



## BECOMING A RISK ADAPTOR: HOW THE CAF CAN MITIGATE RISK AVERSION

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### JCSP 50

#### Service Paper

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# **BECOMING A RISK ADAPTOR: HOW THE CAF CAN MITIGATE RISK AVERSION**

## **AIM**

1. The aim of this service paper is to explore the psychological and behavioural aspects of risk analysis in the decision-making process, in particular focusing on risk aversion and potential ways it may be reduced, including how Artificial Intelligence (AI) and machine learning may be used to enable, in order to increase institutional agility and resilience.

## **INTRODUCTION**

2. The current strategic and operational context has been described as rapidly evolving, and increasingly dangerous, where adversaries leverage speed and “the exponential rate of technological change”<sup>1</sup> to gain strategic and operational advantage. A recently released Internal Department of National Defence Reference Document (to be referred to as internal reference document, or IRD, henceforth in this paper) identifies several imperatives to describe the Canadian Armed Force’s (CAF) approach to addressing the challenges, threats, and critical operational trends recognized by Canada and its allies. One notable theme throughout all elements of the document is that in an environment where the tempo and complexity of competition and conflict are increasing, an approach favouring institutional agility is necessary and that “the CAF must embrace solutions that are sufficient, even if not optimal, so that it can out-pace adversary decision action cycles”<sup>2</sup>. The IRD acknowledges that this type of approach would “require a rethinking of risk trade-offs like perceived certainty versus speed” and that decision-making authority should be pushed as far forward as possible to those best placed to understand the situation and make timely decisions, at times in degraded environments<sup>3</sup>. The recommendations made in the IRD could result in increased tactical-level decisions having heightened operational and strategic level implications within and throughout multiple domains. In this scenario, leaders experiencing risk aversion could prevent a force from sustaining the speed of relevance and from creating or seizing critical initiatives. To better understand this decision-making behaviour, this paper will first explore study-backed psychological reasons behind risk aversion. Then, it will discuss how and why the CAF could benefit from examining the risk propensity behaviour of those working within other sectors, primarily the financial investment sector. Last, ways in which leaders and decision-makers could reduce instances of risk aversion will be discussed.

3. With the advancement of Artificial Intelligence and machine learning technologies, the requirement for human input into risk analysis and decision-making could be counterargued as a diminishing necessity or completely replaceable as system

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<sup>1</sup> Canada. Department of National Defence, “Internal Department of National Defence Reference Document” (2023), 24.

<sup>2</sup> Ibid, 27.

<sup>3</sup> Ibid, 27–28.

intelligence begins to match and out-match human intelligence. Among many, the United States military has harnessed emerging technologies to experiment with and integrate AI into the command and control space to meet the increasing scale and complexity of the operating environment<sup>4</sup>. This includes programs such as Palantir, used by multiple militaries to provide a range of capabilities such as advanced visualization technology to enhance situational awareness and deliver a distributed near-instantaneous common operating picture, as well as AI interface in the Military Decision Making Process, including course of action development, wargaming, modelling simulations, and assistive decision-making<sup>5</sup>. The position of this paper will align with the themes of the IRD, where in the ever-evolving battlespace, the increased insertion of AI will likely see greater consequences from competition and conflict in and through the information domain, which may result in system interference and denial<sup>6</sup>. In degraded information environments, advanced technology systems may no longer be reliable. Thus, even in the future battlespace, human risk analysis and judgement will still be a critical asset to all operational functions as well as organizational agility and resilience. Thus, this paper will provide recommendations that are distinctly human-driven as well as possible areas that may be complemented rather than replaced by AI and machine learning technology.

## DISCUSSION

4. The DND and CAF policies and doctrine on risk management provide clear direction and processes for how risk is to be handled from the strategic level down to the tactical level<sup>7</sup>. The “Risk Management of CF Operations” manual lays out sound procedures for assessing and mitigating risk. It identifies the key element of the risk decision as “determining if the risk is justified” when a commander must examine the risk and/or threat, the mitigation control measures, and the resulting residual risk and compare and balance it against the mission’s potential gain<sup>8</sup>. This critical step in the process could be challenged if a commander experiences risk aversion. This can unconsciously skew a decision maker’s judgement, especially in a degraded environment and in time-compressed situations. In the operating environment described within the IRD, risk aversion is a barrier to maintaining the speed of relevance and sustaining organizational agility and resilience.

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<sup>4</sup> Sue E. Kase *et al.* “The Future of Collaborative Human-Artificial Intelligence Decision-Making for Mission Planning,” *Frontiers in Psychology* 13, no. April 2022 (April 4, 2022): 1.

<sup>5</sup> Kase *et al.*, 2; Nathan Strout. “Palantir: With Joint All-Domain Command and Control, the Pentagon Is Finally Catching Up,” IT/Networks Article, *C4ISR NET*, August 12, 2021, <https://www.c4isrnet.com/industry/2021/08/12/palantir-with-joint-all-domain-command-and-control-the-pentagon-is-finally-catching-up/>.

<sup>6</sup> Avi Goldfarb and Jon R. Lindsay. “Prediction and Judgment: Why Artificial Intelligence Increases the Importance of Humans in War,” *International Security* 46, no. 3 (February 25, 2022): 9, [https://doi.org/10.1162/isec\\_a\\_00425](https://doi.org/10.1162/isec_a_00425).

<sup>7</sup> Canada. Department of National Defence. *B-GJ-005-502/FP-000, Risk Management of CF Operations* (Ottawa: DND, 2007), 2–4; Treasury Board of Canada, “Framework for the Management of Risk,” August 19, 2010, <https://www.tbs-sct.canada.ca/pol/doc-eng.aspx?id=19422>.

<sup>8</sup> Canada. Department of National Defence. *B-GJ-005-502/FP-000, Risk Management of CF Operations*, 3–4.

## Reasons for Risk Aversion

5. One of the reasons why most people, including military leaders, experience risk aversion can be found within the well-documented Prospect Theory. This theory describes findings that “people are risk averse to potential losses, and risk-seeking in regards to potential gains”<sup>9</sup>. Many studies of this theory identify a naturally occurring neurological tendency towards loss aversion, “or the idea that losses generally have a much larger psychological impact than gains of the same size”<sup>10</sup>. Studies estimate that the average perceived loss-gain ratio for most people is 1:2. In other words, most people would demand a reward of two hundred dollars in order to find the risk of gambling one hundred dollars acceptable in a game of heads or tails<sup>11</sup>. Additionally, brain mapping studies have shown notably stronger neural activity in response to possible loss than to possible gains<sup>12</sup>. Thus, people experience a greater fear of a loss than they do desire for an equivalent gain. To compound loss aversion, studies demonstrate that people tend to overestimate the risk of loss when an element of uncertainty is present<sup>13</sup>. For military leaders in operating environments which will always contain a varying degree of friction and uncertainty, this means that the general neurological tendency towards loss aversion can make it especially challenging to assess and weigh risk and risk pay-off. Even more so when the potential perceived benefits of a certain decision do not clearly and significantly outweigh the potential loss. This has the potential to result in increased instances of overestimated tactical and operational risk, inaction in an effort to avoid potential risk, and the loss of the initiative on a tactically advantageous opportunity.

6. An additional reason for risk aversion is captured within studies on Norm Compliance, which demonstrate that people use perceptual information (or reliable facts) as well as social norms in order to make decisions<sup>14</sup>. Studies show that compliance with social norms can have a greater degree of influence on the decision process than perceptual information<sup>15</sup>. This is heightened when the decision-maker has knowledge of potential rewards or punishments for decisions made by others within the organization, depending on whether their choice was aligned with or against social norms<sup>16</sup>. It is also heightened when the reliability of the available information is in question, or an element of uncertainty is introduced. In this case, the decision maker can place even more weight

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<sup>9</sup> Gerald E. Evans and Michael G. Evans. “Leadership, Risk Aversion and Resistance to Change: An Empirical Confirmation of Prospect Theory,” in *European Conference on Management, Leadership & Governance* (Kidmore End, United Kingdom: Academic Conferences International Limited, 2017), 97–98, <https://www.proquest.com/docview/1980087110/abstract/795C6B4E3969493BPQ/1>.

<sup>10</sup> Russell A. Poldrack. “What Is Loss Aversion?,” *Online Journal, Scientific American*, July 1, 2016, <https://www.scientificamerican.com/article/what-is-loss-aversion/>.

<sup>11</sup> Poldrack.

<sup>12</sup> Poldrack.

<sup>13</sup> Peter L. Bernstein. *Against the Gods: The Remarkable Story of Risk* (New York: John Wiley & Sons, 1996), 278–81.

<sup>14</sup> Ulf Toelch, Folco Panizza, and Hauke R. Heekeren. “Norm Compliance Affects Perceptual Decisions through Modulation of a Starting Point Bias,” *Royal Society Open Science* 5, no. 3 (March 28, 2018): 2, <https://doi.org/10.1098/rsos.171268>.

<sup>15</sup> *Ibid*, 8–10.

<sup>16</sup> *Ibid*, 8–9.

on social norms informing the decision<sup>17</sup>. This indicates that when a military leader is making a risk decision, they use the information available to them to assess the potential gains and potential losses associated with a decision and then assess whether the potential loss is socially acceptable within the set of norms the organization fosters. Shifts in Western societal norms, and equally Western military norms have resulted in what some identify as “a risk-averse organizational culture within the CAF, which may in the long run seriously undermine its operational capabilities in the event of a major armed conflict”<sup>18</sup>. Thus, the perception of a more risk-averse organizational culture, responsive to a more risk-averse overarching society, can increase the potential that a military leader may make a decision more heavily influenced by social norm compliance with a preference towards risk aversion.

### **Risk Adaptors**

7. The opposite of risk aversion is risk-seeking behaviour. Risk seekers make up a minority of the population and include people who struggle with compulsive gambling and those who are drawn to extremely high-risk activities<sup>19</sup>. Risk-seeking is not an antidote to risk aversion for military leaders; this type of behaviour could lead to needless and unjustifiable risks to the mission. However, a study developed to measure risk propensity across a range of job functions and organizations identified a third category of risk behaviour: risk adaptors. This study found that people working within the financial sector, notably financial traders, were overall risk avoiders within most domains of their lives, but within their occupation in the finance domain, they were able to not only take risks but also harness and use risks to shape advantageous outcomes<sup>20</sup>. The study suggests that a level of business sector conditioning can account for this. In other words, training and informal socialization and conditioning can transform otherwise risk avoiders into people who are able to selectively and precisely assess and “bear major risks in order to perform”<sup>21</sup>. Although identified within the financial sector, risk adaptive behaviour is highly applicable and beneficial to military leaders who are required to assess, mitigate and bear great risk while minimizing the negative consequences of risk-seeking behaviour.

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<sup>17</sup> Ibid, 10.

<sup>18</sup> Danic Parenteau. “Officers Must Play Key Role in Transforming Organizational Culture,” *Canadian Military Journal (Ottawa)* 22, no. 2 (Spring 2022): 30.

<sup>19</sup> Nigel Nicholson *et al.* “Personality and Domain-specific Risk Taking,” *Journal of Risk Research* 8, no. 2 (March 1, 2005): 158, <https://doi.org/10.1080/1366987032000123856>.

<sup>20</sup> Ibid, 167.

<sup>21</sup> Ibid, 171.

## Reducing Risk Aversion

8. Studies have shown that a strategy called perspective-taking or reappraisal can reduce the neural response and negative emotions related to loss aversion in decision-makers<sup>22</sup>. In this strategy, all elements of the information available to make the decision remain the same, but the decision maker uses perspective-taking to think about it differently or from another angle. For example, studies have shown when people are asked to place themselves in the perspective of a different person, such as a successful financial trader, a stranger, or their supervisor, they experience less loss aversion response than when they only consider a risky financial decision from their own unique perspective<sup>23</sup>. For military leaders, perspective-taking can allow them to look at a risk decision from other perspectives, for example from the perspective of their superior commander, a flanking or supported commander, or a staff officer making a recommendation. This could offer a valuable alternative view of the risk decision and introduce a degree of objectivity to decrease unconscious emotional responses to the process.

9. Another perspective-taking technique allows a decision maker to take a broader view of the decision space. For example, financial firms encourage traders to look at decisions from a greater context to consider if this changes their perspective, such as looking at a financial decision as a small part of a much larger investment portfolio<sup>24</sup>. For military leaders, perspective-taking to consider the greater context will allow a decision maker to consider the possible gains and losses of a tactical risk decision in the context of a broader operation or campaign rather than focusing on immediate-term potential loss.

10. Perspective-taking can be enabled through the use of AI. AI programs that persistently capture and analyze the decision-making behaviour of humans can identify individual military leaders' decision-making patterns and strategies and develop a predictive model to provide a commander with a data-based perspective on how someone else, such as a superior commander, would think about a risk decision<sup>25</sup>. Additionally, operating space visualizers can take the sum of operational data and provide a predictive simulation of how a tactical risk decision could unfold within the greater context of the operating environment and campaign; a decision maker can navigate this simulation in both time and space to develop a richer perspective on both the decision in the context of the bigger picture and the possible cost and gain outcomes<sup>26</sup>. To offer further perspective, AI predictive modelling can provide a decision-maker with the visual representation of the residual risk score matrix for both the possible cost of risk and the possible gain of risk. Currently, commanders are presented a risk matrix from the primary perspective of

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<sup>22</sup> Peter Sokol-Hessner et al., "Thinking like a Trader Selectively Reduces Individuals' Loss Aversion," *Proceedings of the National Academy of Sciences* 106, no. 13 (March 31, 2009): 1, <https://doi.org/10.1073/pnas.0806761106>.

<sup>23</sup> Ibid, 2–3.

<sup>24</sup> Ibid, 2.

<sup>25</sup> Kase et al. "The Future of Collaborative Human-Artificial Intelligence Decision-Making for Mission Planning," 5.

<sup>26</sup> Ibid, 5.

potential threat, this can frame a decision more heavily towards risk aversion. Offering a residual risk matrix from the perspective of both threat and opportunity can provide more neutral baseline data with which a commander may be able to build an assessment and make a less biased decision. Using perspective-taking, assisted by AI or not, can help reduce a decision maker's experience of loss aversion by offsetting the negative emotional response to the potential loss, allowing them to assume a less biased lens when assessing the possible losses and gains associated with a risk decision.

11. These perspective-taking and framing techniques can easily be integrated into military training. At the lowest level, as a reflection exercise to allow developing leaders to better understand their own bias in risk decision-making. At a more sophisticated level, AI should be integrated as an assisting agent to a military decision-maker in operational planning processes in both training and operational settings to offer developed perspectives more complete than a human can provide in both breadth and depth.

## **CONCLUSION**

12. In the current operating environment where the tempo and complexity of competition and conflict are increasing, decision-making processes are critical to institutional agility and resilience. Decision-making authority pushed as far forward as possible relies upon military leaders being able to quickly and accurately analyze the threats, make risk decisions, and create opportunities to seize the initiative – or otherwise stay ahead of an adversary's decision-action cycle. Risk aversion is an obstacle to maintaining the speed of relevance and is a common and natural neurological response to possible loss. Overcoming risk aversion is critical for the CAF to remain agile in the current and future threat environment. Perspective-taking and reframing can assist leaders in reducing their emotional response to loss and dedicating their cognitive effort to assessing risk more as a whole, considering both potential gains and losses. Training to foster risk-adaptor behaviour will enable leaders to use risk and create opportunities to gain a relative advantage over an adversary.

## **RECOMMENDATION**

13. It is recommended that the CAF integrate perspective-taking and reframing techniques into foundational training, operational planning courses, and within military training exercises to provide opportunities for leaders to reflect more deeply on their risk biases and behaviours and to practice viable and replicable methods to overcome risk aversion in operational contexts.

14. Although the focus of this paper was on the human aspects of risk analysis in decision-making, it is recommended that the CAF invest in widely integrating AI and machine learning technology into the conventional force's decision-making processes, especially as a complementary enabler.



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