Illuminating Human Biases in the Intelligence Cycle

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Abstract:

In today's day and age of increasing modernity, when technology on all fronts such as entertainment gadgets and military equipment are undergoing constant cycles of improvement and upgrading, it is not surprising that people's dependency on such technology will only increase further. This is particularly true when it comes to high quality military intelligence as accurate and reliable assessments of potential threats compensate for the lack of strategic depth and provide much-needed time and space to safeguard and protect the country's sovereignty. As a result of this, the SAF has continued to invest substantially in capability development, force structuring and process refinements to sharpen our intelligence edge. This essay will aim to assess the impact of human biases and make recommendations on how to eliminate such biases, enhancing Singapore's military intelligence in the process.

Keywords: Human Biases, Intelligence, Planning and Direction, Technology

INTRODUCTION

In the fall of 1973, clear indications of a Syrian-Egyptian offensive against Israel were mounting. Syrian tanks and artillery batteries were mass mobilised to the Syrian-Israeli border. Egyptian reserve forces were recalled and anti-aircraft positions were reinforced along the Suez Canal. Israeli aerial images revealed that the Egyptians had moved artillery into offensive positions. On 6th October, 1973, a trusted source informed Israel's Head of Directorate of Military Intelligence, Major General (MG) Eli Zeira, of an impending attack later in the afternoon. Despite these clear signs, MG Zeira ruled out the possibility of an imminent attack. He was wrong and on Yom Kippur Day, the holiest day in the Jewish calendar, the Syrian and Egyptian militaries surprised the Israeli with a two-front attack from the East and the South.¹

Such strategic intelligence failures can bear catastrophic consequences, from the destruction of core military capabilities to the demise of a nation.

Singapore, as accurate and reliable assessments of the adversary's capabilities and intentions compensate for our lack of strategic depth and provide muchneeded time and space to safeguard and protect the sovereignty of the nation. In recognition of the strategic value of quality intelligence, the SAF has, over the past decade, invested substantially in capability development, force structuring and process refinements to sustain our intelligence edge over potential adversaries. In 2007, the SAF inaugurated the Unmanned Aerial Vehicle (UAV) Command to develop the burgeoning UAV collection capability for SAF tactical intelligence requirements. In 2012, intelligence entities were also reorganised to form the integrated Command, Control, Communications, Computers and Intelligence (C4I) community, further enhancing the synergy between the various intelligence arms. To realise the full potential of these developments, we need to ensure that our intelligence corps and commanders are imbued with strong

Quality intelligence is especially important for

intelligence instincts and are able to ask the right questions amidst the complexity of modern warfare.

"The root of the problem - the weakest link in the intelligence process - is human nature."

Michael I. Handel²

The production of useful intelligence—piecing together a coherent picture of the adversary's intent and likely course of action from multiple domains of information—is fundamentally a mental process. However, the human mind operates with bounded rationality and is designed to construct and use mental models and mindsets as guiding frameworks to achieve efficiency in information processing.³ The operating environment in the field of intelligencetime pressured, ambiguous and overwhelmed with information—further promotes this reliance on mindsets. Consequently, human biases and errors, arising from the over-reliance on inappropriate mental models, insidiously creep into the intelligence cycle. Far from being objective truths, intelligence products are, in essence, subjective assessments, coloured by our existing mental models, expectations, perceptual biases, and analytical slants. Beyond the scope of this essay, deliberate actions—such as conscious distortions and politicisation of intelligence-to pander to the inclinations of superiors and political masters further undermine the accuracy of intelligence assessments.

Our intelligence community needs to realise that an unquestioning and unconscious reliance on mindsets introduces implicit assumptions and biases into the intelligence cycle. As biases become confounded along the intelligence workflow, the eventual assessment would have been irrevocably wrought by our mindsets. Without a keen awareness of the biasing effect of our mindsets, we could easily become blinkered and potential adversaries could exploit our blind spots to achieve strategic surprise. To this end, this essay illuminates the latent human biases in the intelligence cycle to heighten awareness among our intelligence personnel. Given that these biases arise primarily from our biological and social hardwiring, attempts to eliminate such tendencies would likely be of limited utility. This essay proposes that it would be more adaptive and effective for intelligence personnel to develop critical awareness of their current mental models and biases and contextually adapt and employ suitable mental models to increase the predictive power of intelligence.

The Intelligence Cycle

The intelligence cycle is largely modelled after the traditional five-stage intelligence cycle.⁴ In this cycle, the five continuous phases-planning and direction, collection, processing and exploitation, analysis and production, and dissemination-take place concurrently, centred around the mission. In the planning and direction phase, commanders provide directions for current and future intelligence operations. Specific intelligence requirements are then derived from the broad command guidance. A collection plan is then devised to optimise the collection effort among the available assets. In the collection phase, the various intelligence domains are employed concurrently to achieve comprehensive collection coverage. The collected raw data is then processed into useful information and fused to provide initial interpretation of the processed information. In the analysis phase, different pieces of information are integrated to eventually arrive at an assessment. This phase generates useful intelligence from collected information and the intelligence is subsequently disseminated to commanders to aid their decisionmaking.

19-31_ Illuminating Human Biases in the Intelligence Cycle.indd 20



Figure 1: The Five-Stage Intelligence Cycle⁵

PLANNING AND DIRECTION

Perpetuating Deep-Seated Mindsets

The process of planning and direction is necessarily iterative as the intelligence community seeks to understand the commander's intent so as to derive relevant intelligence products.⁶ During this iteration, there is an inherent risk of either party inadvertently imposing his mindset and mental models onto the other party by framing the conversation through his choice of words or phrasing of questions.⁷ This can steer the direction of the intelligence operations and the specific intelligence requirements. Indeed, when commonly held beliefs and assumptions regarding potential adversaries permeate the organisation, the iterative process between the commanders and the intelligence community may even mutually reinforce pre-existing mindsets, further insulating such mindsets from challenging views. Wrong assumptions and unchallenged mindsets can translate into obsolete and irrelevant collection plans, ineffective use of available intelligence assets and eventually yield parochial assessments that could easily be exploited for strategic surprises.

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The danger of institutionalised mindsets is exemplified by the surprise Syrian-Egyptian attack on Israel on Yom Kippur Day in 1973. The Agranat Commission attributed the strategic surprise partly to the intelligence community's 'stubborn adherence' to the mindset that Egypt would not go to war without the capability to strike deeply at Israeli airfields.⁸ Directed by this mindset, the intelligence community collected information regarding Egypt's acquisition

16/06/2015 11:10

of medium range bombers and rightly assessed that this capability would only be operational in 1975-76.⁹ However, on 6th October, 1973, this mindset was proven wrong as the Egyptians launched a concurrent offensive together with Syria without the capability to strike Israeli airfields. This mindset originated from the military planners' strong focus on air superiority and in the period immediately after the

1967 war, this mindset was useful for tempering warning and decisions.¹⁰ However, in 1970, Egypt was able to provide antiair coverage on the East of the Suez Canal by acquiring and deploying advanced surface-to-air missiles near the canal.¹¹

Hence, it İS important that our intelligence personnel recognise this intuitive confirmatory bias and consciously design collection requirements to refute, rather than confirm their own suspicions, so as to enhance the diagnostic value of the collected information.

This umbrella provided a sufficient degree of freedom from air strikes and obviated the need to strike directly at the Israeli airfields. Fixation on Egypt's deep strike capability, an indicator made obsolete by circumstantial changes, resulted in the failure in piecing together anti-air capabilities to derive a new assessment of the Egyptian's operational concept. This example demonstrates that commanders and intelligence personnel involved in the planning and direction of intelligence collection must consciously question prevailing mindsets and assumptions that may have persisted beyond their usefulness, as these would entrench our collection plans and blinker our assessments.

ASKING CONFIRMING QUESTIONS

The danger of unchallenged assumptions is further perpetuated by our innate tendency to seek confirmatory evidence. The designing of specific intelligence requirements involves asking the right questions to gain greater foreknowledge of the adversary's intent and capabilities. Ideally, this process should follow the scientific strategy of seeking to refute, rather than to confirm pre-existing beliefs. However, intuitive analysis generally focuses on confirming hypotheses. Peter Wason demonstrated this human tendency to seek out confirmatory evidence in an experiment where he asked participants to decipher the rule employed to generate a three-number

> sequence (e.g., 2, 4, 6) by generating their own three-number sequence to test the validity of their guess.¹² It was observed that most participants adopted a confirmatory approach, choosing to generate sequences that adhered to their rule,

rather than generate sequences that contradicted their rules.¹³ Conceptually, seeking confirmatory evidence has less diagnostic value than seeking contradictory evidence, as the latter allows the ruling out of a possibility. In intelligence analysis, information gathered can often be used to support multiple hypotheses. For example, evidence of a large-scale forward mobilisation of fighter aircraft could be an indication of an impending attack, a strategic bluff, or a strategy to wear down our vigilance. Hence, it is important that our intelligence personnel recognise this intuitive confirmatory bias and consciously design collection requirements to refute, rather than confirm their own suspicions, so as to enhance the diagnostic value of the collected information.

FIXATING ON TECHNOLOGY

With technological advancements in military hardware as well as intelligence capabilities (e.g., sophisticated unmanned systems), there is a tendency for intelligence collection efforts to be biased towards

technological capabilities.¹⁴ Also, as capabilities are more easily quantifiable than intentions, there is a tendency for intelligence requirements to be scoped towards the more straightforward and less nebulous task of 'bean counting'.¹⁵ The dangers associated with a technological bias are two-fold.

Firstly, a collection plan overly-focused on the adversary's hardware capabilities might neglect other socio-psychological aspects of its capabilities, such as its people's will to fight, the readiness of its troops, the public's support for its military and the quality of its leadership. In relation to this, planners from any technologically superior military should guard against 'technological ethnocentrism'—the tendency to judge others' capabilities based on one's technological edge—and should take precaution to ensure a comprehensive collection of all aspects of the adversary's capabilities.¹⁶

Secondly, intelligence planners may overestimate the technological capabilities of collection assets, and thus collection tasking may be ineffectively distributed among the different domains of intelligence sources. In fact, the effectiveness of technologically advanced collection assets could be significantly eroded by low-tech Standard Operating Procedures (SOPs). For example, high resolution aerial imagery from satellites and UAVs could still be misled by well-executed decoy and concealment techniques and tactics. This was illustrated by the unsuccessful targeting of Scud launchers during the First Gulf War.¹⁷ Despite being equipped with high resolution infrared targeting pods, the American fighter pilots were tricked by the low-cost decoys assembled from old trucks and missile parts and achieved little success against the Scud launchers. Hence, planners should develop a good grasp of the technological, as well as environmental constraints faced by each type of collection assets, so as to guard against such technological bias.

COLLECTION

Seeing the Expected

In the late days of World War II (WWII), British imagery interpreters were tasked to locate German V-2 launch sites. Armed with the technical descriptions of these launch sites, they quickly located and identified twelve large conical objects as the launch platforms. Fortunately, a sudden disappearance of these 'platforms' prompted the interpreters to reconsider their findings. It was only then that they realised these were actually standard tents, ones that they had seen countless times before.¹⁸

This illustrates how heightened expectations can lead even the trained eye up the garden path. Indeed, the passive act of information collection is constantly coloured by subconscious perceptual biases.¹⁹ The expressed intention to collect a specific piece of information heightens expectations that there exists information to be harvested. Expectations can also result from past experiences, contextual knowledge, or cultural and organisational mindsets about the target of interest.²⁰ Valid expectations are useful because they sharpen our perceptual senses and direct our attention to sieve out characteristics of the target from a noisy environment. Psychological studies have found that people typically respond quicker to stimuli which are congruous to their expectations, as opposed to stimuli which contradict their expectations, primarily because congruous perceptual associations have been primed by pre-existing expectations.²¹ With heightened expectations for a particular set of target characteristics, our front-end observers may become more vulnerable to decoy or spoof techniques, and run the risk of prematurely concluding the collection operation.

19-31_ Illuminating Human Biases in the Intelligence Cycle.indd 23

Furthermore, expectations formed from past experiences and historical lessons may cease to be applicable to current operating contexts. Instead of subconsciously funnelling our perception to the appropriate cues, such outdated expectations may instead become red herrings in our collection efforts and misdirect our perceptual attention. Indeed, cognitive psychologists have repeatedly documented powerful demonstrations where a misdirection of attention resulted in failures to pick up important and conspicuous changes in the environment, even by trained observers. In a well-known study, Simons and Chabris observed that when tasked to count the number of basketball passes in a video clip, many participants failed to notice a man in a gorilla suit walking across the scene.²²

Psychologists explained that when the observers' attention is cued by a specific set of expectations or instructions (e.g., pay attention to ball passes), the top-down constraint is able to override the capturing power of unexpected sustained changes in the environment (e.g., sudden appearance of a man in gorilla suit).²³ In addition, studies have also found that this lapse in our perception of unexpected changes is exacerbated when more complex perceptual processing is involved.²⁵



Figure 2: Screenshot of the video used in Simon and Chabris's experiment. Most participants failed to notice the unexpected appearance of the man in the gorilla suit.²⁴

Our observers should recognise that in their search for information in a cluttered environment, their bottom-up perception is inevitably shaped and constrained by their top-down expectations. Hence, it is necessary for them to constantly challenge the validity of their own expectations and the underlying assumptions of their observation tasks, so as to channel their attention to aid the gathering of relevant information, instead of leading them down the garden path, or blinding them to critical changes in the environment.

EXPLOITATION AND ANALYSIS

Even with a comprehensive collection of relevant information, an accurate intelligence assessment is not guaranteed. The transformation of raw information into actionable intelligence requires the linchpin processes of exploitation and analysis. Exploitation involves overlaying different sources of information in time and space and this allows the analysts to discern intentions from the various interpretations. These processes involve high degrees of subjectivity and uncertainty as many possible interpretations can exist for a single observation. In weighing the relative plausibility of the various interpretations and in ascribing possible meanings to the observations, our analysts unconsciously mobilise their personal concepts and beliefs to help them organise the mass of information. In the process of doing so, they may have inadvertently biased their intelligence assessments.

Situating the Appreciation

The analysts, working in time-pressured environments, often start to evaluate plausible interpretations and craft an initial theory upon receiving the first available information. However, once the initial theory has been formed, it becomes difficult for the analyst to dissociate from this interpretation. In a psychological study, when participants were shown an ambiguous figure that could be interpreted

19-31 Illuminating Human Biases in the Intelligence Cycle.indd 25

features

Figure 3a: These images (from left to right) were presented individually with regular time intervals. When asked whether the fourth image depicted a man or a woman, most participants confidently concluded that it depicted a man.²⁶



Figure 3b: Another group of participants saw these images (from right to left) presented individually with regular time intervals. When asked whether the first image depicted a man or a woman, most participants confidently concluded that it depicted a woman. Both ambiguous images are actually the same image.²⁷

as a man or a woman, those who started viewing versions that were clearly a man were biased in

their interpretation of the ambiguous figure as a man (*Figure 3a*).²⁸ Similarly, those who started off viewing versions that were clearly a woman concluded that the same ambiguous figure was a woman (*Figure 3b*). This demonstrates

To produce an accurate assessment, intelligence analysts have to understand and predict the behaviours and motives of their adversary, whose culture, lifestyles, background, and values may be dissimilar from their own.

that once an initial interpretation or mindset has been adopted, it becomes persistent and is able to bias future interpretations of ambiguous information.

Besides cognitive limitations, the human mind is also affected by intrinsic needs, as well as circumstantial conditions. For example, individuals

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who have an innately stronger desire for cognitive closure over confusion and ambiguity were more

likely to be biased by the initial information given about a candidate when making judgments about him.²⁹ In addition, these participants exhibited higher confidence levels in their judgments and

requested for less information to further substantiate their assessments.³⁰ Leon Festinger also noted that humans have an inherent desire to maintain intrapersonal consistency and given that the analysts would have invested substantial time and mental energy in arriving at their initial conjecture, it is not surprising for them to be reluctant to altering their

initial theory to accept alternative perspectives.³¹ In addition, the persistence of initial assessment could also be fuelled by self-enhancing biases that serve to protect the analysts' self-image and selfesteem. Positive self-views stemming from recognised expertise and deep experience levels may pose as additional personal costs when the analyst considers revising his assessment. The time-pressured and cluttered environment in which analysts operate further exacerbates the reliance on initial information for impressionistic judgments.³²

Indeed, in the arena of intelligence analysis, impressions are formed quickly from initial ambiguous information in order to cope with tight deadlines. The receipt of information in small increments over time facilitates the assimilation of new information into their pre-existing theories and this self-reinforcing feedback loop creates an inflated confidence of the assessment. Taken as a whole, the accumulated information may at times warrant an interpretation that is diabolically different from the initial interpretation. This, however, would have eluded the analyst as the significance of the later information would already have been distorted to conform to the initial interpretation. It is likely that the conforming of fresh tactical intelligence to reinforce the strongly held belief that an Egyptian attack would not be likely in the near future ultimately contributed to the strategic surprise of the Yom Kippur War in 1973.³³

JUDGING OTHERS BY OUR YARDSTICK: ETHNOCENTRISM AND MIRROR IMAGE

Intelligence assessments aim to uncover the adversary's intentions. To produce an accurate assessment, intelligence analysts have to understand and predict the behaviours and motives of their adversary, whose culture, lifestyles, background, and values may be dissimilar from their own. However,

ethnocentrism, a strong human tendency to perceive our own social group and its associated values, culture and practices as superior to those of other groups, could lead us down the slippery slope of downplaying the importance of understanding and adopting our adversary's cultural perspective and result in a misguided projection of our own cultural values, perspectives, and beliefs onto others.³⁴ This analytic bias has been referred to as mirror imaging and could result in a misinterpretation of the significance of accrued information and a failure to observe meaningful trends from seemingly disparate events.³⁵ Over time, judging the adversary by our own doctrines, strategies and cultural norms would breed an incorrect mindset for the understanding of our adversary's capabilities and constraints, as well as its intentions. Once such a mindset permeates the institution, it would become even more challenging for the analysts to overcome the effects of ethnocentrism.

Historical examples of intelligence failures are replete with instances of ethnocentrism and mirror imaging. For example, in September 1941, American intelligence agents received intercepts of a Japanese intelligence requirement for a five-sector reference grid of Pearl Harbour and the locations of its naval assets. However, the Head of Naval Intelligence quickly dismissed the decoded message as insignificant, attributing it to the zeal and efficiency with which the Japanese collected details of little operational use.³⁶ It would hardly be fathomable to an American that the Japanese would be mounting an attack on their prized naval base. Even more unimaginable to the American minds would be the self-sacrificial kamikaze tactics employed against their prized battleships.37 A more extreme example of failed intelligence resulting from institutional ethnocentric biases can be drawn from the Nazi's military defeat in the Battle of Kursk against the Soviet Union during WWII.38 The Nazi

16/06/2015 11:10

intelligence officers, inundated by Nazi propaganda, saw the Russians as culturally and racially inferior and routinely underestimated the Soviet higher level command capabilities and intentions. In the lead up to the Battle of Kursk, intelligence assessments about the Soviet's capabilities were imprecise and chances of a possible counteroffensive were discounted. This ultimately caused Nazi commanders to commit catastrophic mistakes in their operational decisions.³⁹

While we may not suffer from such extreme ethnocentrism, it must be recognised that favouritism for our own social group is an innate human tendency.⁴⁰ Hence, in order for our analysts to guard against such tendencies, they first have to recognise signs of their deeply ingrained cultural biases, and the perceptions and assumptions stemming from these biases. They would also need to fight the impulse to discredit or discount theories which do not fit well into their own cultural perspectives, as these seemingly impossible concepts may well be the norm for another culture. Through immersion and a deliberate study of the adversary's culture and perspective, analysts can have a better shot at discerning a logical pattern and motive from seemingly disparate strands of information.

RECOMMENDATIONS

"An open mind is as dysfunctional as an empty mind."

Jack Davis⁴¹

Following a brief examination of some of the psychological biases plaguing our intelligence cycle, an instinctive response would be a call for our intelligence practitioners to maintain an open and objective mind during their course of work. However, as noted by Davis, an open mind unguided by existing beliefs, expectations and mindsets would hardly be effective. While various mental tools and structural reforms have been designed to increase objectivity and eliminate human biases from intelligence assessments, such efforts are unlikely to be productive since most of these biases arise from our inherent cognitive limitations and social hardwiring. A more adaptive approach seeks to increase the probability of activating suitable mental models and beliefs in accordance to the shifting circumstances. Borrowing the words of Robert Jervis, "the degree to which the intelligence service's predispositions and expectations fit the actions that the adversary is planning to undertake" is of primary importance in the detection of a military or strategic surprise.⁴² Indeed, with the adaptability to tailor our mental models to the changing operating environment, we will be able to wield the cognitive shortcuts hardwired into our brains to aid us in focusing our limited cognitive resources to ask the right questions, gather the relevant information and pave the way for intuitive and accurate assessments.

However, the ability to discern the appropriateness of a particular mindset for a specific set of circumstances is a matter of judgement.⁴³ To hone this judgement, our intelligence community must first develop a keen awareness of the latent expectations and mental models that have been infused into our thinking through personal experiences, institutional culture and shared practices. We must also acknowledge that intelligence officers, as with all human beings, are equally vulnerable to these influences, especially when operating in ambiguous and uncertain circumstances with high stakes. Secondly, our intelligence officers must develop a discipline of making explicit the logic of their thought processes so as to examine their assumptions and the soundness of logic and also to maintain consciousness of the suitability of their mindsets and expectations to the current context. Thirdly, the intelligence community and military commanders should also continue to build up a

repertoire of alternative theories about the adversary by widely drawing from parallels in history, as well as rigorous thought experiments to avoid unnecessarily confining their own conceptions of the adversary. In addition, intelligence officers must possess thorough knowledge and deep experience as a solid foundation from which intuitions can arise. Lastly, a strong set of professional ethics and personal integrity are fundamental to sound judgements, especially when personal costs to self-esteem and career advancements are at stake for refuting widely endorsed yet obsolete viewpoints.

Charged with the responsibility of forewarning our commanders of the adversary's capabilities and intentions, it is imperative that our intelligence community continues to devote emphasis to the development of our human capital in order to sharpen our intellectual edge and maintain our vigilance against complacent mental processes.

CONCLUSION

The journey toward the utopian state of flexibly switching between cognitive models for increased predictive accuracy and efficiency in intelligence assessments necessarily begins with a keen awareness of our own 'blindness'. Working through the various phases of our intelligence cycle, this essay has illustrated that the cognitive processes involved in planning, collection, interpretation and analysis are inevitably influenced by our pre-existing mindsets. These mindsets tend to set in motion a multitude of biases that further reinforces and ensures the persistence of existing theories and beliefs. An understanding of the psychological origins of these

human biases suggests that steps to increase the objective truth in intelligence assessments through the eradication of these biases would hardly be productive. Instead, a more adaptive approach would require our intelligence practitioners to exercise sound judgements in critically evaluating the suitability of their mental models for the current operating environment and flexibly adapting these mental models to transform dysfunctional mental ruts into information processing highways. Charged with the responsibility of forewarning our commanders of the adversary's capabilities and intentions, it is imperative that our intelligence community continues to devote emphasis to the development of our human capital in order to sharpen our intellectual edge and maintain our vigilance against complacent mental processes. Only then can we continue to create the strategic depth that is paramount to the safeguarding of our nation's sovereignty.

BIBLIOGRAPHY

Brown, Donald. "Ethnicity and ethnocentrism; Are they natural?" In *Race and Ethnicity: An anthropological focus on the United States and the world*, edited by Raymond Scupin, (Upper Saddle River, New Jersey: Prentice Hall, 2003), 81-94.

Bruner, Jerome, and Postman, Leo. "On the perception of incongruity: a paradigm," *Journal of Personality* 18, n._2 (1949): 206-223.

Butterfield, Jr., Alexander. *The accuracy of intelligence assessment: Bias, perception, and judgment in analysis and decision (Master's thesis)* (Newport: Naval War College, 1993).

Davis, Jack. "Combating mind-set," *Studies in Intelligence* 36, n._5. (1992): 33-38.

Davis, Jack. "Why bad things happen to good analysts." In *Analyzing Intelligence: Origins, Obstacles, and Innovations,* edited by Roger George and James Bruce, (Washington, D.C.: Georgetown University Press, 2008), 157-170.

28

Derbentseva, Natalia, McLellan, Lianne, & Mandel, David. "Issues in intelligence production: summary of interviews with Canadian managers of intelligence analysts". *No. DRDC Toronto TR*, 2010-144. (2011): 1-120.

Eldridge, Justin, "Delusions of grandeur: Ethnocentrism and Wehrmacht intelligence analysis," *Military Intelligence* 18, n._1 (1992), 20.

Festinger, Leon. *A Theory of Cognitive Dissonance* (Stanford, CA: Stanford University Press, 1957).

Gladwell, Malcolm. *What the Dog Saw: And Other Adventures* (New York: Back Bay Books, 2009).

Handel, Michael. *War, Strategy and Intelligence* (London: Frank Cass, 1989).

Herzog, Chaim. *The War of Atonement October 1973* (Boston: Little, Brown and Company, 1975).

Heuer, Richard. *The Psychology of Intelligence Analysis* (Washington DC: CIA, 1999).

Hulnick, Arthur. "What's wrong with the Intelligence Cycle," *Intelligence & National Security* 21. (2006): 959-979.

Jervis, Robert. *Perception and Misperception in International Politics* (Princeton: Princeton University Press, 1976).

Johnston, Rob. *Analytic Culture in the U.S. Intelligence Community* (Washington DC: CIA, 2005).

Joseph, Uri and Kruglanski, Arie, "Intelligence failure and need for cognitive closure: on the psychology of the Yom Kippur surprise," *Political Psychology* 24, n._1 (2003): 75-99.

Kahneman, Daniel. "Maps of bounded rationality: psychology for behavioural economics". *The American Economic Review* 93, n._5 (2003): 1449–75.

Kobayashi, Masahiko. U.S. failures in the Pearl Harbour attack: lessons for intelligence (Master's thesis) (Medford: Tufts University, Fletcher School, 2005).

Kruglanski, Arie and Freund, Tallie. "The freezing and unfreezing of lay inferences: Effects of impressional primacy, ethnic stereotyping, and numerical anchoring," *Journal of Experimental Social Psychology* 19 (1983): 448-468.

Kruglanski, Arie and Webster, Donna, "Group members reactions to opinion deviates and conformists at varying degrees of proximity to decision deadline and of environmental noise," *Journal of Personality and Social Psychology* 61 (1991): 215-225.

Lavie, Nili. "The role of perceptual load in visual awareness," *Brain Research*, 1080 (2006): 91-100.

Most, Steven, Scholl, Brian, Clifford, Erin, and Simons, Daniel. "What you see is what you set: Sustained inattentional blindness and the capture of awareness," *Psychological Review* 112, n._1 (2005): 217-242.

Shlaim, Avi. "Failures in National Intelligence Estimates: The Case of the Yom Kippur War," *World Politics* 3 (1976): 348-380.

Simons, Daniel, & Chabris, Christopher. "Gorillas in our midst: sustained inattentional blindness for dynamic events," *Perception* 28 (1999): 1059–1074.

Van der Berg, Roy, "The 21st century battlespace: the danger of technological ethnocentrism," *Canadian Military Journal* 10, n._4 (2010): 10-18.

Wason, Peter. "On the failure to eliminate hypotheses in a conceptual task," *The Quarterly Journal of Experimental Psychology* 12, n._3 (1960): 129-140.

Webster, Donna and Kruglanski, Arie. "Individual differences in need for cognitive closure," *Journal of Personality and Social Psychology* 67, n._6 (1994): 1049-1062.

ENDNOTES

- Malcolm Gladwell, What the Dog Saw: And Other Adventures (New York: Back Bay Books, 2009), 301-2.
- Michael Handel, War, Strategy and Intelligence (London: Frank Cass, 1989), 34.
- Daniel Kahneman, "Maps of bounded rationality: psychology for behavioural economics". *The American Economic Review* 93, n._5 (2003): 1449–75. Jack Davis, "Combating Mindset," Studies in Intelligence 36, n._5 (1992): 33.
- 4. Rob Johnston, *Analytic Culture in the U.S. Intelligence Community* (Washington DC: CIA, 2005), 45-46.
- 5. Ibid.
- Natalia Derbentseva, Lianne McLellan, & David Mandel, "Issues in intelligence production: summary of interviews with Canadian managers of intelligence analysts," *No. DRDC Toronto TR*, 2010-144 (2011), 12-13.

- Arthur Hulnick, "What's wrong with the Intelligence Cycle," *Intelligence & National Security*, 21 (2006), 959-79.
- Avi Shlaim, "Failures in National Intelligence Estimates: The Case of the Yom Kippur War," *World Politics* 3 (1976), 374-75.
- 9. Chaim Herzog, *The War of Atonement October* 1973 (Boston: Little, Brown and Company, 1975), 41.
- 10. Shlaim, "Failures in National Intelligence Estimates: The Case of the Yom Kippur War," 358-59.
- 11. Ibid., 364-65.
- Peter Wason, "On the failure to eliminate hypotheses in a conceptual task," *The Quarterly Journal of Experimental Psychology* 12, n._3 (1960), 129-140.
- 13. For example, to test a rule of ascending even numbers, participants would generate a sequence of "4, 6, 8" instead of a sequence of "4,5,6".
- Roy van der Berg, "The 21st century battlespace: the danger of technological ethnocentrism," *Canadian Military Journal* 10, n._4 (2010), 14.
- Alexander Butterfield, The accuracy of intelligence assessment: Bias, perception, and judgment in analysis and decision (master's thesis), (Newport: Naval War College, 1993), 20.
- 16. Van der Berg, "The 21st century battlespace: the danger of technological ethnocentrism," 10.
- Malcolm Gladwell, What the Dog Saw: And Other Adventures (New York: Back Bay Books, 2009), 99.
- Alexander Butterfield, The accuracy of intelligence assessment: Bias, perception, and judgment in analysis and decision (master's thesis), (Newport: Naval War College, 1993), 13.
- 19. Richard Heuer, *The Psychology of Intelligence Analysis* (Washington DC: CIA, 1999), 7.
- 20. Ibid.
- Jerome Bruner and Leo Postman, "On the perception of incongruity: a paradigm," *Journal of Personality* 18, n._2 (1949): 206-223.
- Daniel Simons and Christopher Chabris, "Gorillas in our midst: sustained unintentional blindness for dynamic events," *Perception* 28 (1999): 1059–1074.

- Steven Most et al., "What you see is what you set: Sustained inattentional blindness and the capture of awareness," *Psychological Review* 112, n._1 (2005): 237.
- Daniel Simons and Christopher Chabris, "Gorillas in our midst: sustained unintentional blindness for dynamic events," *Perception* 28 (1999): 1059–1074.
- 25. Nilli Lavie, "The role of perceptual load in visual awareness," *Brain Research*, 1080 (2006): 95.
- 26. Drawings are devised by Gerald Fisher in 1967.
- 27. Ibid.
- Richard Heuer, The Psychology of Intelligence Analysis (Washington DC: CIA, 1999), 10-11.
- Donna Webster and Arie Kruglanski, "Individual differences in need for cognitive closure," *Journal of Personality and Social Psychology* 67, n._6 (1994): 1057-1058.
- 30. Ibid.
- Festinger, Leon. A Theory of Cognitive Dissonance (Stanford, CA: Stanford University Press, 1957): 32-47.
- 32. Arie Kruglanski and Tallie Freund, "The freezing and unfreezing of lay inferences: Effects of impressional primacy, ethnic stereotyping, and numerical anchoring," *Journal of Experimental Social Psychology* 19 (1983): 448-468.

Arie Kruglanski and Donna Webster, "Group members reactions to opinion deviates and conformists at varying degrees of proximity to decision deadline and of environmental noise," *Journal of Personality and Social Psychology* 61 (1991): 215-225.

- Uri-Bar Joseph and Arie Kruglanski, "Intelligence failure and need for cognitive closure: on the psychology of the Yom Kippur surprise," *Political Psychology* 24, n._1 (2003): 75-99.
- 34. Donald Brown, "Ethnicity and ethnocentrism; Are they natural?", *Race and Ethnicity: An anthropological focus on the United States and the world*, ed. Raymond Scupin (Upper Saddle River, New Jersey: Prentice Hall, 2003), 81-83.
- 35. Richard Heuer, *The Psychology of Intelligence Analysis* (Washington DC: CIA, 1999), 70.
- 36. Alexander Butterfield, The accuracy of intelligence assessment: Bias, perception, and judgment in analysis and decision (master's thesis), (Newport: Naval War College, 1993), 1.

- Masahiko Kobayashi, U.S. failures in the Pearl Harbour attack: lessons for intelligence (Master's thesis), (Medford: Tufts University, Fletcher School, 2005), 34-38.
- Justin Eldridge, "Delusions of grandeur: Ethnocentrism and Wehrmacht intelligence analysis," *Military Intelligence* 18, n._1 (1992), 20.

39. Ibid.

- Brown, "Ethnicity and ethnocentrism; Are they natural?"
 82
- Jack Davis, "Why bad things happen to good analysts,", *Analyzing Intelligence: Origins, Obstacles, and Innovations,* ed. Roger George and James Bruce, (Washington, D.C.: Georgetown University Press, 2008), 160.
- Robert Jervis, Perception and Misperception in International Politics (Princeton: Princeton University Press, 1976), 180.
- Alexander Butterfield, The accuracy of intelligence assessment: Bias, perception, and judgment in analysis and decision (master's thesis), (Newport: Naval War College, 1993), 76-80.



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