

Thinking More Rationally: cognitive biases and the Joint Military Appreciation Process

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Their judgment was based more on wishful thinking than on sound calculation of probabilities; for the usual thing among men is that when they want something they will, without any reflection, leave that to hope, while they will employ the full force of reason in rejecting what they find unpalatable.

Thucydides, *History of the Peloponnesian War* ¹

Introduction

A cornerstone of strategic and tactical success is good decision-making. All militaries strive to make effective decisions based on a rational analysis of the situation. And yet things go wrong. Hindsight reveals that many military operations throughout history have failed due to poor decisions. Although such mistakes have been attributed to a variety of explanations, the underlying cause of many of these situations is frequently a failure in human cognitive processes; or, more simply, poor thinking.

Despite the military's care in developing robust planning and decisions processes, humans are not good at clear thinking. Our minds are misled into believing they have reached rational, balanced conclusions but, in reality, cognitive bias distorts our conscious thinking processes, making us susceptible to mistakes and hence poor decisions.

Many of these are systemic errors. They are inherent in our everyday actions and repeated more often than we realise. However, repeatable errors imply that they are predictable—and being predictable, they are also avoidable, at least to some extent.

There is little evidence that the Joint Military Appreciation Process (JMAP), as used by the ADF, considers the effects of these cognitive biases, despite their potential to affect operational decisions.² With this in mind, the JMAP needs to be examined to determine its vulnerability to bias. This article examines a selection of cognitive biases with reference to their effect on the JMAP and suggests some 'de-biasing' techniques to help improve decision-making.

JMAP: an inherent weakness

In the Australian military, the JMAP codifies decision-making processes in a way designed to complement the needs of the military operational environment. It is used to apply operational art and design techniques in support of the planning of campaigns and operations, and some other operational activities. It facilitates the rapid planning and complex decision-making processes required primarily at the operational level.

The JMAP has been developed over time based on solid decision-making theory and its practical application in the military environment. It has proven to be an effective tool for operational planning and is often used to assist non-operational staff work as well, although it is not formalised for that context.

In its current form (see Figure 1), the JMAP is a four-step process: mission analysis; course of action development; course of action analysis; and decision and concept of operations development—supported by joint intelligence preparation and monitoring of the battlespace, which continuously provides the information to support planning.

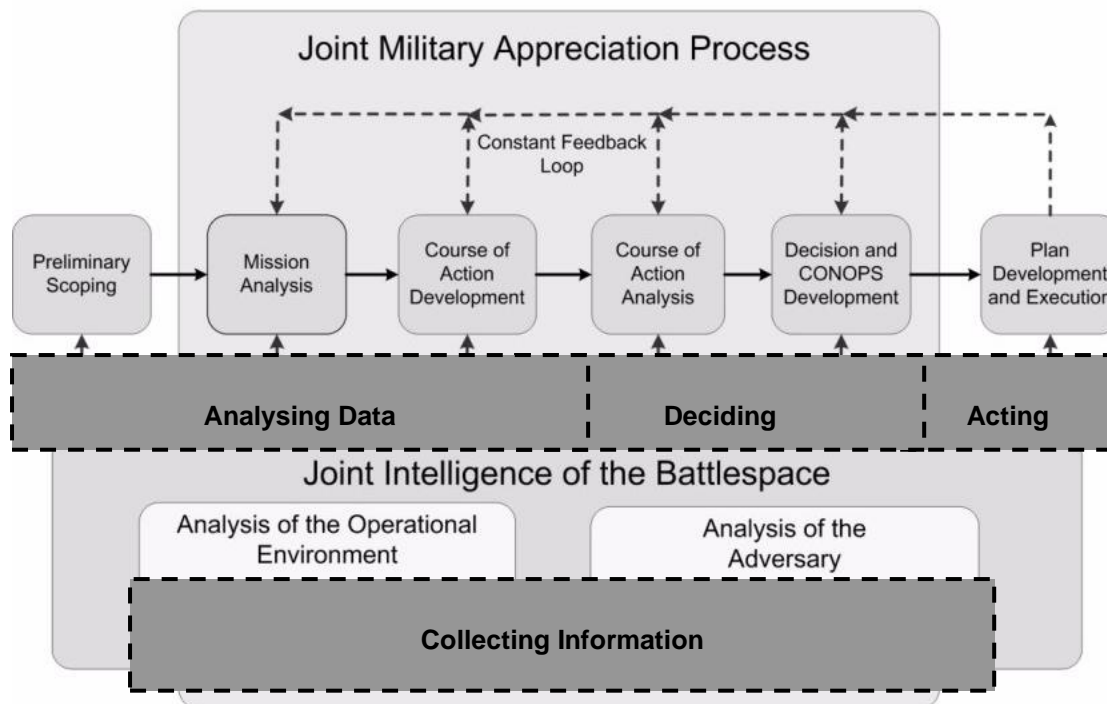


Figure 1. Mapping JMAP with a generic decision-making process

The core problem with the JMAP is that it fails to consider the cognitive and emotive effects of the planning staff and the commander that influence decision making.³ While most military officers would like to think they can take an objective viewpoint and make a rational decision, research suggests that is not a correct assumption. Numerous studies and empirical observations confirm that humans regularly make subjective, or biased, judgments even when they think they are being objective.⁴

However, the foundation on which the JMAP has been designed is the assumption that decision-makers and staff planners act rationally. But because humans often do not act rationally—and are biased without realising it—plans and decisions are susceptible to cognitive bias and are influenced by emotional and social factors that are not currently considered in the JMAP.

Cognitive biases and rationality

Cognitive biases are departures from purely rational thought.⁵ They are systematic errors in thinking that prevent us from being entirely rational.⁶ There are a number of causes. One common cause is complexity. The human mind is not equipped to deal with the sheer number of factors and their relationships in many situations found in a modern, technologically-complex society. In order to counter this, we commonly use heuristics (rules of thumb) to help assess complex situations.

While heuristics are helpful and were useful in a simpler world, they are also a source of cognitive bias because these 'rules of thumb' are often inadequate. Personal and situational factors play a part too. Heuristics can be corrupted by a person's experience. For example, 'dumb luck' that pays off once encourages a person to try the same approach—'it worked before, so it should do again'. This is not necessarily rational. Innate human traits play a role too. Human tendencies, such as being overconfident, influence our abilities to objectively assess situations. The result is that we fail to think in a rational manner, despite our best intentions. These sorts of effects, whereby our deliberate thinking is unwittingly influenced, are called cognitive biases.

Cognitive biases are not always bad. In complex environments, such as during military operations, being blind to a number of factors can reduce 'cognitive dissonance'. Cognitive dissonance is a term used to describe a person's inability to deal cognitively with the complexity of a situation. Competing factors and

considerations slow the mind's ability to respond effectively. It is similar conceptually to cognitive overload, which has had some popularity in the capability development of command and control systems. However, not understanding that biases exist, and that our thinking is subtly influenced by their effects, inhibits the effectiveness of the appreciation process and subsequent execution of the resultant plans.

Hundreds of cognitive biases have been identified and these are categorised in a number of ways. Many of these biases are only subtly different to each other; others may represent the opposite ends of the same spectrum in terms of their effects. A short list of common biases is shown at Table 1.

Table 1: A short list of common biases

Outcome bias	Hindsight bias
Planning fallacy	Irrational escalation
Bias blind spot	Contrast effect
Mere exposure effect	Over-confidence
Bandwagon effect	Pattern recognition
Illusion of control	Gamblers fallacy
Selective perception	Illusory correlation
Authority bias	Ostrich effect
Stereotyping	Ambiguity effect

Not everybody is equally susceptible to every bias. However, it is generally recognised that everybody is in some way influenced by bias. And, indeed, an individual's failure to appreciate his or her own biases is recognised as a bias in its own right, known as 'bias blind spot'.

The key is to recognise that cognitive biases exist. They influence our decision-making every day, and often prevent those decisions from being purely rational. That being the case, it makes sense that bias is considered as a factor in military appreciation and decision-making processes.

Influence on the JMAP

Cognitive biases are systemic. And although they interact with the JMAP and general planning processes in different and often subtle ways, they are always present. Some are more likely to have a significant effect than others, and some will have a cumulative effect. It is important to understand when bias is likely to affect planning in order to counter its influence.

Consider the following example. In the lead up to the 2003 Iraq war, the US had become increasingly concerned that Iraq might be reconstituting its weapons of mass destruction capability, in particular the ability to refine nuclear fuel for weapons. For this to occur, many aspects of advanced engineering would be required, with quite specialised equipment and industrial controls. One of the key components would be centrifuges, requiring very precise tubes of specialised aluminium alloys—which it was thought Iraq had attempted to procure, and which formed the basis of the US intelligence community's case against Iraq.⁷

However, what was inadequately considered was whether Iraq had attempted to procure other relevant equipment and facilities, such as specialised high-speed drives, specialised bearings and related industrial

control equipment. Furthermore, expert scientific opinion was ignored as to whether the alloy tubes might have a legitimate military use, such as the manufacture of rockets. The intelligence community allowed certain information to confirm its pre-existing ideas, while ignoring a larger body of evidence suggesting that no attempts had been made by Iraq to develop a centrifuge plant. As the war progressed, it became apparent that Iraq had no such plant, and was not capable of developing such a plant. However, it was not until 2005 that the scope of the error was made public.

While it is easy in hindsight to find fault with the intelligence community's assessment, underlying cognitive biases are likely to have been significant contributors to the mistakes made. For example:

- **Confirmation bias** - very little attempt was made by the intelligence community to disprove its hypothesis that Iraq was developing the capability to refine nuclear fuel; instead, its effort largely concentrated on proving the existence of the capability.
- **Availability bias** - more credence was given to information that was available, ignoring the gaps of knowledge.
- **Information bias** - the intelligence community seemed to have relied on the quantity of information over its quality, as well as lacking the ability to critically analyse the relative significance of the information available.⁸
- **Groupthink** - despite a few voices of dissent, the 'group' took over. The natural urge to conform with the thinking of the group is likely to have influenced at least some individuals, leading to a snowball effect as analysis was passed up the chain of command and shared with other intelligence agencies.
- A number of **other biases** were evident, including the framing effect, over-confidence, false pattern recognition, interloper effect, and mere exposure effect.

While any one of these biases, in isolation, may not have had a large influence on the intelligence community's analytical processes, the cumulative effect of a number of biases is almost certain to have contributed to its eventual flawed conclusion.

In general, the significant (but subtle) influence of these biases indicates a need to understand their effects. By reducing their negative influence on decisions, a more rational outcome can be reached. Each stage of the general decision-making process is thus discussed below.

Collecting information

Collecting information in a military environment is an ongoing and iterative process that occurs throughout the conduct of the JMAP and indeed the conduct of operations. It is most closely aligned with joint intelligence preparation and monitoring of the battlespace. Collectors, analysts and commanders should be aware that even in the simple act of gathering information, cognitive bias can creep in.

Many of the biases likely to occur during information collection concern subconscious behaviours that cause individuals (and groups) to ignore relevant information and/or give too much emphasis to other information. These biases have the potential to exert a significant effect. They can lead to incorrect conclusions and to 'seeing' patterns when none exists. Biases that are important to information collection in a military environment are described briefly below.

- **Information bias.** Information bias refers to the tendency for humans to acquire more and more information. Some of the reasons given for collecting more information include the perception that more information may lead to better decisions; a fear that mistakes will be blamed on the lack of information; collecting information just in case it is useful; and the thought that the act of performing any activity is better than inaction.

However, in many cases, collecting extra information has the potential to lead to cognitive overload unless there is an adequate supply of time or expertise to filter the information. Overloaded decision makers may omit critical information, fail to assess it in depth, delay processing it, make

invalid approximations, or simply give up and make a decision early without full consideration.⁹ In a military situation, however, the structure and delegation systems in place typically mitigate some of the effects of information overload.

- **Availability bias.** Availability bias occurs where the judgment relating to the likelihood of an event is moved away from what a normative process would indicate because of what is easily available in memory. Thus decisions can be biased toward vivid, unusual or emotionally-charged examples in the case of episodic memory or towards semantic memories which have been strengthened through repeated exposure. The problem occurs when information is associated with these easily-available schemas without reliable evidence to support linkages. Individuals unwittingly make associations with emotive or recent memories that could affect decisions.
- **Pattern recognition.** A common fault shared by most people is false pattern recognition. It is a condition of the human mind to make sense out of the world. Hence we tend to try and make patterns that do not necessarily exist. Experts are not immune; in fact, their expertise can provide additional pressure to 'see' a pattern in random events. Conscious effort must be expended to avoid seeing patterns that do not exist.

Analysing data

Once collected, the data needs analysis. In defence planning, this is commenced through mission analysis and continued through course of action analysis. These primary stages of the JMAP are where analysing data is important—and where it is susceptible to some types of cognitive bias. Cognitive errors in analysis tend to arise from false associations and faulty probabilistic thinking. Although 'genuine' errors in analysis occur through natural mistakes, some of these errors are systemic and predictable.

There are many biases that will cause us to actively neglect, modify and/or distort collected information without realising it. Analysing data in isolation can itself lead to many biases, such as the clustering illusion, a neglect of prior base rates and the 'recency' effect. Confirmation bias, pattern recognition, illusory correlation and irrational expectation of outliers are common tendencies that lead to misleading information evaluation. Some biases which have clear impact on the JMAP are outlined below.

- **Confirmation bias.** Confirmation bias is the tendency to seek or evaluate information that is partial to existing beliefs and expectations. People by their nature will try to confirm their own beliefs, reinforcing the coherence of their worldview, rather than trying to disprove what they believe in.¹⁰

From the initial stages of planning, staff will have a set of beliefs developed from their background, training and experience. These beliefs will be further supported through the individual's situational awareness. Each planner will then be attempting to put new information into their existing mental model of the situation. As the situation continues and the amount of information made available increases, the mind of planner will begin to selectively pay more attention to information that matches prior beliefs than information that does not. Non-conforming information is easily ignored and difficult to remember unless additional cognitive effort and time is devoted to that function.

- **My-side bias.** My-side bias is the tendency for people to assume that others share the same or similar thoughts, beliefs, values or positions.¹¹ Research has consistently shown that people will tend to side with their own, despite trying to be balanced and purely rational. The ability to understand the enemy, and 'to walk in their shoes', is a significant component of the thinking skills required to reduce my-side bias in analysing data available in the JMAP process. In Iraq, a poor understanding of the relationship between political parties and religious groupings arguably led to the projection of American ideals onto an inappropriate foreign situation—an example of my-side bias.
- **Illusory correlation.** When analysing data, it is possible to draw erroneous conclusions from the situation and previous experiences. Similar to the problem of pattern recognition, it is surprisingly easy to draw conclusions based on relationships between factors that do not exist.

- **Over-confidence.** Over-confidence is a bias in that it is a predictable cognitive characteristic that often influences decisions.¹² While confidence is a desirable trait in the military, particularly in commanders, it should be countered with critical evaluation of one's own thinking. Even externally to the military, people can be demonstrably over-confident and not aware of the extent that influences their decisions. A common example is the tendency to under-budget and over-estimate schedule in projects, leading to many of the criticisms of Defence acquisition.

Deciding

The decision on a course of action is the crux of operational planning and defines its outcomes. Although decisions occur throughout the earlier stages of the JMAP, deciding on a course of action to develop into a plan is central. And like the other stages of the decision process, the simple act of deciding can be unwittingly influenced by bias.

Decision-making by definition is the process of selecting the best from a number of alternatives. But deciding on a course of action can be biased, even if information collection and analysis has avoided most other thinking traps. Two biases that can influence decisions are described in brief below.

- **Groupthink.** Groupthink is the tendency for individuals to allow their thinking to be heavily influenced by members of a group to which they belong. Military culture is built around the concept of cohesiveness and *esprit de corps*. One desire in this culture is to build on social identification within the military group, leading to greater in-group social influence and greater attention to messages from within the group which in turn leads to greater trust.

This identification may lead to a repression of differing opinions and limit the desire to challenge information presented from within the group. This culture can be expected to exist throughout the JMAP process, however, it may bring a critical weakness when it comes to decision-making. The very value of cohesiveness due to social identification may take precedence over genuine critical thinking, frankness and dissent. Thus attempting to think as a group can be influenced by the natural social interactions and lead to symptoms such as:

- concurrence seeking (rather than critical evaluation),
- illusion of consensus,
- suppression of dissent,
- an illusion of invulnerability,
- negative or biased stereotypes, and
- self-censorship (restricting information flow and availability).¹³

These symptoms can lead to a restriction of options, anchoring to initial group options, reduced contingency planning, poor risk analysis and a lack of discussion in depth concerning the benefits and costs of various actions.

- **Framing bias.** Framing bias derives from how a question or problem is phrased, such as 'is that glass half empty or half full'? Very different responses can result from the wording of a question or information requirement. The overall way a problem is framed can be adjusted to reinforce a particular path of operation. Information requirements can be worded to get very different outcomes.

This non-military example is illustrative. Identifying organ donors is commonly done by one of two ways: either by asking people to 'tick a box' if they are willing to become a donor; or by asking people to 'tick a box' if they want to opt out of the donor scheme. These similar questions (opt in, or opt out) have exactly the same outcome—the respondent either becomes a donor or not. Yet those countries that use an opt-out question, rather than an opt-in one, have a much higher donor participation rate.¹⁴

Acting

Finally the execution of the plan itself can become susceptible to cognitive bias. Historically, many of the great military disasters have had a strong component of persisting with a doomed expedition. In recent times, biases have been attributed to failure in conflicts involving the Bay of Pigs invasion, the Vietnam War and the 2003 Iraq war.¹⁵ The cognitive bias with the largest potential to affect outcomes once an operation has commenced is the 'sunk cost' effect. Other biases affecting execution are also briefly addressed below.

- **Sunk cost effect.** The sunk cost effect is manifested in a greater tendency to continue an endeavour once an investment in money, effort, time or other resources has been made.¹⁶ Even if a new course of action would result in better outcomes, there is a psychological desire to continue with the existing course of action so that the effort expended so far has not been a 'waste'.

A typical example occurs within acquisition projects. Suppose a project spends several million on a capability option. If a cheap alternative is consequently offered that would save money overall, the sunk cost effect predicts that the current, more expensive option will still continue in order to prevent those millions already spent from being perceived as wasted. But this is not rational if an overall saving could be achieved. The Seasprite helicopter is a well-known example, where considerable savings could have been achieved had the cancellation decision been made earlier.¹⁷

It should be noted that this bias conflicts directly with the primary principle of war in Australian and British doctrine (as well as Chinese), namely 'selection and maintenance of the aim'. However, even though this is a master principle, doctrine also states that if political considerations change, the new objective will create a change in the plan. Flexibility is still a key to campaign planning.¹⁸

- **Illusion of control.** One aspect of acting is that there is often an illusion of control. Even within the military environment, where there is an acceptance of uncertainty, there remains a strong tendency to believe the environment can be controlled. This leads to under-estimation of risks and the failure to properly allow for 'black swans events', which are events that comes as surprise and have a major effect.

The above factors can impact an individual or an entire group. Indeed, a group can escalate individual thinking errors.¹⁹ The stronger a group and its desire for inclusion and conformity, the stronger the forces of impression management will be. Within military groups, strong *esprit de corps* is likely to increase the likelihood of this effect.

In the early 1960s, former US Under-Secretary of State, George Ball, asserted in relation to the early Vietnam War that:

Once we suffer large casualties, we will have started a well-nigh irreversible process. Our involvement will be so great that we cannot - without national humiliation - stop short of achieving our complete objectives.²⁰

This is arguably a rare instance where the possibility of sunk cost and irrational escalation was identified in advance. Once committed to a course of action, people tend to stick to that course and neglect other considerations that would support a change of strategy. As such, cognitive bias does not just effect planning but can influence action, including assessments and evaluations.

Mitigating bias: a conceptual approach for 'de-biasing' the JMAP

If cognitive biases have the potential to influence so much of our rational decision-making, how do we 'de-bias' the JMAP? The answer is not simple. In fact, it is probably impossible to completely counter the effect of bias in practical decision-making.²¹ Awareness is not enough, not least because studies have shown that despite being made aware of a bias, people typically revert to biased actions.²² It is simply not practical to maintain a detailed awareness of all potential biases and their effects. But at least an awareness of the existence of cognitive bias gives people the understanding to reflect more deeply on issues, to investigate the possible causes of error prior to a decision, and to be critical of their thought processes.

In this article, four general strategies are suggested. These are unsurprising and already used to some extent in most workplaces, although usually not to the extent required to mitigate bias. Each possesses a variety of underlying techniques that can be used. These strategies are:

- understanding and recognising bias,
- promoting (and rewarding) lateral and creative thinking,
- ensuring critical thinking, and
- enhancing diversity.

Understanding and recognising bias

Notwithstanding the prior warning that awareness is not enough, the simplest strategy to combat cognitive bias is to develop an understanding that biases exist and recognise those types common to the relevant working environment.

People are likely to soon forget or overlook bias effects. Accordingly, in order to overcome this, those using the JMAP need to be explicitly reminded to consider cognitive biases and their potential effects. This may take the form of checklists at appropriate stages, to highlight possible thinking traps, and/or the implementation of regular training on thinking skills.

In the collection phase, staff should be asking themselves questions to reduce biases that restrain thinking (to avoid availability bias etc) and ensure that balanced, relevant information is collected. Like in the other phases below, this is not exactly surprising. What is surprising is that despite the obviousness of what should be done, people continue to restrict their thinking (to a much greater extent than is generally recognised). To counter this, staff should be encouraged to explicitly ask themselves things like:

- In what way has collection been influenced by recent events?
- How potentially useful is the information? Is it based on historical records or structured requirements?
- What patterns are there? What is the evidence for their existence?
- How balanced is the collection? What perspectives have not been captured?

During analysis, it is important to try and reduce biases that are likely to lead to incorrect conclusions. This requires both lateral and critical thinking. Critical thinking includes examining one's own thoughts and processes as well as the information at hand. Checklists aimed at reducing these might include:

- What information would officers in other services look for, officers both above and below your own level and what information is relevant to support and logistics?
- What information conflicts with prevailing opinions? Has it been adequately considered, or just brushed aside? What is the validity and veracity of supporting and conflicting information?
- What would this information look like and how would one compare the information to get closer to the real world situation?
- What are the alternative explanations for what is being observed?
- What method would you use for determining the accuracy and relevance for each piece of information?
- Is the information relevant for other plans in contrast to the currently accepted commitment?

The most important time to review cognitive biases is the point at which the decision is made. The information has been collected and analysed, potentially with biases, and yet the information has not been acted on. The commander should critically evaluate the work of his staff to identify possible biases in planning before choosing a course of action. Some questions for reflection are:

- **Over-optimism** – is the team overly supportive of a particular course of action? Have they adequately criticised it and/or considered other options?
- **Groupthink** – were there dissenting opinions? Were they explored?
- **Risk** - are the courses of action risk seeking or risk averse? Does the risk analysis consider uncertainty?
- Does the suggested course of action rely too heavily on past successful actions, de-emphasising the risks?
- Has sufficient, relevant and appropriate information been obtained to support the recommendations? Can the data be substantiated?
- **Sunk cost effect** – is the course of action anchored to past actions because it is always done that way? Are there viable alternatives?²³

Lateral and creative thinking

Rigidity of thinking is a factor that leads to people being susceptible to cognitive bias. By following a too narrow thinking focus, an individual can fail to consider alternative options, other viewpoints or appreciate the bigger picture. People do not recognise their own rigidity of thinking and even less often challenge themselves to change

Military training exacerbates this problem as it encourages members to think in a similar manner. While this has some benefits at junior ranks, more senior members need to broaden their thinking skills. Consequentially lateral and creative thinking is a general method to reduce many biases, such as framing and my-side bias.

When collecting information, and particularly conducting analysis, lateral and creative thinking should be encouraged to reduce bias at the point of source. Although the tools and the techniques within the JMAP have been developed over time and work well, staff should not be constrained by these tools alone.

Numerous lateral thinking techniques are available. Techniques such as de Bono's 'Six Thinking Hats', his CoRT program, force field analysis and even brainstorming can be used.²⁴ Unlike traditional approaches to critical thinking, which are based on a reductionist approach and argumentation, lateral thinking seeks to provide tools which are broader in application and use creativity as a method to see problems from a variety of viewpoints.

Critical thinking

Similarly, critical thinking is required to reduce cognitive bias in the decision-making process. Where lateral thinking aims to reduce biases more closely related to gathering information and generating options, critical thinking is required to reduce other biases such as over-confidence, confirmation bias and sunk cost effect.

Critical thinking can be defined as higher order thinking that is purposeful, reasoned and goal directed.²⁵ Aspects of this behaviour include testing assumptions, seeking consistency and critically evaluating available evidence, which are behaviours that can be seen in experienced decision-makers.

There are many thinking fallacies and psychological tricks of the mind. Our memory, thinking processes and even our sight can be tricked. Hence, we should be sceptical of everything we think and do, and critically review our actions and plans to ensure they are valid. Even when we think we are being critical, evidence suggests we are not—that we are too easy on ourselves.

Tools which use structured analytical techniques can be used to simplify and structure a problem into cognitively manageable pieces. By reducing the complexity of a problem, each piece can be analysed with less effect from biases and easier critical thinking processes.²⁶

Red-teaming, or the use of a 'devil's advocate', can provide an effective method of critical analysis. Although red-teams are already used in some contexts within military planning, extending their use is

likely to be beneficial. Incorporating individuals or teams whose specific role is to pick faults with a plan will likely result in a much more rigorous analysis. Such a team is much less likely to be invested in a proposed plan and hence will find it easier to criticise objectively.

Diversity

Diversity in this context does not refer to the inclusion of minority or disadvantaged groups. It refers to achieving diversity of thought, and in the decision-making style and experience within teams generally and planning teams in particular. If a team consists solely of people who think in a particular manner, then issues do not get explored as thoroughly, and alternative ideas might not be expressed.²⁶ It should be no surprise that a planning team, for example, should not contain only warfighters—logisticians are also required for an effective plan, and potentially even scientists to prepare for analysis and evaluation.

Similarly, an ideal team will have members with different viewpoints and different thinking styles (analytical, intuitive, naturalistic, spontaneous, heuristic etc) in order to provide a thorough and balanced assessment. Although this may not always be possible, particularly in a military environment when similar attitudes are encouraged, it does provide an effective means of reducing bias.

Conclusion

This article has taken a broad brush approach to describing the relationship between cognitive bias and the JMAP. It does not imply that the JMAP is a bad process. Rather, it points out that the JMAP could be improved by considering cognitive bias. Decision-making is influenced by psychological processes—perfect rationality is not possible. Given that, it would be beneficial to acknowledge that cognitive bias exists within Defence planning doctrine, and that decision-makers need to take appropriate steps to minimise its influence.

Having briefly covered a few of the varied biases in this paper, it should be evident that cognitive bias can influence Defence decisions. Biases are systemic and have a subtle effect that can be significant; and yet they are often overlooked. These biases have a variety of causes and there is no simple solution due to their innate nature. However, methods of minimising their effects do exist.

By understanding their nature, by thinking laterally and then critically examining both the information available and the analysis, a more robust decision-making process could be enabled. To do this, individuals need to be both open-minded and critical. Decision-makers should test their own assumptions (in addition to those of their staff), critically evaluate the options available, and be prepared to change their minds rather than be constrained to a single line of thinking. Most people think that they do this already but the reality is that they do not.

The awareness of cognitive biases is a key first step in countering their impact on JMAP and military decision-making processes. Awareness needs to be followed with checks and balances to ensure that the effects of biases are limited and not allowed to impede the decision-making process undetected. Reducing the negative effects of cognitive bias is an opportunity to improve decision-making in Defence and avoiding some of the mistakes of the past.

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Notes

- 1 Thucydides, *The History of the Peloponnesian War*, translated by R. Warner, Penguin: London, 2009.
- 2 ADF Warfare Centre, *ADFP 5.0.1 Joint Military Appreciation Process*, Defence Publishing Service: Canberra, 2009.
- 3 Recent decision-making theory highlights the effects of emotions and social influence on decision-making. Like cognitive biases, and often related to them, these effects have subtle but persistent and observable effects on decisions. However, they are not within the scope of this paper.
- 4 See, for example, Thomas Kida, *Don't Believe Everything You Think: the 6 basic mistakes we make in thinking*, Prometheus Books: New York, 2006; Joseph Hallinan, *Why We Make Mistakes*, Broadway Books: New York, 2009; Cordelia Fine, *A Mind of Its Own: how your brain distorts and deceives*, Norton: New York, 2006; and Dan Ariely, *Predictably Irrational: the hidden forces that shape our decisions*, Harper Collins: New York, 2008.
- 5 We tend to think of rationality as the ideal of thinking and decision-making. However, rationality is not a panacea. It is normally associated with deliberate (rather than intuitive) thinking. And there is some debate as to whether intuitive or deliberate thinking is better. For example, Malcolm Gladwell argues in *Blink: the power of thinking without thinking* (Back Bay Books: New York, 2007) the case for intuitive thinking being more effective; while Daniel Kahneman in *Thinking Fast, Thinking Slow*, Kahneman (Farrar, Straus and Giroux: New York, 2011) points out its many pitfalls, preferring deliberate thinking styles. However, there is growing consensus that both have advantages. In simple terms, intuitive decision-making is more beneficial in time-critical situations (for example, tactical situations on the ground); whereas deliberate thought is generally more appropriate when the resources are available. This article is focused on deliberate decision-making, and so is more aligned with operational and strategic decisions rather than boots-on-the-ground tactical decisions.
- 6 It should be noted that cognitive biases are not instinctual biases, such as those leading to racial or sexual discrimination. Cognitive biases are about thinking and errors in our deliberate thought processes, commonly referred to as System 2 thinking.
- 7 L.H. Silberman and C.S. Robb, *The Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction*, US Government: Washington DC, 2005.
- 8 The importance of intelligence-led operations is recognised. There is no intent to suggest that less information should be collected – it is important to know as much about the threat and the environment as possible. However, cognitive overload is an issue that should be acknowledged. Given limited resources, appropriate priorities need to be established. During analysis, there is a limit to what individuals can assimilate effectively in the limited time they may have available.
- 9 J.G. Miller, 'Information input overload and psychopathology', *American Journal of Psychiatry*, Vol. 116, No. 8, 1960, pp. 695-704.
- 10 R.S. Nickerson, 'Confirmation Bias: a ubiquitous phenomenon in many guises', *Review of General Psychology*, Vol. 2, No. 2, p. 175.
- 11 K.E. Stanovich and R.F. West, 'Natural myside bias is independent of cognitive ability', *Thinking & Reasoning*, Vol. 13, No. 3, pp. 225-47.

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- 12 Over-confidence in this context refers to over-confidence of knowledge, not directly to an individual's general confidence. For example, a timid person can still be over-confident of the knowledge that they possess.
- 13 I.L. Janis, *Victims of Groupthink: a psychological study of foreign-policy decisions and fiascoes*, Houghton Mifflin: Oxford, 1972.
- 14 L. Shepherd, R. O'Carroll and E. Ferguson, 'An international comparison of deceased and living organ donation/transplant rates in opt-in and opt-out systems: a panel study', *BMC Medicine*, Vol. 12, 2014.
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- 17 This is a rather simplistic explanation. There are often many complexities to the situation, such as political and contractual imperatives. It is also much easier to identify exit points with hindsight. Hindsight itself is considered a bias as people tend to prefer simplistic answers after the fact, which they could not have identified at the time. Most people sympathise with this to an extent but tend to remain overly critical of past decisions.
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- 19 G. Whyte, 'Escalating Commitment in Individual and Group Decision Making: a prospect theory approach', *Organizational Behavior and Human Decision Processes*, Vol. 54, No. 3, 1993, pp. 430-55.
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- 21 Nor is it likely to be desirable. Biases can actually be beneficial in reducing complexity, cognitive dissonance and reducing decision time.
- 22 While there is some anecdotal evidence from industry that high-performing individuals can develop personal processes to overcome cognitive bias, it is rare—and possibly only in reaction to an external stimulus. Deliberate strategies and built-in processes are required to have a positive and lasting effect.
- 23 Most of these questions are adapted from D. Kahneman, D. Lovallo and O. Sibony, 'Before you make that big decision' in D. Kahneman (ed.), *HBR's [Harvard Business Review] 10 Must Reads on Making Smart Decisions*, Harvard Business Review Press: Cambridge, 2013.
- 24 See, for example, Edward de Bono, *Six Thinking Hats*, Back Bay Books: New York, 1999. For the CoRT program, see E. de Bono, 'CoRT Thinking Skills Curriculum', Edward de Bono website, available at <<http://www.edwdebono.com/cort/index.html>> accessed 10 June 2015. For brainstorming, force field analysis and other techniques, see Bob Dick, *Helping Groups to be Effective: skills, processes and concepts for group facilitation*, Interchange Publications: Chapel Hill, 1991.
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- 26 Note there are a couple of caveats to diversity. Firstly, diversity is only beneficial if different viewpoints are heard and considered—a diverse team that ignores the minority view is not likely to gain any advantage. Secondly, diversity can lead to conflict. Opposing ideas require resolution in order to achieve a considered decision. The resulting conflict, if not handled well, can lead to a reduction in performance. Thus the benefits of diversity are dependent on the professionalism and dynamics of the particular team.