



MINISTRY OF DEFENCE

Joint Doctrine Note 3/11

# Decision-Making and Problem Solving: Human and Organisational Factors



## JOINT DOCTRINE NOTE 3/11

# DECISION-MAKING AND PROBLEM SOLVING: HUMAN AND ORGANISATIONAL FACTORS

Joint Doctrine Note 3/11 dated June 2011  
is promulgated  
as directed by the Chiefs of Staff

A handwritten signature in black ink, appearing to read 'Mr P Colley', with a large, sweeping flourish underneath.

Assistant Chief of the Defence Staff (Development, Concepts and Doctrine)

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## PREFACE

*'The significant problems we face cannot be solved at the same level of thinking we were at when we created them.'*

Albert Einstein

1. **Introduction.** In 2009 General Paul Newton, at that time Assistant Chief of Defence Staff (Development, Concepts and Doctrine), threw down a challenge to his then Head of Joint Doctrine (Air Commodore Paul Colley) to bring the corpus of Joint doctrine to life. The General argued that we had plenty of process and procedure, but too little about what really made strategic planning and live operations work; our people. Both officers easily agreed that people had, throughout history, been at the centre of our successes and failures. They also believed that doctrine, in its various attempts to codify our response to increasing complexity, had failed to capture the dominant factor, which was the human dimension. This doctrine note is an initial corrective. It proved to be one of the most interesting pieces of work that its authors had embarked upon, not least because it seems highly germane to how the MOD approached the last Strategic Defence and Security Review and how it may implement the requirements of Defence Reform.

2. **Purpose and Scope.** The purpose of this doctrine note is to re-balance the weight that we attribute to people and how their thinking influences the conceptual component of fighting power, which provides the foundation for creativity, ingenuity and initiative. We declare high importance for the human input to all aspects of operations.<sup>1</sup> Our documented processes may help, but some problems cannot be managed by process alone. Strategic planning, complex operations and ultimately warfare are intensely human endeavours. Therefore, human and organisational factors inevitably influence decision-making, problem solving and the success or failure of planning and operations. The scope of this note addresses how individuals, teams and organisations contribute to (or detract from) high quality thinking.

3. **Aim.** JDN 3/11 *Decision-Making and Problem Solving: Human and Organisational Factors* aims to improve our decision-making in all complex problem solving, by better understanding the factors that influence the way that we think and behave: as individuals; in groups; and as organisations.

4. **Context.** Studies into the character of future conflict suggest that problems inherent in strategic planning and crisis management will remain complex. Academics variously define such problems as wicked, unbounded or insoluble, noting that attempts to address them using a single institutional

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<sup>1</sup> JDP 0-01, *British Defence Doctrine* (3<sup>rd</sup> Edition), dated November 2008.

framework are almost bound to fail.<sup>2</sup> Decision-making in this environment must reflect myriad inputs from diverse sources and often be undertaken under considerable time pressure. The principal requirement for dealing with complex problems will be the skill to persuade numerous communities of interest to co-operate in solving problems that defy singular or scientific approaches; *complex problems beg comprehensive responses*.

5. **Structure.** This JDN is in 5 parts. Chapter 1 outlines the nature of complex problems. Chapter 2 considers how humans think and introduces an awareness of cognitive vulnerabilities. Chapter 3 describes how teams function and offers advice on forming teams to address complex problems. Chapter 4 describes how organisational rationality, politics and culture influence military thinking.

## LINKAGES

6. This JDN should be read in conjunction with JDP 04 *Understanding*, JDP 5-00 (2<sup>nd</sup> Edition) *Campaign Planning* and JDN 1/11 *Strategic Communication: The Defence Contribution*.

## ACKNOWLEDGEMENTS

7. Assistant Chief of the Defence Staff (Development, Concepts and Doctrine) wishes to acknowledge the significant contributions made by Professor Karen Carr, Doctor Peter Tatham and Doctor Teri McConville (all from Cranfield University) and Professor Theo Farrell (from the Department of War Studies at King's College London).

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<sup>2</sup> Grint K, *Wicked Problems and Clumsy Solutions: The Role of Leadership, Clinical Leader*, Volume 1(2), 2008.

# DECISION-MAKING AND PROBLEM SOLVING: HUMAN AND ORGANISATIONAL FACTORS

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# CHAPTER 1 – AN INCREASINGLY COMPLEX WORLD

*'Uncertainty can lead to paralysis. And if you become indecisive you're dead'<sup>1</sup>*

## SECTION I – INCREASING COMPLEXITY

101. **Introduction.** In contrast to the Cold War experience of inter-state conflict framed by the interests and restraint of 2 superpowers, more recent inter-state conflict has become increasingly complex. We can assume that many future military operations will be *amongst the people* and under the glare of the global media.<sup>2</sup> Increasing competition between a range of actors, state, non-state, humanitarian and commercial, with their own priorities, requirements, and capabilities will present decision-makers with novel, ill-structured and unbounded problems. The range of tasks the military can expect to undertake also continues to increase. UK Armed Forces must be prepared to fight, keep the peace, protect the population, support government and manage the interactions and tensions between competing imperatives and activities. They must also provide humanitarian assistance when called upon to do so, and do all of this in the same battle-space.<sup>3</sup>

102. **Complexity and Recent Operations.** Recent operations in Iraq, Afghanistan and Libya confirm this trend of escalating complexity.<sup>4</sup> Commanders increasingly work with civilian partners and this more inclusive approach is not just cross-governmental; it is an alliance between all those with a stake in complex operations. The typical breadth of inter-agency and multinational engagement increases the complexity of problem solving, but diverse perspectives can also generate big opportunities.

103. **Information.** Information presents 3 additional challenges for military decision-makers:

a. **Data Proliferation.** Modern information and communications technology has led to a proliferation of data. The ability to supply, process and transmit this data raises expectations and demand for even more information. Technology has enhanced the range, speed, and bandwidth of information bearers, and provides the ability to manipulate large amounts of information. However this does not

<sup>1</sup> Citrin J, *Zoom: How 12 Exceptional Companies are Navigating the Road to the Next Economy*, Doubleday, 2002.

<sup>2</sup> Smith R, *The Utility of Force: The Art of War in the Modern World*, Penguin, 2006.

<sup>3</sup> This spectrum of challenges is captured in the concept of '*Three Block War*', famously coined by the former Commandant of the US Marine Corps, General Charles Krulack.

<sup>4</sup> Increasing complexity was also evident during peace-keeping operations in the Balkans, Sierra Leone and East Timor.

necessarily enhance understanding or the ability to exploit the information for decision-making. The volume of information, the requirement to integrate numerous sources and speed of reaction can result in information overload and decision paralysis.

b. **Technological Dependency.** Modern technology has revolutionised the information flow in the battle-space. It provides the commander with significant new capabilities that can deliver operational advantage. It can also lead to dependency on specific technology, applications or bearers to deliver mission critical information; this leads to over-reliance and single points of failure. The increasing pervasiveness of technology has also led to growing human dependency on its ability to enhance sensing, thinking and understanding. Such a technology-centric approach does not necessarily serve the more people-centric approach required for complex operations.<sup>5</sup>

c. **The Media.** The ubiquity of the global media complicates our ability to influence and manage perceptions, both within and external to the immediate area of operations.<sup>6</sup> Media reporting of apparently minor events can create significant interest, placing an additional burden on deployed personnel to understand the potential implications of their actions. Commanders must contend with multiple audiences simultaneously – domestic, allied, in-theatre and regional – by tailoring coherent and credible messages. As Rupert Smith observes, this is ‘a *global theatre of war, with audience participation.*’<sup>7</sup>

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<sup>5</sup> McMaster H R Lt Col, *Crack in the Foundation: Defense Transformation and the Underlying Assumption of Dominant Knowledge in Future War*, US Army War College Center for Strategic Leadership, 2003. Available at [http://www.au.af.mil/au/awc/awcgate/army-usawc/mcmaster\\_foundation.pdf](http://www.au.af.mil/au/awc/awcgate/army-usawc/mcmaster_foundation.pdf).

<sup>6</sup> Particularly novel media such as mobile phone footage, blogs and social networking sites such as Twitter and Facebook.

<sup>7</sup> Smith R, *The Utility of Force: The Art of War in the Modern World*, Penguin, 2006.

## Complex Operations – Iraq 2009

In 2009 the newly sworn-in President of the United States issued strategic direction on the campaign in Iraq. Before commanders could frame the problem they needed to understand the complexity of the operation; the myriad actors involved, the dynamic situation and the volatile security environment.



Iraq was a fragile state recovering, with the support of the international community, from an extended bloody insurgency that threatened to become a civil war. Its political leaders had not developed the shared national vision that would be essential to long-term stability and unity. 2009 was punctuated by multiple simultaneous transitions of power and responsibility. The Strategic Framework Agreement re-established Iraq as a sovereign power and the Coalition transitioned to the realities of the new strategic environment, including new legal authorities required to conduct combat operations. Rather than leading, the Coalition was now required to support the government of Iraq in exerting its sovereignty. Despite substantial progress in reducing violence, the security situation was both fragile and reversible. The most potent threats were at the fault lines between ethnic and sectarian groups, which reflected a continuing struggle over power and resources, and the need to obtain a lasting accommodation between the main political, sectarian and ethnic groups. Each group was influenced by its own fears: the Sunnis feared a loss of power; the Shi'a feared a return to oppression; the Kurds feared Arab oppression; and the remaining minorities feared a loss of their political influence. The perception that the government of Iraq was unwilling to provide good governance and deliver essential services to the population was identified as the greatest risk to its legitimacy and therefore to the campaign. The problem was compounded by a widespread corruption that permeated every strata of society and level of government.

It was against this backdrop and in the glare of the international media that military commanders had to plan and conduct operations.

## SECTION II – THE HUMAN APPROACH TO COMPLEX PROBLEMS

104. **Unbounded or *Wicked* Problems.** Management is often associated with complex but well-bounded problems and leadership with complex, but ill-structured and unbounded problems.<sup>8</sup> Furthermore, the solution to bounded problems may lie in a consistent approach based on precedent or process, but unbounded problems demand a more innovative response. Approaching unbounded problems using individual or single institutional frameworks is invariably unsuccessful because the nature of the problem demands multiple skills. A leader facing an unbounded problem must ask the right questions rather than provide the right answers, to engender collaboration and focussed thinking.

105. **Time Criticality and Stress.** Training, education and importantly experience allow us to base our decision-making in *time critical* situations largely on intuition, rather than on deliberate reasoning or analysis. Forming relevant patterns and mental templates from realistic training and operational experience allows us to associate current problems with past examples and to select appropriate and effective options.<sup>9,10</sup> The adoption of certain practices (procedures, use of checklists and challenge teams) can help to overcome biases inherent in these intuitive approaches to problem solving; Chapter 2 and Annex A cover such biases in more detail. There is, however, a major difference between the approach relevant to tactical situations and the more deliberate analysis applicable to operational design and strategic thinking. Successful tactical commanders do not always make good strategic thinkers.

106. **Operational Thinking.** Unlike tactical issues, problems at and above the operational level of command tend to be more ill-structured and not amenable to precise or pre-rehearsed solutions.<sup>11</sup> Mental and procedural templates for such problems are often ineffective; some problems will be insoluble and their parameters subject to constant change and an unpredictable interplay of myriad actors, chance and friction. Decisive, fast-acting leadership may be appropriate in the initial response to a crisis; snap judgements and first impressions apply to many aspects of problem solving. However, unbounded and ill-structured problems benefit from a more reflective approach that employs adaptive reasoning to exploit the brain's potential.

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<sup>8</sup> Grint K, *Wicked Problems and Clumsy Solutions: The Role of Leadership. The New Public Leadership Challenge*, Editors, Brookes, S and Grint K, Houndmills, New York, Chapter 11, pages 169-186, 2010.

<sup>9</sup> Klein G, *Sources of Power: How People Make Decisions*, Cambridge MA: MIT Press, 1998.

<sup>10</sup> Gladwell M, *Blink: The Power of Thinking without Thinking*, page 14, Time Warner, 2005.

<sup>11</sup> Although complex, tactical problems in general can be addressed by the application of appropriate expertise to generate clear, albeit intricate solutions. We can also rehearse our responses until they are highly effective and efficient.

107. **Organised Thinking.** Organisations evolve to provide a larger pool of resources to manage complexity. They facilitate the development and aggregation of specialist knowledge and skills to resolve complex challenges, enhancing the ability to think and act *rationally*. However, competition for resources between and within organisations, innate organisational interests and organisational culture temper this ability for rational thought. Military organisations have strong cultures that condition how they perceive the external environment, the challenges that they face and their potential responses. Chapter 4 discusses the influence of organisational culture on our decision-making and how commanders must both mitigate and harness organisational rationality and culture to meet complex challenges.

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## CHAPTER 2 – INDIVIDUALS: HOW PEOPLE THINK

*'Sweat saves blood, blood saves lives, and brains save both.'*

Field Marshal Erwin Rommel

### SECTION I – WHAT IS THINKING?

201. **Introduction.** *Thinking* is mental activity that allows us to understand, plan, reason, solve problems, innovate and make decisions; however, the *thinking* in all these tasks is not the same type of activity. Strategic thinking does not use the same mental resources as tactical planning and a person's thinking will not be equally effective in all tasks. It is a common experience that thinking is not always as good as it could be. A commander may encounter circumstances in which his own and his staff's thinking could be, for example, more imaginative or less vulnerable to mistakes. Some understanding of brain sciences such as psychology and neurophysiology can help commanders develop and apply thinking more effectively.

#### When Thinking Goes Badly – Operation MARKET GARDEN



In the planning for Operation MARKET GARDEN, British planners systematically discounted the Airborne Corps staff's accurate, as it turned out, intelligence assessments, ignored the RAF's objections and the Dutch Underground's warnings, and overruled the Polish Airborne Brigade's sensible attempts to re-site its unsuitable drop zone. This was driven to a large extent by the enthusiasm of Lieutenant General 'Boy' Browning and Field Marshal Montgomery's desire to enact his 'narrow thrust' strategy into Germany, rather than Eisenhower's 'broad front' alternative. The result was a military disaster and the destruction of the 1<sup>st</sup> Airborne Division.

202. **Nature and Nurture.** Cognition is a term used by psychologists to describe the acquisition, storage, retrieval and use of information or knowledge to achieve understanding, reasoning, meaning, judgement, learning and memory. All this takes place within a brain that has evolved specialised structures and functions that predetermine the ways in which cognition can work. We begin life with memory, attention, perception and some cognitive processes already working in specified ways. Cognition develops further through life and environment has a significant influence; those with common experiences and those sharing a culture will develop some similarities in the way that they think. The converse is also true; different experiences can cause people to perceive and understand the same situations very differently. In multinational and multi-agency operations, which involve a number of cultures working together, such differences can be insidious and may not be recognised until something goes wrong. This is why an effective liaison officer can play an important role in ensuring that mismatches in assumptions, values, language or expectations are discovered and bridged. Cultural differences in cognition are also important when assessing potential enemy courses of action; understanding that an opponent's thinking can be very different to your own is critical.

203. **Individuals.** Even within a given cultural group there will be significant differences in some aspects of thinking. Various factors can account for this: intelligence, personality, experience, learning, motivation, status and role as well as physical condition. Psychometric tests can measure such individual differences and are often used to assist in the selection of personnel, but given the range of factors that can influence human performance, such tests should be used advisedly.<sup>1</sup> Intelligence tests may not predict the kind of intelligence that is needed for a role and cognitive style preferences do not necessarily predict effectiveness.<sup>2</sup> Furthermore, the emotional state of individuals, influenced by many of these individual factors, has a fundamental role in thinking.<sup>3</sup>

204. **Groups and Organisations.** Thinking not only takes place within the head of an individual. Ideas, understanding, perceptions and attitudes are developed through the accumulated thinking of individuals interacting with each other. The products of thinking are captured in external constructs such as concepts, languages and processes that are shared and used collectively. Group and organisational factors are explored in Chapters 3 and 4.

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<sup>1</sup> Morgenson F P, Campion MA, Dipboye R L, Hollenbeck J R, Murhy K and Schmitt N, *Are We Getting Fooled Again? Coming to Terms with Limitations in the Use of Personality Tests for Personnel Selection*. Personnel Psychology, 60, pages 1029-1049, 2007.

<sup>2</sup> Howard Gardner argues that there are at least 9 types of intelligence and people's ability will vary across these types.

<sup>3</sup> Damasio A, *The Feeling of What Happens: Body and Emotion in the Making of Consciousness*, New York: Harcourt Brace, 1999.

205. **Thinking in Military Concepts and Doctrine.** Military concepts and doctrine describe how various mental activities contribute to operational effectiveness. Conceptual studies at the Development, Concept and Doctrine Centre (DCDC) indicate a generic need for human cognition in the following terms: '*despite technological improvement, the issue of people and their perceptions will increasingly dominate decision-making and will constitute 'the vital ground'. As such, the future operating environment will make increasing demands on the judgement, training and resilience of our people, at all levels.*'<sup>4</sup> Joint Doctrine Publication (JDP) 04 *Understanding* defines frameworks that can be used to describe how information can be gathered into mental models of a military situation in order to make decisions.<sup>5</sup> Several other publications refer to specific thinking skills:

- a. Dealing with ambiguity and complexity through individual and organisational mental agility. (*Future Character of Conflict (FCOC)*).
- b. Understanding the context, anticipating, learning and adapting (JDP 3-40 *Security and Stabilisation: The Military Contribution* (November 2009)).
- c. How communication through words, images and actions is perceived differently by audiences (Joint Doctrine Note (JDN) 1/11 *Strategic Communication: The Defence Contribution*).
- d. Self-reflection, judgement. (*Prepare Interim Concept*, November 2009).
- e. Agility and a sharpness of thought, characterised by intellectual and analytical rigour, enabling intuitive understanding of complex and changing circumstances. (*Operate Interim Concept*, November 2007).
- f. Innovation, self-reflection, interpretation, judgement and intuition, situational awareness and perception, constant re-evaluation and assessment (*Command Interim Concept*, November 2009).

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<sup>4</sup> DCDC, *Prepare Interim Concept*, dated 27 November 2009.

<sup>5</sup> JDP 04 *Understanding* defines 3 levels of understanding (strategic, operational and tactical) and 3 types of understanding (individual, collective and common).

## SECTION II – WHY WE THINK THE WAY WE DO

*'The... internal, natural decision-making process... is [both] deliberate and instinctive. It is rational and emotional.'*<sup>6</sup>

206. **Relevance.** Before the reader detects an imminent shallow dive into psychology, which can switch some people off, unless you have *some* awareness of how people think, you cannot begin to mitigate its potentially adverse effects. If you begin to recognise the traits of other people in these writings, you are half way there. The big trick is to recognise your traits, at which point you will have a fighting chance of teeing up people, teams and organisations to think more clearly.

207. **A Social Animal.** While we are able to adapt and enhance individual thinking, our start point is a pre-programmed brain that has made us successful social animals in a competitive environment. This pre-programming can be usefully categorised as the abilities to deal with complexity, to deal with social situations and to enable learning.

208. **Dealing with Complexity.** Any environment contains a huge amount of data, most of which is constantly changing. Since processing all of this data would require a much larger brain than we possess, we have evolved mechanisms to deal efficiently with the data we need, which is the data most relevant to our survival and purpose. Understanding how the brain works helps us to overcome some of the inherent weaknesses. Mechanisms include:

a. **Attention.** Attention allows us to direct our conscious thinking in different ways according to our needs. We can concentrate with a narrow focus to read detail or to apply analytical rigour, or look more widely and superficially to remain alert to the broader environment. Attention (and therefore conscious thinking) has a limited capacity, being able to deal with no more than about *7 items* at a time.<sup>7</sup> A useful characteristic of the way the brain handles information is that an *item* can contain variable amounts of information, so long as you can conceptually *chunk* the information into one construct. So, '4 8 7' could be either *3 items* as the numbers *four, eight* and *seven* or one *item* as the number *four hundred and eighty seven*. A significant part of expertise in many fields is the ability to chunk information into meaningful complex items that can be remembered and recognised.

<sup>6</sup> Raj Z and Dominiak M, *Emotionally Charged*, 2006.

<sup>7</sup> Miller G A, *The Magical Number Seven, Plus or Minus Two: Some Limits on our Capacity for Processing Information*. Psychological Review, 63, pages 81-97, 1956.

b. **Sub-conscious Pre-filtering of Data.** Pre-filtering data that we acquire through our senses can sensitise us to things that are important so that we only focus mental effort on relevant factors. This is a sub-conscious function of which we are not self-aware. It explains why we are not very good at discovering the unexpected as *we tend to see what we expect to see and find what we are looking for*. While looking for a certain person in a crowd, you are less likely to notice other factors such as the proportion of middle-aged people, the predominant colour of clothing or even another person whom you happen to know. While pre-filtering affords us mental efficiency in many situations,<sup>8</sup> it can be a weakness in others.<sup>9</sup>

c. **Bias.** The human *tendency* to be biased has evolved to allow us to achieve our objectives more efficiently by pre-disposing us to give more weight to information that leads us in a desired direction. We are unaware of many of our biases which contain both innate and learned aspects.<sup>10</sup> They can be counterproductive if our biases influence us in the wrong direction and lead us to discount or over-weight evidence. In such circumstances we should take steps to apply a *counter-weight*, such as someone with the opposite bias, or by using an objective measure. Listening to and *hearing* what might appear to be irritating people is a worthwhile skill. Detail on some important biases is at Annex A.

d. **Heuristics.** Heuristics are cognitive *rules of thumb* that allow us to make the rapid mental calculations that are necessary for quick decisions and responses. They are short-cuts, tried and tested in survival situations, but as they lack rigor they do not work in all situations. They act as a sort of mental anchor that makes it difficult to escape their influence. For example, in many cases a quick estimate of the frequency of an event is sufficient to get an idea of how likely it is to occur, so you do not need to go to the trouble of calculating a statistical probability. It requires conscious thinking and significant effort to overcome such an innate rule of thumb and disassociate, in this example, frequency with probability. Heuristics are covered in more detail at Annex B.

e. **Sub-conscious Sense-making.** Our sub-conscious processing is adept at creating links to make sense of situations. Different ideas

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<sup>8</sup> Readers may like to experiment with an example. See [www.viscog.com](http://www.viscog.com) or you-tube for 'gorilla/baseball' video.

<sup>9</sup> Salomon G and Perkins D, *Rocky Road to Transfer: Rethinking Mechanisms of a Neglected Phenomenon*, Educational Psychologist, 24, pages 113-142, 1989.

<sup>10</sup> Self-testing is available with the Implicit Association Test online at: <https://implicit.harvard.edu/implicit>

and memories, which may not have been related, are associated into new groupings, sometimes called *patterns* of meaning. These processes have a particular knack for *filling in* where information is missing in order to create a pattern that makes sense. This form of sense-making underpins our ability to make inferences, to be innovative and to understand the world. Unfortunately, this great capacity for creating holistic patterns from pieces of information can also go wrong when our strong drive to make sense causes imperfect memories to be reconstructed and *false memories* can be created. We occasionally make sense of something suddenly without knowing how and label it intuition, insight or creativity.<sup>11</sup> This is the product of sub-conscious sense-making. It may be the result of a gradual build up of experience providing highly effective patterns (which is typical of a Commander's intuition),<sup>12</sup> or it may be the result of an instant fortuitous connection made sub-consciously that completes a new pattern; that *light bulb* moment.

209. **Dealing with Social Situations.** As social animals, people have evolved to think about and understand factors that influence social interaction, making sense of other people's behaviour by interpreting intent, motivation and attitude. It also means dealing with uncertain and volatile situations as people often change their minds and do not know what they will do next.

a. **A Cultural Tool-kit.** Over time, people have developed cultural tools such as traditions, languages and beliefs, as well as legal, political and educational systems to function effectively in co-operative social groups. These cultural tools can be very powerful, influencing core values that are very slow and difficult, if not impossible, to change. They have to work in accordance with an inherently social brain, which is dominated by emotion.

b. **Emotion.** Emotion drives important social behaviours such as communication, kinship, dominance and submission, and the control of behaviour through reward and punishment. Our emotional experiences arise from 2 main areas of our brain: a primitive area that drives the powerful inherited emotions that we have in common with all people; and an area which drives our ability to learn emotional reactions and to control our more basic instincts. The balance of control between these 2 areas varies between individuals and will determine the extent to

<sup>11</sup> Albert Einstein described his own experience of thinking creatively in the following words: *'The intellect has little to do on the road to discovery. There comes a leap in consciousness, call it intuition or what you will, the solution comes to you and you don't know how or why. The truly valuable thing is the intuition.'*

<sup>12</sup> Gary Klein has studied expert intuition in commanders. See Klein G, (*Naturalistic Decision Making, Human Factors: The Journal of the Human Factors and Ergonomics Society*, Volume 50, Number 3, pages 456-460, 2008.

which they can over-ride emotionally-driven behaviour. However, whether we realise it or not, emotions colour most aspects of our thinking.<sup>13</sup> They can enhance or degrade how effectively we observe, learn, remember, reason, judge and make decisions.<sup>14</sup> Negative emotions such as fear of failure, ridicule and death will degrade all mental performance, while positive emotions such as feeling valued, trusted and empowered will provide the motivation and energy to perform well, and in effect it tunes the brain to its optimum operating frequency. Strong emotions leave us more vulnerable to our inherent biases and encourage *tunnel vision*, where we can focus too much on our principal task at the cost of other factors.<sup>15</sup>

c. **Reading Others.** We are attuned, to different degrees, to the emotions of others. Our sub-conscious perception of other peoples' emotions will influence how we respond to them and will become part of the sub-conscious processes that make sense of the world for us.<sup>16,17</sup> In this way, a large part of our brain is specialised for dealing with complex social situations and a commander can make effective use of this, not only for leading and managing his own organisation, but also for understanding complex social situations in an operational context. The leadership skills required for volatile, uncertain, complex and ambiguous military situations such as inference, improvisation, divergent thinking, creativity and intuition are all thinking skills derived from the sub-conscious ability to find meaningful patterns in complex, ambiguous and emotionally-charged situations.<sup>18</sup>

210. **Enabling and Exploiting Learning.** The human brain is particularly distinguished from the brain of other animals by its highly developed neo-cortex; the topmost part of the brain that gives us our ability to develop and remember complex concepts, using them to learn and adapt. We are born with an instinct to look for cause and effect by experimenting with the environment, and have a predetermined pattern of development for thinking. When we learn we are creating new patterns of connections in our brains. The more connections we make with new patterns, the better we have learned; we

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<sup>13</sup> Schwarz N, *Situated Cognition and the Wisdom of Feelings: Cognitive Tuning*, in Feldman L, Barrett and Salovey (Editors), *The Wisdom in Feeling*, New York, Guilford Press, pages 144-166, 2002.

<sup>14</sup> Dror I E, Peron A E, Hind S-L and Charlton D, *When Emotions Get the Better of Us: The Effect of Contextual Top-down Processing on Matching Fingerprints*, *Applied Cognitive Psychology*, 19, pages 799-809, 2005.

<sup>15</sup> Dolan R J, *Emotion, Cognition, and Behaviour*, *Science*, Volume 298, number 5596, pages 1191-1194, 2002.

<sup>16</sup> McClelland D C, *Testing for Competence Rather than Intelligence*, *American Psychologist*, 28, pages 1-14, 1973

<sup>17</sup> Goleman D, *Emotional Intelligence*, New York: Bantam, 1995.

<sup>18</sup> Paparone C R, Anderson R and McDaniel R, *Where Military Professionalism Meets Complexity Science*, *Armed Forces and Society*, 34, pages 433-449, 2008.

shall be able to remember and apply the new knowledge in more situations. We generate more connections through using the new knowledge and also by optimising the state of the brain for making connections. If we are over-anxious or under-stimulated we do not learn well. If we do not allow a period of *down-time* from learning, the sub-conscious processes will not have the opportunity for working the new information into patterns. Sleeping or engaging in leisure activities often allows insights to emerge from new learning; work-life balance is not a management fad but an essential element of mental fitness. People also learn through cultural mechanisms. Collectively, we have extended our conscious thinking by developing analytical methods, logic and reasoning; methods that aim to escape the inevitable constraints of our subjective brains. This has allowed people to develop complex plans of action to achieve sophisticated effects upon each other and the environment. The ability to be logical, analytical and rational is a skill that can be learned, and which may be easier for some people than others.

### SECTION III – USING THINKING

*‘The intuitive mind is a sacred gift and the rational mind a faithful servant. We have created a society that honours the servant and forgets the gift.’*

Albert Einstein

211. **Modes of Thinking.** In general, psychological research has focussed on 2 main types of thinking in order to compare how effective they are in different situations.<sup>19</sup> *Intuitive thinking*<sup>20</sup> has been compared with *analytical thinking*,<sup>21</sup> particularly for reasoning, judgment and decision-making. The Strategic Defence and Security Review and the Defence Reform process, for example, inevitably involved combinations of both thinking modes and it helps when wrestling with such complex problems to understand which thinking mode is best at which time and for which part of the problem. Figure 2.1 summarises the comparison of the different thinking modes:

<sup>19</sup> For example, Pretz J E, *Intuition Versus Analysis: Strategy and Experience in Complex Everyday Problem Solving*, Memory and Cognition, 36 (3) pages 554-566, 2008.

<sup>20</sup> Also described as implicit, unconscious/pre-conscious, experiential, associative, System 1, X-system.

<sup>21</sup> Also described as explicit, conscious, deliberate, rational, rule-based, System 2, C-system.

Intuitive	Analytical
Can be very effective under time pressure and reacting to sudden, unexpected events	Superior when accuracy and evidence are needed, and time and information are available
Expertise is often based on intuitive thinking developed through experience, and can be very accurate	Novices will rely on analytical thinking until they become more expert.
More vulnerable to heuristics and biases	Skilled analytical thinking is less influenced by emotion and heuristics
May use valuable situational information that is perceived unconsciously	Can encourage stove-piped thinking
Has been shown to be superior than analytical thinking for some types of complex or unstructured problems	Many tools and techniques have been developed in the tradition of objectivity and determinism and only use conscious means
General (non-expert) intuition can be more effective than analysis for novel, undefined problems	Training in logic can enhance analytical reasoning
Large capacity and parallel	Limited capacity and therefore linear

**Figure 2.1 – Comparison of Thinking Styles**

212. **Cognitive Styles and Preferences.** We have different abilities and preferences that affect when and how well we use different types of thinking. Education, training, experience and changing circumstances influence abilities and preferences. The evidence is that people use both types of thinking and can vary the predominance of either according to situation or preference. With self-awareness, gained through education and feedback, people can adapt their thinking strategies. Some, however, will have greater abilities for certain types of thinking.

213. **Situational Factors.** There is ample evidence that logical, analytical approaches to clearly defined problems work well. People (and technology) can apply systematic reasoning according to explicit rules very effectively and new analytical techniques and processes are constantly being developed. Analytical approaches do not work well in situations that are poorly

understood, where there is ambiguity and uncertainty with no common agreement about the nature of the problem or the desired outcome.<sup>22</sup> They can give a false sense of progress while the reassuring process of analysis is underway, and can lead to blinkered perceptions and lost opportunities. The skill is to identify what levels of analytical and intuitive thinking should be used for what sort of situations. It is unlikely to be a question of all analysis or all intuition for either completely defined problems or completely undefined problems. In real situations there will be gradations of all these.

214. **Leadership.** The role of a leader in complex and uncertain situations will require a range of thinking skills as well as the ability to get the best thinking from their organisation. Studies have described leadership in these situations as enabling an organisation to think for itself, to develop ideas and co-ordinate in a bottom-up manner. In such cases, the means for executing leadership is through social mechanisms that encourage communication and dialogue, develop trust, and stimulate interest and creativity.

## SECTION IV – INFLUENCING THINKING

215. **Improving Thinking.** Many different approaches have been taken in the quest to improve thinking. Understanding how thinking fails allows us to develop ways of avoiding failures. Understanding how thinking works allows us to create the best conditions for thinking through training and education, selection and the design of equipment, processes, organisations, doctrine and information. In sum, training, mental discipline and rigour are key components for good analytical thinking, while intuitive thinking relies on the right conditions, knowledge, a quiet mind, positive emotions and confidence.

### Improving Thinking in Criminal Investigations

D K Rossmo collected the following set of guidelines for avoiding thinking failures in the FBI, directed at both the organisation and the individual:

- Ensure managerial awareness of thinking problems through case study based training
- Encourage an atmosphere of open enquiry, with managers remaining neutral
- Defer reaching conclusions as long as possible
- Consider different perspectives, cross-fertilisation
- Brainstorm, seek creativity rather than consensus

<sup>22</sup> The term 'wicked problems' was first devised to describe these sorts of problems by Rittel H and Webber M, *Dilemmas in a General Theory of Planning*, Policy Sciences, Volume 4, pages 155-169, 1973.

- Managers should be receptive to objections, doubts, criticisms and challenges
- Encourage investigators to express alternatives – appoint a devil's advocate
- Use sub-groups for different tasks and have parallel independent decision-making
- Recognise assumptions, inferences, uncertainties – always ask how do we know what we think we know?
- Obtain expert opinions and external reviews at appropriate points
- Conduct routine and systematic debriefings

216. **Cognitive Resilience.** Individuals are cognitively resilient if they are able to recognise, adapt to and absorb variants, changes, disturbances and surprises.<sup>23</sup> This is essential for operating effectively in a complex environment but can be degraded by physiological stressors including physical exertion, dehydration, hypothermia, sleep loss and poor diet.<sup>24</sup>

217. **Cognitive Fitness.** Cognitive (or brain) fitness is defined by as '*a state of optimised ability to reason, remember, learn, plan and adapt that is enhanced by certain attitudes, lifestyle choices and exercises*'.<sup>25</sup> It is contended by some to be analogous with physical fitness since cognitive fitness is increased by mental stimulation, physical exercise, good nutrition, stress management and sleep. Equally, it is eroded by chronic stress, anxiety, depression and ageing.

218. **Over-Dependency on Technology and Processes.** Some tools such as planning templates, mind maps, white boards and other visual displays can help to overcome the limitations of short-term memory. For example, doctrine contains templates to help execute complex tasks such as the operational estimate and recommends battle rhythms with their associated meetings. However, these templates are guides that require judgement in their application. Common processes are vital to help disparate organisations work together effectively, particularly when limited time available induces pressure. But we should not become slaves to technology or process at the expense of adaptation to, and innovation in, a new operating context. The key is to be flexible enough with any template and to take other partners with you when adaptation becomes vital.

<sup>23</sup> Woods D D and Hollnagel E Prologue, *Resilience Engineering: Concepts and Precepts*, Ashgate: Aldershot, 2006.

<sup>24</sup> Wesensten et al, *Cognitive Readiness in Network Operations*, Parameters, Spring, 2005.

<sup>25</sup> Gilkey R and Kilts C, *Cognitive Fitness*, Harvard Business Review, November, pages 1-10, 2007.

219. **Reasoning by Analogy.** People will often look to past experiences or other similar situations to make comparisons and diagnose courses of action that have worked previously. The effectiveness of this approach depends upon how accurate the comparison is with the previous situation. Situations may be superficially similar but have radically different underlying properties. When situations are inherently uncertain and ambiguous, there is a higher risk of using inappropriate analogies.<sup>26</sup> Training and education can help people to become more effective in using analogy. The study of history can be a good antidote to narrow practice, although it is no substitute for broad experience.

220. **Multiple Perspectives.** Expertise is not always the most effective resource. Experts can develop highly efficient ways of thinking, but may inadvertently become less flexible and unable to recognise new perspectives. Sometimes a naive viewpoint will provide a valuable new approach to a situation.<sup>27,28</sup>

221. **Methodology.** Various models, frameworks and processes have been devised to help guide thinking. Models of situational awareness,<sup>29</sup> sense-making,<sup>30</sup> decision-making<sup>31</sup> and other cognitive activities also help with assessing and managing thinking. Mnemonics for checking whether good thinking practice has been adopted can be used.<sup>32</sup> Staged appreciation<sup>33</sup> is a method that offers ways to open up fields of view, to extend focus of attention and interest, and naturally to encourage hedging options and compromise solutions to be found. This is particularly effective in population-focussed operations and those that require cross-institution or cross-governmental shared understanding.

222. **Avoiding Heuristics and Biases.** An awareness of cognitive biases and heuristics has been shown to help people avoid their effects, particularly

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<sup>26</sup> Gavetti G and Rivkin J W, *How Strategists Really Think: Tapping the Power of Analogy*, Harvard Business Review, April, pages 1-11, 2005.

<sup>27</sup> Frensch P A and Sternberg R J, *Expertise and Intelligent Thinking: When is it Worse to Know Better?*, In *Advances in the Psychology of Human Intelligence*, Sternberg R J, Ed, Volume 5, LEA, Hillsdale, 157, 1989.

<sup>28</sup> Heuer R J Jr, *Psychology of Intelligence Analysis*, CIA, page 11, 1999.

<sup>29</sup> Endsley M R and Garland D J (Eds), *Situation Awareness Analysis and Measurement*, Mahwah, N J Lawrence Erlbaum Associates, 2000.

<sup>30</sup> Smith E A, *Effects Based Operations: Applying Network Centric Warfare in Peace, Crisis and War*, Washington, CCRP, 2002.

<sup>31</sup> Klein G A, Orasanu J, Calderwood R and Zsombok C E, Eds, *Decision-Making in Action: Models and Methods*, Norwood N J: Ablex Publishing Corporation, 1993.

<sup>32</sup> For example: 'CUPCATER' (collated from various literature), a mnemonic for: Be willing to **C**hange your mind; Embrace **U**ncertainty – work with it; Use **P**rompts – frameworks, checklists, to explore different perspectives; **C**hallenge assumptions, habits; Seek **A**lternatives – don't stop at the first good idea unless you have to; Use one-to-one **T**alk with a trusted but culturally different other person to stimulate constructive thinking; Be **E**motionally self-conscious in decision-making; **R**eview for the effects of cognitive bias.

<sup>33</sup> Dodd L, Stamp G and Prins G, *Going from Closed to Open; How We May Help to Make it Bearable?* International Conference on Complexity Science, NECSI, Boston, October, 2007.

for people of high intellectual capabilities.<sup>34</sup> Therefore, simply reading and exploiting this doctrine should provide some measure of inoculation. (A summary of some key heuristics and biases is provided at Annexes A and B.)

**223. Organisational Constraints.** The opportunity and ability for individuals to think will depend on external factors, such as individual development, organisational structure and processes, culture, leadership and rewards. The collective ability of individuals within the organisation will constitute the overall success of the organisation in generating effective thinking.<sup>35,36</sup>

### Changing Minds

Howard Gardner examined the ways in which people's minds can be altered in order to affect thinking. He identifies a number of possible levers:

- Reason (logical argument)
- Research (data, observations, case studies)
- Resonance (new information makes sense, feels right)
- Re-description (Presenting information in different ways – different representation, media)
- Rewards (rewards and punishment can influence thinking)
- Real world events (dramatic events can change perspectives and ways of thinking)
- Overcoming resistance (focusing on the barriers and overcoming them allows thinking to be changed)

<sup>34</sup> Stanovich K E and West R F, *On the Relative Independence of Thinking Biases and Cognitive Ability*, Journal of Personality and Social Psychology, Volume 94, Number 4, pages 672-695, 2008.

<sup>35</sup> Weick K E, *Sensemaking in Organizations*, Sage Publishing, 1995.

<sup>36</sup> Glynn M A, *Innovative Genius: A Framework for Relating Individual and Organizational Intelligences to Innovation*, Academy of Management Review, 21, 4, pages 1081-1111, 1995.

## SECTION V – ADVICE TO THE LEADER

*‘Machines don’t fight wars. People do, and they use their minds.’*

John R Boyd<sup>37</sup>

224. **Cognitive Readiness.** A leader may wish to consider the cognitive readiness of himself and his staff.<sup>38</sup> This requires an assessment of the ability to recognise patterns in chaotic situations, to modify problem solutions in the light of a changing situation and to implement plans of action based upon these solutions.<sup>39</sup> In the same way that analytical and creative reasoning can be tested, the brain can also be trained to a certain degree.

225. **Avoiding Cognitive Pitfalls – Mitigation Strategies.** Some mitigation is possible through good mental hygiene and habits. The leader and his staff should consider:

- a. Their willingness to change minds.
- b. Embracing uncertainty and working with the grain of it.
- c. Using prompts, frameworks and checklists to explore different perspectives.
- d. Seeking out and challenging assumptions; one of the most common pitfalls of otherwise elegant work.
- e. *Always* seeking alternatives; not stopping at the first good idea. Using competing hypotheses rather than seeking evidence to support a preferred theory.
- f. Using one-to-one dialogue with a trusted, but culturally different person to stimulate constructive thinking.
- g. Being emotionally self-conscious in decision-making.
- h. Checking for the effects of bias and heuristics.

<sup>37</sup> Boyd J R, quoted in Spinney F C, *Genghis John*, Proceedings, pages 42-47, July 1997.

<sup>38</sup> Defined by Fletcher et al as *‘the mental preparation (including skill, knowledge, abilities, motivations, and personal dispositions) an individual needs to establish and sustain competent performance in the complex and unpredictable environment of modern military operations.’*

<sup>39</sup> Fletcher J D, *Cognitive Readiness: Preparing for the Unexpected*, IDA Document D-3061, Log: H 06-000702, September, 2004.

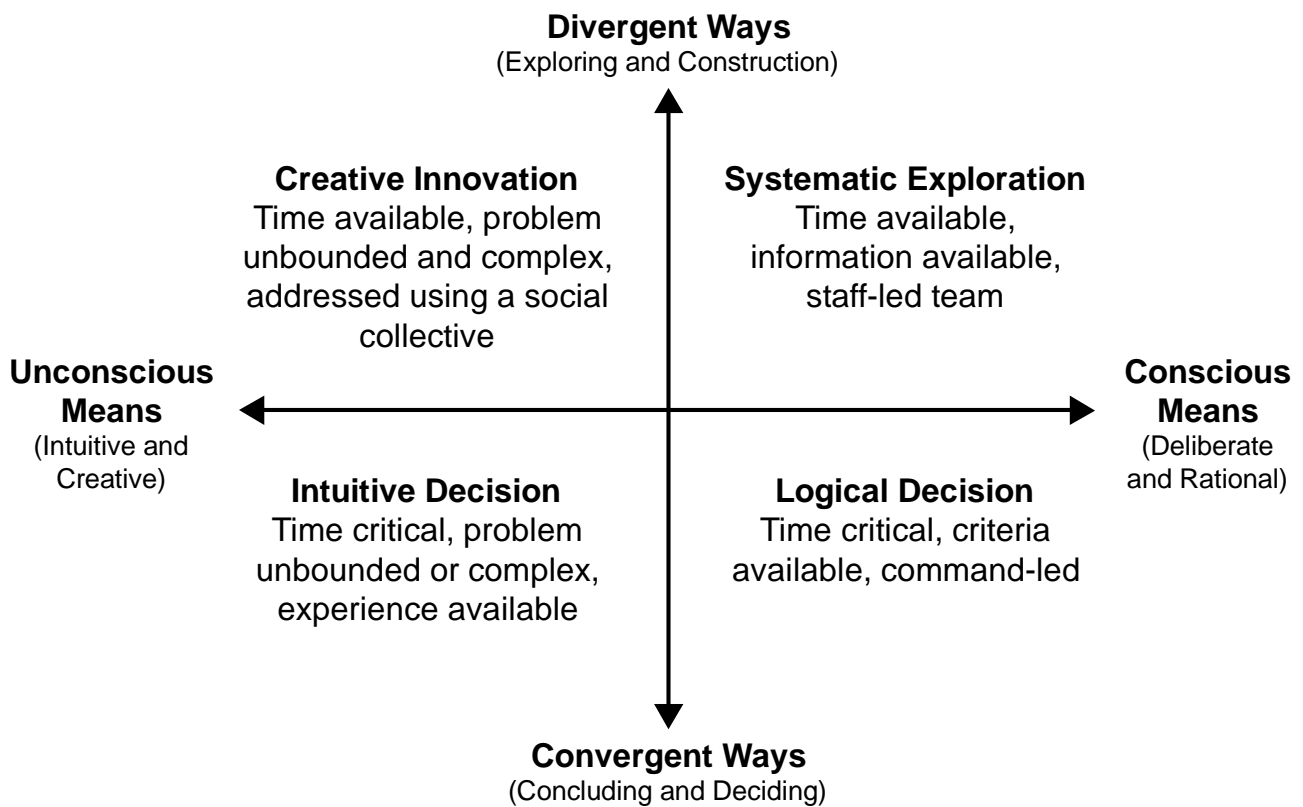
226. **Choosing the Right Approach – Analysis or Intuition?** Conscious processes are particularly good for analytical thinking and we recognise and use conscious analysis as the main approach to problem solving. Many of the tools and techniques we deploy support this kind of thinking. We tend to neglect, however, the kind of thinking provided by unconscious processes, which are particularly good for dealing with large amounts of information and with complexity, ambiguity and volatility. When we do use unconscious processes, for example in the form of intuition or creativity, it is often *ad hoc* and fortuitous. In some situations, especially when there is a need to understand and influence other people, unconscious processes are very effective and commanders should learn to exploit them. To ensure an effective balance of thinking skills for any particular situation, a leader can take the following steps:

- a. Monitor staff over-reliance on analytical thinking.
- b. Employ techniques such as brainstorming that support unconscious thinking and trigger lateral thinking, innovation and new insights (noting paragraph 313).
- c. Assign staff with particular thinking styles or skills to roles and teams.
- d. Assign a thinking monitoring task to a staff role (e.g. as part of red teaming).
- e. Diagnose your own, your staffs', collaborator and opponent thinking to exploit or mitigate strengths and weaknesses.<sup>40</sup>

227. **A Conceptual Framework for Thinking.** A conceptual framework for thinking can assist in finding and then applying the right thinking strategy to a particular situation. Figure 2.2 depicts a framework with 2 thinking dimensions – ways and means. The *ways of thinking* (the method adopted) contrasts *divergent* methods that explore, develop options, generalise and use inductive reasoning with *convergent* methods that conclude, decide, deduce and deconstruct. The *means of thinking* (the resources applied) contrasts *conscious* methods applying logic, analysis, rules and procedures, and scientific method with *unconscious* methods of intuition, creativity, insight, social understanding, instinct and heuristics. This provides 4 potential models for the application of thinking skills to assist in reviewing how best to exploit the full scope of thinking available for a particular situation.

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<sup>40</sup> Dahl A B, *Command Dysfunction: Minding The Cognitive War*, Thesis, School of Advanced Airpower Studies, Air University, Maxwell Air Force Base, Alabama, 1996.



**Figure 2.2 – A Conceptual Framework for Thinking**

## CHAPTER 3 – GROUPS AND TEAMS: INDIVIDUALS WORKING TOGETHER

*'Hell is other people'*

Jean-Paul Sartre

### SECTION I – GROUP DYNAMICS

301. **Introduction.** The group or team is a central tenet of the approach to solving complex problems. The cognitive factors discussed in Chapter 2 also influence groups, but there are a number of particularly relevant factors that influence the successful development and employment of teams. These factors include topics such as peer pressure, group-think, social prejudice, education and culture, which can affect how teams, rather than individuals, develop perceptions, construct meaning, judge, decide and act.

302. **Peer Pressure.** Peer pressure is the influence exerted on an individual within a peer group to change their attitudes, values or behaviours in order to conform to group norms. This influence can be positive, particularly in terms of team building and has a fundamental role in building and maintaining team discipline. However, the pressure to conform can inhibit a team's ability to challenge its collective understanding and its ability to think creatively or to innovate.

303. **Group-think.** Closely aligned with peer pressure, group-think involves a tendency to adopt majority decisions, particularly by group members who are similar in background and values and where they perceive a need to present a consensus view (or simply wish to keep their leader happy).<sup>1</sup> Although the *energy* of such cohesive groups is focused on the external problem, internal group dynamics will draw out conformity of opinion that is difficult for any individual to overcome, even when they know that the opinion of the group may be wrong. This can lead to the group short-cutting the rational decision-making process so that the majority view is not challenged.<sup>2</sup> In extreme cases, the group may begin to feel invulnerable and may be prone to take excessive risk; it may discount warnings, apply pressure to those who oppose the prevailing mood and create an illusion of unanimity.<sup>3</sup> Overcoming group-think requires acceptance of authentic dissent, which can be difficult as groups often shun dissenters. Group leaders must be aware of this and acknowledge the value of dissenting views.

<sup>1</sup> Irving J, *Groupthink: Psychological Studies of Policy Decisions and Fiascos*, Houghton Muffin, 1982.

<sup>2</sup> McConville T, *The War on Terrorism: A New Classic in Groupthink*, Cass, 2003.

<sup>3</sup> Brooks I, *Organisational Behaviour – Individuals, Groups and Organisation*, Prentice Hall, 2003.

304. **Social Prejudice.** Social prejudice is a belief that another social group is less capable than one's own. Operating within groups can amplify such beliefs and their unconscious acceptance within a group. The nature of modern operations, set against a diverse cultural and social backdrop, places a priority on the ability to overcome or set aside such prejudices, whether between individual Services, departments or nations.

305. **Education and Culture.** Chapter 2 discussed how education and culture can influence the way in which we, as individuals, approach problem solving; the same influence applies to group thinking and analysis. In particular, groups that receive better levels of education within an organisation unconsciously adopt analytical methodologies and thinking strategies consistent with that education and culture. This can be a strength in certain situations, but could be a vulnerability when dealing with complex issues.

306. **The Importance of Language.** Language, and how we use it to articulate ideas, has a strong influence on perception and understanding. Specialist language helps to reduce ambiguity and can allow communication to be more precise, but it relies on inference, culture, body language and common understanding. But specialist language can be unintelligible to those unaware of the rules or context. This can be a significant issue for modern, cross-cultural communication, particularly when virtual interaction using email and text messaging deny us the subtle but vital cues we gain from facial expressions and body language. Video teleconferencing can capture some of these subtleties and convey sufficient emphasis to improve understanding, but successful communication depends ultimately on our ability to understand *what is meant* rather than *what is said*. The military in particular tend to be opaque to other organisations through over-use of specialist language and acronyms. Commanders must be aware of this tendency and encourage the use of plain, concise language, particularly in multinational or multi-agency environments.

307. **Control without Command.** The dynamics at play between various groups on operations provides particular challenges for command and control. Groups take their cues from their leaders, but current and likely future operations will involve a range of leaders. These leaders will have high levels of empowerment and broad spans of control, but it is unlikely that any one will have total authority over the full range of actors dealing with ill-structured and unbounded problems. They must instead adopt a more collaborative approach to persuade and cajole, building tacit rather than formal authority based on subjective considerations such as values, beliefs and opinions of audiences. Such implicit authority is earned over time, based on reputation, experience and character, enhanced by a commander's ethics, values, integrity, as well as physical and moral courage. The degree to which

aspirations of others are managed or met demands that a commander understands the other actors involved. Under-promising and over-delivering can help to manage expectations; the reverse endangers credibility and trust. Unifying themes are: engendering respect; cultural awareness; a predisposition to work with all agencies; and an ability to communicate to diverse audiences using different media. Personal commitment can be decisive.

308. **Group Cultures.** Robust cultures within military groups reinforce cohesion under stress and sustain a strong moral component of fighting power. However, group culture can be destructive when disparate groups are brought together, even when working ostensibly towards a common aim. In many cases, antipathy between separate groups may develop before they meet. A clash of different group cultures can inhibit creativity, distort decision-making or make people reluctant to voice different opinions. Forming and combining groups to deal effectively with complex crises relies on the ability to develop trust and a mutual common understanding based on achievement of a common aim. Section III describes some of the factors that leaders can use to develop trust.

309. **Diverse Groups.** Diverse groups typically consist of members who do not recognise formal structures or authority. Leaders of diverse groups tend to emerge naturally, particularly if they begin as strict conformers but later start to lead in a new direction attractive to other members. In contrast, leaders within the military and other agency groups are appointed and while they can relatively easily establish their credibility, authority and responsibility within their own hierarchies, they will inevitably have to earn this within the wider groups that typically respond to complex problems.

310. **Group Size.** In large groups, individuals may be able to hide in the group, or fail to recognise the importance of any one task. Subordinates that do this are said to be *socially and intellectually loafing*. Clearly, this is likely to result in the reduced effectiveness of the group. It is particularly pertinent where there is insufficient direct motivation of individuals.

311. **Dysfunctional Group Decision-making.** Other factors can make group approaches to decision-making dysfunctional. For example, initial preferences can become exaggerated during group discussions, a phenomenon known as group polarisation. We can reduce this by avoiding uniformity in the composition of the group. More baffling is group behaviour that inhibits the ability to share information effectively. Rather than revealing vital information known only to them, research shows that individual team members tend to talk about things that everybody already knows. We can reduce this counter-productive behaviour by disciplined pre-meeting routines

that expose what is already known and which clarify clear boundaries for what the meeting intends to achieve.

**312. Group Roles.** Groups have norms or rules that apply to every member, but they often have specific roles and corresponding rules that apply to sub-groups within them. Experiments demonstrate that individuals are surprisingly susceptible to group conformity and external pressures when adopting such roles, even when subsequent behaviour may contradict their own moral values. Experiments indicate consistently that people will adapt their behaviour to conform to views other than their own. Contributory factors include the fear of disapproval from others, a lack of self-belief or the need to avoid confrontation, high levels of anxiety and low status or high need for approval.

### **The Stanford Prison Experiment – A Dangerous Tendency to Conform**

In the Stanford Prison Experiment psychologists put young men into a simulated prison environment, randomly selecting some as prisoners and others as guards.

The subjects selected as prisoners were arrested, fingerprinted, blindfolded, put in a cell, stripped, searched, deloused, had their heads shaved and were given a uniform. The other participants were made into guards with the symbolic trappings of power.

All was quiet until the second day when the prisoners rebelled against their incarceration. The guard's retaliation was surprisingly swift and brutal; they stripped the prisoners naked, removed the beds from the cell, placed the rebellion's ringleader in solitary confinement and began harassing the remainder. After only a few days realistic role-playing, participants (both prisoners and guards) felt as though their old identities had been erased. Men previously identified as pacifists were, in their roles as guards, humiliating and physically assaulting the prisoners, some even reported enjoying it.



The experiment had to be stopped after only 6 of its planned 14 days as participants conformed too well to their roles as submissive prisoners or domineering guards. The experiment sought to answer underlying questions about human nature, for example what may make a good person commit evil acts. It argues a strong case for the power of a situation, vice the traditional view that only some people have the capacity for evil. The psychological explanation for the behaviour included adopting the implicit social norms associated with roles: guards should be authoritarian and abuse prisoners; while prisoners should become servile and take their punishment.

313. **Brainstorming – A Note of Caution.** Despite its widespread use, group brainstorming produces fewer new ideas and less innovation than when people work in isolation. Operating within the group environment can allow individuals to *loaf*, particularly within larger groups and they will often forget their own ideas when they hear alternative views. The latter issue often relates to introverts, potentially some of the deepest thinkers in a group, who will be less likely to project alternative ideas than their more extrovert colleagues. In addition, many individuals are apprehensive within a group environment owing to a perception that they are being evaluated. Even when brainstorming conventions are clearly articulated some individuals consider that other group members are scrutinising their input. Overall, groups tend to be more effective when *evaluating* ideas, rather than *creating* them. Group members should, therefore, be tasked to generate ideas *before* the meeting and leaders should mediate discussion about those ideas to allow the group to evaluate the options. Participant involvement in the evaluation process will also help to build consensus on the final outcome; participation in the creative stage is also more likely to motivate efforts to achieve the desired outcome.

## SECTION II – CHOOSING THE RIGHT TEAM

### Regional Command (South) Prism Cell

On taking command of Regional Command (South) in Afghanistan, November 2009, Major General Nick Carter established a Prism Cell within his headquarters. It functioned as a challenge team but was also directed to focus on issues that were receiving insufficient attention in the headquarters such as operationalising political engagement, reintegration and mobilising the religious establishment. In this latter role, the Prism Cell pushed the boundaries of conventional J5 planning and was proactive in anticipating issues and scoping solutions.

Among other tasks, the Prism Cell was directed to look into the reintegration of insurgents. Previous reintegration programs had been generally ill-conceived, poorly executed and contaminated by corruption and, as a result, the Afghan people and international community were cynical about new schemes. The task given to the Prism Cell was to draw together a common approach to overcome resistance and cynicism – joining up with Headquarters International Security Assistance Force's (ISAF) Reintegration Cell and the Reintegration Team at ISAF Joint Command. The Prism Cell successfully produced a policy and guidance for reintegration and designed the cross-functional team to make operational the Coalition's approach in the South.

314. There are different ways for military leaders to structure teams to mitigate the individual, group and organisational limitations for problem solving. Some of these approaches are explored in this Section.

315. **A Multi-discipline Approach.** Increasing specialisation is a natural response to the opportunities created by modern technology, but places high demands on technical knowledge. This begs a multi-discipline approach to problem solving, including approaches such as joint organisations, albeit with the purpose of integrating specialist knowledge and capabilities without diluting them. Multi-disciplinary teams have proven highly effective in areas such as air-land integration, but are equally applicable to humanitarian relief, peace support, stabilisation, counter-insurgency and even strategic planning in MOD, which all demand comprehensive approaches to integrate the available expertise and capabilities.

316. **Task-orientated Teams.** Rigid organisational structures may not adjust effectively to new tasks and can stifle effective inter-agency collaboration. Leaders should consider forming task-orientated teams and if necessary re-aligning existing structures. A lack of capacity within the traditional brigade structure to develop and target influence activities led the Commander of Task Force Helmand on Operation HERRICK 7, to establish Non-Kinetic Effects Teams. These 2-man teams, operating down to company level, drew on personnel from within the task force who demonstrated the appropriate skill-sets and aptitude for the task.

317. **Challenge Teams.** One way to counter the effects of cognitive bias is to form a group whose *raison d'être* is to challenge the leader's plan. This is similar to the concept of red teaming.<sup>4</sup> Challenge teams may have a broader role to seek out dissenting and novel ideas and to present alternative and critical perspectives on all aspects of the problem. A challenge team can check for *groupthink* within and ensure that the analysis and debate has run its course before a policy, plan or strategy is decided. For example, DCDC has routinely provided a challenge function, not only for operational planning, but during the Defence Review and Defence Reform as well.

318. **Knowledge Networks.** Knowledge networks that reach out beyond the organisation can help a leader gain access to new ideas and multi-disciplinary expertise. They are also a useful means to test the reliability of existing information and ideas. Deployed leaders have traditionally used reach-back to draw on mainly UK-based expertise, but they should also consider much wider sources. For example, the Regional Command (South) Prism Cell described in the vignette above incorporated a knowledge network

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<sup>4</sup> DCDC, DCDC Guidance Note, *A Guide to Red Teaming* dated February 2010.

of UK-based and deployed experts from academia. The potential sources are limited only by a leader's imagination.

319. **Supporting the Team.** It can be difficult for a challenge team to gain traction within an existing organisation. The experience of the Prism Cell was that such teams, which often approach problems from a novel perspective, can cause angst amongst mainstream headquarters elements focused on the core *plan-refine-execute-assess* cycle. For such small challenge teams to work effectively, they must have: the authority, patronage and support of the commander and chief of staff; good lines of communication with the rest of the command; sufficient independence to think critically about sensitive issues; and a thick skin. Since such teams are not staff branches, their products (policies, concepts, plans) need to be injected at some point into the mainstream of the organisation. For the Regional Command (South) Prism Cell this process was managed by the Chief of Staff who handed the product across to a staff branch with clear direction about what was to happen next.

### SECTION III – BUILDING TRUST IN TEAMS

*“Successful coalitions are based upon building and having trust. It needs leaders who can rise above the obvious exasperations that are natural and to be expected.”<sup>5</sup>*

320. **Crisis Teams.** Establishing trust within, and between, groups from different organisations or cultural backgrounds is an essential prerequisite to effective partnering. Such teams require incentives to developing trust, including shared goals and objectives, but trust takes time to develop.<sup>6</sup> During crises, inter-organisational teams often develop on an *ad hoc* basis and without a long-term perspective. We characterise such groups as crisis driven, task-orientated, self-evolving, time-sensitive, and temporary. We define them conceptually as *hastily formed networks that are established rapidly from different communities working in a shared problem space, in which they plan, commit to, and execute actions to complete a large, urgent mission.*

321. **High-Trust and Low-Trust Teams.** The commander needs to understand the level of trust that exists within a team. Figure 3.1 lists the attributes of high-trust and low-trust teams.<sup>7</sup> It highlights the advantages of high-trust teams and provides a checklist for commanders to alert them to emerging low-trust team tendencies.

<sup>5</sup> General Mattis US Marine Corps speaking to the Advance Command and Staff Course (ACSC) 13, October 2009.

<sup>6</sup> Christopher et al., in Dr Tatham's work on Swift Trust, 2006.

<sup>7</sup> Colonel Mclay E, *Strengthening RC(S) – Unity of Effort*, CJTF-6/DCOS/001, 19 July 2009.

	<b>High-Trust Teams</b>	<b>Low-Trust Teams</b>
<b>Shared Goals</b>	<p>Awareness of shared goals</p> <p>Time given to build shared goals</p> <p>Early and open debate of goals</p> <p>Primacy of team-based goals</p>	<p>Lack of awareness of shared goals</p> <p>Lack of shared goals</p> <p>Opinions of others not considered</p> <p>Primacy of individual goals</p>
<b>Power</b>	<p>Availability of facilitators</p> <p>Facilitators' focus on win-win</p> <p>Recognition of knowledge as power</p> <p>Recognition that power can shift between team members and across the distributed environment</p> <p>Power differentials minimised</p>	<p>Power battles</p> <p>Coercion</p> <p>Misunderstandings and conflicts of interest</p> <p>Use of hierarchical power</p> <p>Perception of 'I have power'</p>
<b>Communication</b>	<p>Face-to-face where possible</p>	<p>Over-reliance on electronic means</p>

**Figure 3.1 – Trust in Teams**

322. **Building Trust Quickly.** The term *swift trust* encompasses the vulnerability, uncertainty, risk and expectations that surface within hastily-formed networks.<sup>8</sup> Although behaviour within such personal networks presupposes trust, traditional forms of trust such as familiarity, shared experience and reciprocal disclosure are not obvious.<sup>9</sup> A framework based on the following conditions will serve to build trust more quickly:

<sup>8</sup> Meyerson D, Weik K E, Kramer R M, *Trust in Organizations: Frontiers of Theory and Research*, Sage Publications, pages 166-195, 1996.

<sup>9</sup> *Ibid*, page167.

- a. **Reputation.** Trust can be based on the reputation of the organisation, rather than the capabilities of an individual. Reputation is context-dependent, so leaders should be aware of which lens prospective partner organisations are looking through. The single Services, for example, generally enjoy a better reputation than the MOD from outsiders looking in, even though the 2 organisations are inextricably interwoven. The perspective of MOD looking across to the single Services may be different.
  - b. **Dispositional Trust.** This refers to the general disposition of an individual to trust other people; some people are more trusting than others. The trick is learn how to read people, or know who you can rely on to do it for you.
  - c. **Rules or Protocols.** The presence of rules or protocols and the adherence to them is a safeguard against maverick behaviour, which could otherwise have the potential to destabilise an organisation and reduce inter-personal and inter-organisational trust. For example, DCDC established a protocol for behaviour on the CDS Strategy Forum, which allowed tough open debate and competing ideas without fear of them being exploited elsewhere to run single Service agendas.
  - d. **Organisational Factors.** Differences in organisational goals, negative organisational stereotypes and ideological differences serve to complicate working relationships between the military and other organisations. For example, military organisations are typically hierarchies and the members largely conformist, but non-governmental organisations prize individualism and are less hierarchical.
  - e. **Specialist Role.** People make assumptions about individual ability based on their specialisation, rather than knowledge about their competence or motives. Role-based trust is also described as assumed competence; for example, most agencies will trust British soldiers to take responsibility for physical security.
323. **Personal Contact.** Personal contact, wherever possible, is vital for trust building within newly formed, multi-disciplinary teams. The UK's Government 2007 *Next Steps Strategy for Afghanistan* sought to address cultural differences and lack of trust by creating a civil-military mission. The key breakthrough came when Brigadier Carleton-Smith moved his J5 cell from Task Force Headquarters into the Provincial Reconstruction Team building. Collocation of military and civilian personnel was a positive step toward building trust in this rapidly-expanding civil-military team.

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## CHAPTER 4 – ORGANISATIONS: DYSFUNCTIONAL BY DESIGN

*'And let it be noted that there is no more delicate a matter to take in hand, nor more dangerous to conduct, nor more doubtful in its success, than to set up as a leader in the introduction of changes. For he who innovates will have for his enemies all those who are well off under the existing order of things.'*

Niccollo Macchiavelli

### SECTION I – MAN IN MODERN SOCIETY: AN ORGANISED WORLD

401. Human cognition and group dynamics are not the only factors that influence military decision-making. Organisations are a principal characteristic of modern societies and shape practically every aspect of modern life. They are endemic in our societies and we tend to take them for granted, even though we spend most of our lives interacting with or inside organisations. Psychologists note how humans take their cues on how to act and behave from their social environments, which are predominately *organised* and involve formal rules and informal norms. War itself is organised violence for political ends and it is through organisations that states generate military capabilities. Understanding how organisational factors impact on military operations and strategic planning requires knowledge of how organisations function, fail, learn and adapt.

402. **Modern States and Bureaucracies.** The rise of the modern western state saw the emergence of the state holding a monopoly on the legitimate employment of violence. As states grew in power and developed full-time professional armies there was a growing need to manage their affairs and forces in a more organised way. This led to the development of civilian bureaucracies to manage the state military. Most modern public organisations (including militaries and ministries of defence) are bureaucracies. They are seen typically as unresponsive, unwieldy, inefficient and impersonal; a source of constraints rather than support and solutions. However, bureaucracies, in theory at least, enable humans to operate more effectively as a group, thereby emphasising collective effort as being greater than the sum of its parts.

## SECTION II – ORGANISATIONS AS RATIONAL, POLITICAL AND CULTURAL SYSTEMS

403. **Introduction.** Organisation theory views organisations as rational, political and cultural systems. The *rational systems* view captures the idea that organisations make up for human cognitive limitations that prevent us from being truly rational. The notion that any collective will seek to preserve itself, most often by growing, forms the essence of the *political systems* approach: organisations pursue resources to advance self-interests. Organisational form and activities are also shaped by the dominant ideas held within the organisation about its purpose, and how it should operate. The *cultural systems* perspective highlights the role of these collective identities and shared norms of behaviour in defining organisational interests and activities.

404. **Rational Systems.** Rationality requires perfect information, identification of all potential courses of action, prioritisation of all options against a hierarchy of goals and a cost-benefit analysis of each option to select the most effective. Organisations have greater capacity to think and act rationally than humans, who lack the capacity to complete the entire decision-making sequence. This explains why we take cognitive shortcuts and make do with imperfect information, engaging in serial information processing that focuses on only one aspect of a problem at a time. Organisations engage in parallel processing, breaking down problems into components for consideration by different parts of the organisation. Division of labour enables them to devise and deliver solutions more efficiently than individuals. Specialisation enables application of individual technical expertise to specific aspects of larger problems, and team-working delivers greater productivity than working independently.

405. **Political Systems.** The political systems perspective views organisations as biological systems that focus on survival, self-interests and reproduction. As political systems, organisations have stated output goals and often unstated maintenance goals, such as the protection of core capabilities. These goals may conflict and military organisations in particular often attempt to resolve tensions by prioritising maintenance over output goals, reasoning that protecting the organisation is in the national interest. A focus on maintenance goals leads to 2 imperatives; preserving organisational autonomy and maximising resources for the organisation.

406. **Cultural Systems.** Organisational culture includes elements such as shared identity, common understanding and norms of behaviour. An organisation's culture can determine its *preferences* and behaviour. The *big war* culture of the US Army, for example, could have produced a predisposition

against what was termed *blue-helmet peacekeeping*. In contrast, Scandinavian military organisations more readily accept peacekeeping as an important role. Common understanding frames how organisations see their environments and their norms of behaviour influence and define their response to situations. UK Armed Forces, for example, operate in an environment regulated by the law of armed conflict, ruling out certain practices undertaken by less scrupulous militaries.<sup>1</sup>

407. **Bureaucratic Politics.** The notion of organisations acting as political systems has profound implications for national security. Studies show that organisational self-interest can influence even high level decision-making. This influence will vary across 3 areas of national security policy: crises; resources; and strategy. In a crisis, we can expect that bureaucratic politics will decrease because the national security stakes are so high and immediate. For policy involving resources, such as equipment acquisition, we could expect bureaucratic politics to be more intense since the stakes are higher for the organisations concerned, than they are for the state. Strategy lies somewhere in between: bureaucratic politics will influence policy debate and outcomes where the strategy itself threatens organisational autonomy and resources.

#### **Bureaucratic Politics – The Cuban Missile Crisis (1962)**

Graham Allison's *Essence of Decision* examines US and Soviet behaviour during the 1962 Cuban Missile Crisis. His bureaucratic politics model appeared to demonstrate that policy positions taken by political actors were influenced by their position in the political hierarchy; they were driven by organisational self-interest. Allison states that government policy is the product of 'pulling and hauling' between bureaucratic actors, rather than the product of a rational system, with the strongest actor or coalition carrying the day rather than the most rational option. However, more recent analysis suggests other factors at play, including personal relationships, were more influential in shaping US policy. The President's brother, the US Attorney General, played a leading role but should have had little influence on this area of policy according to the bureaucratic politics model.

<sup>1</sup> Farrell T, *The Norms of War: Cultural Beliefs and Modern Conflict*, Boulder, Lynne Rienner, 2005.

## SECTION III – THE MILITARY IMPLICATIONS OF ORGANISATION THEORY

408. **Inter-Service Rivalry.** The political systems perspective highlights the existence of competition or rivalry between a nation's army, navy and air force for resources and roles. Such rivalry can be damaging for the national interest but also for organisational interests, particularly if it permits or prompts civilian intervention. This explains why military organisations will frequently seek to reach agreements to avoid elevating any dispute. The experience of the US military in the World War II is a good example; the US Army took command of the European theatre with the tacit agreement that the Navy would take command of the Pacific theatre.

409. **Combined Arms Warfare.** Division of labour and specialisation, 2 key characteristics of organisations, are fundamental to modern warfare. Division of labour in modern militaries occurs within each environment (air, land, maritime) and within each Service between the branches (for example, naval surface warfare and sub-surface warfare). Specialisation within each branch promotes the development of technical expertise, an important factor given continual increases in the technological sophistication of military capabilities. The focus on joint warfare, requiring more effective co-ordination between the Services, may be in tension with the division of labour principle. Yet modern warfare requires the combining of Service-based specialisations to achieve, for instance, air-land integration.

410. **Military Culture.** Militaries usually have strong organisational cultures that they nurture and seek to exploit. The image of the US Marine Corps as an elite, all-volunteer war-fighting force was carefully manufactured by the Corps to support its attempts to mobilise political support and resources, and to defend its autonomy from the US Army.<sup>2</sup> Training is a significant mechanism for socialising members into organisational culture. Military training regimes are intense in comparison to other organisations; they also serve to break down individual identity and rebuild it in the image of the organisation. Military culture is expressed through rituals: observation and practise of these rituals reinforce the culture even further. Military organisations also exist apart from the civilian society that they serve, unlike other public organisations with strong cultures such as the police. This underpins the importance of civil-military relations in democracies and explains why some democratic states feel nervous about the intentions of their military guardians. It also suggests that a strongly-integrated civil-military MOD model is the right one for the UK.

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<sup>2</sup> The Corps worked with public relations firms and Hollywood in the inter-war period to promote this identity.

411. **Cultural Preferences.** Strong military cultures shape organisational preferences for certain forms of warfare, influencing capability development and framing how the organisation conducts operations. This culture and the attendant preferences reflect the dominant war-fighting communities within the organisation.

### Battle-fleet versus Submarine Force (Inter-war years)



The Royal Navy's battle-fleet culture between the world wars arguably led it to neglect submarine warfare: it was reluctant to invest in offensive sub-surface capabilities at the expense of investment in capital ships and did not wish to encourage development of a mode of warfare that could threaten the battle-fleet. The Royal Navy's culture thus blinded it to the lessons of the previous war. The German Navy, a relatively new organisation, had less cultural investment in the battleship. While it built up its battle-fleet, it also developed an aggressive submarine force.

412. **Rational, Political and Cultural Systems.** Rationality, politics *and* culture shape and drive military organisations. Rationality permeates modern militaries and their design and purpose; for example, combined arms warfare emerged as the rational response to the revolution in firepower that came with industrialised war. Politics also permeates modern militaries which have a natural drive to thrive and survive. This usually creates a determination to protect organisational autonomy and maximise organisational resources. Finally, as closed and ritual-bound organisations, militaries have strong cultures that can be fiercely resistant to change and which shape how they develop and how they act. If we are to avoid the worst effects of these factors, we must consider all 3 organisational characteristics to understand how militaries learn and adapt, and why they fail.

## SECTION IV – ORGANISATIONAL LEARNING AND ADAPTATION

*'It's not the biggest, the brightest, or the best that will survive, but those who adapt the quickest.'*

Charles Darwin

413. Organisational learning is critical to avoid failure, especially repeated failure. Organisations identify lessons from their own experiences and from the experiences of others, but organisational learning involves codifying those lessons in modified or new organisational *routines*. Militaries express their routines in doctrine, training and standard operating procedures that allow them to act in a co-ordinated and effective way in often highly dynamic and chaotic situations, where there is a low tolerance of failure.

414. **Organisational Learning.** Learning is difficult for most organisations, especially if it challenge routines, special interests and cultural norms. These factors will often lead the organisation to reject or ignore important lessons. Organisational learning also requires tolerance of criticism, both internal and external, but militaries are among the most hierarchical of organisations and arguably least open to internal questioning or dissent. They also tend to be sensitive to external criticism, especially from civilians without military experience. This is a growing problem owing to the decline in the west of the number of civilian policymakers with military experience and the increasing dependency on civilian specialists and agencies on operations.

415. **Adaptation and Innovation.** Organisational learning should lead to adaptation and, if necessary, innovation. Military adaptation involves incremental changes to tactics, procedures, structures and equipment to improve organisational performance. However, adaptation is sometimes insufficient and militaries must innovate to retain their advantage over would-be opponents. Innovation often involves large-scale changes, requiring a mix of doctrinal, structural and technological change. Classic examples of military innovation include the advent of armoured warfare and aircraft-carriers. A more recent example is the introduction of provincial reconstruction teams in Iraq and Afghanistan, which combine civilian expertise with military support. Innovation often builds on existing organisational strengths. For example to enable these teams, NATO militaries have drawn on existing and core competencies in planning, logistics and operations.

416. **Competency Traps – Why Military Innovation is Difficult.** A number of competing factors stifle innovation, which organisation theory considers as *competency traps*. This term captures the reasons why sunk costs, culture-bound routines and vested interests make militaries loath to abandon that at

which they are adept. Innovation questions the routines and systems that underpin core competencies, which can deteriorate quickly without repetitive training, exercises and operations. Innovation also threatens existing capabilities in which militaries have made heavy investment and around which sub-community interests and cultures have developed. Militaries also tend to favour tried and tested methods and be sceptical of new ideas owing in part to the unforgiving nature of warfare. But innovate we must if we are to develop the capacity to anticipate and prepare for future combat environments.

417. **Centralised versus Decentralised Organisations.** We assume that the highly agile and relatively decentralised organisational structure of our irregular opponents' enables them to learn and adapt faster than our own highly centralised structures. Similarly, a lower number of less well-defined routines should make them more responsive to their environments, with a faster learning capacity. Organisation-wide application of lessons and the ability to codify and disseminate them relies on organisation and a large repertoire of competencies and capabilities. Irregular organisations will vary in their ability to adapt; some will be highly adaptive, others will be surprisingly slow to adapt and make persistent tactical errors. However, militaries are usually slow to innovate and irregular opponents enjoy the advantage of not being bound by organisational interests defending existing ways of operating. They also often lack cultural and bureaucratic obstacles to innovation. In summary, decentralised organisations are fast learners and better at innovating than adapting; centralised organisations are better at organisation-wide learning and adapting.

418. **Organise for Adaptation and Strive for Innovation.** As large, centralised organisations, western militaries are ideally suited to adaptation because they have a wide repertoire of capabilities and the structure to capture and exploit lessons learned. However, western militaries are not good at innovative change, which challenges vested interests and organisational culture. And yet we must strive to innovate and to identify critical areas for which innovation, rather than adaptation, is the only way in which to maintain our advantage over actual and would be enemies.

#### **Decision-making in the MOD – An SO2's Plea**

*'The world is changing too fast for us to stop, look, work out a path and then start again. We need to be able to change direction as we move, and that will take agile minds, properly educated and freed from the constraints of structural dysfunction and systemic drag.'*

Major A R Pitt RA<sup>3</sup>

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## CONCLUSION

1. There is a pervading human influence over everything that we do, but while our doctrine reflects that in spirit, it does not do so in detail. We should not be lured into thinking that organisational and procedural frameworks automatically accommodate the human dimension, because they are influenced by the very factors that they seek to overcome. It follows that a greater understanding of human and organisational factors will help to alleviate their more destructive influences, but also harness their considerable strengths. This note has highlighted a number of key points.

a. **Command-Driven Approach to Problem Solving.** The increasing complexity of modern operations places a premium on understanding by leaders of the human cognitive, group and organisational influences on effective problem solving and decision-making. While an understanding of the nature of complexity goes some way to alleviate its effects, the mitigation of complexity lies in a command-driven approach to problem solving.

b. **Mental Hygiene.** Military commanders learn early the importance of looking after the tools of their trade, but often neglect the primary tool of the commander and his staff – their minds. Developing sound mental hygiene habits can significantly enhance the performance of the commander and his staff. This includes improving self-awareness of how the brain helps and hinders us, achieving adequate sleep, avoiding undue haste where time will allow both creative and analytical approaches.

c. **Monitor and Select Approaches to Thinking.** Effective problem solving requires reaching beyond the familiar to consider new ideas and it values information for its accuracy and reliability rather than its accessibility and consistency. Leaders should consciously monitor and select the right approach to thinking for themselves and for their staff, promoting processes that check the effects of cognitive bias and that allow leaders and their teams to be truly reflective.

d. **Selecting the Right Team.** Leaders should structure their teams to harness the diversity of approach that complex problems demand, establishing and developing bespoke teams to deal with specific problems. Such teams, particularly if they are operating outside of the organisational norms, will need support from the highest levels of the organisation if they are to achieve their goals.

e. **Organise for Adaptation, Strive for Innovation.** Western Ministries of Defence are not particularly good at innovation, which challenge vested interests and organisational culture. As large, centralised organisations, however, they are good at adapting; drawing on a wide repertoire of capabilities and the structures to capture and exploit lessons learned. We should organise ourselves to exploit this adaptive strength, while still striving to innovate, if we are to retain the competitive edge that the future character of conflict work suggested we will need.

2. The human brain has a staggering potential which, if understood in all its imperfect glory, may be harnessed and exploited as the foundation for success in all of our endeavours. However, where the brain is used and applied without an understanding of its potential failings and inherent weaknesses, our endeavours are more likely to founder. The study of human and organisational factors in decision-making is a demanding discipline for which there is no simple instruction manual. But the commander who is at least equipped with an understanding of these factors has made the important first step to mitigate their potentially malign influences, whilst maximising the obvious benefits.

An afterthought:

*'Take time to deliberate, but when the time for action arises,  
stop thinking and go in.'*

Napoleon Bonaparte

## ANNEX A – DECISION-MAKING BIASES

A1. Our genetic potential, formative experiences and learning all strongly influence our *cognitive* (mental activity or thinking) abilities. They also give rise to unconscious influence through biases that serve to influence the way in which we think. This Annex details some of the biases pertinent to decision-making.

A2. **Confirmation Bias.** *Confirmation bias* is the tendency to search for or interpret new information in a way that confirms one's preconceptions, or to irrationally avoid information or reject new evidence that contradicts an established view. This is especially pertinent to the development of intelligence where any failure to rigorously analyse competing hypotheses can introduce confirmation bias.

A3. **Optimism Bias.** *Optimism bias* is a systematic tendency for over-optimism about the outcome of a planned course of action. This includes over-estimating the likelihood of the positive and under-estimating the likelihood of the negative. This is one reason why contingency planning, rehearsal of concept drills and red teaming are so important; *branches* and *sequels* in operational planning hedge against such over-optimism.

A4. **Bandwagon Effect.** The bandwagon effect is the tendency to do or believe things because others do or believe the same. Cultures within military hierarchies for senior-subordinate relationships vary from an expectation of blind obedience to one that encourages open challenge or concepts of *loyal opposition*. Commanders must exercise care when working across national cultural lines and foster an open culture that encourages subordinates and seniors to test the accepted wisdom to safeguard against the bandwagon effect.

A5. **Premature Closure.** The human need for closure varies between individuals, situations and cultures. Those with a high need for closure prefer order and predictability, and are decisive, but more likely to have a closed mind at a critical juncture. They can be good in a crisis, but tend to dislike ambiguity; they will seek to make rapid decisions even if the information supporting that decision is of relatively poor quality. Those with a low need for closure will tend to express more open-mindedness and be more creative. Organisational and time pressures can reinforce the need for closure and a formal commitment to a course of action may result in a vested interest in maintaining the position.

A6. **Framing Effect.** How information is framed can result in individuals drawing widely different conclusions. Information presented in vivid detail will often lead people to disregard abstract or statistical information that may have greater evidential value. Things that we see or hear directly with our own eyes or ears are likely to have greater impact than information received second hand, even though the latter may have greater value. Similarly, case histories and anecdotes tend to have greater impact than more informative but abstract aggregate or statistical data. For example, compare the interest in a commander's just released post-operational report with the interest in a piece of doctrine even though the doctrine is compiled from numerous such reports and lessons over time. We also seldom reflect on an *absence of information*. The framing effect has implications for how commanders task their staff to present information and the weight they attribute to it.

A7. **False Certainty Effect.** The false certainty effect inclines us to make risk-averse choices if the expected outcome is positive and risk-seeking choices to avoid negative outcomes. Experiments show that how such choices are presented will influence our choices, with clear implications for the way in which we articulate risk. The example below uses real experimental data, with the scenario adjusted to fit the military context; the psychological phenomenon is well documented and real.

### **The False Certainty Effect: Illogical Choices**

An enemy attack is imminent and 600 'friendly' soldiers assigned to a potential counter attack. All are likely to become casualties if no counter attack takes place. There are only 2 Courses of Action (CoAs) in the time available.

- CoA 1: 200 soldiers will survive.
- CoA 2: A 33% chance that all 600 will survive, but 67% chance that nobody will survive.

Before you read on, which course of action would you chose? About 70% of readers will choose CoA 1 and 30% CoA 2. Most of you will prefer a definite positive outcome (saving 200) over the conditional but much larger positive outcome of saving everybody. Note the effect when exactly the same data is presented in a different way.

- CoA 1: 400 soldiers will die.
- CoA 2: A 30% chance of no casualties, but a 70% chance of 100% casualties.

Studies confirm that nearly 80% of you will now chose CoA 2. You are most likely willing to risk a larger negative outcome (600 casualties) to have a chance of averting an otherwise definite negative outcome (400 casualties).

A8. **Hyperbolic Discounting.** Hyperbolic discounting is a tendency to prefer more immediate payoffs. Often associated with economic gains, it is proven as a psychological phenomenon with implications for military planning. Commanders should prepare to invest in longer-term, higher pay off strategies rather than the proven tendency to bias towards the short-term pay off. This is a significant issue in security and stabilisation, but relatively short operational tours and political imperatives can create pressure to seek short-term (but lower overall yield) pay offs.

A9. **Information.** We tend to seek too much information even when it cannot influence a course of action or analysts already have more than they can digest. Analysts often need more *useful* information – such as reliable Human Intelligence – to develop better understanding.<sup>1</sup> Information supporting an existing hypothesis reinforces this bias; information that weakens it is often judged unreliable or anomalous.

A10. **Choice Supportive.** We tend to remember our choices as better than they actually were or to view our past performance through ‘rose-tinted glasses’. Surveys indicate that we generally perceive our own actions as the cause of our successes, but not of our failures. Self-awareness that this is the case is the only safeguard.

A11. **Blind Spot.** Some people fail to compensate for blind spots in their own cognitive biases, even when aware of them. Open planning cultures and thorough staff procedures are good defences.

A12. **Distinction.** Distinction is a tendency to view 2 options as more dissimilar when evaluating them simultaneously than when evaluating them separately. This has implications when reviewing and selecting operational courses of action.

A13. **Extreme Aversion.** Extreme aversion is an inclination to avoid extremes by choosing an option that is an intermediate choice. This can also affect course of action selection if there are obvious extremes of risk between the proposed courses.

A14. **Focusing Effect.** People can focus too intently on one aspect of an event, introducing errors in predicting the overall utility of a future outcome.

A15. **Irrational Escalation.** This is a tendency to make irrational decisions based upon rational decisions in the past or to justify actions already taken.

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<sup>1</sup> Heuer R J Jr, *Psychology of Intelligence Analysis*, CIA, page 6, 1999.

A16. **Mere Exposure.** Mere exposure effect is a predisposition to express undue liking for things because of familiarity. Commanders should guard against a natural tendency to engage too deeply in subject matter with which they are familiar or expert; their *comfort zones*.

A17. **Neglect of Probability.** Neglect of probability is an inclination to disregard probability when making decisions under uncertainty.

A18. **Omission.** Omission is a tendency to judge harmful actions as worse or less moral than equally harmful omissions or inactions. Commanders must on occasion be *cruel to be kind* and show the moral courage to take difficult, but necessary, action.

A19. **Zero Risk Bias.** There is a preference for reducing a small risk to zero over a larger but incomplete reduction of a bigger risk.

## ANNEX B – HEURISTICS: THINKING STRATEGIES

B1. Our brains attempt to avoid cognitive overload through the use of learned or innate thinking strategies known as heuristics.<sup>1</sup> These mental short cuts reduce the burden on cognitive resources but have significant limitations and risks. This Annex describes common heuristics in decision-making.

B2. **Anchoring and Adjustment.** Our brains often anchor mentally onto specific information or values and adjust for other factors. This could occur, for example, when an intelligence analyst or a commander moves to a new appointment and is responsible for updating judgements or estimates made by a predecessor. The previous analyst's work acts as an anchor, and once set it introduces an *unconscious shift* toward that value and a tendency to give other aspects of the problem insufficient weight.

B3. **Availability, Similarity or Familiarity.** Availability, similarity and familiarity are technically discrete but practically similar heuristics describing how we associate past experiences with a current situation. They can explain how we tend to predict the frequency of an event depending on how easily an example can be brought to mind. For example, if asked to rate the probability of a variety of causes of death we tend to rate newsworthy causes as more likely because we can more readily recall an example from memory. Recent media coverage can therefore influence our choice of example and leads to flawed judgement. Over-reliance on current or recent operational experience falls into this category. Although past experience can bring significant value we must apply it in the correct context.

B4. **Naive Diversification.** If asked to make several choices at once we tend to diversify more than if making the same type of decisions sequentially. Thus, 3 courses of action developed simultaneously by a commander to answer an operational problem will be illogically more diverse than 3 developed sequentially.

B5. **Affect.** Individual feelings can affect the decisions we take. Feelings such as fear or happiness are shorter in duration than moods and can occur rapidly and involuntarily in response to a stimulus. This is particularly relevant to our perception of the risks associated with a course of action. A positive affect could lead to a perception of lower risk and higher benefit, even when illogical for the situation. The implication is that a strong emotional response to a stimulus can alter our judgement and decision-making, even if subsequent facts weigh against it. Safeguards might include *sleeping on the problem* to

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<sup>1</sup> A method of solving a problem, for which no formula exists, based on informal methods or experience.

allow re-appreciation, without the emotion that accompanied its initial inception.

**B6. Recognition.** If we recognise one of 2 objects, but not the other, we infer that the recognised object has the higher value. This heuristic applies more broadly to comparison of the relative frequency of 2 categories. If we recognise one category, but not the other we can wrongly conclude that the recognised category has a higher frequency of occurrence. Narrow experience exacerbates this and the study of military history is a reasonable, if limited, mitigation technique.

**B7. Contagion.** The contagion heuristic leads us to avoid dealing with people, objects or facts associated by previous experience with someone or something considered bad. It can less frequently lead to association with people, objects or facts that have been in contact with people or things considered good.

**B8. Effort.** The effort heuristic reflects the tendency to assign a value to something based on the amount of perceived effort that went into producing it, for example deep personal involvement in an intelligence hypothesis or an operational course of action. Alternatively, if a goal is of little importance the amount of effort we are willing to put into it will be lower.

**B9. Peak-End Rule.** We judge our past experiences almost entirely on how they were at their peak – pleasant or unpleasant – and how they ended. Other information, including the net pleasantness or unpleasantness and how long the experience lasted, is not lost but it is generally not used for future judgements.

## JOINT DOCTRINE PUBLICATIONS

The successful conduct of military operations requires an intellectually rigorous, clearly articulated and empirically-based framework of understanding that gives advantage to a country's Armed Forces, and its likely partners, in the management of conflict. This common basis of understanding is provided by doctrine.

UK doctrine is, as far as practicable and sensible, consistent with that of the North Atlantic Treaty Organization (NATO). The development of national doctrine addresses those areas not covered adequately by NATO; it also influences the evolution of NATO doctrine in accordance with national thinking and experience.

Endorsed national doctrine is promulgated formally in JDPs.<sup>1</sup> From time to time, Interim JDPs (IJDPs) are published, caveated to indicate the need for their subsequent revision in light of anticipated changes in relevant policy or legislation, or lessons arising out of operations.

Urgent requirements for doctrine are addressed through Joint Doctrine Notes (JDNs). To ensure timeliness, they are not subject to the rigorous staffing processes applied to JDPs, particularly in terms of formal external approval. Raised by the DCDC, they seek to capture and disseminate best practice or articulate doctrinal solutions which can subsequently be developed in due course as more formal doctrine. Alternatively, a JDN may be issued to place some doctrinal markers in the sand, around which subsequent debate can centre.

Details of the joint doctrine development process and the associated hierarchy of JDPs are to be found in JDP 0-00 *Joint Doctrine Development Handbook*.

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<sup>1</sup> Formerly named Joint Warfare Publications (JWPs).