

Cognitive Biases: The Root of Irrationality in Military Decision-Making

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Abstract:

In this essay, the author explores the different types of military decision-making by the operational staff and how it might affect the rationality of their assessment of the current situation. The author then provides examples for each different type of bias, which include overconfidence bias, confirmation bias, disconfirmation bias, availability bias, sunk cost fallacy and anchoring bias and proposes ways to mitigate such biases, so that the Singapore Armed Forces (SAF) can be more accurate in their assessment and thus make better decisions. The author concludes by highlighting that in combination with contextual factors, cognitive biases have been shown to result in starkly inaccurate assessments and therefore poor military decisions at the strategic and operational levels. He highlights that the SAF needs to be cognisant of these biases and to implement strategies to counteract them.

Keywords: Cognitive Bias; Decision-Making; Logical; Probability; Magnitude

INTRODUCTION

Operational staff who had previously participated in a Singapore Armed Forces (SAF) high level exercise would understand that they need to provide multiple options for decision makers. These options include different courses of military action straddling the strategic and operational levels. Almost always, there are no perfect solutions; operational staff would therefore need to rationally review and compare the associated costs and benefits across the various options. Indeed, the SAF's doctrine articulates the need to logically outline the strategic pay-offs and political costs for military options to facilitate decision-making. Similarly, established foreign militaries provide decision-making matrices, which detail the pros and cons of each option, to support the logical comparison across options.¹

In assessing the costs and benefits of the options, the operational staff must carefully consider two important factors: (1) the magnitude of each cost and benefit; and (2) the probability of each cost and benefit materialising. It is interesting to note that individuals can differ remarkably in their estimation of such probability. Consider Napoleon's discussion with his top lieutenants over whether they should invade Russia in 1812. The latter warned against the invasion, citing significant risks to blood and treasure, as well as a high risk of failure. Napoleon, however, saw his invasion plan as swift, decisive and hence low-risk.²

As a matter of fact, there can only be one real probability value for each cost and benefit materialising. Granted, we often cannot calculate that exact value, owing to the lack of perfect information in the real world. However, if we assume that the operational staff are rational, that they share the same

information and that they put it on the same decision matrix as dictated by military doctrine, we should expect the estimated probabilities to be similar. This is often not the case because we are not always rational in reality. Indeed, research in behavioural economics has demonstrated that we are susceptible to cognitive biases, which are patterns of deviation in judgment that lead to irrationality.³

Borrowing from such research, this essay seeks to explore the common types of cognitive biases that might skew the operational staff's rational assessment of probabilities and hence affect decision-making at the strategic and operational levels. These biases include the overconfidence bias, confirmation bias, disconfirmation bias, availability bias, sunk cost fallacy and anchoring bias. This essay then proposes ways to mitigate such biases.

OVERCONFIDENCE BIAS

"Guard against arrogance, avoid underestimating the enemy, and be well prepared."

- Mao Tse-Tung⁴

Before the final battle of the Chinese Civil War in 1949, Mao Tse-Tung ordered his coastal army commanders to guard against the overconfidence bias.⁵ This is a cognitive bias that result in the inaccurate calibration of probabilities, by leading individuals to falsely believe that they are more accurate in their judgements than they actually are. Psychological experiments have provided ample evidence for this concept. In a spelling task, only about 80% of the subjects' responses were correct when they were '100% certain' of their answers.⁶

The overconfidence bias is more pronounced when the individual of concern is an expert in the discipline.⁷ In the discipline of Warfighting, there are few experts who could have rivalled Napoleon Bonaparte, hailed

by Carl von Clausewitz as 'The God of War'. Prior to the invasion of Russia, Napoleon had already planned and orchestrated an impressive 35 victorious campaigns and only losing three. As mentioned previously, Napoleon's subjects had painted a bleak prospect for the Russian campaign. Nevertheless, Napoleon's stellar track record gave him boundless confidence that 'through sheer force of will', he would be able to surmount the glaring challenges he faced and subjugate Russia. The overconfidence bias could never have been more obvious, with the palpable risks of the campaign nullified in Napoleon's mind. Alas, the terrible miscalculation of risks and consequent attempt to invade Russia saw Napoleon's 500,000-strong Grand Army reduced to less than 20,000 men and thwarted his ambition to dominate Europe.⁸

CONFIRMATION AND DISCONFIRMATION BIAS

"It is a capital mistake to theorize before one has data. Insensibly, one begins to twist facts to suit theories, instead of theories to suit facts."

- Sherlock Holmes⁹

In the novel, *A Scandal in Bohemia*, by Sir Arthur Conan Doyle, Sherlock Holmes had found a mysterious letter in the post. Curious about what the letter actually meant, Watson, Holmes' trusty companion, had asked for his theory on this matter. As we can see from his response, Holmes, ever the fine detective, was careful to avoid confirmation bias, which is the tendency to favour information that confirms one's hypothesis, regardless of its credibility.

The overconfidence bias is more pronounced when the individual of concern is an expert in the discipline

This bias causes individuals to selectively search for evidence that supports their preconceived



Napoleon's withdrawal from Russia, a painting by Adolph Northen.

hypotheses and believe that such evidence has a disproportionately higher probability of being true, than in reality. Confirmation bias was brought to its extreme during the series of events leading up to the Japanese attack on Pearl Harbour in 1941. Prior to being fundamentally surprised, the top brass in Washington clung to the deep-seated belief that Tokyo was incapable of mounting a raid on Pearl Harbour.¹⁰ Among a series of assessments fraught with confirmation bias, the top brass readily accepted the ridiculous proposition that the Japanese would not be able deliver their bombs accurately for a successful raid, given their severe myopia—attributable to the shape of their pilots' eyes.¹¹

The flipside of confirmation bias is disconfirmation bias. This is the tendency for individuals to set more stringent standards of evidence for hypotheses other than their own.

Disconfirmation bias contributed significantly to the fundamental surprise of the Israeli Defence Force by the Egyptian offensive, during the Yom Kippur War in 1973. Then Director of Military Intelligence, Major General Eli Zeira was instrumental in developing 'The Concept', which captured assumptions about Egypt's military strategy. 'The Concept' articulated that Egypt would only attack Israel if it had the air power generation capability to strike Israel's rear operating air bases, so as to reduce their air superiority. As Egypt would only have achieved this capability at least two years later, Zeira assessed that Egypt would not attack Israel.¹² Little did Zeira know that Anwar Sadat, the Egyptian leader, sought to retake the Suez Canal, rather than defeat the Israeli forces. Therefore, the Egyptian forces' lack of air power was not a showstopper. On 6th October, 1973, 100,000 Egyptian troops commenced

their attack on the 450 Israeli soldiers along the Suez Canal. The Israelis were fundamentally surprised.

Along the way, Zeira committed several disconfirmation biases. Before the attack, the Israelis had clear evidence of the Egyptians' attack plans and military deployment. However, Zeira discounted the possibility that Egyptian forces were massing for an attack and chose to situate the evidence in the context of the Egyptian forces conducting a training exercise, buying into the Egyptian forces' deception plan. This was despite the lack of evidence for actual training being conducted on the ground. Even when Jordan's King Hussein undertook a clandestine flight to Tel Aviv to warn the Israeli Prime Minister about Syria and Egypt's intention to attack Israel, Zeira was unmoved. Disturbingly, even when an operative at the highest levels of Egypt's government sent a warning to Israel just hours before the offensive, Zeira chose not to believe the report. It was proposed that his insistence on a flawed theory and playing down of contrary indicators contributed to his failed assessment of Egypt's intention to attack.¹³

AVAILABILITY BIAS

"(Post 9/11), 1,500 Americans died on the road in the attempt to avoid the fate of the passengers who were killed in the four fatal flights... This estimate is six times higher than the (latter)."

- Gerd Gigerenzer¹⁴

Gigerenzer, a German Psychologist, observed that post 9/11, people flew substantially less (reduction of 12-20%) and drove substantially more (mileage clocked by cars on interstate highways increased between 2.2-5.7%). Gigerenzer offered that many might have chosen driving over flying, probably in fear of experiencing another terrorist attack. At the same time, the number of fatal road accidents every month, for the 12 months following September 2001, turned

out to be significantly higher than the baseline for the preceding five years. Overall, it was estimated that six times more Americans were killed on the road as they tried to avoid the risk of flying, than the fatalities from the four fatal flights in the 9/11 incident.¹⁵ While the cause of increased land-based travel is probably multi-factorial in reality, this serves as a conceptual example of the availability bias.

The availability bias refers to the tendency for individuals to assess probabilities based on how readily they can retrieve memories of the issue at hand.

The availability bias refers to the tendency for individuals to assess probabilities based on how readily they can retrieve memories of the issue at hand. Retrievability of memories, in turn, will depend on how familiar, vivid or emotionally salient these memories are. Several studies, including the one conducted by Gerd Gigerenzer, have suggested that shortly after a terrorist attack, people tend to believe that another attack is much more probable than it is, in reality. In fact, people tend to be more worried about the risk of another terrorist attack than other statistically more significant risks that they face in everyday life.¹⁶

Granted, this bias could be beneficial, because "if one thing actually occurs more frequently and therefore is more probable than another, we probably will be able to recall more instances of it."¹⁷ However, it is also important to remind ourselves that the emotional salience and vividness of a memory also determine how readily it is retrieved. This has implications for the interpretation of rules of engagement during military operations. As the decision maker deliberates on whether to target an individual undertaking, an act that might or might



An American F-15E Strike Eagle similar to one used in the attack on NATO fuel trucks that had been hijacked by Taliban forces in 2009.

not be threatening, the ease of retrievability of recent or salient examples of others undertaking similar acts will invoke the availability bias.

On September 2009, a German commander ordered an airstrike on North Atlantic Treaty Organisation (NATO) fuel trucks that had been hijacked by Taliban forces. The hijacked trucks had gotten stuck while crossing the Kunduz River and dozens of civilians had gathered around the trucks to siphon free fuel from the tankers. As a result, the airstrike killed up to 142 people, including over 100 Afghan civilians.¹⁸ Despite the fact that the trucks had not moved for more than four hours, the German commander had perceived an 'imminent threat' (this being a necessary condition for ordering an airstrike), noting that "my feeling was that if we let them get away with these tankers, they

will prepare them to attack police stations or even the (Provincial Reconstruction Team)."¹⁹ The German commander seemed to have based his decision on recent and salient events. Indeed, Taliban fighters had detonated a tanker truck in Kandahar not too long ago.²⁰ Moreover, there had been several other hijackings of the German Provincial Reconstruction Team's tanker trucks by the Taliban in Kunduz.²¹ In addition, just one month before the airstrike, intelligence had suggested that the Taliban was planning to overrun the German camp, using explosive-laden trucks.²² All these easily retrievable events could have contributed to the availability bias that affected the German commander's assessment of the seriousness and imminence of the threat that the hijacked trucks had posed, ultimately leading to his ill-fated decision.²³

SUNK COST FALLACY

“Throw good money after bad”

– English Proverb²⁴

This proverb describes people’s hopeless commitment of more resources to reinforce a poor decision that has already proven to be costly. In the end, instead of recouping their previous loss, they incur further loss. Such an irrational escalation of commitment of resources can often be explained by the ‘sunk cost fallacy’. This is the tendency for people to justify additional investment based on how much resources they have already invested in a decision—and that they will not be able to get back (therefore termed ‘sunk costs’). This occurs despite evidence demonstrating that the potential costs for maintaining the decision will be significantly greater than the potential benefits.

Sunk cost fallacy, in the case of military strategy, could result in the unnecessary protraction of wars due to fears that war-termination would result in wastage of the human lives, money and time previously expended. This could, in turn, result in a greater loss of human lives, money and time. Some have argued that the United States’ (US) long-drawn involvement in the Vietnam War was an excellent example of this bias. Back then, a key argument made by supporters for the war was that the US’ withdrawal from Vietnam would disparage the many who had already sacrificed their lives, letting them ‘die in vain’. Therefore, the country ‘owed’ it to these war heroes to ‘stay the course’. This line of reasoning, reinforced by mounting numbers of individuals who ‘sacrificed their lives’, arguably contributed to the protraction of the Vietnam War and, therefore, produced another 250,000 more casualties.²⁵



Steve Jobs, Apple's then CEO, introducing the iPad.

ANCHORING BIAS

“What should we price it at? If you listen to the pundits, we’re going to price it at under \$1000, which is (the) code for \$999. <<long pause>> I am thrilled to announce to you that the iPad pricing starts not at \$999, but at just \$499!”

– Steve Jobs²⁶

As the former CEO of Apple introduced the newly launched iPad back in 2010, he made sure to fully exploit the anchoring bias. This refers to people’s tendency to place too much emphasis on the initial piece of information provided (the ‘anchor’) for subsequent judgments during decision-making. Once the anchor is determined, subsequent judgments will be calibrated using the anchor as a reference point. Consequently, the decision-maker will be biased towards interpreting subsequent information obtained around the anchor.

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By stating the 'initial' cost at \$1,000, Steve Jobs anchored the audience's minds on the idea that an iPad costs approximately \$1,000. When he subsequently announced the actual price, the audience felt that they had saved \$500. If Steve Jobs had said, "We were thinking of pricing it at \$399, but we decided to go for \$499," the audience would certainly have felt that they were being swindled—although the actual iPad price would have been the same across the two scenarios.²⁷

During World War Two (WWII), the British orchestrated a deception ploy, known as the Cyprus Defence Plan, which exploited the Germans' anchoring bias. With the Germans' capture of Crete, the British feared that the mere 4,000 soldiers on Cyprus would not be capable of defending against a German offensive. Therefore, the British implemented the Cyprus Defence Plan, which was intended to convince the Germans that 20,000 troops were stationed on the island. They achieved this by creating a false division headquarters, barracks and fleet of military vehicles together with fabricated radio communications. The British also distributed a phony defensive plan with maps, graphics and orders through double agents. The Germans were successfully deceived and were anchored on '20,000 troops', factoring this figure into their planning, for the remaining three years of the war. It is believed that the anchoring bias persisted despite their subsequent analysis that this figure could have been an exaggeration, attesting to the resistance of the anchor to subsequent information.²⁸

SOLUTIONS

Cognitive biases impair our assessment of the probability of each cost and benefit materialising. This, in turn, impairs military decision-making at the strategic and operational levels. If we were to refer to the Observe–Orient–Decide–Act (OODA) loop, cognitive biases can exert their detrimental effects during the search ('Observe') and interpretation ('Orient') of data leading up to a decision, as well as, the decision-making process itself ('Decide'). The preceding sections have covered examples for this in depth.

Cognitive biases can be amplified by 'group-think', which is 'the practice of thinking or making decisions as a group, resulting typically in unchallenged and poor-quality decision-making'. Once the cognitive biases are combined with 'group-think', the biases remain uncorrected and there can be disastrous consequences.

Therefore, it is imperative for the SAF's operational staff to employ strategies that mitigate these cognitive biases, to allow for more accurate assessment of probabilities and therefore facilitate better decision-making.²⁹ These strategies would need to be grounded on an open culture, in which operational staff are encouraged to be honest about their views.

The following section describes how checklists, red teaming, games and fresh eyes can be employed to counteract cognitive biases at different stages of the Observe–Orient–Decide–Act (OODA) loop. Please refer to *Figure 1*.

Checklists

Checklists promote methodical thinking of issues. Some judges adopt this tool to promote comprehensiveness and objectivity as they rule on court cases, so as to counter cognitive biases.³⁰ Checklists are also used in the SAF when we evaluate our units,

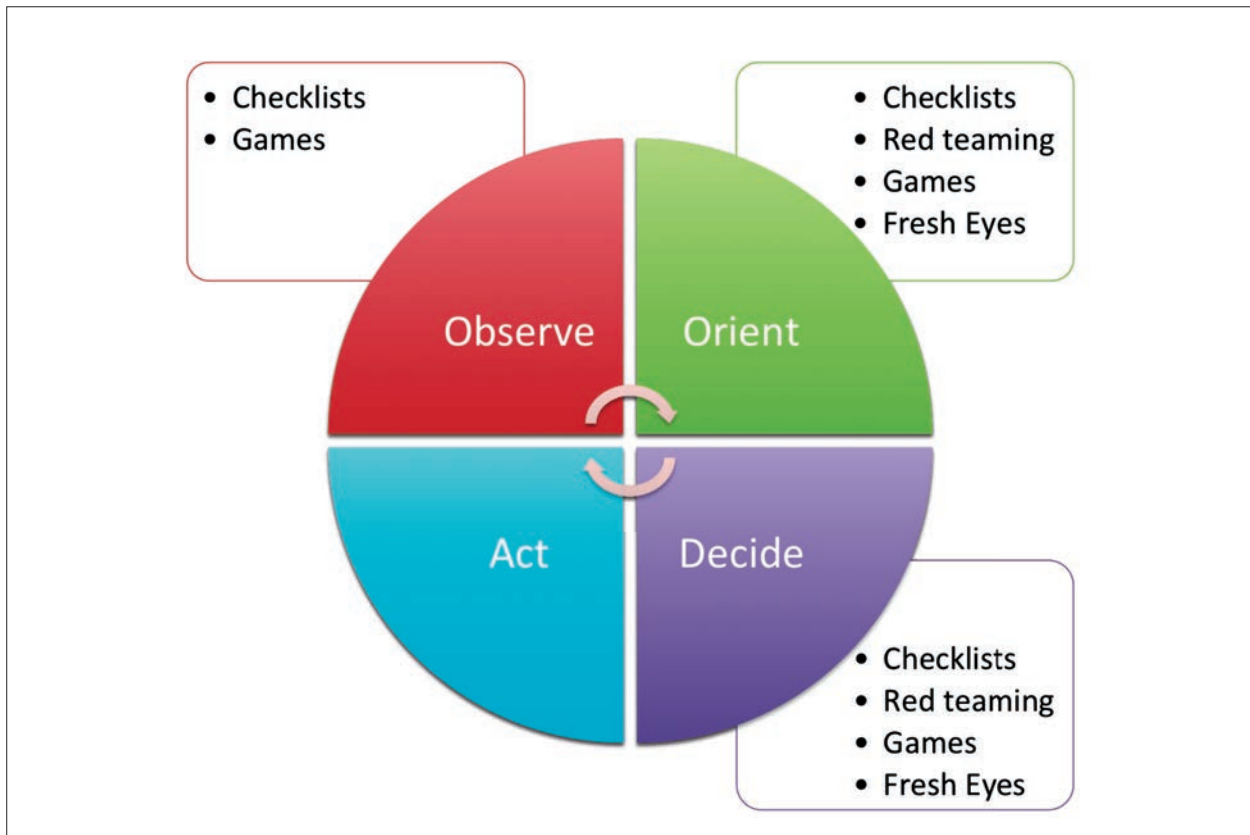


Figure 1: Strategies to Counter Cognitive Biases in the OODA Loop

prepare our forces for operations and make certain important financial decisions. Likewise, checklists can be used effectively in the SAF Command Post to counter cognitive biases throughout the ‘Observe’, ‘Orient’ and ‘Decide’ steps. In formulating and following checklists, the operational staff will be forced to comprehensively search for, list down and consider all relevant factors. The rigorously completed checklist will subsequently serve as a thorough guide for decision-making. It would include factors such as:

- (1) Both salient and less salient events—The checklist should comprehensively include both recent salient events that support the working hypothesis, as well as other events that might be less salient but nonetheless relevant. In doing so, the operational staff would be less reliant on their memories and not be beholden to readily retrievable ones.

They would therefore be less susceptible to the availability bias.

- (2) Disconfirming evidence and alternative hypotheses—Other than supporting evidence, the checklist should also include disconfirming evidence that does not conform to the favoured hypothesis, as well as include alternative hypotheses. By systematically reviewing these factors, the operational staff can mitigate confirmation and disconfirmation biases.

Red Teaming

To overcome cognitive biases, there is a need to consider alternative hypotheses for the information at hand. However, research has demonstrated that people, on their own, are rather inept at generating such alternative hypotheses.³¹ The SAF Command Post

could overcome this by institutionalising red teaming throughout the 'Orient' and 'Decide' steps. A red team, separate from the main operational staff, can be created to dedicatedly conceptualise viable alternative hypotheses to explain the data and to subsequently propose decision-making options.

President John F. Kennedy employed red teaming during the Cuban Missile Crisis. He split his staff into separate groups and designated his brother as the 'devil's advocate'. His advisors were therefore compelled to rigorously critique and defend their own assumptions and to creatively generate alternative responses to the crisis.³²

Red teaming is also an approach adopted by established militaries. The United Kingdom's (UK) Joint Doctrine Publication 5-00, *Campaign Planning* lays out the purpose of red teams: "to challenge the perceived norms and assumptions of the commander and his staff."³³ Similarly, the US Army Training and Doctrine Command specially chartered a university to conduct a suite of red teaming courses for its commanders and staff.³⁴

Alternative hypotheses generated by a red team will help prevent the main operational staff from ignoring contrary information (disconfirmation bias) and over-emphasising supporting evidence (confirmation bias). A formidable red team will also serve as a check against the excessive confidence of the main operational staff and also point out when sunk cost fallacies have been committed.

Games

The SAF has developed an array of simulation systems to create virtual scenarios for training purposes. Such systems, from single platform simulators to the Multi-Mission Range Complex, have proven to be effective in enhancing our servicemen's warfighting competencies.

Similarly, simulation technology can be used to train up our operational staff's ability to counteract cognitive biases. For instance, Raytheon funded the design of a decision-making game that might help intelligence analysts detect and mitigate cognitive biases during their course of work. This game simulates scenarios based on actual situations that US intelligence analysts experienced in Iraq. These scenarios were developed from a compilation of digital documents and reports from theatre.³⁵ Similar simulation technologies can be applied to train our operational staff's ability to mitigate cognitive biases across the stages of the OODA loop.

Fresh eyes

To the extent that the operational staff aggregate data for decision-making over a period of time, they can be susceptible to the anchoring bias and confirmation/disconfirmation bias. To mitigate this bias, the SAF could institutionalise the requirement for an individual, who was not involved in the prior information analysis, to step into the process at the end of the data collection process (after the 'Observe' stage, before 'Orient'). His role would be to lend a pair of fresh eyes as he reviews all the information at once. We should expect this individual to be free from the anchoring bias because he would not have an anchoring piece of information to start with. We should also expect this individual to be free from the confirmation/disconfirmation bias. He would probably not have had a preconceived hypothesis and therefore would not have different thresholds of evidence.³⁶

During the 'Decide' stage, another pair of fresh eyes can be engaged to review the findings from the data analysis process for sense-making—the 'Orient' Stage. Decision-making will be more objective as it will similarly be protected against the anchoring and confirmation/disconfirmation biases.

The SAF has previously employed the fresh eyes strategy for project development, in peacetime. On some occasions, major projects had been stalled due to a lack of new ideas—dynamism in thinking had probably been curtailed as the project members developed fixed hypotheses over time, reinforced by a plethora of cognitive biases. By establishing working groups to lend pairs of fresh eyes, the SAF had decisively broken such deadlocks. This solution of using fresh eyes need not be restricted to a peacetime developmental setting, but can also be used to mitigate cognitive biases within the operational staff of the SAF Command Post.

CONCLUSION

In assessing probabilities of costs and benefits, prior to making staff recommendations for options, our operational staff will be susceptible to a slew of cognitive biases. In combination with other contextual factors, cognitive biases have been shown to result in starkly inaccurate assessments and therefore poor military decisions at the strategic and operational levels. Therefore, the SAF needs to be cognisant of these biases and to implement strategies to counteract them.

While not discussed in this essay, it should be noted that cognitive biases also affect tactical decision-making. For instance, a slew of biases could affect a patrolling soldier's decision on whether a plainclothes man is a terrorist planting an IED or just an innocent civilian. Cognitive biases at the tactical-level can similarly be mitigated by the abovementioned strategies. However, this falls beyond the scope of the present essay.

Finally, cognitive biases might not always be to our detriment; taking a leaf from the Cyprus Defence Plan, we can also exploit our adversary's

vulnerability to cognitive bias in our military strategy. The resulting concerted use of strategic and operational deception will bring us closer to attaining Sun Tze's concept of "breaking the enemy's resistance without fighting."³⁷ 🌐

ENDNOTES

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