business performance?*

There have been extensive studies on the impact of gender and inclusion on strategic business performance. Much of this research is focussed on the impact of diverse senior leadership on business performance in the largest companies.<sup>17</sup> The impact of gender and inclusion on the rest of the rest of the business population is under researched<sup>18</sup>.

The studies were largely using publicly available data i.e. gender and ethnicity of board membership compared with business performance data. Whilst this avoids response bias, (where the firms that place the most value on diversity and inclusivity stand the most chance of responding), it means the academic researchers are focussing on secondary over primary research.

Linking company performance to gender at a senior level is difficult to link cause and effect area. Some sectors have a culture of representation of women at board level. If a company is growth focussed and well governed, the question is whether the gender balance has

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*Business Strategy and the Environment* Vol 33, Issue 8, pp 8067-8086

<sup>14</sup> Zahid R., Maqsood U., Irshad S., et al. (2025) The role of women on board in combatting greenwashing: A new perspective on environmental performance. *Business Ethics Environmental Responsibility* 34: 121–136. <https://doi.org/10.1111/beer.12607>

<sup>15</sup> Daniels, D., Dannals, J., Lys, T., and Neale M. (2025) Do Investors Value Workforce Gender Diversity? *Organization Science* Vol 36, Issue 1, pp 313- 340,

<sup>16</sup> Askarany, D., Pouryousof, A., Habibi, S., Yazdifar, H., (2025) Board Gender Diversity and Risk Management in Corporate Financing: A Study on Debt Structure and Financial Decision-Making. *Risks* Jan, Vol. 13 Issue 1, p11-22p.

<sup>17</sup> Financial Conduct Authority (2021) Review of research literature that provides evidence of the impact of diversity and inclusion in the work

<sup>18</sup> 80 of the 169 studies in the FCA report cited above, were carried out by academic researchers (and were likely to be the highest validity), nearly all focussed on senior leadership and stock market listed companies. There is also a western European and North American bias. Of the 169 relevant research studies identified by the 2021 Financial Conduct Authority meta study there were some biases. 70 of the studies were on US companies and 26 for the UK with the rest of world under-represented. For example, only 3 from Australia and 1 from China.

contributed to this culture or the gender balance has shifted as a result of changes in company culture.

The research carried out by Turban, Wu and Zhang (2019) published in the Harvard Business Review is typical.<sup>19</sup> It examined 1,069 firms across 35 countries and 24 industries. It found that gender diversity correlates with higher productivity and market value, particularly in contexts where gender diversity is culturally accepted and valued. The McKinsey report (2023)<sup>20</sup> said that companies with diverse leadership teams outperform their peers financially. Their research spanned over 1,265 companies across 23 countries and highlighted the holistic benefits of diversity, including improved decision-making and social impact. Again, the research could not link gender to company performance, but said that companies that are doing well are often inclusive.

### **Barriers and Challenges to Participation at a Senior Level:**

It is important to conclude this brief overview of the literature that women often face obstacles in strategic roles, such as under-representation, stereotypes, and limited access to leadership opportunities. These barriers can affect their ability to contribute fully to decision-making processes. For firms that have increased diversity at a senior level, it requires constant effort to maintain that diversity. For example, companies based in the USA often face pressure to increase the representation of women at a senior level in business. Research published in 2024 found that many companies were “ticking the gender diversity box”, but often fail to achieve a critical mass of female senior leadership. Firms with relatively more women in senior management compared to their industry peers are likely to allocate fewer attentional resources, time, and effort toward internal diversity practices”.<sup>21</sup>

This is addressed in the interview portion of this study, and raises additional barriers to entry for women, those of different socio-economic and cultural backgrounds.

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<sup>19</sup> Stephen Turban, Dan Wu and Letian (LT) Zhang (2019) Research: When Gender Diversity Makes Firms More Productive <https://hbr.org/2019/02/research-when-gender-diversity-makes-firms-more-productive?form=MG0AV3> accessed on 14 March 2025.

<sup>20</sup> McKinsey (2023) Diversity matters even more: The case for holistic impact <https://www.mckinsey.com/featured-insights/diversity-and-inclusion/diversity-matters-even-more-the-case-for-holistic-impact?form=MG0AV3> accessed on 14 March 2025.

<sup>21</sup> Dwivedi, Priyanka; Paoletta, Lionel (2024) Tick Off the Gender Diversity Box: Examining the Cross-Level Effects of Women's Representation in Senior Management *Academy of Management Journal* Volume 67, Issue 4, page 991-1024.

SONAC argued that wargaming is a valuable and impactful tool frequently employed by UK Defence<sup>22</sup>. Therefore, improving the effectiveness of wargames for training, education and operational analysis was an important part of the mix that made up the UK Defence Sector, including the armed forces responses and effectiveness.

The under-representation of women in wargaming prompted discussions within SONAC regarding the effects of gender balance. Specifically, how does the gender composition of participants—be it in a room or, in this case, a wargame—affect decision-making processes, if at all? What might be the consequences of actively increasing the participation of women in wargames for decision-making, in-game actions, and, more broadly, for Defence? This led to the formulation of the following research question:

*“To what extent, and in what way, does the gender balance of players influence decision-making in wargames?”*

To answer this effectively, two sub-questions were then determined:

- a) To what degree do men and women structure their decision-making differently? In the context of male only, female only and mixed gender environments.
- b) How does altering the balance of men and women in a wargame influence decision making?

SONAC then carried out a pilot study and published a working paper by Rebecca Brooks (2024) *The Power to Decide – Women, Wargaming and the Importance of Gender Equity*.

The research methodology was to run a sample of four wargames, with eight players, using the DSTL designed strategic wargame CONTESTED (described in more detail in the Game 1 section below). The scenario used was about a general war between two powers, with various allies in varying degrees of support. The games were observed, player actions noted and the players completed a post-game survey to further analyse their thinking.

The sample was small with four games (one all male, one female, two mixed), but it was an essential test of the methodology to explore the research question. The subsequent research which was used for this paper was essentially an expansion of the one used in the pilot study.

The SONAC pilot study research concluded that promoting diversity among participants enhanced decision-making by encouraging varied perspectives, fostering constructive debate, supporting alternative analyses, inspiring creativity, and expanding the scope of discussions. While diversity encompasses many dimensions, ensuring the representation of women continues to be a central priority for Defence and, by extension, for wargaming. The

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<sup>22</sup> Rebecca Brooks (2024) *The Power to Decide – Women, Wargaming and the Importance of Gender Equity*.

research included the appropriate caveat that it was limited in scope and the findings needed to be validated by independent academic research. The result was SONAC sponsoring a wider study which is this research.



*The Studio is a dedicated wargaming space based in central Salisbury. It had the capacity to run four CONTESTED game simultaneously, with breakout rooms for negotiations. The breakout rooms and spaces proved particularly important to enable players to fully engage in the game and behave how they would want to.*



The scenario used was 'Turtle Island', an abstract imaginary world situation with great powers competing over the future of a contested archipelago. Each country has its own aims and objectives, with a wide range of potential strategies to achieve these. The actions potentially included political, cyber, economic, covert, diplomatic, influence, military and military readiness actions. Most games had six players.

CONTESTED was a strategic wargame in which each player represented a single country faced with a crisis and advancing their short- and long-term objectives. The players did this by developing strategies, various levels of negotiation with each other and taking actions each turn in attempts to achieve their goals, often at the expense of their adversaries. The rules were a rigid Kriegsspiel, with little arbitration required by the umpire of the outcome. Dice were used to reflect the roll of chance in the real world. Experienced facilitators superimposed an engaging narrative on the events to assist in player immersion.



*The scenarios in the book were near real world but using fictitious geography and country names. This is a mechanism used in some wargames to allow players to experiment with strategies without advocating actual UK strategies or intentions within a wargame. For example, if country A put sanctions on country B in the game, all participants understood that it was not suggesting that real world country X intended to sanction country Z.*

*The game was designed to support analysis.<sup>23</sup>*

The challenge set by SONAC was to run the scenario 'Turtle Island' multiple times with different make ups of teams to test and compare any differences in strategic decision making between genders, or when genders were mixed together. Initially it was suggested that these should all be professional wargamers. This however raised a number of issues including that there were ostensibly only 4 such females in the UK and therefore not enough to make up even one game, also what is defined as 'professional wargamer' – a contentious issue even outside of this study, and finally that professional wargamers would 'game the game' and therefore skew the results.

Consequently, the research team decided to go with those with limited experience of wargaming. The results of the recruitment effort were rapid enrolment of enthusiastic players. Final research participants ranged from ages 17 to 71 and from a wide cross section

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<sup>23</sup> CONTESTED Strategic Analysis Outcomes Booklet, page 2.

of society including from delegates from the FCDO, Cabinet Office, DWP, local council, charities, Navy, Army, RAF, but also from church groups, retail shop workers, students, librarians, teachers and security guards. The mix enabled us to flatten out any knowledge of military Standard Operating Procedures (SOPs) with a strong civilian balance that meant that the participants were starting largely from the same knowledge base.

In just five days of advertising on the DSET/Ruddy Nice network, we recruited over 130 volunteers from all over the UK. A note for further studies – in order to include those from backgrounds that are not usually represented, the study found that offering to cover train fares, calling people to explain what to expect, and telling people directly that their skills were valid, meant that we had a wide demographic in terms of jobs, skills, and education levels. It would be worth capturing socio-economic backgrounds for future studies so that we can monitor, capture, and train talent available from all sectors of society.

The volunteers were self-selecting, and the majority had experience or interest in national security and defence, or were working in businesses that supplied the defence industry, or were employed by government agencies such as the Cabinet Office, Foreign Office or DSTL.

Seven game days were planned, split between male player days, female player days, and mixed player days. The provisional schedule, and total games/players was:

Headline numbers:

- 800+ hours of wargaming play across all 3 games delivered – CONTESTED, MOSUL and ARTICLE 5.
- 134 players
- 10 Facilitators
- 14 Observers

| Serial | Item                     | Coverage                              | Qty | Collection Method                                                           | Who                  | Notes                                    |
|--------|--------------------------|---------------------------------------|-----|-----------------------------------------------------------------------------|----------------------|------------------------------------------|
| 1      | Pre-Participation Survey | Basic demographic and experience data | 224 | Built into sign-up form – online                                            | Participants         |                                          |
| 2      | Observer Field Notes     | How players played and made decisions | 28  | Paper or digital notes, provided to analysts in digital form from Observers | 2 observers per game | Facilitators could also act as observers |

|   |                         |                                                              |    |                                                                                |              |  |
|---|-------------------------|--------------------------------------------------------------|----|--------------------------------------------------------------------------------|--------------|--|
| 3 | Facilitator Field Notes | How players played and made decisions                        | 16 | Paper or digital notes, provided to analysts in digital form from Facilitators | Facilitator  |  |
| 4 | Game Audio Recording    | All in-game discussion                                       | 3  | Mobile phone/laptop with wide-area mic                                         | Facilitator  |  |
| 5 | Game Turn Decisions     | All game actions and results                                 | 98 | Game forms annotated with results                                              | Facilitator  |  |
| 6 | Participant Post Survey | How players felt they approached decision-making in the game | 57 | On-line form, accessed from terminals in the room, or own devices              | Participants |  |

## Findings

Each of the games took around 6 hours.

### F1: Time to Resolve the Crisis and Discussion

The first observation was that although the games were resolved in different numbers of turns, the length of play remained the same. The differences were that the fewer the turns to resolve the crisis, the longer each turn took due to extensive discussions and negotiation. Female only games took the fewest turns to resolve but the longest time on each turn. In the field observer forms it was noted that the average first turn for the female only games took two hours. The male only games first turn averaged 50 minutes, the mixed gender teams were only slightly longer at around an hour. The field notes showed that the females participating in the female only games conducted many more discussions in many more variations than the male only or mixed gender games.

It was noted that there was some potential correlation between game length and discussion with the experience of the facilitators. Experienced facilitators allow the players to be kept on track whilst allowing discussion and role play, whilst maintaining the pace of the game.

Even with pre-game training of the facilitators to ensure standard delivery and Dr John Curry supervised delivery with a view to ensuring consistency of delivery, the length of time to resolve the scenario in the game and the length of discussion may have been influenced by

the facilitator. Although it was agreed with the facilitator team that if the players were discussing different approaches or that they were having discussions in different groups, the discussions could continue. This was particularly striking in the female only games where they exhausted all permutations of group dynamics, using the breakout rooms habitually. For the two supporting games MOSUL facilitators were all trained the preceding day, and no indications of bias were observed. All games were observed by 3 additional staff who oversaw the entire delivery. ARTICLE 5 did not provide data. However, comparing future games with other facilitators would identify if there was such an effect.

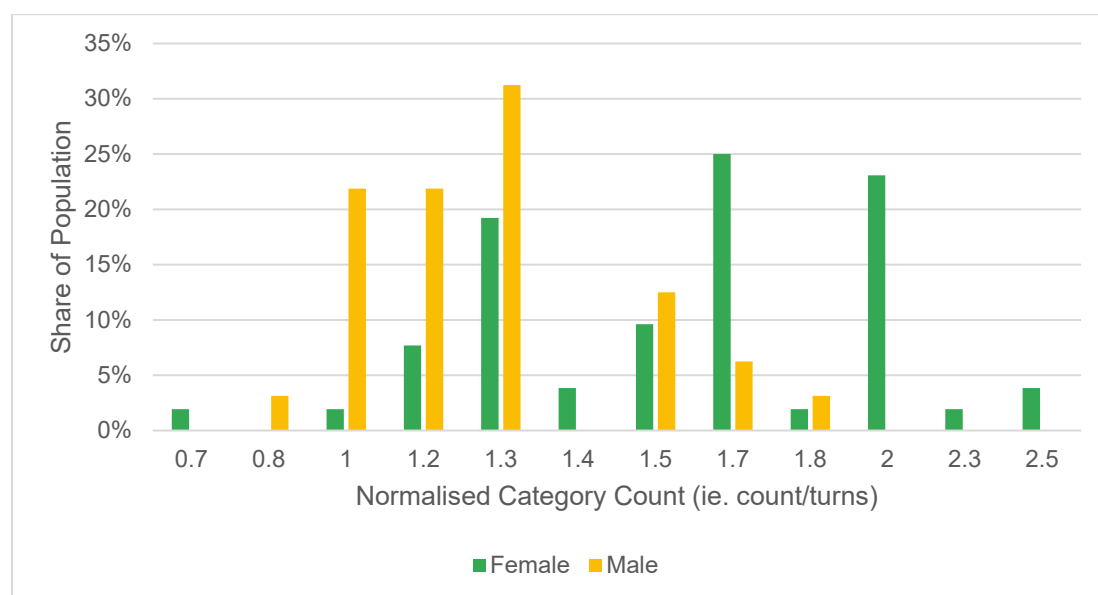
F2: Female players seem more likely to use a wider variety of actions;

### RANGE OF CATEGORY CHOICES BY GENDER

Another useful perspective on category choices is to examine how many of the 8 categories a player used in a game. Since games were not of the same number of turns the count of category has been normalised to the number of turns they played, so players in short games aren't penalised). The resulting data is below:

| DiffNorm | 0.7 | 0.8 | 1   | 1.2 | 1.3 | 1.4 | 1.5 | 1.7 | 1.8 | 2   | 2.3 | 2.5 |
|----------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Female   | 2%  | 0%  | 2%  | 8%  | 19% | 4%  | 10% | 25% | 2%  | 23% | 2%  | 4%  |
| Male     | 0%  | 3%  | 22% | 22% | 31% | 0%  | 13% | 6%  | 3%  | 0%  | 0%  | 0%  |

### Range of Category Choices by Gender



*Range of Category Choices by Gender - Graph*

F3: Female players self-report as more dependent compared to male players in their GDMS assessment:

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#### GENERAL DECISION-MAKING STYLE (GDMS)

In planning for the data collection for the project it was identified as desirable that a validated measure of decision-making style was used, in order to a) give the data and analysis more validity, and b) to potentially enable comparison with other data sets. From six different approaches examined it was decided to use General Decision-Making Style (GDMS) measure from Scott & Bruce (1995)<sup>24</sup> as this has the highest citation rate (and therefore recognised as the most academically valid), had all relevant information available and had been previously used in a defence context. There was also a reasonable overlap with the questions asked in the pilot study, and so the 20 questions from Scott & Bruce were augmented in the post-game survey just the four most reported questions from the pilot study in order to do a read-across between the two studies. The full questionnaire is at Appendix 7.

GDMS assesses a person's decision-making style in four dimensions:

- Rational - emphasizes a thorough search for and logical evaluation of alternatives;
- Intuitive - emphasizes "a reliance on hunches and feelings;
- Avoidant - emphasizes postponing and avoiding decisions;
- Dependent - emphasizes a search for advice and direction from others; and
- Spontaneous - emphasizes a sense of immediacy and a desire to get through the decision-making process as soon as possible.

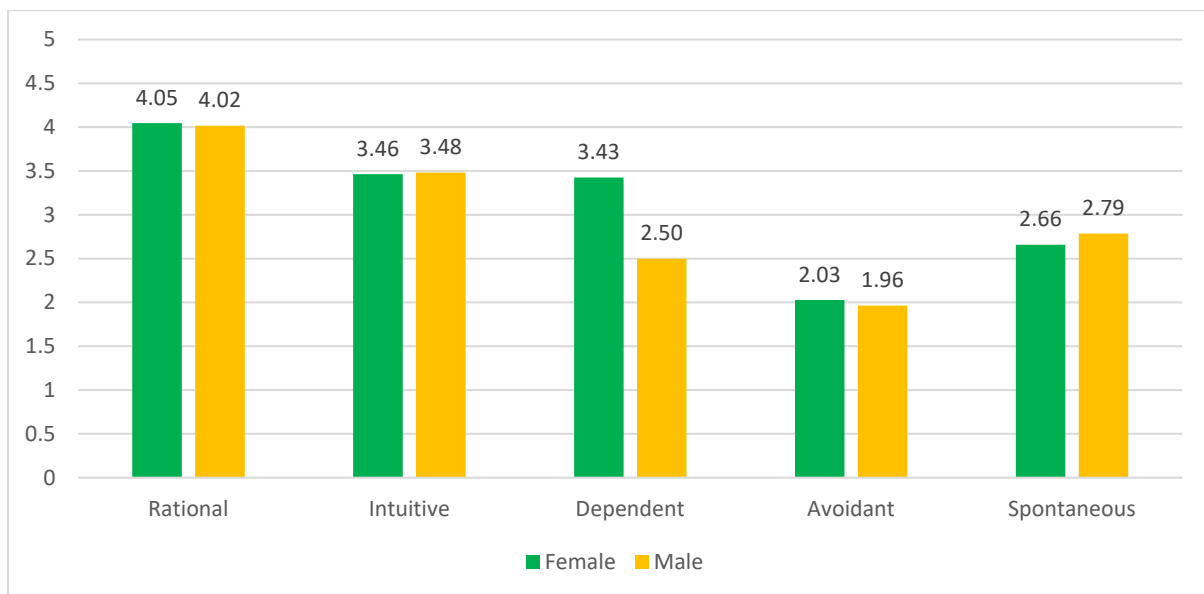
Rational and Intuitive can be seen as normal approaches, whereas Avoidant, Dependent and Spontaneous can be seen as abnormal or degenerate approaches. Not all players completed the post-game survey forms, and one player identified as Other in terms of gender. The average GDMS profiles by gender are presented below.

|        |    |        | Rational | Intuitive | Dependent | Avoidant | Spontaneous |
|--------|----|--------|----------|-----------|-----------|----------|-------------|
| Female | 27 | Female | 4.046296 | 3.462963  | 3.425926  | 2.027778 | 2.657407    |
| Male   | 14 | Male   | 4.017857 | 3.482143  | 2.5       | 1.964286 | 2.785714    |
| Other  | 1  | Other  | 4.5      | 3         | 4         | 2.25     | 2.5         |

#### Player GDMS Measures by Gender

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<sup>24</sup> [https://www.researchgate.net/publication/247728315\\_Decision-Making\\_Style\\_The\\_Development\\_and\\_Assessment\\_of\\_a\\_New\\_Measure](https://www.researchgate.net/publication/247728315_Decision-Making_Style_The_Development_and_Assessment_of_a_New_Measure)



*Player GDMS Measures by Gender - Graph*

## ANALYSIS

The only metric to show significant difference between male and female is that of Dependent, where females were significantly higher. The “other” gender result has been discounted since it is a sample of one.

A useful secondary metric from the GDMS is the ratio between the two “normal” modes of Rational and Intuitive, which gives an indication of how someone is balanced between the two (a ratio of 1 suggesting that they are equally rational and intuitive). This might also take out some self-reporting bias (e.g. avoid high or low responses). On this basis the ratios were:

- Females: 1.168
- Males: 1.154

The difference is only 1% and so probably not significant.

However, the GDMS data was also analysed in terms of the age of participants, and this is shown in below. This clearly shows an increasing shift from a rational to a more balanced and then slightly biased to intuitive approach to decision making as age increases – which would make sense on the basis that older players have more life and decision-making experience to draw on and so are happier making more naturalistic decisions.

| Age Band | Rat/Int Ratio | Notes                                                                                                                                                                  |
|----------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Under 18 | 1.5           | As players get older they take a more intuitive approach based on previous experience and knowledge. When young the players do not have that background to assist them |
| 18-25    | 1.450704      |                                                                                                                                                                        |
| 26-30    | 1.243902      |                                                                                                                                                                        |
| 31-39    | 1.115646      |                                                                                                                                                                        |
| 40-49    | 1.108108      |                                                                                                                                                                        |
| 50-59    | 1.041237      |                                                                                                                                                                        |
| 60-69    | 0.935484      |                                                                                                                                                                        |

### R/I GDMS Ratio by Age Group

F4: Female players may rank slightly higher than males in terms of evaluating a wider variety of options (which chimes with their use of a wider variety of actions):

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#### PILOT STUDY QUESTIONS

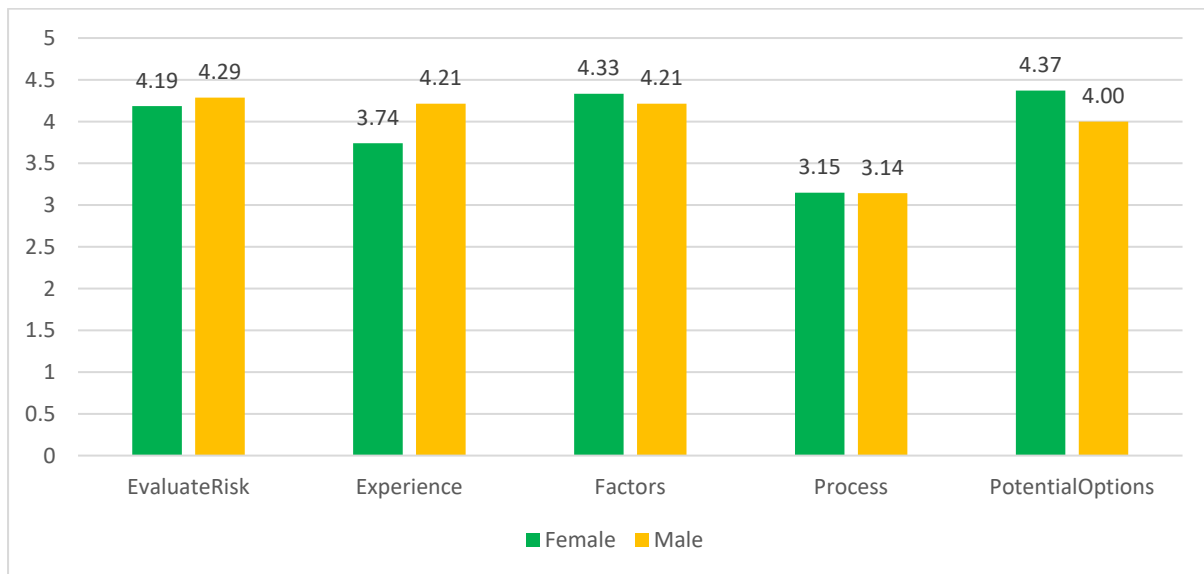
As mentioned, 5 questions/statements which were particularly commented on in the Pilot Study were also asked of the current cohort. These statements were:

- I evaluated the risks before committing to a decision/action;
- I relied on my experiences/knowledge to find possible solutions;
- I determined the factors most important to the decision and then used these to evaluate my choices;
- I used a well-defined process to structure my decisions;
- I considered a variety of potential options before making my decision.

The results are shown below:

|        | Evaluate Risk | Rely on Experience | Determine Factors | Structured Process | Consider Potential Options |
|--------|---------------|--------------------|-------------------|--------------------|----------------------------|
| Female | 4.185185      | 3.740741           | 4.333333          | 3.148148           | 4.37037                    |
| Male   | 4.285714      | 4.214286           | 4.214286          | 3.142857           | 4                          |
| Other  | 5             | 4                  | 5                 | 5                  | 4                          |

## Pilot Study Questions – Current Cohort Answers



*Pilot Study Questions - Graph*

## ANALYSIS

Males are marginally higher on the Experience value (although given the previous analysis they may be the older cohort), and Females are marginally higher on the Evaluating Potential Options measure (which might chime with their wider use of categories). Again the Other gender result has not been considered.

Although the current study does not have access to the raw data from the Pilot, current study data can be expressed in the same terms as Table 1 in the pilot study, so that direct comparison can be made, as shown in Table 11. To aid comparison cells have been coded on a 4 level RAYG basis.

|   |         | CONTESTED game        |                 |         |         |         |                       |                 |         |         |         |
|---|---------|-----------------------|-----------------|---------|---------|---------|-----------------------|-----------------|---------|---------|---------|
|   |         | This Study            |                 |         |         |         | SONAC Pilot Study     |                 |         |         |         |
|   |         | Eval-<br>uate<br>Risk | Exper-<br>ience | Factors | Process | Options | Eval-<br>uate<br>Risk | Exper-<br>ience | Factors | Process | Options |
| F | Ag      | 81%                   | 67%             | 96%     | 33%     | 96%     | 100%                  | 71%             | 86%     | 57%     | 100%    |
| M | Ag      | 100%                  | 100%            | 100%    | 36%     | 86%     | 75%                   | 25%             | 63%     | 25%     | 63%     |
| F | Ne<br>u | 11%                   | 19%             | 4%      | 41%     | 0%      | 0%                    | 29%             | 14%     | 43%     | 0%      |
| M | Ne<br>u | 0%                    | 0%              | 0%      | 29%     | 14%     | 13%                   | 38%             | 25%     | 38%     | 13%     |
| F | Dis     | 7%                    | 15%             | 0%      | 26%     | 4%      | 0%                    | 0%              | 0%      | 0%      | 0%      |
| M | Dis     | 0%                    | 0%              | 0%      | 36%     | 0%      | 13%                   | 38%             | 13%     | 38%     | 25%     |

*Comparing Current and Pilot Study Decision Making Questions*

Experience, Process and Options were the statements identified in the pilot study as having statistically significant variation between male and female players. From the current study:

- Experience shows a higher rating from males than females, the opposite to the Pilot finding, and with more difference than any of the other “agree” scores;
- Process shows no significant variation;
- Options shows some variation, and in the same sense as the pilot – which may also chime with the comments about the varied category choices above.

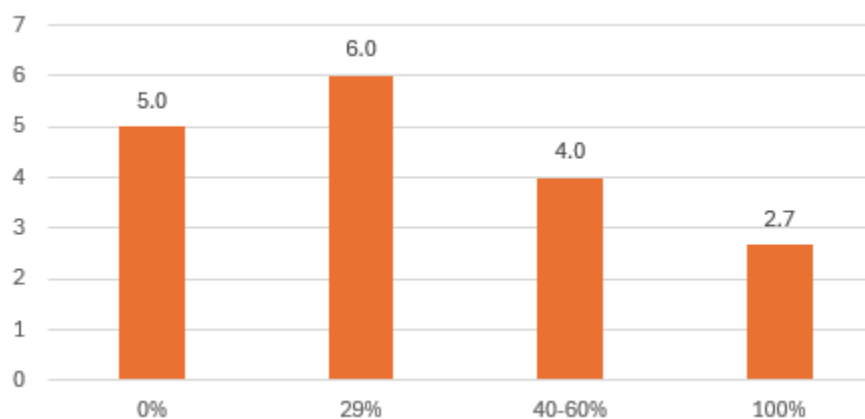
Overall though the current study shows far less variation in answers between genders – which may be a result of the larger sample size, 41 male/female players as against the 8 of the pilot study.

F5: The all-female groups got through fewer turns and used more and more varied words in discussion, which chimes with anecdotal information about more chat in the female groups.

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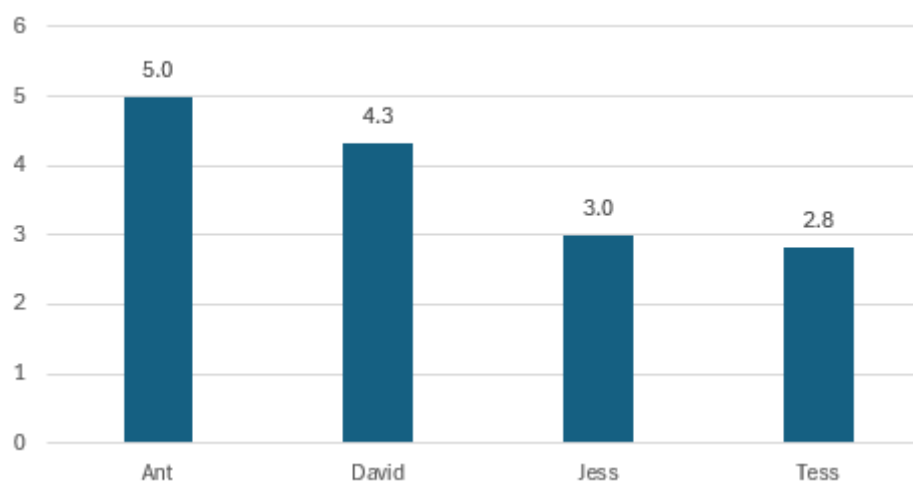
#### GAME LENGTH BY TURNS

Figure 10 shows the average game length for the games by gender ratio. The 29% “band” is only a single game, so some variation could be expected. Excepting that a trend to short games *by number of turns* does seem evident. This matches with anecdotal observation that in female games there was more talking and so turns took longer, and so fewer turns were completed - although all achieved the objective of resolving the hostage crisis.



#### Game Length in Turns by Gender Ratio

Another perspective on this though is offered by below. It was noted that there was some potential correlation between game length and discussion with the experience of the facilitators. Experienced facilitators allow the players to be kept on track whilst allowing discussion and role play, whilst maintain the pace of the game.



#### Game Length in Turns by Facilitator

Based on the written record by the research team (observers and game facilitators) for each game, within MaxQDA, generated a word list of all significant words by frequency.

The total number of words on each list are:

- 0% female: 204
- 40-60% female: 210
- 100% female: 569

Even considering that the notes were being made by different people, and that games were of different turn lengths, this still suggests a far wider range of topics and views, and of general conversation, in the all-female groups than the others.

F6: There is some indication from both the severity of actions and the code groups that the female groups conduct less aggressive actions and use less aggressive words and interpersonal interactions – but the difference is marginal at best based on this data.

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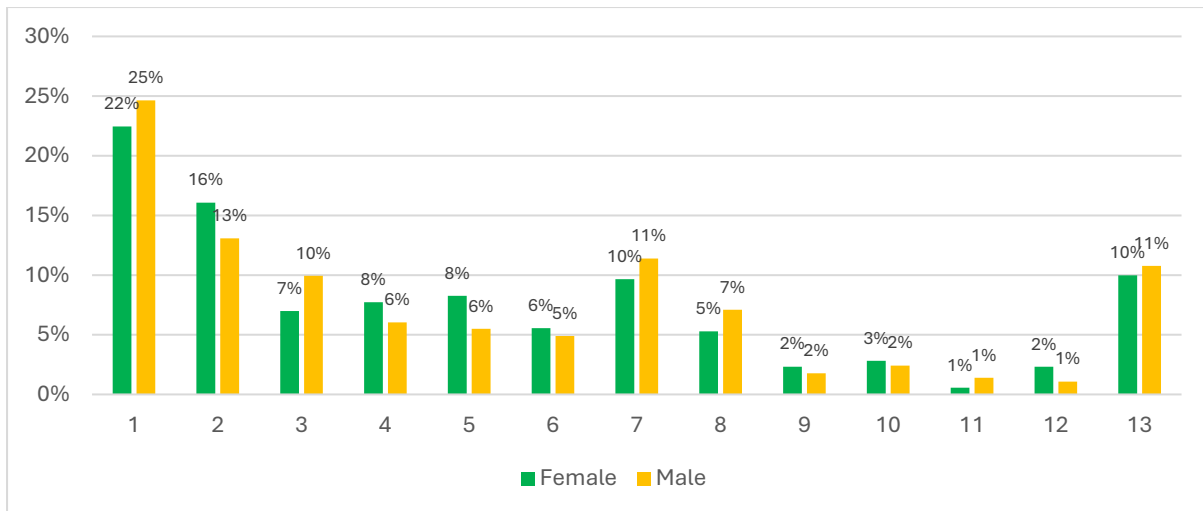
#### ACTION SEVERITY LEVEL BY GENDER

It is important to note that the numbers do not mean anything, but only the trend. For example, it is wrong to assume that cover action C10, *Launch a Coup*, is twice as aggressive as C5, *Train Ally Special Forces*. We are saying that C10 is more aggressive than C5, but a quantifiable number.

Each action category has a range of actions (from 5 to 13) of increasing “severity” level (e.g. Military-1 is a conventional exercise, Military-12 is a nuclear exercise. Table 4 shows severity level by gender, and the same data is plotted in Figure 3. Note that in order to make comparisons between those categories with only 5 or 6 options (Influence, Readiness and Cyber) their severity number has been doubled to make it comparable to those categories with 12 or 13 actions.

|        | 1   | 2   | 3   | 4  | 5  | 6  | 7   | 8  | 9  | 10 | 11 | 12 | 13  |
|--------|-----|-----|-----|----|----|----|-----|----|----|----|----|----|-----|
| Female | 22% | 16% | 7%  | 8% | 8% | 6% | 10% | 5% | 2% | 3% | 1% | 2% | 10% |
| Male   | 25% | 13% | 10% | 6% | 6% | 5% | 11% | 7% | 2% | 2% | 1% | 1% | 11% |

#### Severity Levels by Gender



**Severity Levels by Gender – Graph**

## ANALYSIS

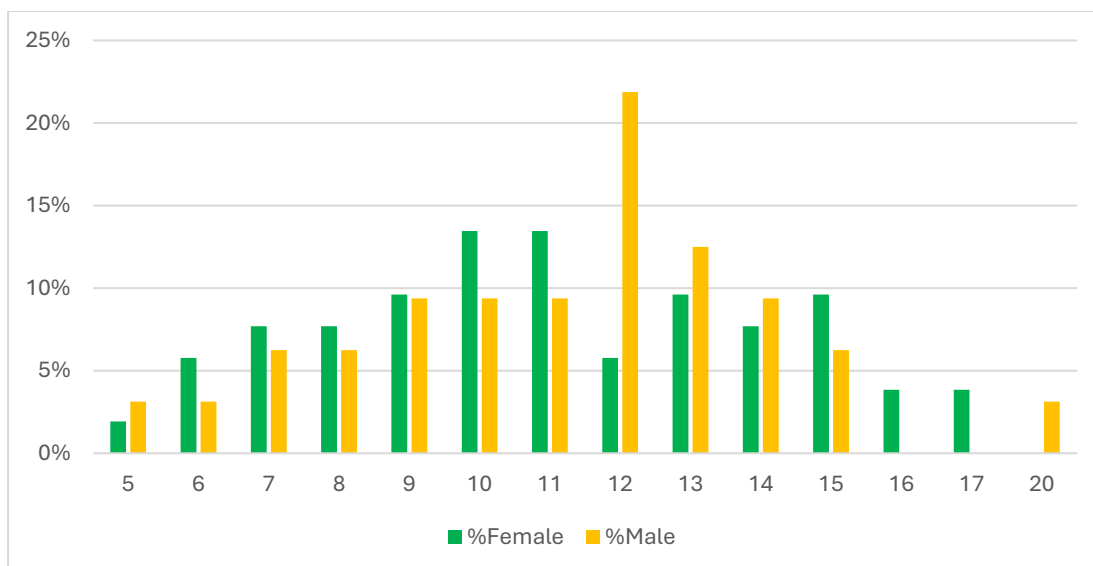
Again, the patterns for both male and female players are very similar, with no significant difference between the two. There do though seem to be biases towards the “least”, “average” and “most” severe actions in both genders.

## AGGRESSIVENESS OF CATEGORY CHOICES BY GENDER

In order to develop a single measure of how “aggressive” a player was, the categories they used were summed on a weighted bases ( $P = x1$ ,  $D = x2$  etc) and then normalised to the number of turns/actions they played, giving a value that we’ve termed the Weighted Aggressiveness (WA). This is then shown in Table 5 and Figure 4, as the percentage of each gender which had a resultant WA in the N-1 to N range.

| WA     | 5  | 6  | 7  | 8  | 9   | 10  | 11  | 12  | 13  | 14 | 15  | 16 | 17 | 20 |
|--------|----|----|----|----|-----|-----|-----|-----|-----|----|-----|----|----|----|
| Female | 2% | 6% | 8% | 8% | 10% | 13% | 13% | 6%  | 10% | 8% | 10% | 4% | 4% | 0% |
| Male   | 3% | 3% | 6% | 6% | 9%  | 9%  | 9%  | 22% | 13% | 9% | 6%  | 0% | 0% | 3% |

**Aggressiveness of Category Choices by Gender**



### *Aggressiveness of Category Choices by Gender – Graph*

#### ANALYSIS

For males there is a distinct bell curve, as expected from the normal distribution. For females, the bell curve is flatter and broader, and if anything shows a slight bias to a centre which is slightly below (i.e. less confrontational) than male players, but only by 1 or 2 points (out of a potential Highest Possible Score (HPS) of 24). Note that with an HPS of 24 (and LPS of 3) the centre of the male bell curve is just below the median of the weighted confrontational range.

The software, MaxQDA does not allow Document Portraits to be generated from aggregated documents, but a similar information result can be obtained using the Code Matrix Browser. This provides a count of each code category in each of the document groups, and this can then be normalised to the number of coded instances in each document group to give the table below. Note that as mentioned above non-confrontational is also synonymous with consensual/empathic in the coding scheme.

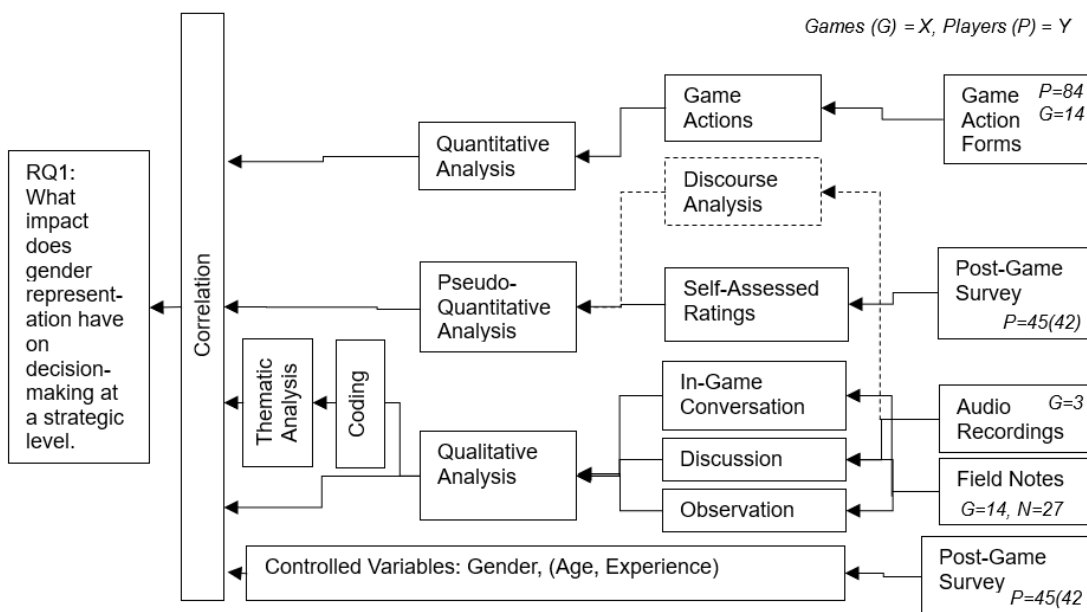
| Code Group                        | 0% Female | 40-60% Female | 100% Female |
|-----------------------------------|-----------|---------------|-------------|
| Non-Confrontational (75)          | 43%       | 37%           | 50%         |
| Slightly Non-Confrontational (33) | 15%       | 11%           | 6%          |
| Neutral (29)                      | 4%        | 8%            | 10%         |
| Slightly Confrontational (53)     | 17%       | 19%           | 15%         |
| Moderately Confrontational (35)   | 10%       | 13%           | 7%          |
| Confrontational (30)              | 11%       | 12%           | 12%         |

## Code Matrix by Gender Ratio

The number after each category is the number of codes it contains.

A number of observations can be made from this:

- For all groups, the non-confrontational category is the most used;
- The 100% female group shows higher use of non-confrontational group, but not by a huge margin;
- The neutral category ranked low in all groups – but had the fewest codes (just);
- The 40% - 60% group had the most even spread of codes, but also the most of any level of confrontation.



*Data and Analysis Overview*

## GAME 2: MOSUL

Tess Butler was commissioned to run a Women In Wargaming workshop for the NATO ACT GENAD team in Norfolk, VA as part of their conference programme. For the workshop, a historical set solitaire game<sup>25</sup> was chosen so that those new to wargaming would be able to discuss and reason their actions, but also gave the opportunity to observe any gender affects by setting the groups as follows:

Games 1 & 3 – female only.

Games 2 & 4 – mixed gender.

Game 5 – male only.

A focus of the GENAD team is the protection of civilians in an urban environment, hence the Battle of Mosul game developed by Fight Club International was chosen to represent these challenges, as well as inform this study. This is a simple solitaire game designed to both educate students on events in Mosul, but also to test their operational thinking and see if they could provide an alternative course of action to the historical reality.

There are 9 turns in this game with a restricted number of strategic moves (that bring in coalition support) that can be made each turn. These are ISR, Counter Strike, Info Ops, Support.

The games were run as solitaire scenarios, but with different mixes of genders working together to decide the strategic actions. Each of the groups were made up of 4 players.

### Strategic action choices:

The main findings were that the all-female teams were 2.5 times as likely to use *Intelligence Strategic actions* as the all-male team and 1.5 times more likely to use *Intelligence Strategic actions* than the mixed teams. The mixed teams had balances of 2 male/2 female and 3 female/1 male. Even when there were more females than males in the team, this still did not increase the frequency of intelligence actions to a level of the all-female games. This follows the pattern of the pilot games that were run in preparation for the workshop.

Other observations of note in the actual game play and how teams responded to their facilitators. The only team that argued or challenged outright the ‘umpire’/ facilitator was the all-male team. The all-female teams challenged the rules, operation of the game, and the systems, rather than the facilitator. The mixed gender teams had questions on the

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<sup>25</sup> This was a multi-player solo game, with a team against the game system (a manual pre-programmed AI)

systems and operational rules of the game, but once furnished with explanations, were content to follow the rules.

Observers agreed that the all-female and one of the mixed games strove for consensus over challenging proposed courses of actions. The other mixed game and all-male game worked on challenging suggestions before coming to an agreement of a majority.

#### Outcomes:

Games 1 & 3 (all female) concluded (urban centre of Mosul is captured) at the end of turns 6 and 6

Games 2 & 4 (mixed) concluded at the end of turns 6 and 8

Game 5 (all male) concluded at turn 9

#### Field notes report

There were distinct differences in focus during the discussions, both at the beginning of the game and throughout the turns. The female and mixed groups mentioned the civilians during the preparation for turn 1. The all-male team did not. As the game progressed both of the female games used the word 'humanitarian' actions on at least 3 occasions. One of the mixed-gender teams also used 'humanitarian'. The second mixed-gender team and the all-male team did not. The use of the word 'civilians' became more prevalent as the games went on, but mostly in the context of 'revealing' civilian actors in each of the game sections.

All teams were focussed on achieving the military objective of taking the urban centre of Mosul. There were no differences in strategic goal. The differences were in choice of actions. The all-female teams used all the options available throughout the game. One of the mixed gender teams also used all the options available to them. The second mixed gender team and the all-male team used 75% of the options available to them.

The field notes from the observers noted on Games 1 & 2 that 'Force was only used when civilian casualties could be avoided' and 'It's too early to do full strikes without knowing where all of the civilians are'

It is interesting to note that the consideration for civilians was not counter to the strategic goal of capturing the urban centre of Mosul. The outputs of the game show that the higher use of ISR and Info Ops, (within the context of the Protection of Civilians (PoC)) the quicker the resolution of the conflict.

Timings of the games: The number of turns correlated with the amount of game play time recorded. This could also have been influenced by the amount of time that we had scheduled for the actual session. For future iterations of this game, it would be useful to have audio recordings to record player statements and debates. This was not possible at

NATO ACT due to security restrictions. As this was an unclassified game, this could be run in an unclassified environment to allow a greater freedom for observers and data collection.

### Battle of Mosul Solitaire Game



### GAME 3: ARTICLE 5

As part of this research, an additional game was run in order to give another point of comparison on gender on strategic thinking in wargames. This was a small-scale study of eight games. ARTICLE 5 was a staff college exercise type problem of a maximum of 45-minute duration.

The scenario was a surprise invasion of NATO territory by ENEMY forces. This scenario was not seen as likely or probable by the research team but was selected as a strategic situation that had a wide range of potential responses. It was felt unlikely any of the participants would have considered this scenario or had wargamed the situation before.<sup>26</sup>



*Article 5 refers to the principle of collective defence in the NATO (North Atlantic Treaty Organization) treaty. It states that an armed attack against one or more NATO members is considered an attack against all members, and they agree to take action to restore and maintain security.*

*Zealand is approximately 7,000 km<sup>2</sup> has approximately 400,000 people including the capital of Denmark, Copenhagen.*

The players were told that at dawn on Christmas Day, ENEMY FORCES invaded Zealand. By the end of Christmas day the island has been largely occupied. There have apparently been very limited casualties. However, the Internet and telephones are down to the island, so there is very limited communication. In the evening, the most senior member of the Danish government who was not in the capital was the Minister for Culture. They had invoked Article 5 and asked for NATO intervention to liberate Zealand.

The players were told they were the senior political leaders of the alliance who could be contacted at short notice. They were allowed to suggest up to 5 actions, between the group, they would take in response to Article 5 being invoked.

The player responses were then codified using the options from the DECISIONS Game. The observers were surprised to note that the players reacted with shock to the scenario; perhaps this reflected immersion in strategic thinking from the result of playing of

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<sup>26</sup> Only one person had, and they were a facilitator for the game.

CONTESTED.<sup>27</sup> A simple heatmap based on the codified responses demonstrates clear differences in response priorities based on gender

For the female groups, 56% (5 out of 9) of the actions were economic, covert, political or cyber, 8% (1 out of 12) of the all-male group actions were in the same category, but 33% (5 out of 15) from the mixed groups.

|        | Diplom | Influence | Military | Readiness | Economic | Covert | Political | Cyber |
|--------|--------|-----------|----------|-----------|----------|--------|-----------|-------|
| FEMALE |        | 1         |          | 1         | 2        | 1      |           |       |
|        |        | 1         | 1        |           |          |        | 1         | 1     |
| MIXED  |        |           |          | 2         |          | 1      | 1         | 1     |
|        | 1      |           | 1        | 3         |          |        |           |       |
|        | 1      | 1         |          | 1         |          | 2      |           |       |
| MALE   | 1      | 1         |          | 1         |          | 1      |           |       |
|        | 1      |           | 3        | 1         |          |        |           |       |
|        | 1      |           | 1        | 1         |          |        |           |       |
| SME    | 1      | 2         | 1        | 1         |          |        |           |       |

It was interesting to note that the SME response, based on COBR procedures, reflected decision making by all male groups. This is perhaps reflected in the literature, for example the key text on emergency responses by David Omand (2025) *How to Survive a Crisis: Lessons in Resilience and Avoiding Disaster* included no reference to gender in decision making.

Upon consideration, all the responses, including the SME, were incomplete. Only the female groups considered the people aspects of the crisis. History demonstrates that such an invasion would cause a human tidal wave of refugees, but also an information flood that would bring block all communication networks. Unless immediate attention was paid to the human terrain, much of the electronic response and physical and would be blocked for many hours or days.

The small-scale study using ARTICLE 5 supported the conclusions from the main CONTESTED study that a mixed gender decision making group considered a wider range of responses to a crisis.

*The scenario was put through two Large Language Models (LLMs), Chat GPT and Llama<sup>28</sup>. Although outside the scope of this research, it was noted that both gave a set of responses that were similar to the all-male group responses. This may have implications if advisors are using LLMs as input to their analysis process. However, a wider study would be necessary to validate this indicative research and assess its potential implications.*

<sup>27</sup> Further research would be needed to explore the culture fear of a surprise attack on western culture.

<sup>28</sup> Simpler than ChatGPT with less data to work from

In order to get more in-depth information on the experiences of women involved in professional wargaming, one-on-one semi-structured interviews were conducted with prominent professional female wargamers around the NATO world. The purpose of this section of the report was to compare the results of the various games with the experiences of the limited number of female wargamers that we have been able to access.

Experiences documented in the *Women in the Armed Forces from Recruitment to Civilian Life, 2021*<sup>29</sup> were reflected in the responses given in the interviews for this research, which perhaps should not have been an unexpected finding. It was clear from the interviews of female professionals that they do not feel included, mentored or encouraged to work towards strategic decision or wargaming positions. In fact, their perception is that they are positively 'gatekept' from participation.<sup>30</sup> The limited number of women involved in professional wargaming apparently face the same challenges as women in other areas of defence.

The interviews were supplemented by a short survey with 41 respondents of UK female professionals in defence that have connections to or around professional wargaming. Of these 56% were serving armed forces, 8% serving government, 27% veterans, 9% defence industry. The vast majority of whom (85%) had served for over 10 years.

When asked how easy it was to enter the profession, answers ranged from difficult to impossible. Most professional female wargamers with a career outside of serving armed forces or government have come from game development, business strategic thinking, or an education background. Only 2 of those interviewed had served in the armed forces. Both had left after 10 and 12 years, due to the difficulties faced with childcare and having a full career in the armed forces (Army).

Female wargamers felt that they brought a wider set of considerations into game design and did not just look to repeat examples of earlier wargames. They felt they were prepared to do 'difficult thinking' to deliver the best wargame that was most fit for purpose for each commission. Some female wargamers said that they found working in business wargaming more open and satisfying than working in defence with the blocks and constraints put upon them in that environment.

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<sup>29</sup> <https://publications.parliament.uk/pa/cm5802/cmselect/cmdfence/154/15402.htm>

<sup>30</sup> For balance, it should be noted that the similar interviews were not conducted with male professional wargamers. The research team have now asked the question if male wargamers feel included, mentored or encouraged to work towards strategic decision or wargaming positions. There has been some progress in the US in providing formal training in aspects of professional wargaming.

100% of the interviewees and survey respondents said that they had been excluded, dismissed, or discriminated against with gender-based words or actions in their professional careers. The information given was extremely long and involved. One woman said, that although she felt capable and that she didn't let words slow her down, she still recorded the bias. The findings can be summarised by one woman, when asked of her experience in wargaming and defence as, "\*\*\*\*\* harassment, persistent male group bullying, sexist comments, intimidation, isolation, loneliness, judgement."

Despite women (3 in the UK) being employed for wargaming contracts, it was usually as a contractor to a larger all-male business, that only called them in when they were short on staff. They were not included at the beginning of the process, either to secure the work or understand the requirement, mostly not at the game design stage, and frequently excluded from the post-game analysis. Women have had interviews with all-male businesses, and despite being told (in interview) that women were welcome, and the company was doing everything they could to hire them, the results were that they were not hired. The narrative is that only older men are credible in front of a military customer.

The perception that only older men ("grey beards") being the only credible option to deliver wargaming was openly stated by a panellist on the pubic platform at a university wargaming week-long conference.

Women reported delivering a lot of pro-bono work in support of wargaming, either for bids (industry) or "strawman work" for the Defence Academy or other government (both in the UK and Internationally) and subsequently not receiving the same invitations for paid work.

One woman noted that "Being the only female amongst several male equivalents, I am constantly left out of correspondence, meetings and rarely engaged on matters that fundamentally affect my area of work. Constantly feeling like so am not 'in the club'."

One point that fundamentally was repeated throughout the study interviews and questionnaire was the lack of care support – either child or parents (or sometimes both) and that the lack of affordable and present childcare made it extremely difficult to reach their full potential in education and training, as courses were either outside of hours or remote, making professional development in wargaming and related areas out of reach for the vast majority of our respondents (90%). Those that were trained had done training and education before children were born and had kept up knowledge in their own time, but with no further professional development or experience if they were serving military or government. Those in the defence industry fared little better, but could at least access some flexible working, if not financial support, to attend off-site residential courses.

Respondents and interviewees were positive, though, about the impact that they feel that they could make. The vast majority enjoyed the work and their professions and wanted to

do more to reach their full potential to provide a positive impact on our national security and defence.

We will address some of these points in the recommendations for supporting female talent into wargaming roles. Further work would be necessary to compare the experience of males and females in this space.

It should be noted that in the United States, the availability of training in professional wargaming is apparently changing. For example, it is only in the last four years that professional wargaming training courses have been offered widely in the United States. MORS offer various virtual wargaming courses. These include general wargaming, tactical wargaming, cyber wargaming, WMD Wargaming, Homeland Security etc. Approximately 30% of the attendees are female and nearly all attendees are sponsored by their employer.

<sup>31</sup> As of 2025, various new courses for professional wargaming are in the process of being introduced in the UK.

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<sup>31</sup> <https://www.mors.org/>. The figure of 30% female participation is approximate based on the experience of one of the report's authors who works for MORS and should not be quoted as authoritative.

## CONCLUSIONS

The gender studies literature was compared to findings on the pilot study, three games (CONTESTED, MOSUL AND ARTICLE 5) and the interviews with the professional gamers.

1. Females considered and chose a wider range of options in all games in this study. Conversely men chose a more limited range of options.
2. Groups with a balance of gender appeared to show a different balance of discussion and action choices.
3. There was evidence that women adopted a more collaborate approach and built more consensus in group decisions.
4. There is some indication that women were less confrontational than men, but men were generally also less confrontational than aggressive in their actions in their own groups.
5. There were minimal differences between genders in decision making styles, but women showed a higher bias for dependency (which may include consensus-based decision making).
6. The balance between the rationale and intuitive decision making changed dependent on players' age. Generally older players balanced intuition with rationale making.
7. There are some suggestions that presence of female members in a group help members to share opinions and information with each other. However, there is no evidence from this study about what proportion of male/ female was necessary to achieve this effect. It would be reasonable to assume that personality could influence this proportion.
8. There was limited evidence that in all female or female dominated groups, there was any tendency for the group to encourage individuals to adopt a median strategy.
9. From this initial research, the delivery of the strategic and subsequent tactical actions were that male players saw troop movements as aggressive, but female players saw them as preventative and moved many more of their capabilities

into the crisis zone. At the strategic level male players, slightly, chose more aggressive actions than the female players. This doesn't match the literature completely where women are seen as more cautious.

10. There was evidence in Game 1 – Contested, that women role-played throughout the wargame.
11. Based on this research there was no evidence that women rely more on empathy, men more on logic.

## POTENTIAL IMPACTS FOR DEFENCE CAPABILITIES

It is clear from this research that all female groups and mixed gender groups consider and use the widest range of possible strategic actions. By ensuring that teams in command of decision making have a balanced gender make up, this capability should be available to senior decision makers when considering resolution of a conflict. However, based on this research it is not clear what gender proportion is required to have this effect.

As all-female and mixed-gender teams used fewer actions to resolve the simulated crises studied, it could be that employing mixed gender or all female teams in strategic planning produces potentially cheaper and more cost-effective options.

## RECOMMENDATIONS

1. Strategic wargames should include more appropriately skilled females in the design, delivery and participation.

There are very few qualified female professional wargamers in the UK (six were identified at varying levels of experience) – either in government or civilian business. This study had to interview international female wargamers, as well as those in the UK, in order to build a dataset that would produce credible analysis. Currently those employed to deliver professional wargaming capabilities in the public sector are mostly civilians and almost 100% male.

2. We recommend education and training to relevant senior leaders in order to inspire a cultural change led from above, to enable the female talent that wants to deliver into defence strategic thinking and wargaming.
3. In order to create a larger pool of female (and male) professional wargamers, we recommend access, funding, and support to women wishing develop skills in designing, delivering and participating in wargamer. These to be serving military, government employees and civilians.
4. The research reflected existing work around the perceptions of all genders about the tool of professional wargaming<sup>32</sup>. There are preconceptions around wargaming that

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<sup>32</sup> Which is not totally surprising.

it is all 'war', historical reenactments, only for men, only done in defence environments or occasionally in academic settings or only done by 'nerds'. The perception is that it is also potentially 'boring'. Many of the participants of the study came with these perceptions, but as they self-selected to participate in this study, they also showed curiosity and open minds. The vast majority (125 of 130) have all signed up for future wargaming experience and education through The Studio.

5. We recommend a wider campaign on what professional wargaming actually is, and wargaming workshops or introductory sessions run in unclassified environments to ensure the greatest participation and education. Leaders at all levels in defence should understand what wargames are, when they are useful (and when they are not) and how to obtain the maximum education, training and analysis from their application.

## FUTURE RESEARCH

**Individual State Actors v Coalition of Allies:** The CONTESTED game was based around confrontation between nation states. The research could be rerun with the central game based on a situation more typical for the UK; internally developing policy between stakeholders such as the governing party, FCDO, MOD, security services, industry etc; externally the UK operating in collaboration with allies

**Game Design:** Professional wargames have long been an integral part of the tool set used by the military. The literature includes many examples of wargames that have been successful in terms of training, military education, procurement, operational analysis and planning for war. However, retrospective examination demonstrates that many of these professional wargames also had major errors in them and by implication current games about future confrontations are similarly flawed. Research is needed to identify best practise in creating accurate designs to model future confrontations.<sup>33</sup>

**Use of wargaming guide:** The UK, and other countries have some doctrine publications on wargaming.<sup>34</sup> There are a wide variety of wargaming methods, matrix games, confrontation

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<sup>33</sup> Curry, J. (2020) 'Professional wargaming: a flawed but useful tool', *Simulation & Gaming*, 51 (5), pp. 612-631. Official URL: <https://doi.org/10.1177/1046878120901852>, available from <https://researchspace.bathspa.ac.uk/13197/1/13197.pdf>

<sup>34</sup> Wargaming Handbook (2017) [https://assets.publishing.service.gov.uk/media/5a82e90d40f0b6230269d575/doctrine\\_uk\\_wargaming\\_h](https://assets.publishing.service.gov.uk/media/5a82e90d40f0b6230269d575/doctrine_uk_wargaming_h)

analysis, map based, staff college problems, committee games, hidden scenarios etc. Currently, some of the professional sector turn to a hobby publication for guidance<sup>35</sup>. There is scope for a publication on the variety of game design methods available that are suitable for defence wargame.

**Digitisation:** The research team noted that games used for this research could have been delivered and facilitated faster if the game had been digitised or even just designed for hybrid delivery. E.g. A manual game, but with player actions chosen using a drop-down menu to reflect the actual range of options the state actor they were playing would have. Digitisation would maximise the return on investment. This would also make the data capture immediate and enable a more agile data analysis process.

**AI For wargaming analytics:** initial limited trial using Military GPT<sup>36</sup> demonstrated the potential for a rapid raw analysis that could then be challenged by traditional academic methods. This would use innovation in technology to accelerate the data analysis.

We are recommending that this research project is used as an initial case study where all data generated from all three games, methodologies, literature reviewed and other LLM material be loaded into the system and then interrogated. This would then produce a military case study of existing academic methods v using AI. This work would then have implications in to setting future wargaming projects i.e. they should routinely include use of AI in post-game after action reviews. We are genuinely excited about the potential of this research.

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[andbook.pdf](#) Influence Wargaming Handbook (2023)  
<https://www.gov.uk/government/publications/influence-wargaming-handbook>

<sup>35</sup> The Wargame Developments Handbook (2022) <https://wargamedevelopments.org/wp-content/uploads/2023/01/WD-Handbook-Third-Edition-October-2022.pdf>

<sup>36</sup> i.e. no confidential information input then propagates across the Internet in the way that using the free version of ChatGPT does.

## APPENDIX 1: GAME SCHEDULE – THE STUDIO, SALISBURY, UK

Male Only      Wednesday 22nd January 2025

Female Only    Tuesday 28th January

Wednesday 29th January 2025

Mixed            Tuesday 4th February

Wednesday 5th February 2025

Saturday 18th January

Saturday 25th January 2025

NATO ACT, Norfolk, VA, USA    Friday November 2024

## APPENDIX 2: GENDER AND DECISION MAKING

The table below summarises some of the findings from the literature as to whether there is a link between gender and decision-making.

| Paper                                                                                                                                                                                    | Experiment/<br>Audience                                                                                                                                                                                                                                                              | Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Spicer, D. P., & Sadler-Smith, E. (2005). An examination of the general decision making style questionnaire in two UK samples. <i>Journal of Managerial Psychology</i> , 20(2), 137-149. | Business school undergrads                                                                                                                                                                                                                                                           | "No relationships with gender or year of study were observed."                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Blais, Ann-Renee & Weber, Elke. (2001). Domain-specificity and gender differences in decision making. <i>Risk, Decision and Policy</i> . 6. 47-69.<br>10.1017/S1357530901000254.         | Undergraduates (psychology credit)<br><br>5 simple scenarios with responses linked to the 5 models in Frisch, Taylor, and O'Brien<br><br>"We used these modes because they emphasize a selfish versus other-inclusive utility distinction on which women have been shown to differ." | Good literature review<br><br>"Johnson and Powell (1994) reviewed the literature on gender differences in business decision making and found that studies before 1980 suggested that women were more cautious, less confident, less aggressive, had inferior leadership and problem-solving and leadership abilities, and were easier to persuade. However, more recent investigations seem to have refuted some of these results. For example, no significant gender differences were found in recent studies comparing management decision-making styles or values (Powell, 1990) and |

| Paper                                                                                                                                                                                                                                                      | Experiment/<br>Audience                                                         | Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                            |                                                                                 | <p>leadership abilities (Eagley, Karau, &amp; Makhijani, 1995)."</p> <p>There own study found some preference in females for more rational/inclusive modes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p>de Acedo Lizárraga, M. L. S., de Acedo Baquedano, M. T. S., &amp; Cardelle-Elawar, M. (2007). Factors that affect decision making: gender and age differences. <i>International Journal of psychology and psychological therapy</i>, 7(3), 381-391.</p> | <p>589 participants (294 men and 295 women) of ages between 18-80 years old</p> | <p>Good literature review</p> <p>"Till now, the results of research are somewhat ambiguous because, although some significant differences have been identified, most of them are minimal (Crow, Fok, Hartman, &amp; Payne, 1991; Hatala &amp; Case, 2000; Hawkins &amp; Power, 1999; Venkatesh, Morris, &amp; Ackerman, 2000). It seems that women are more affected by the environment; they look for more information, and dedicate more time to the decision process (Gill, Stockard, Johnson, &amp; Williams, 1987). Men, on the contrary, are more dominant, assertive,</p> |

| Paper | Experiment/<br>Audience | Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------|-------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                         | <p>objective, and realistic (Wood, 1990). However, these differences have been interpreted as the result of the incidence of sex-related social norms and stereotypes that are transmitted in the form of values, traditions, and behavioral expectations. Together with some other educational factors, these probably foment and maintain some of the differences associated with certain aspects of decisions (Bussey &amp; Bandura, 1999). Therefore, although till now the findings have been somewhat limited, it is relevant to continue to investigate these differences and determine how they are formed.”</p> <p>For their study:</p> <p>“Thus, women are more concerned with uncertainty, doubts, and the dynamism that are</p> |

| Paper | Experiment/<br>Audience | Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|       |                         | <p>involved in the decision. They place more value on time and money; they are more concerned about the consequences that may derive from the decision, no matter whether these affect them or other people. Women are more aware of the constraints that the setting and close persons put on them, and their emotions are more important to them in the decision process. Conversely, men assign more importance to the analysis of the information required to carry out the decision and to the definition of the goals or purposes of the decision. They are more motivated during the process and also feel more intensely the pressure from all the work-related aspects. Another result of this study is that no sex differences were observed in cognition and self-regulation. That is, men and women both carefully</p> |

| Paper                                                                                                                                            | Experiment/<br>Audience                                                                           | Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                  |                                                                                                   | process information, retrieve the relevant decision-related data from their memories, categorize the data if they are very diverse, think logically about the alternatives, predict results, evaluate the consequences, solve the problems posed by the situation, and monitor all the decision stages. To some extent, the equivalence in these intellectual aspects in the sample under study shows that sex differences are closer to behavioral styles or to the demands of men and women's social roles than to the intellectual competences or to capacities" |
| CROW, S.M., FOK, L.Y., HARTMAN, S.J. and PAYNE, D.M., 1991. Gender and Values: What is the Impact on Decision Making? Sex Roles, 25(3), pp. 255. | Business school students<br><br>case study (labour relations) plus 28 statements in 14 categories | "In this research, we asked whether the decision-making process is influenced by gender. We found that men and women differ in their perception of the importance of decision issues and the final decisions Coupled with our finding that men and women differ in                                                                                                                                                                                                                                                                                                  |

| Paper                                                                                                                                                                                                                                                                                            | Experiment/<br>Audience     | Findings                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                  |                             | <p>terms of moral development, what is suggested is that at least some of the male/female differences we observed may result from differences in moral development, rather than gender, in men and women."</p> <p>"Our findings lead us to conclude that the relationships between gender, values, and decision making may be far more complex than we originally expected them to be."</p> |
| <p><a href="#">Klenke, K.</a> (2003), "Gender influences in decision-making processes in top management teams", <i><a href="#">Management Decision</a></i>, Vol. 41 No. 10, pp. 1024-1034. <a href="https://doi.org/10.1108/00251740310509553">https://doi.org/10.1108/00251740310509553</a></p> | <p>Top management teams</p> | <p>"it is postulated here that it is not gender per se that accounts for differences in decision making among senior female and male executives, but that four constructs, namely power, political savvy, conflict management and trust mediate the hypothesized relationships explicated in the model. Implications for increased participation of women on TMTs are explored."</p>        |

| Paper                                                                                                                                                                                                                                                                                                                                                              | Experiment/<br>Audience                                                                                                                     | Findings                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Rebecca Delaney, JoNell Strough, Andrew M. Parker, Wandí Bruine de Bruin, Variations in decision-making profiles by age and gender: A cluster-analytic approach, Personality and Individual Differences, Volume 85, 2015, Pages 19-24, ISSN 0191-8869, <a href="https://doi.org/10.1016/j.paid.2015.04.034">https://doi.org/10.1016/j.paid.2015.04.034</a>.</p> | <p>1075 members of RAND's American Life Panel (56.2% female, 18–93 years, <math>M_{age} = 53.49</math> ).</p> <p>Used Scott &amp; Bruce</p> | <p>“Three decision-making profiles were identified: affective/experiential, independent/self-controlled, and an interpersonally-oriented dependent profile.</p> <p>Older people were less likely to be in the affective/experiential profile and more likely to be in the independent/self-controlled profile.</p> <p>Women were less likely to be in the affective/experiential profile and more likely to be in the interpersonally-oriented dependent profile.”</p> |
| <p>Spicer, D.P. and Sadler-Smith, E. (2005), "An examination of the general decision making style questionnaire in two UK samples", Journal of Managerial Psychology, Vol. 20 No. 2, pp. 137-149. <a href="https://doi.org/10.1108/02683940510579777">https://doi.org/10.1108/02683940510579777</a></p>                                                            | <p>Used Spicer &amp; Sadler-Smith GDMS</p>                                                                                                  | <p>“No relationships with gender or year of study were observed”</p>                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>Apesteguia, J., Azmat, G., &amp; Iriberry, N. (2012). The impact of gender composition on team performance and decision making: Evidence from the field. <i>Management Science</i>, 58(1), 78-93.</p>                                                                                                                                                           | <p>MBA students in the L'Oréal e-Strat Challenge “one of the biggest online business simulation”. Teams of 3.</p>                           | <p>“We have shown that three-women teams are outperformed by teams of any other gender combination and that there is not a</p>                                                                                                                                                                                                                                                                                                                                         |

| Paper                                                                                                                             | Experiment/<br>Audience               | Findings                                                                                                                                                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                   |                                       | monotonic relationship between the number of men and team performance”                                                                                                                                                                                                                                                 |
| George, J. (2024) Individuals Versus Group Decision Making: Simulating the Real World. <i>MORS Journal of Wargaming</i> , Vol. 1. | 60 groups of 3 in a crisis simulation | “Overall, we find that both individuals and groups favor the moderate option of low escalation. However, we find that more than 13% of individuals' preferences diverge from the group outcomes. We also find that female participants were less likely to choose aggressive strategies than their male counterparts.” |

A key observation in many of the studies is that there may be more important elements in an individual’s make-up than gender that drive differences in decision-making, and that differences in gender performance may be more attributable to those than to gender *per se*. For instance:

- Crow et al (1991) found decision making was possibly more linked to the participants moral development than to gender itself, it was just that the women scored higher on their moral development survey;
- Klenke (2003) observed that “it is not gender *per se* that accounts for differences in decision making among senior female and male executives, but that four constructs, namely power, political savvy, conflict management and trust mediate the hypothesized relationships explicated in the model”.
- Bavořár & Orosová (2015) (using Scott & Bruce) found correlations in some decision-making measures with mental health.

Although time may not allow, it might be useful to assess personality data (such as Big 5/Myers-Briggs) of participants to see if there is a strong link between those factors and decision-making than for gender, as otherwise there is the danger that we attribute differences to gender rather than a more fundamental difference.

### APPENDIX 3: GENDER AND DECISION MAKING IN WARGAMING

Johnson et al (2006) found that “overconfidence and attacks are more pronounced among males than females; and (iv) testosterone is related to expectations of success, but not within gender, so its influence on overconfidence cannot be distinguished from any other gender specific factor.”

(Johnson DD, McDermott R, Barrett ES, Cowden J, Wrangham R, McIntyre MH, Peter Rosen S. Overconfidence in wargames: experimental evidence on expectations, aggression, gender and testosterone. Proc Biol Sci. 2006 Oct 7;273(1600):2513-20. doi: 10.1098/rspb.2006.3606)

Roger Mason has an interesting blog post (near paper) exploring wargames as synthetic experience for decision making. (<https://www.lecmgt.com/blog/wargaming-decisions-and-synthetic-experience/>)

Richard, Burden & Strong (in press) have shown that the shared mental models which typically underly team decision making are developed when playing co-operative boardgames (e.g. Pandemic) in the same way that they are developed in professional tasks and situations.

Lin-Greenberg et al (2022) explore the notion that “*group interaction in wargames is more representative of real-world decision-making than experiments or surveys that collect individual-level preferences*”, noting that:

*“Group-level interaction in most wargames provides a unique opportunity to study how decision-making unfolds, and potentially enhances ecological validity by better simulating actual decision-making processes and behavioral responses than other research approaches. Factors such as emotions, hubris, miscommunication, status, reputation, diversity, gender, experience, and hawkishness can influence group dynamics and decision-making during wargames, allowing*

*researchers an opportunity to explore how these important (but difficult to collect) variables affect foreign policy (Wang et al., 2020). Wargaming discussions can also reveal how groups self-sort and assign or defer decision-making responsibility according to the dispositions or characteristics of team members. Indeed, one rapporteur in a 1960 wargame shrewdly noted that policy heavyweight Walt Rostow “did an estimated 75% of the talking” on the US team (Bloomfield, 1960). In contrast, surveys and many experiments often overlook group dynamics and make generalizations about foreign policy decisions by measuring individual-level preferences.”*

(Lin-Greenberg, E., Pauly, R. B. C., & Schneider, J. G. (2022). Wargaming for International Relations research. *European Journal of International Relations*, 28(1), 83-109.  
<https://doi.org/10.1177/13540661211064090>)

## APPENDIX 4: PRE-PARTICIPATION SURVEY

*This survey was used to recruit participants for the CONTESTED and ARTICLE 5 games.*

1. Name
2. Job Role
3. Employer
4. Age (in years)
5. Gender What gender do you self-identify as? Male/ Female/ other
6. Years of professional wargaming experience, if any.
7. Years of hobby wargaming experience, if any.
8. Availability dates

## APPENDIX 5: OBSERVER BRIEFING AND GUIDANCE

*This briefing was used for the CONTESTED, ARTICLE 5 and MOSUL games.*

### **Role**

Your role is to observe how the players play the wargame and how they arrive at decisions on what to do, both individually and collectively.

### **The Game**

During the wargame you should make notes (long hand or on a digital device) of anything that you think can help contribute to answering the research question:

*What impact does gender representation have on decision-making at a strategic level.*

Note that we are not particularly interested in how “well” they play the game or whether they “win” the game or even succeed in their objectives, but more about how they arrive at decisions and how they work as part of a group of competing players.

When the wargame is being played you should NOT ask probe questions of participants or otherwise offer advice or comment on the game or participant behaviours.

You may be asked to ensure that the game (and any “private” discussions) are recorded for later analysis. Recording equipment will be provided by the project team. If asked please ensure that the recording are started when the session starts (including any Turn 0 or briefing), and then continue until stopped at the end of the game.

### **Post Game Discussion**

After each game there should be a post-game discussion. Again make any notes which will help with the analysis and answering the RQ. You may ask questions of the players during this session. Again you may be asked to help audio record the session.

There may also be a Plenary discussion for all players at the end of the day, and you are welcome to take additional notes during this.

### **End of Day Actions**

At the end of the day please email any digital notes to the project team at [xxx.xx.com](mailto:xxx.xx.com).

If you have made physical notes then please transcribe them into digital form (NOT scanned) and emailed them to the project team with 48 hours of the completion of the event. You should delete local copies of notes once the project team acknowledges receipt.

*If you have any questions at any point then please just ask one of the project team.*

## APPENDIX 6: GAME FACILITATOR BRIEFING AND GUIDANCE

*This briefing was used for in the CONTESTED, ARTICLE 5 and MOSUL games.*

### **Role**

Your primary role is to facilitate the playing of the wargame. If you have time, and without interrupting the flow of the game, you should also observe how the players play the wargame and how they arrive at decisions on what to do, both individually and collectively.

### **The Game**

You must be familiar with playing, and ideally facilitating, the chosen wargame before the session. A briefing session will be held with facilitators prior to the experimental sessions in order to help you become familiar with the game, how best to facilitate it, and what to look for when running the game.

Note that the game will be audio recorded and observers will be taking notes, so you can focus on the facilitation of the game.

During the wargame you may though make notes (long hand or on a digital device) of anything that you think can help contribute to answering the research question:

*What impact does gender representation have on decision-making at a strategic level.*

Note that we are not particularly interested in how “well” they play the game or whether they “win” the game or even succeed in their objectives, but more about how they arrive at decisions and how they work as part of a group of competing players.

You may ask probe questions of participants to understand why they are making decisions they are making (as long as it does not prejudice the game) but should not otherwise offer advice or comment on the game or participant behaviours beyond that required for the participants to play the game.

### **Post Game Discussion**

After each game you should facilitate a post-game discussion to understand:

- How players found the game?
- How they found the decision-making process and what factors guided them in the decisions they made?
- How they through the group as a whole worked, particularly in terms of alliances, co-operation etc?

You may make any notes will help with the analysis and answering the RQ, but the session will be audio recorded and the observers will be taking notes.

There may also be a Plenary discussion for all players at the end of the day, and you are welcome to take additional notes during this.

### **End of Day Actions**

At the end of the day please email any digital notes to the project team at [XXX.XX.COM](mailto:XXX.XX.COM).

If you have made physical notes then please transcribe them into digital form (NOT scanned) and emailed them to the project team with 48 hours of the completion of the event. You should delete local copies of notes once the project team acknowledges receipt.

*If you have any questions at any point, then please just ask one of the project team.*

## APPENDIX 7: POST-PARTICIPATION SURVEY FORM

*This survey was used for the CONTESTED and ARTICLE 5 games.*

|                |  |
|----------------|--|
| Name           |  |
| Participant ID |  |
| Date           |  |
| Game Number    |  |
| Colour         |  |

*This is currently based on the pilot study*

| <b>Please indicate how strongly you agree with the following statements ('Decisions' refer to the actions taken/submitted by your cell):</b> | <b>Strongly Agree</b> | <b>Agree</b> | <b>Neutral</b> | <b>Disagree</b> | <b>Strongly Disagree</b> | <b>N/A</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------|----------------|-----------------|--------------------------|------------|
| My cell achieved its strategic outcomes.                                                                                                     |                       |              |                |                 |                          |            |
| I influenced the decisions made.                                                                                                             |                       |              |                |                 |                          |            |
| I evaluated the risks before committing to a decision/action.                                                                                |                       |              |                |                 |                          |            |
| I relied on my experiences/knowledge to find possible solutions.                                                                             |                       |              |                |                 |                          |            |
| I was surprised by the consequences of my decisions.                                                                                         |                       |              |                |                 |                          |            |
| I used a well-defined process to structure my decisions.                                                                                     |                       |              |                |                 |                          |            |
| In the negotiation stages, involving other cells made the decision-making process more complicated than it needed to be.                     |                       |              |                |                 |                          |            |
| I tended to rely on 'gut instinct' for decision making.                                                                                      |                       |              |                |                 |                          |            |
| Action discussions were factual and dispassionate.                                                                                           |                       |              |                |                 |                          |            |
| If I had doubts about a decision, I went back and checked my assumptions and my process.                                                     |                       |              |                |                 |                          |            |
| I took the time I needed to decide.                                                                                                          |                       |              |                |                 |                          |            |
| I considered a variety of potential options before making my decision.                                                                       |                       |              |                |                 |                          |            |
| When communicating my decision, I included                                                                                                   |                       |              |                |                 |                          |            |

| Please indicate how strongly you agree with the following statements ('Decisions' refer to the actions taken/submitted by your cell): | Strongly Agree | Agree | Neutral | Disagree | Strongly Disagree | N/A |
|---------------------------------------------------------------------------------------------------------------------------------------|----------------|-------|---------|----------|-------------------|-----|
| my rational and justification.                                                                                                        |                |       |         |          |                   |     |
| I determined the factors most important to the decision and then used these to evaluate my choices.                                   |                |       |         |          |                   |     |
| To gain support from others, I emphasised how confident I was in my actions.                                                          |                |       |         |          |                   |     |
| In negotiations, I supported Allies' proposals and tried to find ways to make them work.                                              |                |       |         |          |                   |     |

## APPENDIX 8: SEMI-STRUCTURED INTERVIEW PROMPTS

*This survey was used by Tess Butler to interview professional wargamers*

### **Background**

My name is .... And my background is...

We have been sponsored to carry out research on the differences of male and female gender on decision making in professional wargames that are set at the strategic level. Part of that research will involve running a large number of games with all male, all female and mixed gender games. Another part of the research is talking to those involved in professional gaming for their experiences.

The interviews will be recorded.

No quotes without your agreement.

### **Question prompts**

1. What is your current job role?
2. How did you get into wargaming/ professional wargaming?
3. What are the highlights of your job?
4. Do you feel that you make a difference?
5. How often do you participate in designing or playing wargames?
6. What is your experience of designing/ playing in such games?
7. How do you think your gender affects the way that you play and design wargames?
8. How do you think that your gender affects the way that you are perceived a) as a player of a wargame and b) as a member of the professional wargaming community?