**CANADA’S ARCTIC**

A policy analysis framework

**L’ARCTIQUE CANADIEN**

Un plan d’analyse politique

A Thesis Submitted to the Division of Graduate Studies of the Royal Military College of Canada

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Abstract

This thesis examines the impact of Canadian Arctic security policies both at home and abroad over short, medium, and long-term time horizons. While the extant literature on Arctic security policy does offer some guidance for Canadian policymakers, there are no means to forecast the response these suggestions will elicit both domestically and abroad. This thesis argues that Rational Choice approaches to cooperation games as well as the use of a Strategic Tradeoff Model when forecasting the likelihood of a policy’s success are instructive. This study offers a combination of different relevant cooperation games and synthesises them into a single, sequential forecasting framework to which a policy can be applied and tested for international cooperation followed by a Tailored Strategic Tradeoff Model to evaluate outcomes domestically over short, medium, and long-term time horizons. This thesis not only presents the framework, but also tests it against select Arctic security policies for Canada. The findings reveal that the forecasting framework and accompanying Strategic Tradeoff Model offer insights to policymakers drafting Canadian Arctic security policy and is indeed a useful tool for future security discussion and decisions.

Resumé

Cette thèse examine l’impact que des politiques canadiennes de sécurité dans l’Arctique pourraient avoir au Canada et ailleurs à court, moyen, et long terme. Bien que la documentation existante sur la politique de sécurité dans l’Arctique offre quelques conseils aux décideurs politiques canadiens, il n’existe aucun moyen de prévoir la réponse que ces idées provoqueront au Canada et ailleurs. Cette thèse soutient que les approches relevant du choix rationnel au sein d’un modèle de jeux coopératifs et un modèle de compromis stratégique permettent en partie de prévoir la probabilité de succès d’une politique. Cette étude propose de combiner différents jeux coopératifs pertinents, et de les synthétiser dans un cadre de prévision logique et séquentiel auquel une politique pourra être testée et appliquée suivi par un modèle de compromis stratégique pour évaluer les résultats au niveau national sur des horizons temporels à court, moyen et long terme. Cette thèse présente le cadre et teste celui-ci par rapport à certaines politiques de sécurité dans l’Arctique pour le Canada. Les résultats révèlent que ce cadre de prévision et le modèle de compromis stratégique offrent des perspectives concrètes aux décideurs politiques qui établissent la politique de sécurité dans l’Arctique canadien, et qu’il s’agit finalement d’un outil utile en vue des discussions et des décisions futures en matière de sécurité.

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LIST OF ACRONYMS

ADIZ - Alaska Air Defence Identification Zone

ANPF - Arctic and Northern Policy Framework

CAF - Canadian Armed Forces

GDP - Gross Domestic Product

NASTE - The New Arctic Strategic Triangle Environment

NATO - North Atlantic Treaty Organization

NORAD - North American Aerospace defence Command

NSR - Northern Sea Route

NWP - Northwest Passage

SSE - *Strong, Secure, Engaged: Canada’s defence Policy*

UNCLOS - United Nations Convention On the Laws of the Sea

USNORTHCOM - United States Northern Command

In 2017, the Government of Canada released *Strong, Secure, Engaged* (SSE), Canada’s newest defence policy. The document offers guidance for policymakers by articulating defence priorities and challenges for the Canadian Armed Forces (CAF) at home, in North America, and abroad by outlining Canada’s long-term vision for the role of the CAF in the global community. The document provides the Canadian public and foreign governments with an outline of the federal government’s intentions for the defence and security of the country. SSE separates these Canadian challenges into three approaches for policymakers titled: anticipate, adapt, and act. In a defence policy-making context, anticipate means “better understand potential threats to Canada and Canadian interests so as to enhance our ability to identify, prevent or prepare for, and respond to a wide range of contingencies” (2017). The intended result is to have adequate infrastructure, resources, and protocols in place enabling the state to respond quickly and efficiently against future threats to national security both domestically and abroad.

Emerging security threats that Canadian policymakers anticipate in SSEwill take place in the Arctic specifically. There are threats to the Arctic, such as to the quality of life for northern peoples and the impacts of climate change, threats from the Arctic, such as adversarial states approaching Canadian airspace in the north triggering the scrambling of Canadian fighter jets, and threats that emerge through the Arctic, such as high-altitude balloons used for foreign surveillance that transit through the Arctic into the rest of Canada and even into the United States.

SSE is not Canada’s only policy document that speaks to the Arctic. In 2016, the federal government released *Canada’s Arctic and Northern Policy Framework* (ANPF). This framework offers a multifaceted approach to security beyond traditional approaches that focus on conflict to include food sustainability, environmental security, access to energy, and human security for Canada’s northern communities that call the Arctic home. A concern highlighted by both frameworks surrounds the implications of climate change on the Arctic region. Presently, climate change is increasing annual temperatures in Canada’s Arctic region. For example, every summer since 2007, the Canadian Archipelago in the Arctic experienced temperatures warm enough to melt ice that has previously remained solid year-round (Perovich, Gerland, Hendricks, Meier, Nicolaus, Richter-Menge, & Tschudi, 2011). The result of such thawing has led to progressively longer openings of the “Northwest Passage” (NWP) every summer. The effect of warmer temperatures leading to longer shoulder seasons for the waterway means that trans-Arctic summer shipping will become feasible in the coming decades (Corell, 2006). Increased access to the Arctic region has generated global interest regarding possible economic developments. Potential economic interests include but are not limited to natural resource extraction, tourism, and shipping routes for trade purposes and even for illegal activity. Within Canada, there is also much discussion on investing in Northern communities who, to this day, struggle with inflated food prices, poor Wi-Fi connection, infrastructure damage due to permafrost, and a lack of adequate housing, all of which are a by-product of the harsh Arctic climate and distance from the vast majority of Canadian society who reside within 160 kilometers of the United States’ lower 48 states.

The Canadian Arctic is, therefore, a region that is becoming more accessible and of increasing interest to both Canada’s allies and adversaries, while also emerging in Canadian domestic policy as a region requiring investment and support in order to improve the quality of life for northern peoples and economic opportunity. In keeping with SSE, the increase in Arctic-related discourse both domestically and internationally means that Canadian policymakers must anticipate future security threats that might arise in the region. At the 2022 Kingston Conference on International Security: International Competition in the High North, panelist Gaëlle Rivard Piché argued that Canada is slow to wake up to Arctic issues because of the region’s historic inaccessibility but, as climate change and technology advance, threats that once seemed far away are now able to manifest closer to home. During the Conference, Rivard Piché further noted that the Arctic is where Canada is most vulnerable to exploitation by foreign actors, through both formal and informal means, emphasizing that the Canadian federal government requires an overarching, multipronged strategy when anticipating future Arctic security challenges.

The increasing global interest in the economic development of the warming Arctic region creates a new state of affairs for Canadian defence policymakers. They must now anticipate possible future threats and challenges to Canadian security that could emerge from within its Arctic territory, to its Arctic territory from an outside influence, or through Canada’s Arctic territory from an outside influence, and produce and adapt policies accordingly. For example, an increased human presence generated through tourism could require additional resources to be allocated for potential Arctic search and rescue missions. An increase in the number of ships transiting the Canadian Arctic region at any given time could create concerns regarding the establishment of an effective means for monitoring pollution in Canadian Arctic waters and an effective means for enforcing compliance with the Canada Shipping Act in order to lessen the environmental impact of such pollutants on Arctic ecosystems. The social and economic difficulties that remote northern communities face must also be addressed when looking to develop the entire Canadian Arctic region that includes the Canadian territory Nunavut, which has the highest suicide rate compared to other Canadian provinces and territories. As most economic opportunities in Canada’s north revolve around natural resource extraction, these opportunities could also present an informal threat to Canada if large-scale foreign investments by adversarial nations were to be allowed to take place as they could increase foreign influence in the region that does not align with Canadian interests.

There are also possible future threats to Canadian national security in the Arctic region. For example, the Government of Canada claims that the NWP is internal Canadian water over which it exercises sovereign control. “Under this international strait framework, Canada has the right to regulate most aspects of traffic in the waterway yet cannot prohibit or restrict international shipping traffic” (Steinfeld, 2020). However, Canada’s closest ally, the United States, officially considers the NWP to be an international strait, thus subject to transit passage. Transit passage is defined by the United Nations Convention on the Law of the Sea (UNCLOS) as,

…the freedom of navigation and overflight solely for the purpose of continuous and expeditious transit of the strait between one part of the high seas or an exclusive economic zone and another part of the high seas or an exclusive economic zone. However, the requirement of continuous and expeditious transit does not preclude passage through the strait for the purpose of entering, leaving or returning from a State bordering the strait, subject to the conditions of entry to that State (1982).

While the discrepancy between Canada’s and the United States’ official position on the status of the NWP does not currently pose a threat to Canada due to its protection under Article 35a of the United Nations UNCLOS which clearly defines how ships and planes are able to operate in the region, were international perception of the waterway to change, overflight of the passage from competitors could occur for different reasons (Lalonde, 2015). For example, overflights over the NWP could pose a risk to national security because of the proximity to Canadian territory and the possibility of espionage or aggressive behavior, which is already being seen in the Arctic through covert methods such as high-altitude balloons and monitoring buoys, even if such actions are not sanctioned by the United Nations. As a direct result of such anticipated security challenges, defence policymakers have to utilize the other two pillars listed in Canada’s defence policy, named adaptation and action, in order to prepare for and assert Canadian domestic and foreign interests in the region.

Another emerging factor Canadian policymakers must consider when creating and developing policy for the Arctic is the current political tensions between Russia and the North Atlantic Treaty Organization (NATO) countries of which Canada is a member. As the invasion of Ukraine continues, Russia and NATO states remain at odds. Concurrent with European disputes, the United States recently released its *National Strategy for the Arctic Region* which, when referencing conflict with Russia, seeks “to both effectively compete and manage tensions.” The strategy document, despite being fifteen pages in length, contains twenty references to the nation’s conflict with Russia and its commitment to enhancing its military capabilities in order to deter threats from adversaries. Canada, being a NATO state that shares the world’s largest land border with the United States, and being party to the only bi-national command in the world under the North American Aerospace Defence Command (NORAD) with the United States, must therefore carefully consider escalating tensions when creating its own Arctic security policies.

Arguably, the Arctic has always been an area of geopolitical importance for Canadian defence policymakers. During the Cold War, the Arctic served as a boundary between the Soviet Union and of Canada and the United States. The region became crucial to Allied security because it supported infrastructure for early warning systems that were able to alert NORAD personnel to possible Soviet bombers. Both radar and sonar devices were used to warn Canada and the United States of potential incoming Soviet air-breathing threats and maritime vessels thus increasing the amount of time both nations had to deny and prosecute provocative Soviet actions such as by intercepting and neutralizing threats, launching counterattacks, and issuing warnings to civilians about possible incoming dangers. Following the end of the Cold War in 1991, the Arctic lost much of its geopolitical importance. Instead, the Government of Canada and other NATO member states focused their attention primarily on the war against terrorism and Pacific waters (Bott 2020). Canadian defence policymakers have renewed their interest in the Arctic region due to the impacts of climate change and the rise of great power competition in the region. This renewed interest in the development of Canada’s Arctic is demonstrated in Canada’s defence policy, SSE released in 2017.

Canadian policymakers must constantly work to keep abreast of the ever-evolving understanding of Canadian Arctic security. Traditional notions of security must be reconsidered in order to include socio-economic development and environmental protection, all while positioning Canada as a powerful state to both allies and adversaries. Policymakers must therefore develop domestic and international Arctic policies that complement one another across the short, medium, and long term.

In keeping with the first approach of SSE, this thesis examines and assesses the ability of Canadian defence policy to more accurately anticipate all types of future challenges when developing Arctic security policy. To begin with, Arctic actors and Arctic interests are varied and frequently at odds even among allies, notwithstanding the interests of competitors. Moreover, there lacks a consensus on the “correct” approach to anticipate and prepare for future security challenges. Some argue that Arctic security should strictly pertain to social and economic investment while others hold the view that Arctic security is about military capacities to deter threats from adversarial nations. As Rivard Piché’s remarks demonstrated earlier, there are also scholars who believe that Canadian Arctic policymakers must consider both arguments when developing policy. Regardless of differing opinions, currently, Canada lacks both adequate social and economic investments for its northern peoples, as well as adequate Arctic military capabilities to defend itself against adversarial states. Given that Canadian policymakers must always anticipate all future security threats, they must therefore consider both approaches when evaluating existing and future Canadian Arctic security policy by forecasting their potential short, medium, and long-term impacts.

While much has been written about such future challenges, comparatively few studies have offered guidance towards a framework for Canadian policymakers to follow in order to evaluate future impacts of existing Arctic security approaches, be they military-based or socio-economically driven, over short, medium, and long-range forecasts. In addition, of the studies that do exist offering guidance for Canadian policymakers, almost none examine responses to Canadian efforts by competitors or Canadian Allies. While not a critique per se of the extant literature, it is nonetheless an underdeveloped aspect and one that this thesis addresses. More specifically, this thesis develops an analytic framework to forecast if and how Canada’s own efforts to secure its Arctic claims are able to produce favorable domestic and international outcomes over three different periods of time: short-term (5 years), medium-term (10-15 years), and long-term (20-25 years). Put simply, moving forwards, how might Canadian northern people, Canadian Allies, and Canadian competitors respond to the Government of Canada’s efforts to increase security over its Arctic region?

This thesis begins with a literature review discussing differing scholarly approaches to Arctic security, Canada’s national Arctic strategy, the Canadian Rangers, and northern peoples. From there, the theory section outlines the approaches used to create a forecasting framework for Canadian policymakers such as Rational Choice and game theory. Next, the methods chapter provides an overview of the created forecasting framework and how it can be utilized for policymaking decisions. The findings chapter provides an evaluation of the forecasting framework on existing Canadian Arctic policy topics. Then, the discussion chapter demonstrates that the insight produced from the forecasting framework contributes to a clearer understanding of the potential negative impacts Arctic security policies might have on Canada’s relationship with allies, adversarial states, as well as its own northern peoples. Lastly, the conclusion and recommendations chapter advocates that the model is a heuristic for Canadian Arctic policymakers.

LITERATURE REVIEW

**Understanding Different Scholarly Approaches to Arctic Security:**

As previously noted, there is no consensus among scholars regarding the best or “right” approach to Arctic security. Upon examining the literature produced regarding Canadian Arctic security, academic opinions are divisible into three separate camps. Dubbed “warners, reassurers, and inbetweeners,” by Mikkel Runge Olesen, all schools of thought produce valid insights into Canadian Arctic security. Warners are scholars who point to the possibility of political and or military conflict in the Arctic and advocate for states to prepare themselves accordingly. Reassurers on the other hand argue that Arctic conflict is unlikely, and that Arctic policy should instead focus on strengthening existing Arctic cooperation in order to ameliorate Arctic living conditions. Lastly, in-betweeners, who fall amid both groups, prefer to be cautiously optimistic, pointing out past, present, and expected future successes among cooperating nations, but not discounting the possibility that conflict could occur (Olesen 2014). The following literature review establishes that while all schools of thought present credible arguments, policy analysts and policymakers cannot choose to follow only one camp. Instead, policymakers must be adequately prepared for all scenarios, in layman's terms, hoping for the best, but preparing for the worst.

The warners camp of literature offers a narrower, military-based approach to Arctic security. For example, in his journal article entitled “Arctic Meltdown: The Economic and Security Implications of Global Warming”, Borgerson indicates that as global warming increases the possibility of competition in the Arctic for resources as well as the possibility of two trade routes, Russia’s superior military capabilities put the United States, and its allies by association, at a dangerous disadvantage. Such a disadvantage is dangerous because Russia’s dominance will inhibit allies to develop favorable solutions to competing claims and potential conflicts (Borgerson 2008). Cohen, Dolbow, and Szaszdi argue that instances of Russian dominance are already occurring as they aggressively advance economic and territory claims by making use of international law and projecting their military strength in the region (2008). For example, in his article called “A U.S. Security Strategy for the Arctic” written for *War on the Rocks*, Professor David Auerswald indicated that in 2020 U.S. Alaska Command, under U.S. Northern Command (USNORTHCOM), reported that they had intercepted more Russian military aircraft near the Alaska Air Defence Identification Zone (ADIZ) than at any other time since the Cold War (2021).

The stance on Russia’s Arctic powers is furthered by retired US Navy Captain Christopher D. Bott with regard to Russian naval capabilities in his paper titled “Responding to Russia’s Northern Fleet”. Bott’s paper emphasizes that Russia’s Northern Fleet is currently “better organized, equipped, and trained than ever” whereas allied Arctic capabilities were not prioritized over counter-terrorism initiatives and operational capacity in the Pacific. (2019). These claims are furthered by Eric Posner who argues that despite reassurers’ belief in intergovernmental organizations’ legislation designed to handle conflicts, the law tends to defer to states capable of enforcing sovereignty claims, thus recognizing that when analyzing the possibility of future disputes, power is paramount (2007). This argument is echoed by Cohen, Dolbow, and Szaszdi as they dictate that Russian military capabilities enable the Kremlin to take de facto possession of disputed underwater territories (2008). Posner, therefore, recommends that allies work closely together in order to counterbalance Russian strength. In order to accomplish this challenge, Posner specifically recommends that Canada and the United States compromise on their current stances regarding the legality of the NWP in order to focus more on countering Russia. A similar sentiment was expressed by the late Paul Cellucci, the former United States ambassador to Canada, who suggested that it could be in the interest of the United States national security to have Canada maintain and exercise control over the waterway in order to create a security perimeter for the allied nations (2007).

Still, reassurers point correctly to the fact that Canada has never been attacked through its Arctic and that Arctic nations are part of numerous intergovernmental organizations that seek to work collectively to promote Arctic sustainability. Hubert notes, however, that while this is true, there is an increase in arms buildups among numerous Arctic 8 states. For example, in recent years Russia has reactivated and modernized previously unmanned military bases, increased military exercises in the Arctic, and increased military training in the Arctic (O’Rourke 2021). Also of note is that Russia has the only nuclear-powered icebreaker ships, powerful enough to break ice up to seven feet in thickness. While these icebreakers do not belong to the Russian military, they are demonstrative of Russian capacity to better navigate Arctic waters than other states and were designed with economic incentives in mind. The Director of the Northern Sea Route (NSR) Directorate of Rosatom State Corporation is quoted as saying that the “icebreakers will ensure the fulfillment of all tasks for Russia in the Arctic Ocean” (2020). His takeaway from assessing the increasing military capabilities of Arctic states leads him to pose the question regarding state intentions. If the Arctic is peaceful, why continue to develop military capabilities? When states develop military capabilities, there is always the possibility of triggering an arms race. Left unchecked, such actions are capable of escalating into conflicts. Similar to Huebert, Greenhaw, Magruder Jr, Mchaty, and Sinclair predict that Russian and Chinese Arctic military security activity will create a security dilemma that will compel the United States, Canada, and NATO Nordic states to reciprocate. Already, they argue, Russian arms build-ups have led both NORAD countries to increase their cold weather training in the Arctic region (2021).

Moreover, despite reassurers’ arguments that conflict is unlikely, in a press release issued in June 2020, NORAD indicated that the Russian military had penetrated Canadian or Alaskan Air defence Identification Zones a total of eight times. While remaining in international airspace, these actions are antagonistic in nature and demonstrate Russian capacity to test the readiness of NORAD forces which must act accordingly. Outside of the North American Arctic, other Arctic states are experiencing changes in their established dynamics with Russia and its military. For example, Norweigan journalists reported a decrease in open communication with Russia in March of 2021. Providing an interview for Larry Luxner’s article for the Atlantic Council titled “The Arctic is a place of unusual international cooperation. Can that last?” Thomas Nilsen indicates that whereas in the past journalists were able to get a direct line with a Russian military press spokesperson, this is no longer the case. Nilsen suggests that this lack of communication is problematic because when situations arise, such as when a recent Russian warship sailed west of the Fisher Peninsular close to the territorial waters of Norway for the first time since the fall of the Soviet Union, there was no line of direct communication to address concerns or wrongdoings. Instead, Nilsen argues that the lack of communication enables Russia to deny the occurrence of antagonistic actions and leads to possible misinterpretations of military activity (2021).

Similarly, there are multiple reports of foreign activity in Canadian territorial waters without permission. This topic is discussed in Lieutenant Colonel Dittmann’s article titled “In Defence of Defence: Canadian Arctic Sovereignty and Security” where it is noted that there are continuous rumours of adversaries, such as China and Russia, and even allies, such as the United States the UK and France transiting submaries under Canadian Arctic waters (2009). This topic is also mentioned by Lackenbauer and Lajeunesse in their article “The Canadian Armed Forces in the Arctic: Building Appropriate Capabilities”. The authors discuss the fears that such unauthorized transits have existed since the Cold War as well as credible reports indicating that such incidents have indeed occurred (2016). For example, in Wallace and Staples’ article “Ridding the Arctic of Nuclear Weapons: A Task Long Overdue” it is discussed that the Canadian Armed Forces deployed naval and air assets to investigate two Canadian Ranger reports linked to a foreign submarine sighting, first an explosion and then a sighting near the eastern entrance of the NWP (2010).

Huebert indicates that maritime threats, such as the submarines discussed by aforementioned scholars, and aerospace threats supersede any invasion threat which oftentimes warners and even military leaders have indicated are unlikely due to difficult weather conditions (2018). This argument is echoed in NORAD and USNORTHCOM’s *Strategy Executive Summary* when USAF Commander General Glen D. Vanherck states that “Russia’s fielding of advanced, long-range cruise missiles capable of being launched from Russian territory and flying through the northern approaches and seeking to strike targets in the United States and Canada has emerged as the dominant military threat in the Arctic” (2021).

In addition to overt threats such as cruise missiles, there are also covert threats to the Arctic. For example, there has recently been much media attention surrounding the discovery of high-altitude balloons and monitoring buoys found within Canada’s Arctic territory or found to have transited through Canadian Arctic territory. This was confirmed by Mr. Daniel Le Bouthier, head of media operations at Canada’s Department of National Defence when he provided a statement to *The Globe and Mail* saying that “The Department of National Defence and CAF are fully aware of recent efforts by China to conduct surveillance operations in Canadian airspace and maritime approaches utilizing dual-purpose technologies”. In this context, dual-purpose technologies refer to equipment that can be utilized for civilian and military purposes (2023). Canada’s former Minister of National Defence, Anita Anand, was also quoted saying that such types of foreign surveillance activities are not new (2023). For example, instances of Chinese monitoring are also known to affect Canadian allies as can be seen in 2019 when the Danish Defence Intelligence Service chief Lars Findsen also quoted Chinese research expeditions as having a “dual purpose” highlighting that research expeditions are being utilized as a means for the Chinese military to gain more access to the Arctic region.

On this matter, the federal government of Canada recently announced a 4.9 billion dollar 6-year project to upgrade Canada’s air defence radars under NORAD for improved early warning radar coverage and tracking of threats emerging from the North, a project that will total 40 billion dollars over the next 20 years.

The reassurers camp is more dovish when approaching the topic of Arctic security. Reassurers seek to demonstrate that fears regarding the conflict in the Arctic are exaggerated (Young 2009). Hilde echoes this assertion in his article titled “The “New” Arctic: The Military Dimension”when he submits that there is no current arms race in the Arctic, but rather “a limited modernization and expansion of military installations and forces in the Arctic; with which an important aim is to strengthen the ability of the coastal states to deal with accidents and other crises resulting from human activity” (2013). This claim is furthered by Andrea Charron and James Fergusson’s *Arctic Sovereignty: Preoccupation vs. Homeland Governance and Defence* when they argue that examples of so-called Russian “aggressive” behaviour in the Arctic region, through the form of military flights penetrating Canadian or ADIZs, does not challenge Canadian sovereignty because there is no *de facto* threat to Canadian sovereignty. In this context, *de facto* implies something that is factual, regardless of whether it planned or intended to be that way. As such, Charron and Fergusson are demonstrating that aggressive behaviors have not and do not translate to a physical loss of land for Canada in its Arctic region. Charron and Fergusson note that military flights always respect Canadian airspace (2018). Another key indicator that reassurers argue is the fact that Russia has no interest in attacking either the United States or Canada and if it were to do so, the Arctic does not possess any strategic targets and Russia has antiquated military aircraft making the interception of flights unlikely to escalate into kinetic operations (Lackenbauer and Lajeunesse 2016).

Furthermore, it is argued that “sovereignty” is often used as a buzzword to inaccurately describe homeland security issues (Charron and Fergusson 2018). This discounts warner assertions that “in the Arctic, sovereignty equals security” (Coffey and Kochis 2021). Charron furthers reassurer’s arguments in *NATO, Canada, and the Arctic* when she asserts that, of all the Arctic states, Russia has the most to lose should it become conflict-ridden since it is the largest and most important Arctic actor (2017). Koivurova and Salmela echo Charron’s argument regarding utility when they argue in their chapter written for *Nordic Cooperation and the Far North* that even states with disputed territorial claims gain more from internationally settled standards than acting otherwise. Seeing as all states gain more from stretching their outermost limits as far as possible, legal legitimacy as a whole is more utility-maximizing than select disputed areas. Further to this argument, Koivurova and Salmela note that any and all disputes have, so far, been addressed in accordance with international law (2011). In fact, scholars Lasserre, Le Roy, and Garon argue that on the topic of Arctic sovereignty disputes, Canada is perceived as the most aggressive country by Europeans (2012). However, Koivurova and Salmela do discuss the differences between state obligations and rights and military strategy. They note that, if zones are established for which a state’s military will develop a strategy to protect and defend, spheres of influence could be established prompting controversy (2011).

Despite Charron’s argument that Russia has the most to lose should the Arctic become conflict-ridden, this has indeed happened since 2014. For example, in his chapter on “The New Arctic Strategic Triangle Environment (NASTE)”*,* Huebert notes that “although Moscow attempted to isolate its action in Ukraine from its cooperative efforts in regional Arctic affairs, its actions in 2014 had a spill-over effect into circumpolar relations”. Specifically, Canadian officials boycotted the Arctic Council task force that took place in Russia that year and the Canadian government-imposed travel bans on some Russian officials and suspended bilateral exchanges (2019). It can also be seen that, despite multiple references concerning the importance of international law being upheld in its current National Security Strategy, Russia continues to move forward with its invasion of Ukraine following Kyiv’s desire to join NATO and now Russian President Vladimir Putin is the subject of an arrest warrant issued by the International Criminal Court regarding an alleged scheme to forcibly deport Ukrainian children to Russia. While it is important to note that the Ukraine conflict is in no way linked to matters of the Arctic, it cannot be ignored that Russia has willingly ignored international law and entered into a costly conflict in order to achieve its own defence objectives. With Finland and Sweden now members of the Atlantic Alliance, Russia now believes it will have to look to its Northern Fleet to “safeguard the northern approaches to Russian territory, stand up to NATO in the Arctic, secure navigation along the NSR, and project itself towards the “world ocean” to fulfill an even more demanding range of missions” (Delanoë, 2023).

In a report titled *Changes in the Arctic: Background and Issues for Congress*, authors from the U.S. Congressional Research Service attempt to balance the arguments of warners, reassurers, and inbetweeners. They highlight that, while all perspectives deserve merit, it is not sufficient for policymakers and policy analysts to adhere to one single approach since the future is unpredictable and bounded rationality limits decision-making. Canadian policy analysts will therefore never be able to fully predict when, where, and how future security challenges will appear (Dittmann, 2009). Instead, O’Rourke suggests that the best avenue to take is to “devise an approach that best mixes the potential strengths of each perspective” (2021). This is exemplified throughout current scholarly literature which debates whether the issue of Arctic security is or is not a pressing threat more than providing policy recommendations. Lackenbauer and Lajeunesse have argued that “it is important for commentators and analysts to contemplate worst-case scenarios to identify potential risks and vulnerabilities. However, an excessive fixation on remote *potentialities* and their misidentification as *probabilities* can lead to misallocated resources (intellectual and material), unwarranted suspicion and paranoia, and messaging that can lead to a security dilemma” (2016). The “inbetweener” notion is also seen in SSE*.* In his introduction for Chapter Two of Lackenbauer, Dean, and Huebert’s collection of articles on *(Re) Conceptualizing Arctic Security,* Ryan Dean argues that SSEmoves beyond the warner and reassurer debate in order to address both “probably and possible” threats to Arctic security (2017).

**Understanding Military-Focused Approached to Arctic Security**

Military approaches to Arctic security differ from theoretical approaches because they do not have the option to be wrong. Put simply by Iris A. Ferguson, the United States Deputy Assistant Secretary of Defense for Arctic and Global Resilience, “There might not be conflict now — and there hopefully will never be conflict in the Arctic — but we need to be prepared to operate there" (2022). This is exemplified by the 2019 Arctic Strategy Unit’s creation by the U.S. Department of Defense, closely followed by the U.S. Navy, Army, and Air Force as well as NATO’s first meeting on the Arctic held in the same year.

In their policy paper titled *Beyond Norad and Modernization to North American Defence Evolution,* Andrea Charron and James Fergusson offer a present-day analysis of Canada’s defence capabilities in its Arctic region. Both authors discuss how Canada and the United States do not have the adequate defence infrastructure to protect themselves from acts of aggression originating from the North in the form of air-breathing threats such as cruise missiles and those that can be launched from an aircraft that, with modern-day technology, can now be launched from outside of NORAD’s North Warning System scanning boundaries. It is argued by both authors that this lack of defensive technology places Canada and the United States at a disadvantage when engaging in policy tactics with Russia (2017).

Russia’s military capabilities mean that the Russian government is currently able to employ the escalate-to-de-escalate tactic without Canada and the United States having the military infrastructure to escalate their own weaponry to an equal or superior level to that of Russia. The escalate to de-escalate tactic refers to the notion that Russia could be able to use its advanced weaponry in order to intimidate the United States and Canada into cooperation. Thus, both nations would have no other choice than to appease Russia were there to be an act of aggression in the Arctic region. Charron and Fergusson as well as Bott conclude that greater military investment must be made in order to better balance this power dynamic (2019, 2017).

In Canada, SSE lays the foundational approach for the Canadian military’s role in the Arctic. The document created by the federal government establishes that under SSE there will be increased Arctic presence, improved Arctic satellite communications (including for intelligence, surveillance, and reconnaissance purposes), the delivery of the Arctic and Offshore Patrol Ship project, the delivery of vehicles that can operate in Arctic environments, increased cooperation with Arctic partners, improved search and rescue responses in the Arctic, an expanded Canadian Air Defence Identification Zone, and an increase in joint Arctic exercises with Allies (2017). The policy outlines concrete military actions that Canada will take to protect and expand its Arctic presence and capabilities.

**The Role of the Canadian Rangers and Northern People in Arctic Security**

Harsh Arctic temperatures require niche expertise (Aitchison and Breede 2021). It is for this reason that Canada has successfully employed the skills and knowledge of indigenous peoples who have long called the Canadian Arctic region home. While not exclusively made up of indigenous peoples, the Canadian Rangers, a subcomponent of the CAF reserve is Canada’s permanent and widest-reaching northern presence. Initially dubbed as the eyes and ears of the North, the role of the Canadian Rangers has evolved in recent years to offer more support to the CAF. For example, in the Report of the Standing Committee on Foreign Affairs and International Development titled *Nation-building at Home, Vigilance Beyond: Preparing for the Coming Decades in the Arctic* it was highlighted that in 2018, the Canadian Rangers were actively used in a CAF surveillance operation. The operation was so successful that the committee put forth a recommendation that the Government of Canada should expand the National Defence Act in order to train Canadian Rangers and Junior Rangers in drone technology, thus increasing their capacity for intelligence gathering. The Canadian Rangers have also been deployed alongside southern CAF regiments for the purpose of teaching and guiding, the result of which has repeatedly been found to increase the CAF’s efficiency in the Arctic region (Lajeunesse 2015).

Additionally, scholars are quick to point out that the Canadian Rangers play a critical nation-affirming role for the Canadian government. Lackenbauer states that the Rangers act “as a bridge between diverse civilian and military cultures, and between North and South, the Rangers successfully integrated national sovereignty and defence agendas with local interests” (2013). For example, given their proximity and ties to the community, the Rangers receive reports of suspicious activity, as seen in 2008 when Inuit hunters spotted a foreign submarine following an explosion near the entrance of the NWP (Teeple, 2010). In the first instance of the explosion and the second of the submarine sighting, the Inuit hunters sought out the Canadian Rangers who then transferred the information accordingly, coordinating with their CAF counterparts.

The Rangers also contribute to Canadian Arctic security by expanding the number of military personnel present in the region at any given time, training other forces members, and increasing their participatory role in Canadian defence. This point is exemplified by the fact that there are currently about 5,000 active rangers, speaking 26 different languages across five different patrol groups with a robust Junior Canadian Ranger program. Lackenbauer goes further to argue that the Canadian Rangers are successful because they adjust military policy to First Nations cultures, ensuring that niche Arctic expertise is passed down from generation to generation (2013).

However, the scattered presence and limited military capabilities of the Canadian Rangers do not adequately enable the Government of Canada to successfully argue that Canada has the capacity to effectively coordinate defence-based initiatives in its Arctic region. Nevertheless, with its current trajectory, the federal government can argue that coupled with other initiatives, the development of the Canadian Rangers will play a role in ensuring Arctic security in a region expected to see increased traffic in the coming years.

The Government of Canada’s ANPF also provides context for Canadian Rangers as it notes the importance of their presence and the need to expand Ranger training and effectiveness. Further on the topic of Arctic security, the policy framework makes note that as the Arctic increases in development there is an increased “acute security risks associated with irregular movements of people and goods, the pursuit of foreign interests and human-induced disasters” emphasizing the need for the CAF and the Canadian Coast Guard to continue to work with northern communities in order to create sustainable solutions (2016). The document also emphasizes that the NWP is part of Canadian internal waters, something which is not agreed upon by the global community. However, the document does note that “The complexity of the regional security environment places a premium on collaboration amongst all levels of government, Indigenous peoples and local communities, as well as with trusted international partners, and we will continue to improve the ways we work together to keep pace with the evolving challenges” which demonstrates the importance of advancing Canadian interests, both domestically and abroad, while retaining existing allied relationships (2016). The ANPF also includes reassurer guidance as it outlines its vision to include socio-economic developments in health, transportation, and economic opportunities, as well as noting the importance of facing the effects of climate change on northern populations.

The literature examined shows that policymakers and policy analysts are left with the delicate task of balancing scholarly arguments that advocate for policies focusing on domestic, allied, and adversarial threats to security. One thing that warners and reassurers can agree upon, however, as Huebert notes and Lackenbauer agrees, is that Canadian Arctic policy is often reactive rather than proactive (2013). Dittman explains this behaviour as the result of it being virtually impossible to ever fully predict “when, where, and how future challenges will appear” (2009).

The overarching conclusion that can be drawn from the scholarly debates in this literature review is that at present, Canadian policymakers lack an adequate framework to assist them in their decision-making as they look toward expanding defence policies in Canada’s Arctic region. From warners to reassurers, there is no shortage of guidance for policymakers. However, through inbetweeners, it becomes evident that there is no concrete direction to follow. There is, therefore, an opportunity to establish a model for policymakers to use in order to determine the possible outcomes of policy recommendations in order to help determine the most favourable outcomes possible for domestic and foreign Canadian interests. Since Canada is not a global hegemon, lacking the political, economic, and military strength to assert its own agenda on an international stage with little pushback, the state must act strategically with other nations in order to obtain desired results. It is therefore imperative that Canadian defence policymakers consider the reactions of allied and adversarial nations when drafting Arctic security policies.

Of course, the future is impossible to predict however with absolute certainty. Rational Choice presents possibilities to forecast potential outcomes using game theory. This tool used as a heuristic, could help create a forecasting framework by enabling Canadian defence policymakers to forecast future policy reactions by entering their policy ideas into a model for assessment. From there, with the results produced from the model, decision-makers can adjust policies if necessary in order to improve their chances of future cooperation. It is thus in the interest of Canadian defence policymakers to make use of a decision-making model when creating policy on a topic in order to help maximize their own state’s interests. How this works is the focus of the remainder of this thesis.

THEORY

The biggest challenge Canadian policymakers face is not the creation of defence policy itself, but rather if the outcomes of such policies are favourable both domestically and abroad. At home, Canadian Arctic policymakers look to improve the security and socio-economic challenges that northern peoples face. On the topic of diplomatic relations, while seeking to advance its own state defence interests, Canada’s aim is to retain its present status as a cooperating security-seeking member of collective security and collective defence organizations. In order to remain cooperative, Canadian policymakers must ensure that their policies produce favourable outcomes in the short, medium, and long term.

The literature reviewed indicates that scholarly works on the topic of Arctic security have not yet produced game theory-based models to use as a forecasting tool when evaluating the likely responses that potential policy decisions regarding the Canadian Arctic might produce both domestically and abroad. A negative implication of the lack of the use of a standardized forecasting framework for policies being enacted is that such policies might not be assessed based on whether or not they will produce a positive or a negative outcome for Canadian interests over the short, medium, and long term. The lack of such a forecasting framework consequently means policy decisions are made individually. The implication is thus that there is no established standard framework in which all potential Arctic policies are inputted ahead of adoption by the Canadian government. Without a framework to determine the forecasted success of Canadian foreign policies in the Arctic region, discrepancies may occur in the short, medium, and long term. For example, policymakers seeking to advance Canadian interests might overlook the notion that their policies could negatively impact relationships with northern peoples, allied relations, and even adversaries. In order to produce optimal outcomes, policymakers must have the tools to properly evaluate the possible outcomes their policies might produce. While an individual policy may account for the response of others, this thesis proposes a systematic framework to assess all policies for coherence and potential unintended consequences. This thesis advocates for a forecasting framework to be used in order to ensure that all potential policy ideas are equally evaluated in a manner that seeks to determine whether or not the policy will produce Canada’s desired reaction from allied nations over the short, medium, and long term.

To begin with, Rational Choice theory and policy analysis’ strategic tradeoff model are introduced since they serve as the founding theoretical approach behind the proposed framework of this thesis. The groundwork presented by this theory is expanded upon throughout the rest of the Theory chapter. Then, the security dilemma and the irrational behaviour that it produces, are addressed in order to highlight that states must coordinate and cooperate with each other when policymaking in order to avoid conflict. Next, the theory behind the proposed forecasting framework is discussed. The discussion begins by examining why game theory is a useful tool followed by a determination that the Prisoner’s Dilemma, the Iterated Prisoner’s Dilemma, and the Stag Hunt game are best applicable to the question of forecasting for Canadian foreign policymakers focusing on Canada’s Arctic region over the short, medium, and long-term. The Prisoner’s Dilemma game is explained as a tool that Canadian policymakers can utilize as they attempt to coordinate with other states in order to evaluate whether or not their policy will be accepted or rejected. Stag Hunt is then addressed as a technique behind creating an incentive for states to cooperate. Furthermore, the use of Tit for Tat and the Reassurance Game is explored as a means of promoting said cooperation between states. Lastly, the possible use of these models in combination with one another to form a forecasting framework beneficial to Canadian policymakers is conceptualized.

**Defining and Understanding Security Policy**

In his book entitled *Security and International Relations*, Edward Kolodziej defines security as a specific type of problem: one that includes exchanges between people and their agents (states, organizations, or institutions) wherein violence and intimidation will be used if needed to attain a desired outcome (2005). In this context, security policy would therefore be focused specifically on military capability so that Canadians do not suffer from violence or intimidation in their everyday life. An example of a policy document that encompasses such ideas of security is SSE. However, as previously discussed, SSE is not Canada’s only Arctic security policy document. In the ANPF, the government of Canada expands security theory to include socio-economic concepts that are also capable of threatening one’s ability to exist, even if violence and coercion are not present. As mentioned earlier, topics such as food sustainability, access to energy, limited Wi-Fi services, and transportation, as well as climate change, high suicide rates, and minimal economic opportunities all make daily life for Canada’s northern peoples a challenge. In this context, traditional security theory must be expanded upon when developing a forecasting framework to consider these broader ideas of security policy as they too play a critical role in ensuring the sustainable development of Canada’s Arctic.

**A Foundation in Rational Choice Theory and Policy Analysis**

The overarching theoretical approach behind a forecasting framework that uses game theory is Rational Choice theory. Rational Choice theory is “a methodological approach that explains both individual and collective (social) outcomes in terms of *individual goal-seeking under constraints*” (Snidal 2022). It assumes that individual actors base their decisions upon a cost-benefit analysis. That is to say, rationalism theorizes why the same actor might make different choices in different situations (Lichbach and Zuckerman 2009). Lastly, Snidal argues that Rational Choice theory isn’t just a positive theory on how actors behave, rather it can be used as a normative theory to evaluate how actors should behave based on the options at hand (2002). In a political context, this means that states employing a rational choice approach assess what other states should do, based on a common understanding of utility maximization before making a decision. This is done in order to achieve the state’s desired outcome within the constraints of the international system.

In order to evaluate the behaviour of another state, game theory is often employed. Game theory is an analytical framework that allows an actor to evaluate the possible outcomes of a situation in order to determine which course of action is most favourable. Game theory relies upon the notion that individual actors always seek to maximize their own self-interests. However, Rational Choice and thus game theory have expanded in recent years to also consider the strategic interactions states make with one another prior to engaging in a decision-making scenario (Lichbach and Zuckerman 2009). As a result, game theory has grown to include theories like costly signaling which rationalize how actors are able to demonstrate their good intentions to one another through utility-minimizing reassuring actions.

Modern-day rationalists understand that the lessons learned from comparative politics must be incorporated into Rational Choice theory. Such lessons include considering structure, culture, power, and bounded rationality when decisions are being made or evaluated. These incorporated topics do not, however, detract from the Rational Choice affirmation that rational models can be broadly applied to analyze an actor’s behaviour. Instead, considering such factors alongside the use of Rational Choice leads to more detailed results than otherwise. Current rational choice is thus “concerned fundamentally with bargains, strategic interactions, transactions, and institutions and, increasingly, with incorporating research on cognitive capacities and limitations, information, and networks” (Lichbach and Zuckerman 2009). In policymaking, this means that Rational Choice theory can assist policymakers in determining which prospective policies will be successful both domestically and abroad. Rational Choice theory continues to evolve in order to remain a relevant decision-making theory in the modern era as Snidal asserts that its bargaining models can be used in order to determine the possibility of and strategies for desired inputs to lead to preferred outcomes. Snidal advocates for models that are simple in nature and create a clearer baseline, providing clarity on how one should proceed (2002).

Robert D. Putnam furthered the depth of Rational Choice’s game theory when he developed the political model for two-level games which serve as a metaphor for domestic-international interactions. Putnam’s model demonstrates that international negotiations between states consist of simultaneous negotiations taking place at the domestic level with different relevant societal actors (1988). Level I is thus the international level. Level II is thus the intranational level. He argues that a chief negotiator absorbs concerns from different relevant societal actors and translates those concerns into international policy that seeks agreements with other governments on the topics raised at the domestic level (1988). In policymaking, it is critical to consider Putnam’s model as it teaches the importance of ensuring that proposed national policies also deliver positive results to local actors. For Canadian Arctic security policymakers, it is therefore critical to ensure that relevant Arctic actors and their interests are given due consideration when developing Arctic security policy.

In his work *Policy Analysis in National Security Affairs: New Methods for a Modern Era*, Kugler defines a national security policy as actions “intended to bring about favorable consequences that will help achieve articulated national goals”. Kugler further defines policy analysis to be the concentrated effort of alternative policies by examining values, goals, activities, results, and rationales in order to determine how policy goals might be pursued in the most efficient and effective manner possible (2006). As such, policy analysis ultimately seeks to assist governments in producing the best possible policies over the short, medium, and long term. Like other theories and frameworks, policy analysis is unable to predict the future. However, Kugler argues that it can improve the chances of a policy’s success (2006). In order to evaluate prospective, big-picture national security policies which often have multiple values and goals, Kugler recommends utilizing strategic evaluation methods such as a strategy tradeoff table. The table below illustrates how multiple strategies can be evaluated at once with regard to how well they will perform in relation to specific policy goals using performance scores: low, medium, and high.

|  |  |  |  |
| --- | --- | --- | --- |
| **Strategy Options** | **Goal A** | **Goal B** | **Goal C** |
| Strategy 1 | High | Low | Low |
| Strategy 2 | Low | Low | High |
| Strategy 3 | Medium | Medium | Medium |

**Table 1 - Strategy Tradeoffs**

Canadian policymakers could utilize the strategy tradeoff concept in order to employ Putnam’s argument as well as analyze the possible outcomes of potential policies over different time horizons. Goals could be replaced with short, medium, and long-term time horizons, and strategies replaced with likely, desirable, and dangerous outcomes of a possible policy. The evaluation of each time horizon could include possible actors and interests at stake, allowing Canadian policymakers to consider policy outcomes on Canada’s northern communities. The result of such considerations and evaluations would assist policymakers in putting forth successful policies which produce favourable outcomes domestically. However, this model does not include a forecasting framework to evaluate a prospective policy’s chances of success with allied and adversarial states. A forecasting framework, therefore, needs to be created and used in combination with the strategic tradeoff model. By using Rational Choice’s Game Theory further discussed below, a policy could be tested for its international success ahead of being inputted into the table to consider additional actors and their interests over short, medium, and long-term time horizons.

**Security Dilemma, Arms Races, and the Failure to Secure**

In order to promote their state’s interests in the international community, Canadian policymakers must use tools to evaluate their proposed policies in order to determine if they are a safe option with a rationally concluded chance of success. A critical concept policymakers can make use of is understanding what triggers a security dilemma. Jervis defines a security dilemma by indicating that “many of the means by which a state tries to increase its security decrease the security of others” (1978). He further argues that while this is not always the case in a domestic society, it is often the case, although inadvertently, in international politics as there is always a fear of being exploited (1978). Adequate defensive weaponry, technology, and infrastructure can lessen the likelihood of another state’s aggression because having such capability lessens an aggressor’s chances of success. However, Arctic policy that involves increased security policies, such as those put forth in SSE, is not without risk in an international system. Other states may observe a state’s policy and perceive it to be a threat to their own security. When this threat is provoked, the other states could begin to arm themselves in order to be adequately prepared should the threat become imminent. The fear and subsequent further arms buildup prompted by another state’s military expansion triggers what is called a security dilemma (Herz 1950).

Lackenbauer defines a security dilemma as a situation that arises when a state misperceives another state’s actions to be threatening, thus prompting action of their own in order to remain defensible (2010). In turn, this action is found threatening by other states who then begin to further their own potential conflict preparedness. It further leads to multiple nations arming themselves over a perceived threat that might not even exist. A security dilemma is thus perpetuated when a state feels unable to determine the motivations of another state. Therefore, security dilemmas often occur between states who do not cooperate with each other on a regular basis indicating a lower level of trust. However, security dilemmas can also occur between states who usually cooperate but begin to act differently under new leadership. Moreover, even states in close alliances with one another have no guarantee over their partner state’s actions. Therefore, security dilemmas are possible regardless of the relationship between states. This is because, when evaluating another state’s actions, officials cannot ensure that such policies/actions will not result in an act of aggression against their own state. At root, the intentions of others are still uncertain.

The Cold War is a clear example of a security dilemma. During this time period the United States and the Union of Soviet Social Republics (USSR), unsure of each other’s motivations, engaged in an arms race. An arms race occurs when states, involved in a security dilemma, competitively build up their respective militaries' capabilities in order to remain equal or ahead of each other in military strength. Arms races are by-products of security dilemmas and have an established relationship with conflict initiation (Sample 2012). Furthermore, there is empirical proof that arms races and war occurrence are connected. This is because when a dispute occurs during a military buildup it is more than twice as likely to escalate than the absence of an arms race (Sample 2000). Due to a societal dependence on military institutions, it is expected that governments remain relatively competitive with other nations in terms of weaponry and technology. Therefore, depending on the security policy of a state, it is justifiable for governments to allocate varying levels of their state budgets to obtain desired results. Using the example of the United States and the USSR, an arms race began. As a result, both nations continued to develop enormous military capabilities even though both states already had enough offensive capability to pose a bona fide existential threat to each other, and indeed the entire planet.

This example is demonstrative of a traditional security dilemma because one state’s actions were deemed threatening and prompted another state to further arm itself. The cycle continues past adequate military capabilities for the sole reason that the other state’s behaviour is considered too threatening for the other state to cease its own weaponry development regardless of whether or not it is already sufficient to cause irreparable damage. On the other hand, the eventual fall of the Soviet Union and the end of the Cold War is an example of a state’s failure to adequately secure itself. Despite an authoritarian regime that tried to tightly control the economic, military, and day-to-day lives of Soviet citizens, it failed and therefore ceased to exist. As a result, the present-day nations that emerged from the pieces of the USSR had to build their own institutions and economies from scratch leading to hardships such as poverty as seen in Tajikistan, territorial disputes as seen with Russia’s annexation of Crimea, and little political freedom as seen in Azerbaijan where vast access to natural resources have been coupled with widespread corruption. These problems are attributed to the USSR’s failure to adequately secure itself against the United States. In short, defence policy is by no means a guarantor of state security.

What makes a security dilemma so problematic in an international system is the need it triggers for a state to “win”. As Gaddis explains in *The Cold War: a new history*, during an arms race, states can lose sight of their original objective, which is to defend themselves. Instead, states seem to get fixated on the idea of “beating” their opponent, no matter the cost, as long as that cost is less than the cost of their opponent (2005). This cost can be economic, the result of physical destruction, or lives lost. This need to win is best explained through game theory. O’Neill’s “International Escalation and the Dollar Auction” discusses irrationality among state actors engaged in a security dilemma. In the Dollar Auction game, there are two players who must each place a bid in order to win a one-dollar bill. Regardless of who places the highest bid at the end of the game, both players must pay out their bid. It is mathematically proven that, while it might seem illogical, both players will continue to bid even when the price begins to exceed one dollar (1986). The goal thus becomes to win and to suffer a smaller marginal loss than the opponent (Winkworth 2012). This goal of winning allows policy analysts to rationalize behaviour previously determined to be irrational. When applying this theory to the Cold War between the United States and the USSR, we can see that despite both states achieving nuclear capabilities capable of inflicting mass damage on the opposing nation, they continued to arm themselves with the aim of beating their opponent. In this application, achieving the military capability to cripple an opponent can be seen as the one-dollar bill and the economic cost incurred can be seen as the goal to win and suffer a smaller marginal loss than one’s opponent. Although both the United States and the USSR had already surpassed the metaphorical cost of the one-dollar bill, their decision to continue an arms race demonstrates the strength of security dilemma theory as both states militarized in efforts to be considered more powerful than the other, leading both states to willingly accept marginal losses throughout the process. It is thus crucial that states engaging in renewed and revamped defence policies cooperate and coordinate with other states in order to minimize the likelihood of a security dilemma and dollar auction game being triggered by assuring their peaceful intentions.

**Prisoner’s Dilemma, Stag Hunt, and the Reassurance Game**

Game theory is used as a tool to explain state behaviour. It is able to produce models that embody the concept that states are utility-maximizing at all times. Game theory is useful to policymakers because it can help them to plan for the expected outcomes their policy decisions will produce. For example, games such as Prisoner’s Dilemma put forth different outcomes if the game is played once or multiple times. This demonstrates that states evaluate the consequences of their actions in situations where they must deal with each other repeatedly. It thus opens the door for cooperation among states with existing relationships. Game theory can therefore be used as a tool for policymakers to rationalize cooperation and defection in current as well as future cooperation scenarios between states. Incentives for cooperation and defection can also be determined through game theory. Games such as Stag Hunt demonstrate that cooperation with other states can, at times, produce more lucrative outcomes for all parties involved. When defection does occur, game theory also demonstrates that states are able to pursue punitive measures until cooperation is eventually achieved, at which point said cooperation is rewarded. The model for punishment or rewarding another state is called Tit for Tat. Lastly, game theory is also able to exemplify that states can perform actions that display their intent to cooperate before a game has even begun. The Reassurance Game argues that costly signaling helps states to better predict one another’s intentions, whether it is to cooperate or defect, in order to build trust and foster positive outcomes.

How a state determines whether cooperation is likely to produce greater utility than defection can be demonstrated using game theory. Using the game Prisoner’s Dilemma, one is able to rationalize how a state might make the choice to hurt an ally in order to achieve a better outcome than what might have been achieved through cooperation. The game first titled The Flood-Dresher Experiment but now known as Prisoner’s Dilemma begins with two criminal partners who are arrested and imprisoned. They are kept separate by authorities with no means of communication. For the purpose of this game, the criminal partners are named Prisoner A and Prisoner B. Both prisoners are separately offered a bargain by the prosecutor regarding the sentence they will have to serve for their crime. The bargain is as follows: they can either both stay silent in order to receive a conviction on a lesser charge, or they can betray their partner by confessing to the crime thus eradicating their own sentence. However, this betrayal would maximize the sentence of their accomplice.

Important to note is that if both prisoners betray each other, they will each receive a longer sentence than if they both remained silent, but a shorter sentence than if they remained silent and were then betrayed. This situation presents four possible outcomes: First, both Prisoner A and Prisoner B could remain silent and receive a sentence of one year. Second, Prisoner A could betray Prisoner B and walk free while Prisoner B serves three years in prison. Third, Prisoner B could betray Prisoner A and walk free while Prisoner A serves three years in prison. Fourth, both Prisoner A and Prisoner B betray each other, and each serve two years in prison. Their choices and corresponding years in jail can be observed in the figure below.

|  |  |  |
| --- | --- | --- |
| A/B | Prisoner B stays silent | Prisoner B betrays |
| Prisoner A stays silent | -1/-1 | -3/0 |
| Prisoner A betrays | 0/-3 | -2/-2 |

**Figure 1 – “Single Shot” Prisoner’s Dilemma Game**

By looking at the table, one can see that a successful one-way betrayal offers the best outcome to an individual player, and mutual silence is the best outcome for both players. However, game theory states that in a single-play game, both Prisoner A and Prisoner B are most likely to choose to mutually betray each other in order to minimize the risk of being betrayed and thus have to face a three-year sentence. Applied in a real-world context where states are members of alliances and multinational organizations, the opportunity cost for betrayal or defection can too be higher as opposed to an outcome achieved through cooperation. For example, if states all agreed to reduce dangerous emissions in order to improve air quality, a defecting state would benefit from cleaner air while not having to spend money reducing harmful emissions. While this does not mean that states will always defect, since there might be possible retaliations for their defection, it indicates that the possibility is never off of the table.

The lessons learned through the Prisoner’s Dilemma game can be used by policymakers. When creating policies, decision-makers can evaluate whether or not another player would benefit more from defecting than they would from cooperating. After performing this analysis, policymakers can then verify whether or not additional measures must be taken in order to increase the chances of cooperation.

Another lesson policymakers must consider is the fact that in a real-world context, states play multiple rounds of the Prisoner’s Dilemma. This repetitive game led to the development of the Reassurance Game by Andrew Kydd. The idea behind the Reassurance Game is to play more than one round of the Prisoner’s Dilemma, called an Iterated Prisoner’s Dilemma. In doing so it allows states to make initial cooperative gestures before a round of the game is played in order to signal to other states that they are securing seeking and not expansionist. A security-seeking state has no intention of threatening another state’s sovereignty. In contrast, an expansionist state is looking to further its power and will do so by lessening the power of another state (Kydd 2018). The Reassurance Game has three major implications: first, a state’s strategy in the first round will be based on whether or not they consider the opposing player to be security-seeking or expansionist. Second, a state’s strategy for the second round will be updated based on the results from the first round. Third, the second round’s strategies will be rationally calculated based on the evidence each state has obtained from the prior round (Kydd 2018). The game thus allows for players who do not have much initial trust to work towards cooperation with each other by initially demonstrating, through security-seeking actions, their willingness to cooperate.

Kydd furthers the idea of security-seeking actions when discussing the theory of costly signaling. Costly signaling occurs when a state makes a small but significant gesture in order to prove to other players that they are security-seeking and thus trustworthy enough for cooperation. The gesture must be costly because otherwise, expansionist states could mimic such measures in order to deceive security-seeking states (2018). The size of the cost is dependent upon two different variables. The first variable is trust. The lower the level of trust between two states, the smaller the costly signal will be because states are unwilling to take big risks when there is much uncertainty about the payoff.

On the other hand, states with higher levels of trust in each other will make more costly signals in order to demonstrate their continued interest in cooperation (Kydd, 2018). In both situations, costly signaling is a way of building up assurances between two states in order to promote cooperation. The second variable is power. A stronger state will offer a cheaper signal to a weaker state whereas a weaker state will offer a costlier signal to a stronger state. This is due to risk levels. Weaker states are prepared to demonstrate their security-seeking intentions at all costs because conflict with a stronger state cannot be afforded. In contrast, stronger states are less worried about conflict with weak states (Kydd 2018). They thus do not have to offer such costly signals.

Most states play an Iterated Prisoner’s Dilemma because they regularly work with one another for a variety of reasons such as trade, participation in international organizations, and tourism. When two states work closely with one another over an extended period of time, they are able to rationalize that mutual defection might not always be necessary. When multiple rounds are played, states are capable of eventually developing trust with one another through security-seeking actions in order to mutually cooperate and obtain better collective outcomes.

Another tool used to promote cooperation is called the Stag Hunt game. Policymakers can make use of the Stag Hunt game in order to demonstrate to other states that cooperation in a decision-making scenario can achieve the best overall outcome for both parties involved. The Stag Hunt game thus incentivizes cooperation. Coined by Jean-Jacques Rousseau, the idea behind the game is that two players go hunting (Player A and Player B). Each player can choose to either take home a stag or a hare without consulting the other player. A stag is of greater value than a hare because it produces more meals. However, if an individual wants to hunt a stag, then it must have cooperation from the other player. Contrastingly, a hare can be hunted alone. If the situation were to arise where one player opted to hunt a stag and the other a hare, the stag hunter would go hungry and its partner would still be able to hunt the hare. Therefore, each player must individually decide whether or not they wish to cooperate. While there is a risk that a player may go hungry, it is in the interest of both players to decide to hunt a stag. If both players are allies and have a history of cooperation then, as Rational Choice theory tells us that all states are utility-maximizing, it is likely that if trust has been established both players will opt to cooperate in order to maximize their perceived benefit. The possible outcomes are demonstrated in the figure below:

|  |  |  |
| --- | --- | --- |
|  | Stag | Hare |
| Stag | A, A | C, B |
| Hare | B, C | D, D |

**Figure 2 – Stag Hunt Game**

The most important lesson that the Stag Hunt game teaches Canadian policymakers is that framing a policy to suit the mutual interest of other players increases the incentive for cooperation. Applied directly to Canadian foreign policy in the Arctic, if Canadian policymakers are able to formulate a policy that is of mutual interest to allied nations in the short, medium, and long term, they increase their chances of cooperation. Themes like mutual security and climate change could thus be touched upon to help the Government of Canada increase incentives to cooperate with Canadian domestic and foreign policy goals*.* Given the opportunity to maximize one’s utility, Rational Choice theory indicates that states will likely choose the option with the best possible outcome. However, one must also account for trust. In the Stag Hunt game, if Player A opted for a stag and Player B a hare, then Player A would go hungry. As such, Player A might also choose to hunt for a hare given that it is the safest option. Policymakers can thus use the Stag Hunt game to demonstrate the rewards of cooperation, but they must also consider ways to build trust with other states.

The Stag Hunt demonstrates to policymakers that they are able to incentivize cooperation. A state can also try and increase the likelihood of cooperation through another means: coercion. In our global structure, there are multiple rounds of play in decision-making scenarios between nations because states cooperate on numerous initiatives with one another at any given time. The chances that a state would face consequences for defecting on one particular policy are likely. These consequences, or retaliations, can coerce a state to alter its behaviour. In the language of game theory, all games are indeed iterative. Should there be no possible retaliation ever or in terms of game theory, thus meaning that only one game is ever played between two actors, then all states would defect in order to self-maximize. However, in the present global predicament, there are always future games to be played. These retaliations were defined in game theory by Rapoport and Axelrod and are called Tit for Tat. The principle of the theory is that in a two-player system, if an actor defects in one round then its playing partner will not cooperate in the next round. There is a form of retaliation regarding one’s choice to defect. In other words, as Rational Choice theory dictates, after the first round has been played each player will consider their opponent's previous choice to cooperate or defect and then modify their decision accordingly in the following round. The Tit for Tat model is depicted in the figure below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | ... |
| Player A | C | D | C | D | ... |
| Player B | D | C | D | C | ... |

**Figure 3 – Uncooperative Tit for Tat**

Of course, should both players begin the game with cooperation, then the outcomes will look like the below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | ... |
| Player A | C | C | C | C | ... |
| Player B | C | C | C | C | ... |

**Figure 4 – Cooperative Tit for Tat**

Therefore, the theory behind the Tit for Tat model is that if a state wishes for cooperation in the future, it will not defect out of fear of future retaliation. States would thus have to determine if the opportunity cost of defection in one round is worth more than the possible future retaliations they might face in a subsequent round. This theory also applies to alliances and multinational organizations where states come together to act as one body. This means that a state refusing to cooperate with its alliance or multinational organization members will also face repercussions. Tit for Tat is an effective strategy for policymakers because it is clear, predictable, and forgiving. The strategy is clear because a player understands that the refusal to cooperate in one round will be matched by a refusal to cooperate from the other player in the following round. The strategy is predictable since, as seen in the table, the rules are not a threat but a guarantee. Should a state defect it can expect other states to defect moving forwards. Lastly, Tit for Tat is forgiving because should a state defect, realize its mistake, and then begin to cooperate, it will not be further punished beyond one round. Instead, the initially defecting player will be able to reap the rewards of cooperation once more. The game thus encourages positive and mutually beneficial behaviour among players.

The idea of a Tit for Tat scenario, though unwanted, is helpful for Canadian policymakers because it enables them to leverage the notion that a state’s choice to reject foreign policies might result in retaliatory, unfavourable actions that would not advance their own national interests. For example, the Government of Canada could leverage its geographic position when policy making with the United States. Should the United States want to expand NORAD or have more American troops on Canadian soil, they would need approval from the Government of Canada since the technology is on Canadian land. With regards to the NWP, Canada would have the fastest response times for any distress calls. For that reason, states must understand that the security of their ships and people relies upon cooperation from the Canadian government. Failure to acknowledge Canadian sovereignty in the region and a failure to comply by foreign vessels declaring themselves in Canadian waters could lead to delayed response times and inadequate resources depending on the type of distress call. It can be seen that at times, the cost of defection in one round could lead to future situations that are less than favourable. It should therefore be noted that policymakers can leverage the predictability of the Tit for Tat model in order to demonstrate to other decision-makers that the opportunity cost of an initial defection is not worth the loss that will be incurred from a retaliatory defection in a future round.

**Theory Conclusions**

Rational Choice theory and policy analysis’ strategic tradeoff model as well as the game theory models demonstrate that there are tools that can be utilized for those looking to forecast and evaluate the potential outcomes of policies. This thesis argues that Rational Choice, policy analysis, and game theory can be used to help conceptualize a model which will allow policymakers to proactively evaluate the efficacy of their policy ideas. By using a strategic evaluation model, policymakers will be able to have an overview of the outcomes that potential policies might produce over the short, medium, and long-term both domestically and abroad. In order to produce such an overview, the game-theory-based models discussed should be combined into one heuristic tool. This combination of models will allow policymakers to develop a standardized process applicable to all Arctic policies. Moreover, the models will also allow policymakers to be able to determine whether or not there are any additional measures that can be taken to incentivize cooperation and establish trust with other nations.

Based on the findings of the forecasting model, policymakers will be able to make any necessary adjustments to promote a superior outcome for their intended policy. Together, this model will be an evaluative framework that can be applied broadly to all Arctic policy decisions. It will act as a baseline test to validate whether the policy is ready to be enacted or if any modifications need to be made thus helping to answer the question posed by this thesis regarding how might Canadian northern people, Canadian allies, and Canadian competitors respond to the Government of Canada’s efforts to increase security over its Arctic region in the short, medium, and long-term.

METHODS

The evaluative capabilities of strategic tradeoffs and cooperation games such as Prisoner’s Dilemma, Stag Hunt, and the Tit for Tat model have been established independently from one another. Additionally, the importance of avoiding the triggering of a security dilemma due to the massive costs incurred as demonstrated by the Dollar Auction game and the possible mitigating policy option of costly signaling through the Reassurance Game has also been discussed. This methods section demonstrates how each of these decision-making models can be utilized in sequence to create a heuristic framework capable of addressing the different impacts policies might have on Canadian relations with allies.

This chapter presents the strategic tradeoff table and game theory models as a system to form a heuristic in order to produce a coherent and cohesive forecasting framework. In order to do so, this section combines the previously discussed relevant models to create one sequential evaluative framework wherein a policy can be applied and outcomes anticipated.

**The Forecasting Framework**

When putting forth an Arctic policy that requires acceptance or cooperation, one must take the time to evaluate whether or not this policy is believed to likely be accepted or rejected both domestically and abroad. Based on this evaluation, policymakers can decide to pursue the policy, modify the policy in order to improve the likelihood of success, or try an alternate option. Canadian policymakers can also make use of tools such as costly signaling and the Stag Hunt game that incentivize cooperation in their evaluations. Canadian policymakers must also have the foresight to consider the event that a policy is rejected by other states and determine whether or not such a rejection can be remedied. There are thus numerous factors that go into a single policy’s creation.

The components of Rational Choice theory help to ease this process because they offer critical insight behind a player’s motivating behaviours, such as the desire of one to maximize their utility and the rationale to evaluate the likely decisions of another player before making one’s own decision. Using Rational Choice theory’s modeling, policymakers can thus rationalize and predict behaviour prior to communicating with other states, and then address whether or not said communication is capable of increasing the likelihood of cooperation.

Their effectiveness having been established, the next question becomes how might these tools be combined to create one singular model for policymakers to employ? The game theory models discussed must be entered into a sequential decision-making timeline in order to benefit from the insights each model offers. In order for the framework to be used as a decision-making tool, a policy must only progress through each stage once it meets the criteria listed, making it capable of producing the policymaker’s desired result of cooperation from other actors. As previously discussed, the initial Rational Choice theory decision-making tool known as the Prisoner’s Dilemma, has limitations. A model must thus be built making use of the Reassurance Game’s costly signaling and the Stag Hunt game’s communication tactics to incentivize cooperation in a multi-round context. Furthermore, Tit for Tat can also be used as an additional tactic to evaluate the success of promoting allied cooperation on an Arctic policy. The proposed model appears below in Figure 5:

Policy Idea

Security Dilemma?

Costly Signalling

Cooperation

Stag Hunt Game

Clusivity

Iterated Prisoner’s Dilemma

Coercion

Tit-for-Tat

Policy

**Figure 5 - Game Theory Policy Analysis Framework**

In general, the forecasting framework in Figure 5 suggests a series of benchmarks that a proposed policy should be tested against. First, the policy is tested for triggering a security dilemma by using the heuristic of costly signaling. Second, the policy is then subjected to the test of incentive to cooperate through the Stag Hunt game. The third step would be testing for coercion through a Tit-for-Tat game and lastly, an iterated prisoner’s dilemma would test the clusivity – meaning how well it accounts for the interests of other actors – of the policy. Each of these four tests will be explained below.

**Security**

As a first step, the framework proposes a test for security which will determine whether or not the policy will trigger a security dilemma. Remember, this occurs when a state considers another state’s actions to be threatening (Lackenbauer 2010). Additionally, it is more likely to occur between states who do not often work together or previously worked together often but now have different leadership. While it might not always be easy to determine how another state will perceive a policy, policymakers can look to see if their policy directly contravenes a state’s existing foreign policy or if the policy seeks to expand military activity in an area that has territorial disputes before the United Nations. In this situation, should any of these criteria be met, this framework indicates that a state will most likely defect in order to mitigate the risk of being betrayed. This decision is demonstrated through the Prisoner’s Dilemma game where in a single round of play both players will opt to defect in fear of being betrayed. If defection is likely to occur, it would therefore be in a Canadian policymaker's best interest to recommend putting forth a costly signal that demonstrates their commitment to remain security-seeking and not expansionist. The Security Dilemma section of the forecasting framework thus serves as an initial benchmark for policymakers to assess whether or not their proposed policy is capable of producing an unwanted reaction.

**Cooperation**

Next, a Canadian policymaker should determine if there is any way that they can proactively communicate to states how their proposed policies can be mutually beneficial for all actors involved, thus incentivizing cooperation. In doing so, policymakers can draw upon logic from the Stag Hunt game. The Stag Hunt game is able to demonstrate that, through cooperation, both players involved are able to reap greater benefits as opposed to acting independently from one another in the pursuit of utility maximization. Therefore, it can be rationally understood that if Player A is able to signal to Player B that both parties will be better off through cooperation, then Player A’s policy is more likely to be successful as opposed to otherwise. Policymakers can thus look for ways that their policies can benefit the Government of Canada and then be sure to communicate how it would be in the interest of other states to support the policy.

**Coercion**

Should incentivizing cooperation not be sufficient, Canadian policymakers must have a contingency plan. This contingency plan falls into the category of possible retaliation. The Tit for Tat model demonstrates that if Player A intends on cooperating in round one but Player B defects, then in the following round Player A will defect. Knowing the logic of this game, a state which seeks cooperation from another state in existing policy matters or intends on seeking cooperation for future policies would be inclined to consider the possible repercussions of defecting. Canadian policymakers can thus be sure to effectively communicate foreign policy regarding the utility minimizing consequences that a failure to cooperate could produce before any decision-making takes place. Policymakers can thus be sure to demonstrate in their proposed policy’s legislation that Canadian cooperation will be vital in the future of the international community’s utility.

**Clusivity**

Borrowed from the field of linguistics, the term clusivity refers to the degree of inclusionary or exclusionary behaviour observed. As a way in which to capture the idea of confidence-building between actors, the concept of clusivity is apt. In this stage, Canadian policymakers can analyze whether or not they believe that the steps taken can sufficiently ensure a change in the outcome of an Iterated Prisoner’s Dilemma game. This evaluation will determine whether there was sufficient communication to demonstrate that the Government of Canada’s proposed policy is security-seeking, and that the international community would be better off accepting the policy rather than fighting against it. If the policy passes this final check, then it can be deemed ready to be enacted. This would mean that the question posed at the beginning of this thesis would have been answered in a positive manner as policymakers will have a better understanding of how Canadian northern people, Canadian Allies, and Canadian competitors might respond to the Government of Canada’s efforts to increase security over its Arctic region. In other words, Canadian policymakers’ proactive measures have been able to alter the benchmark established in a single round of the Prisoner’s Dilemma. On the other hand, if the evaluation has failed to demonstrate that the policy will likely be accepted by other states, then policymakers will have to make the necessary modifications and repeat the process once more.

However, this model fails to account for the consideration of northern peoples and Indigenous communities living in the Canadian Arctic. As scholars have established, Arctic security does not just include possible threats from adversaries, but also the socio-economic and environmental challenges that northern people face on a daily basis. A strategic tradeoff model can therefore be employed to evaluate prospective Arctic policies in a way that incorporates both the results of the Game Theory Policy Analysis Framework as well as impacts on northern communities over the short, medium, and long term. Below is an amended Strategic Tradeoff model, tailored to the question of this thesis, how might Canadian northern people, Canadian Allies, and Canadian competitors respond to the Government of Canada’s efforts to increase security over its Arctic region in the short, medium, and long term?

|  |  |  |  |
| --- | --- | --- | --- |
| **Outcome/Timescale** | **Short (5 years)** | **Medium (5-10) years** | **Long (20-25 years)** |
| **Likely** | Actors?  Interests? | Actors?  Interests? | Actors?  Interests? |
| **Desirable** | Actors?  Interests? | Actors?  Interests? | Actors?  Interests? |
| **Dangerous** | Actors?  Interests? | Actors?  Interests? | Actors?  Interests? |

**Table 2 - Tailored Strategic Tradeoff Model**

By focusing on actors and interests for each of the outcomes and timescales, the model can bring the interests of not just foreign governments and Canadian allies, but can also account for overarching interests of local indigenous communities. The data gathered from the Game Theory Policy Analysis Framework will be inputted into the Tailored Strategic Tradeoff Model, and evaluated as likely, desirable, or dangerous while also allowing Canadian policymakers to factor in domestic security actors and interests. From there, policymakers will have the additional option to consider the short, medium, and long-term implications of their prospective policies. For example, for security policies that must also consider the ever-changing Arctic environment due to climate change, it is important that a decision taken in 2023 will account for changes expected to occur in future decades. Similarly, a policy that might have implications on allied relations should also be evaluated over different timescale horizons in order to ensure that policies encourage continued collaborative allied relations with important states such as the United States. Canadian policymakers focusing on creating Arctic security policy will therefore have an all-encompassing decision-making framework that will assist in increasing the likelihood of policy success.

FINDINGS

The combined forecasting framework demonstrates both the complexity of developing Arctic security policy that encompasses threats to the Arctic, from the Arctic, and through the Arctic, and the importance of creating effective and efficient Arctic security policy that considers short, medium, and long-term time horizons. As SSE anticipates, a growing international interest in the development of the Arctic region, policymakers must aim to advance Canadian environmental, economic, and security interests all while appeasing allied nations and not provoking adversarial states.

First, this chapter applies the forecasting framework to address the challenges that Canadian policymakers face as they develop Canadian Arctic security policy. It applies the framework through the four sequential steps of security, cooperation, coercion, and clusivity as outlined in Figure 5’s Game Theory and Policy Analysis Framework. Policy outcomes are then entered into Table 2’s Modified Strategic Tradeoff Model and evaluated over short, medium, and long-term time horizons to consider the different actors present in the Canadian Arctic and their interests.

**Security**

The forecasting framework reveals that, without making necessary verifications to their policies, Canadian policymakers might produce unwanted outcomes from allied and adversarial states regarding Arctic security policies. The goal is to put forth Arctic security policies in a manner that falls in line with Canadian interests and values while not appearing too aggressive on an international stage. Policymakers, therefore, walk a fine line regarding the promotion of the Canadian Arctic’s defence readiness without prompting fears of an arms buildup.

Increased military presence, infrastructure, and readiness, particularly buildups which are outside the scope of allied agreements, are not without risk in an international system, investments in a state’s military could be perceived by other states as a willingness and readiness to securitize Canada. While highly unlikely for Canada, given allies such as the United States and adversaries such as Russia’s significantly more extensive Arctic military posture, Canadian policymakers must nevertheless recognize that such a perception would be incredibly dangerous for policymakers because the act of securitization is an aggressive behaviour and the perception of a willingness to securitize could trigger a security dilemma. Without adequate care to demonstrate that policy intentions are security-seeking in nature and willing to promote collective security, policymakers could therefore inadvertently escalate conflict and put themselves in a precarious position with regard to how Canadian policies are perceived on the international stage.

An example of Canadian Arctic policy success in ensuring that conflict does not escalate can be found in former Canadian Prime Minister Brian Mulroney and former United States President Ronald Reagan’s cooperation over the transit of United States icebreakers through the NWP in the 1980s. The issue arose based on both governments’ opposing opinions with regard to the NWP. The United States believed and sought to assert its right to traverse the passageway freely, and Canada believed in the NWP’s classification as internal waters and therefore its right to approve or deny foreign transit. Despite initial back and forth and much media attention, through their agreement signed on 11 January 1988, both nations opted to agree to disagree. The agreement was characterized by the Reagan administration as “a pragmatic solution based on our special bilateral relationship, our common interest in cooperating on Arctic matters, and the nature of the area. It is without prejudice to our respective legal positions, and it sets no precedents for other areas”. The agreement recognized the close relationship between both nations and their desire to cooperate on matters pertaining to Arctic development and security. In particular the agreement specified that, without agreeing with Canada’s assertion over its internal waters, the United States would seek consent to navigate through said waters. The agreement demonstrated an effort by both the government of Canada and the United States to prioritize cooperation ahead of disagreements that could jeopardize strong allied relations. Evaluated against the Game Theory Policy Analysis Framework, the nature of the agreement between Canada and the United States was successful because, when presented with a situation that could have triggered a security dilemma given the United States refused to recognize and affirm Canada’s 1986 declaration creating baselines around the islands of the Arctic Archipelago making all waters within the boundaries “internal”, thus undermining Canadian sovereignty, consistent diplomacy that demonstrated both states’ security-seeking intentions as well as their desire to cooperate given the mutual benefits of their allied relationship, produced an outcome that was viewed to be in line with both nations’ national security agendas.

When pushing forwards with Arctic security policies during the framework’s first step of considering whether or not a policy might trigger a security dilemma, it is also important that the Government of Canada considers the Dollar Auction game. The Dollar Auction game must be considered because it serves as a predictive model for state policymakers who are forecasting the possible ramifications of their actions were they to engage in conflict. It demonstrates that if a security dilemma triggered a conflict between Canada and other states, policymakers can expect other states to act irrationally. This irrationality is characterized by the need to win no matter the cost (O’Neill 1986). Of course, the possibility of entering into a conflict scenario is not ideal as it would mean that the Government of Canada’s Arctic security policies would have been rejected by members of the international community, but Canadian policymakers must consider whether or not they are also prepared to pay the cost of winning with regards to the policies they enact. The Dollar Auction game tells policymakers that the cost of winning can mean using an unnecessary amount of resources towards a policy aim that detracts from the possible use of such resources elsewhere. Moreover, the model teaches Arctic policymakers that the irrationality demonstrated in the Dollar Auction game can result in the Government of Canada incurring greater costs than the value of the conflict itself.

Canadian foreign policymakers must thus ask themselves, to what extent are they prepared to risk potential adverse ramifications in the pursuit of their goals? With regards to Canadian policymakers and the Canadian Arctic, the Dollar Auction game serves as a further lesson that conflict is to be avoided at all costs and must always be accounted for, despite its unlikeliness. Canadian policymakers can thus gather from the Dollar Auction model that in the event of a hypothetical conflict, their loss might be greater than the profits gained through increasing military presence in the Arctic. Therefore, the forecasting framework teaches Canadian policymakers the importance of avoiding a security dilemma. Using the example of ensuring that Arctic policy does not trigger a security dilemma with Russia, Canadian policymakers could evaluate proposed Arctic military initiatives to ensure that they are not all offensive in nature or directed towards the Russian border, instead opting for policies that focus on defence readiness and updating existing infrastructure such as modernizing NORAD air defence radars with Over-the-horizon Backscatter radars.

The Prisoner’s Dilemma game is thus an important first step of the forecasting framework because it helps Canadian Arctic policymakers to foresee the possibility that a security dilemma might be triggered. It does this by allowing a policymaker to determine whether, after evaluating all possible outcomes created through cooperation and defection, it is in another state’s best interest to cooperate. It, therefore, goes on to establish the need for Canadian Arctic policymakers to consider reassurances of peaceful intentions.

As the forecasting framework points out, should a policy risk the triggering of a security dilemma, then policymakers can help to remedy this issue by implementing a costly signal. For Canadian policymakers tasked with creating Arctic security policy, they can look to perform a costly signal through established trust-building initiatives. For example, there are presently some factors at hand that can mitigate the possibility of triggering a security dilemma. These mitigating factors take the form of treaties, alliances, and participation in international organizations. Treaties, alliances, and membership in international organizations surrounding the promotion of international peace, protection of the Arctic environment, and improved socio-economic conditions for those living in the Arctic can remove or minimize the feelings of threat among participating nations because they help to establish trust among members of each other’s security-seeking intentions.

An example of a mitigating factor for Canadian policies triggering a security dilemma among allies would be the Government of Canada’s participation in NATO. Since NATO promises the mutual defence of all member states against an attack from an outside state, it establishes trust between participating nations. This established trust makes NATO members less likely to perceive a threat from each other’s military investment policies due to the fact that such Arctic security policies related to increased military investment in the Arctic region are beneficial to all participating members. NATO members benefit because better military technology and weaponry deter non-members from attack and also increase NATO members’ chances of success if they were to enter into conflict.

Canadian policymakers can thus ensure that Arctic security policies are security-seeking by being sure that their policies include investing in infrastructure that is beneficial to the allied community such as better technology for harsh climates. An investment in shared infrastructure would help to increase NATO’s capacity to operate in cold regions and during wintertime. By advertising and assuming the financial responsibility of establishing a protectionist role in the Arctic region, Canadian policymakers can demonstrate the peaceful intentions of their policy initiatives in order to encourage allied cooperation on a matter that would be mutually beneficial to all parties involved. This costly signal would help to remedy any mistrust from allied nations because the Government of Canada would be assuming a substantial financial responsibility for allied mutual protection as opposed to using resources to enhance Canadian-only interests. This behavior would not be deemed threatening because it demonstrates a sacrifice made by Canada in order to establish itself as a security-seeking nation and as a contributing member of NATO. However, Canadian steps to improve NATO’s capacity to operate and wage military operations in the Arctic by the very fact of reassuring allies could be seen as Ottawa joining in the West’s anti-Russian provocations. It is therefore imperative that Canada also demonstrate its security-seeking intentions to Russia as well.

Costly signaling with adversarial nations presents a more complex challenge for Canadian policymakers. As discussed in the Theory chapter, costly signals are usually smaller when there is less trust and increased risk among players. A possible example of a costly signal for Canadian policymakers would be to encourage and welcome improved relations with Russia through the Arctic Council. Seeing as the Arctic Council is not mandated to discuss and make binding agreements on matters of security, but instead, environmental protection, scientific exploration, and improving quality of life for northern peoples, Canadian policymakers could advocate that Canada seeks to repair relations in this forum, displaying a willingness to begin to rebuild deteriorated levels of communication, cooperation, and coordination with Russia.

**Cooperation**

Once policymakers have established a sufficient costly signal, their proposed policy can move along to the next phase of the forecasting framework. The forecasting framework demonstrates through the Stag Hunt game that if trust is assured, nations can work together in order to produce greater utility-maximizing outcomes than if nations were to operate independently. This holds true for both allied and adversarial states. For Canadian Arctic policymakers, this means that they not only have to make a costly signal to demonstrate their security-seeking intentions, but they must also seek to create policies that maximize mutual utility in order to incentivize cooperation from other nations.

Of particular importance to Canadian policymakers is the Government of Canada’s relationship with the United States as it is unique to all of its other allied relationships. The relationship is unique because the Canadian government relies upon the United States for not only economic well-being through trade but also relies upon the United States heavily for mutual defence initiatives due to geographical proximity. Starting during the Cold War, NORAD is a perfect example of clear coordination between both states in order to achieve a utility-maximizing shared defence objective. Through NORAD, both governments were able to mutually warn and protect each other from possible aerospace threats emerging from the USSR. The Government of Canada allowed American troops to deploy to Canadian soil to operate radar stations in exchange for the United States’ enhanced military technologies, such as radars, which Canada’s military budget could not afford.

According to the Stockholm International Peace Research Institute, in 2019 the United States spent about 3.5% of its total GDP on defence spending. Contrastingly, Canada spent about 1.5% of its total GDP on defence spending. Moreover, the United States has nuclear capabilities. Canada, on the other hand, does not. The two types of radars used by NORAD are the AN/FPS-117 and the AN/FPS-124. Both of these radars were developed by the United States. As such, it is evident that Canada relies upon the United States for superior military capabilities that contribute to collective security against threats originating from the North. These military capabilities are called early warning systems. Using radar technology, early warning systems alert both governments if an air attack originating from the North is imminent. The NORAD agreement between the United States and Canada is therefore mutually beneficial to both nations. As the Stag Hunt game teaches, both nations would not be able to achieve their desired levels of defence if they were to act independently rather than acting together.

On the one hand, without Canadian cooperation, the United States would not be able to station its early warning systems across the North because the radars are placed on Canadian Arctic land. On the other hand, without cooperation from the United States, Canada would not have access to the early warning system technology that the United States had developed. At their book launch with Andrea Charron, James Fergusson stated that NORAD was created because “it became clear to the military planners, the technical experts, that it was obvious that efficiency, effectiveness, and incredible deterrent required something more than trying to coordinate two independent commands” (2023). However, as experts such as Lackenbauer have pointed out, Canada depends too heavily on the United States in terms of Arctic security (2009).

The Canadian government does not invest nearly the same amount of its Gross Domestic Product (GDP) into military expenditures compared to the United States which invests much more in order to obtain foreign policy objectives including allied obligations. The result of Canadian dependence upon the United States for Arctic security leads to what Lackenbauer defines as an asymmetric security threat between both states. An asymmetric security threat occurs when one state, in this case, the United States, is capable of exploiting its power to control another state. As such, Lackenbauer asserts that the United States can alter Canadian foreign policy so that it is in line with their own state interests (2009). For example, in their policy paper titled “Beyond NORAD and Modernization to North American Defence Evolution” Charron and Fergusson argue that, with the current levels of Canadian NORAD spending, Canada lacks cruise missile intercept capabilities. In order to remedy this limitation, the United States would have to deploy more troops and equipment onto Canadian soil (2017). This might create a domestic problem as Canadians may dislike additional troops and equipment due to recent public dislike for United States government administrations that differ from Canadian domestic policy on social issues. Canadian Arctic policymakers must address this asymmetric security threat since it presents an additional challenge to incentivizing cooperation with a nation that one already benefits more from than the other. Canadian Arctic policymakers must therefore make use of the Stag Hunt game because, using the model, they can demonstrate that despite an unequal balance of power among states there are still benefits to be found through cooperation rather than independent action. The Stag Hunt game’s results work well with the dynamic between the United States and Canada because the model is able to demonstrate that there remains an attractiveness to cooperation, even in an unevenly balanced partnership.

The United States is a global power. It invests more than any other state in its military, boasts the world’s biggest economy, and is capable of asserting its political will on other states. This powerful status thus creates an unequally balanced partnership with the Government of Canada as they aim to assert their foreign policy agenda upon a more powerful state. When creating policies and trying to incentivize the United States’ cooperation, Canadian policymakers have the option of using hard or soft power. Joseph Nye defines soft power as “the ability to get what you want through attraction rather than coercion or payments” (2004). It is the notion that if those who admire your principles and share a common interest as you then coordination will happen naturally, without force. The use of soft power to sway American foreign policy is ideal for Canadian Arctic policymakers because they lack the means to use hard power. Hard power occurs when a state uses its economic and military strength to coerce another state into shaping its own agenda. Canadian officials want to utilize soft power to the extent that United States policymakers are willing to coordinate alongside their ally without feeling any need to coerce the Government of Canada to alter its agenda to their liking.

The Stag Hunt game can be used to demonstrate the attraction that Nye discusses. Canadian Arctic policymakers must seek to find policies that will advance the security interests of both themselves and their closest ally. For example, were Canada to frame the importance of the United States’ cooperation regarding Canada’s assertion of sovereignty over the NWP as a means to protect the passage’s use from threatening nations, the United States might also see this protection to their advantage. Canadian Arctic policymakers could thus highlight to their American counterparts that, were the NWP to be declared as an international strait, then nations such as Russia, Iran, and China would be able to fly their aircraft closer to North American airspace than ever before. This presents security threats to both the Canadian and American governments as it opens the door to the possibility of surveillance and armed aircraft using the strait. As the former United States ambassador to Canada, the late Paul Cellucci said, endorsing the position that the NWP falls under Canadian sovereignty would actually be more beneficial to the United States than allowing the NWP to be declared as an international strait (2007). American cooperation would be more advantageous to the Government of the United States due to the diminished security risk of the straight being under Canadian control. Under Canadian control, foreign surveillance aircraft or armed aircraft would not be able to enter the region.

Furthermore, when discussing Arctic trade routes, allies benefit more from a Canadian-protected passageway. The other option nations have is to make use of the Northern Sea Route (NSR) which is off the coast of Russia. When discussing allied use of the NSR, Christopher Bott argues that the route is too long, dangerous, and unknown for allied forces to use with only Russia to rely upon should any issues arise (2020). As such, the United States would benefit heavily from a secure trade route under Canadian protection. Additionally, there is a strong likelihood that there would be a trade agreement between both nations regarding the use of the NWP for economic purposes. In this case, Canadian Arctic policies are not a threat to the Allies but rather a demonstration of Canadian commitment to its duties as a member of NATO.

Another way Canadian policymakers could demonstrate their desire to cooperate with allied nations on Arctic security policies would be to advocate for the inclusion of Greenland and Denmark in NORAD. In their article for The Rand Blog titled “Should Greenland and Denmark Become Part of NORAD?” authors Bohnert and Savitz argue for the inclusion since Greenland is at risk of exploitation by China and Russia as both nations seek to exploit fish and mineral resources while also gaining political influence in the region. Authors argue that “in the event of Greenlandic independence, such influence could curtail NATO activity on the island or facilitate hostile intelligence collection, jeopardizing security both in North America and in the European gateway to the North Atlantic” (2022). By advocating for Greenland and Denmark to be included in NORAD, Canadian policymakers could demonstrate to allied nations its commitment to uphold and strengthen alliances, affirming its stance against adversarial states. It would also allow Canadian policymakers to present themselves as a cooperating ally specifically in the Arctic region, diminishing fears that Canada might defect on existing allied Arctic security policies.

With regard to adversarial states, the Stag Hunt game can also encourage cooperation. Using the example of Russia and the Arctic Council, cooperation has consistently proven to produce desirable outcomes for all Arctic Council member states. In an article for Reuters, Pamuk, Dickie, and Fouche discuss how since ceasing to cooperate with Russia in the Arctic Council, “about a third of the council's 130 projects are on hold, new projects cannot go ahead, and existing ones cannot be renewed. Western and Russian scientists no longer share climate change findings, for example, and cooperation for possible search-and-rescue missions or oil spills has stopped” (2023). The lack of cooperation with Russia has profound impacts on the safety and security of northern populations who are becoming increasingly vulnerable to the changing Arctic climate. Given that Russia is the largest Arctic state, they have much to lose on critical agreements to protect the livelihood of people living and working in the Arctic. Canadian Arctic policymakers could utilize this to their advantage by incentivizing cooperation as together more can be achieved than when states operate independently.

The Stag Hunt game is therefore an effective tool for Canadian Arctic policymakers to make use of when encouraging cooperation from allied and adversarial nations. It encourages Canadian policymakers to choose to implement policies that not only advance Canadian interests but are also advantageous to Canadian allies and adversaries. In doing so, their policies are not only more likely to be accepted by the international community but are also more likely to continue to promote a cooperative relationship moving forwards into an era where the Arctic will see many changes.

**Coercion**

The forecasting framework next demonstrates that Canadian Arctic policymakers can also try to employ a tougher approach in order to have their security policies accepted by the international community. Through the Tit for Tat model, the Government of Canada can demonstrate that, if nations fail to cooperate with Canadian policies, then Canada could retaliate by not cooperating with nations on their policies in the future. Canadian Arctic policymakers can thus understand that in order to make use of the lessons taught from the Tit for Tat model, any policy that outlines retaliation for a lack of cooperation must be clear, predictable, and most importantly forgiving. Canadian Arctic policymakers must thus be prepared to follow through with whatever is outlined as a future retaliation and then cease such retaliations once cooperation is obtained.

Learning from the Tit for Tat model, Canadian Arctic policymakers can make use of Canadian proximity to areas where there are territorial disputes with the international community, such as the NWP, in order to advance their policy agenda. Proximity becomes a matter of importance when contingency planning for search and rescue operations. Canadian policymakers can argue that, without compliance to the Canadian government’s request that ships notify of their intention to use the passageway and comply with other Canadian regulations regarding the use of the NWP, the possible response time of the Canadian Coast Guard might be delayed and their level of preparedness not adequate in the event of a search and rescue operation. The retaliation is thus that the Government of Canada is unable to ensure a protective stewardship of the region for nations who refuse to cooperate with Canadian policies. This assertion is clear because it demonstrates to other nations that a refusal to cooperate means that they are accepting a potential risk to their citizens. The assertion is predictable because nations can rationally understand that if they do not communicate with the Canadian Coast Guard regarding their ships prior to entering the NWP, then they cannot expect a search and rescue operation to be as successful as one that was communicated. Lastly, the assertion is forgiving because should a nation decide to cooperate, then it would immediately receive a heightened level of protection from the Canadian government. Through this assertion, nations wanting to protect themselves are thus persuaded by a possible lack of adequate maritime safety assistance to cooperate with Canadian Arctic policy.

Another persuasive tactic that Canadian Arctic policymakers can utilize is the Government of Canada’s developing leadership role in NATO. For example, Canada has supported every major allied initiative since 2014, including operations in Europe such as the training of Ukrainian forces in Operation UNIFER from 2015-2019, its ongoing role in Operation Reassurance (2014 to present), and its ongoing leading role in Latvia under NATO’s Enhanced Forward Presence defence and deterrence military force (2017 to present). These findings are important for Canadian policymakers to consider as they demonstrate Canada’s leverage regarding coordination on collective security initiatives with European allied states. It means that Canadian Arctic policymakers can understand their relatively increasing value as a NATO member and use this knowledge to leverage their power in adherence to Canadian foreign objectives.

Canadian Arctic policymakers can thus demonstrate to European allied nations that a failure to support Canadian interests at present can result in a future Canadian retaliation to not support other European allied NATO interests in the future through sustaining and supporting existing and prospective operations and defence initiatives. Policymakers can use this threat of future cooperation as leverage since European nations currently depend upon Canadian contributions and expect to continue depending on Canadian support in the coming years. European allied states will be able to understand that it is in their collective best interest to support present Canadian foreign policy initiatives that, through the Stag Hunt model have already proven to offer collective security to NATO members, in order to ensure increasing Canadian contributions to NATO in the coming years.

With adversarial states, such as Russia, Canada can continue to employ tactics that are currently in use such as economic sanctions and a refusal to cooperate with one another in the Arctic Council while making clear that the moment Russia accepts Canadian policy, all will be forgiven and states can move on and begin to work with one another once more.

The Tit for Tat model must be used carefully by Canadian Arctic policymakers who look to persuade the international community to cooperate on policy initiatives due to the risk of demonstrating threatening behaviour. It is therefore imperative for policies to be framed in a manner that highlights the advantages of cooperation before the disadvantages of retaliations. If retaliations are framed as unfortunate outcomes rather than punitive measures, the Government of Canada is able to present its policies in a light that considers cooperation and mutual benefits to be of greater importance than a power struggle between nations. Once Canadian Arctic policymakers have highlighted the importance of how present cooperation encourages future cooperation, they can then perform an evaluation of their desired policy’s chance of success through an Iterated Prisoner’s Dilemma.

**Clusivity**

The Iterated Prisoner’s Dilemma game is the last step of the proposed forecasting framework. All of the previous steps in the model are designed to produce a positive outcome in this final stage of the model. During this step, Canadian Arctic policymakers are essentially evaluating whether or not the insights they have learned from the previous parts of the framework were adequate enough to overcome the difficulties presented when designing Canadian Arctic security policy. Perhaps the trickiest part of the framework, policymakers must rely upon the information gathered from the loading of the model in order to predict the outcome of their proposed policy’s success in an Iterated Prisoner’s Dilemma. In this instance, the lessons learned from the previous steps in the framework determine whether or not adequate initiatives have been taken to overcome the traditional outcome of the Prisoner’s Dilemma model where players will defect in order to protect themselves from receiving the most utility-minimizing outcome.

The difference between the traditional model and the iterated model is that in an Iterated Prisoner’s Dilemma, the game is played an indefinite number of times. In order for Canadian Arctic policymakers to determine whether or not their policy will produce a cooperative outcome in the Iterated Prisoner’s Dilemma model, they must determine three things. First, they must determine whether enough trust has been established that nations believe Canadian interests to be security-seeking. Second, they must determine whether or not the policy has been framed in a light that offers mutually beneficial outcomes for the other player. Lastly, Canadian Arctic policymakers must determine whether their policy demonstrates that should a nation opt to defect on cooperation, it will face a utility-minimizing consequence in the future. If policymakers believe that these criteria have been met, then the policy would successfully produce a cooperative outcome in the Iterated Prisoner’s Dilemma mode. The policy can be put forth by the government and be expected to receive favourable responses from the international community. Put simply, the policy will likely produce the intended outcomes.

Using the example of the disagreement between Canada and the United States regarding the assertion of Canadian sovereignty over the NWP, in order for the proposed policy to pass the final stage of the forecasting framework, Canadian policymakers must be able to demonstrate that their proposed Arctic security policy successfully achieved three things: first, the policy must have avoided a security dilemma through a costly signal. Second, the policy must have successfully presented itself as a mutually beneficial policy for both parties involved. Third, the policy must have demonstrated that the future would be less utility-maximizing for the United States if they defected from the policy due to the negative consequences that such a defection would incur. Assuming responsibility for coordinating and funding search and rescue efforts for American ships passing through the NWP is a costly signal because the federal government is making a financial sacrifice to aid its closest ally. Canadian sovereignty over the NWP is mutually beneficial for both the United States and Canada because it protects both nations from surveillance aircraft flying closer to North American airspace than ever before whereas deeming the NWP an international straight would allow nations such as Russia, China, and Iran to freely fly their aircraft without legal intervention by Canadian or American forces (Lalonde, 2015). Lastly, in retaliation for not supporting Canadian sovereignty over the NWP, the Canadian Coast Guard might face potential delays and inadequate resources for search and rescue missions since the Canadian Coast Guard will not have been prepared to assume stewardship for the voyage of American ships through the NWP.

In this example, since the policy of asserting control over the NWP has been put through the model and altered as a result of the lessons learned through game theory, Canadian policymakers can feel confident that their proposed Arctic policy will have a greater chance of success than had the framework not been used. The proposed Arctic policy of asserting Canadian sovereignty in the NWP will predictably achieve cooperation in the Iterated Prisoner’s Dilemma thus making the policy ready to be enacted by the Government of Canada. The forecasting framework can thus be employed by Canadian Arctic policymakers in order to determine the impact of their Arctic security policies on relationships with the international community.

Evaluating whether or not a policy has possibly addressed clusivity – meaning the desired degree of inclusionary or exclusionary intention – is no easy task. However, the forecasting framework’s proposed recording units are able to identify key areas that increase a policy’s chances of success. If incentivization and coercion are adequately established, then the inclusionary intent of this final step is a rational possibility as demonstrated by the possibility of cooperation in an Iterated Prisoner’s Dilemma.

**Strategic Tradeoffs**

Once the proposed policies have been evaluated using the forecasting model, they can be entered into the Strategic Trade Off Table to be assessed utilizing short, medium, and long-term time horizons. This step of the forecasting framework is critical because it allows Canadian policymakers to also consider how their proposed Arctic security policies will impact northern peoples. By including involved actors and national interests for policies as well as their prospective outcomes, policymakers can examine how the international community might respond to their proposed policies in conjunction with critical interests facing northern communities such as climate change, healthcare, education, inflated costs of living, and many more. This will allow policymakers to apply a holistic approach to policymaking, one that defends and promotes security both domestically and abroad. For example, if a policy analyst were to look at the NORAD modernization initiative timeline as found on the government of Canada’s website, they would note that while the project includes a reference to climate change and job creation and includes expected progress over the span of a decade, it does not specifically outline the short, medium, and long-term outcomes of either reference directly for northern peoples. Climate change is simply referenced, and economic opportunities are country-wide and not necessarily northern-specific.

In this situation, one tasked with creating an Arctic Security policy supported by warners, reassurers, and inbetweeners could determine that the policy could be improved to include infrastructure support for changing climate conditions and an emphasis on environmentally friendly construction and operation methods to lessen the infrastructure’s impact on the environment as well as a recruitment taskforce to prioritize economic opportunities to local communities. The revamped policy would allow not only for an increase in defence readiness over short, medium, and long-term time horizons but also seek to better the quality of life for northern peoples and help protect them against climate change. The use of the Strategic Tradeoff model is therefore a critical aspect of the forecasting framework because it allows policymakers to incorporate the scholarly debate of warners and reassurers into their work by creating Arctic security policy that successfully integrates military and socioeconomic/environmental concerns.

**Findings Conclusions**

The findings reveal that a forecasting framework is a beneficial tool for Canadian policymakers seeking to evaluate their proposed Arctic security policies in order to better determine a policy’s short, medium, and long-term outcomes both domestically and internationally. The framework demonstrates that policymakers can make use of select game theory models as a heuristic to forecast potential responses by other actors to a particular policy followed by a Strategic Tradeoff model that allows policymakers to consider additional actors with interests in the Arctic region. The framework also teaches that delivery is key. A policy that is framed as mutually beneficial and a policy that indicates that defection would produce utility-minimizing outcomes is likely going to incite the international community to perform a cost-benefit analysis. In this instance, if utility-maximizing outcomes have been adequately displayed and retaliations made clear, states will determine that it is in their best interest to cooperate. The forecasting framework is simple enough to be easily applied to all Arctic security policies but adequately detailed to accurately evaluate the different motivations behind cooperation and defection in a decision-making scenario and then use game theory heuristics to suggest tactics to encourage cooperation over short, medium, and long-term time horizons. The forecasting framework thus fills the current gap in Canadian Arctic decision-making literature as it is able to take the different policy suggestions put forth by other authors and evaluate their potential for successfully advancing Canadian interests.

**DISCUSSION**

**Implications**

The results produced from the forecasting framework contribute to the anticipatory pillar of Canada’s defence policy because they eliminate the current gap that exists in the scholarly and policy discussions regarding the Arctic security policies and their impacts on Canada’s relationships with allies, adversarial states, as well as on Canada’s northern peoples. As was discussed in the literature review, there is no overarching framework to guide policymakers looking to put forth holistic Arctic security policies. Instead, scholarly work identifies and addresses the potential problems that the Canadian Arctic might face and makes suggestions moving forwards that advance Canadian interests. It also promotes warner or reassurer assertions, with inbetweeners focusing on why both have value. However, these scholarly debates are not then combined and evaluated for their chances of success. The forecasting framework created thus seeks to build upon previous work by developing a model to evaluate said policy suggestions. The model helps policymakers to determine if their proposed policies will be likely to produce positive outcomes. The framework thus adds insight for Canadian policymakers looking to develop Canadian Arctic policies that are successful, effective, and efficient over the short, medium, and long term. This information takes the form of guiding policymakers to determine the practical implications of their actions in order to create security policies for the Canadian Arctic region.

**Limitations**

The information produced by the forecasting framework faces two different limitations. The first limitation applies generally to the framework, including the Strategic Tradeoff model, regarding the inability of an individual to examine and effectively evaluate every single policy alternative due to the natural constraints of bounded rationality. As such, there is always room for improvement. The second limitation of the forecasting framework has to do with the asymmetrical power that the Government of Canada must face when creating Arctic security policies that require cooperation from the US and other allies who do not entirely share Canada’s specific interests in the Arctic.

Bounded rationality is a problem that decision-makers face. It deals with the relationship between a decision-maker’s natural ability and the complexity of the decision-making task at hand. It does not undermine human intelligence but rather accounts for the impossibility that one will not face any limitations when making a decision (Bendor, 2010). A bounded rationality model, therefore, accounts for the relative difference between the cognitive resources of a decision-maker and the size of the scope a singular problem demands (Bendor, 2010). Limitations can take the form of time constraints, cognitive limitations, and unintentional biases (Bendor, 2010). Similarly, Jervis also discusses the importance of considering perceptions and misperceptions when decision-making. He argues that “accuracy in perception and success in policy have such a strong pull that it is hard to resist the temptation to equate them with rationality” (1976). In order to remedy this limitation, Jervis suggests that decision-makers practice mindfulness to reduce over confidence and understand that individuals perceive evidence differently than their peers (1976). The limitation of bounded rationality is applied to the framework developed in this thesis because the framework is unable to remedy this limitation when offering theoretical insight that can be translated into policy suggestions. While the framework is capable of producing results that guide policymakers to answer the question of the impact of Canadian Arctic security policies, it is unable to guarantee results since unforeseeable outcomes are always possible.

The limitation does not detract from the results produced by the framework. Rather, it encourages policymakers to respect the weight of the responsibility at hand and take action in order to reduce the impact of the limitations produced by bounded rationality. Such actions can be to develop policy suggestions independently in order to produce more alternatives than if policymakers worked together and then to evaluate them independently as well as in a group setting to minimize the impacts of unintentional biases. Policymakers can also be proactive in developing policy ideas in order to reduce the limitation of time constraints.

The second limitation of the forecasting framework concerns asymmetrical security threats. As Lackenbauer states, the Canadian North is becoming increasingly vulnerable to asymmetrical sovereignty threats which result in other states exploiting the Government of Canada by utilizing their power to gain influence and or increase their presence within Canada. An example of an asymmetrical sovereignty threat is the relationship between Canada and the United States (2009).

At the same time, dealing with North American asymmetry in matters of economics, the environment, and defence, has been a continuing challenge for Canada since before Confederation: “The Canadian policy dilemma has been to sip from the cup of interdependence with the United States without drowning in it.” (Swanson, 1982). Canadians have, however, successfully met this challenge and dilemma exceedingly well. As Henry Kissinger observed, in their relations with the United States, Canada’s leaders “required both close economic relations… and an occasional gesture of strident independence.” Canada’s “instinct in favour of common defence conflicted with the temptation to stay above the battle as a kind of international arbiter. Convinced of the necessity of cooperation, impelled by domestic imperatives toward confrontation, Canadian leaders had a narrow margin for manoeuvre that they utilized with extraordinary skill” (1979).

As part of this skillful diplomacy, Canada has generally avoided institutionalizing the bilateral relationship. Indeed apart from NORAD, which is only a bi-national functional command arrangement, there are no overarching U.S-Canada international organizations in economic or defence realms similar to the European Union or NATO. This suited both Washington and Ottawa. As John Holmes observed forty years ago:

There was little construction of continental institutions. Americans were only fitfully aware of any need and not anxious to dilute their control over their own policies. Canadians were chary of bodies which, they assumed, would, by any inevitable system’s bias, operate in favour of the stronger member…Those few institutions that were continued or set up anew, whether they were from bodies or agreed principles were designed to stake out and protect the Canadian interests against the uninhibited power of American society (1982).

The success of Ottawa’s approach, which has preserved Canadian national security interests, not to mention prosperity, has been made possible by the reality that it has posed no major impediments to the fulfilment of American national interests. Indeed, the US has generally been able to show wise and farsighted sensitivity to Canadian sensitivities because it can afford to do so. An example of this is US-Canada cooperation in the Arctic through USNORTHCOM and Canadian Joint Operations Command (CJOC) as well as under NORAD auspices which has increased in recent years.

The framework proposed in this study is consistent with this historically successful approach, one that manages continental asymmetry and seeks out cooperation where possible yet is ever conscious of the inherent imbalance of power. It does its best to demonstrate to Canadian policymakers how to ensure that their proposed Arctic security policies are trusted, how they can incentivize cooperation, and how they can employ stronger tactics. However, were the United States to reject Canadian security policies in its Arctic region then the Government of Canada would have little wiggle room for negotiations. For example, were the United States to commence an escalate to de-escalate scenario with Canada over any political tensions that may arise from a broad array of defence-related topics such as NATO spending, NORAD agreements, or the use of the NWP, the Government of Canada would have no choice but to appease the United States. To this day, such a situation has never occurred, mainly because the United States and Canada negotiate through existing institutional structures which reinforce the current cooperative and amicable nature between both countries and that United States foreign policy has never required a non-cooperative stance with Canada.

This history of cooperation, though, may well be tested in the near future. For example, it has recently been argued that Canada’s Arctic currently presents NATO’s weakest link in all of its Arctic territory (Sands, 2023). Given that this weakness could potentially jeopardize U.S. security, this could lead to the U.S. rejecting Canadian Arctic security policies in favour of furthering their own security interests in the region. Speaking from the perspective of the United States during an expert series, Christopher Sands argued that “We need Canada, we need Canadians, but we don’t need the Canadian government…Call us when you have some money on the table because otherwise, we don’t want to hear what you think. We really don’t, because you have an opinion, but no contribution to make, or not enough of one (2023).”

Furthermore, former Deputy NORAD Commander and Commander of CJOC recently argued the impact of the return of Great Power Competition amongst the US, Russia and China is already impacted the situation in the Arctic in volume 23 of the *Canadian Military Journal* titled “North American Defence and the Canadian Arctic in the 21st Century.” He points out that “As Russia continues to enhance and expand its Arctic military capabilities, it presents the more traditional threat to North America,” while “China also recognizes the importance of the Arctic for its ongoing economic growth and international influence” (Coates, 2023).

In an article for the *Wall Street Journal* titled “America's Military Trails Russia and China in Race for the Melting Arctic; U.S. is competing with a partnership between the two countries but has fewer icebreakers and ports, and less experience”, Angela Owens outlines how recent Russian and Chinese actions in the Arctic region, such as last fall’s joint exercise in the Bering Sea which resulted in vessels entering into surface action group formations and steaming alongside one another as well as an increased Russian interest in its Arctic fleet, as evidenced by its desire to add three new “Project 23550” class icebreakers by 2024 to its already better-equipped fleet than that of the United States or its allies, are becoming increasingly important to the United States. This is evidenced by leaked U.S. potential “freedom of navigation” operations to assert dominance and undermine Russian assertions that they are able to regulate traffic through the Northern Sea Route (2023).

If the United States and its norther European NATO allies, continues to perceive the Arctic as a region of increasing strategic importance, this could affect the American continued willingness to accommodate Canadian sovereignty claims over the NWP as larger issues of national security are at stake. In a recent article for *CNN* titled “US military responded to Chinese and Russian vessels near Alaska”by Natasha Bertrand, it is evident that American concerns are indeed mounting as the most recent joint exercise between Russian and Chinese vessels was met with a larger military presence than the year before, with four US Navy destroyers responding to the operation opposed to one coast guard ship as seen last year who stumbled upon the exercise without prior knowledge (2023).

If such actions continue to occur and influence current United States Arctic policy, the outcome for Canada is inevitable therefore requiring Canadian policymakers to advocate for policies that are accepted by the United States in order to continue to build upon the solid foundation of their bi-national relationship. This is furthered by earlier discussions on the importance of policymakers not triggering or suggesting that the Government of Canada is prepared to securitize the Arctic in regard to conflicting opinions over sovereignty claims in the Arctic region due to its weaker military capabilities than the United States.

However, in light of this new American concern and given the past and current record on bilateral Arctic security cooperation, Canadian policymakers can remedy the limitation of this framework by slowly building upon existing successful policies. The forecasting framework is still a valuable tool to be used by policymakers and contributes to enhancing the likelihood of positive outcomes being produced. The power dynamic just encourages policymakers to use caution by continuing to promote Canadian interests through small-scale initiatives enabling policymakers to increase the likelihood of eventual American acceptance of any Arctic security policy that might, in the future, become at odds with American foreign policy.

Small-scale initiatives are also less likely to trigger diplomatic disagreements and tensions. For example, on the subject of the threat of foreign surveillance through the Canadian Arctic and its NWP, Canadian policymakers should focus on developing policies that readily welcome cooperation with the United States to improve the existing monitoring of and response to foreign objects such as high-altitude balloons and monitoring buoys as it could lay a foundation to demonstrate how working together to enforce Canadian control over its Arctic areas is mutually beneficial for both parties involved given that there are instances of other countries taking advantage of the region for foreign surveillance utilizing dual-purpose technologies. In doing so, Canadian policymakers can reduce the chances of triggering a large territorial dispute that could stem from debating a large topic, such as Canadian sovereignty over the NWP, where most allied nations already have an existing foreign policy position that does not favour the Canadian position by demonstrating the mutual benefits for all parties involved.

A successful example of Canada working with the United States in order to produce a successful outcome is the agreement reached by the Mulroney and Reagan governments over tensions arising in 1988. Despite its military disadvantage, Canada was able to succeed in signing a treaty with the United States which included that “The Government of the United States pledges that all navigation by U.S. icebreakers within waters claimed by Canada to be internal will be undertaken with the consent of the Government of Canada.” As seen in the Treaty, Canadian policymakers can seek to chip away at the larger topic by focusing on smaller but relevant aspects surrounding the theme of sovereignty. Canadian policymakers could focus on and emphasize its desire to develop its role as a protective steward over the Arctic region. Due to Canadian first responders’ proximity to the region and its potential trade routes, such as the NWP, this is a feasible initiative to build international recognition of Canada’s pivotal role in the Arctic. It allows the Government of Canada to increase its Arctic presence without appearing threatening or challenging American interests.

This increased Arctic presence is a symbolic form of sovereignty since all vessels entering the region will become accustomed to a Canadian presence and even defer to Canadian authorities for help in the event of an emergency. The results of such initiatives seek to change the discourse surrounding the Arctic region. Should a Canadian presence remain and increase through additional smaller initiatives then allies will become more and more accustomed to the Government of Canada’s presence and position of authority in the region. In other words, Canadian policymakers can seek to ingrain the role of the Government of Canada into habitual use of the Arctic’s waterways. Such smaller initiatives are capable of laying the groundwork for the eventual United States and international recognition of Canadian sovereignty in the Arctic because gradual changes of perception change discourse and seek to put the Government of Canada in a strengthened position allowing the nation to demonstrate that allied acceptance of Canadian sovereignty in the Arctic region is in the best interest of all parties involved.

**CONCLUSION AND RECOMMENDATIONS**

The analysis above presents a framework and argument for the creation of a framework designed specifically to aid Canadian policymakers tasked with creating and evaluating policies for Canadian Arctic security. The framework allows policymakers to proactively analyze their potential policy options and this thesis has shown that game theory is a useful tool to help forecast the likely outcomes such policies can have on Canadian relations with allied and adversarial nations, as well as Canadian northern peoples, and evaluate written policy accordingly. The findings indicate that Canadian policymakers can make use of the framework in order to mitigate their chances of triggering a security dilemma and increase their chances of domestic and international cooperation on the Arctic.

**Recommendations**

Canadian Arctic security policymakers should employ the framework described here. The framework should be considered because it is capable of helping to proactively evaluate different policy options and identify areas where such policy options could produce undesired results. The use of the framework could therefore be applied to a list of policy alternatives and used as a tool to modify problematic policies and to thus determine the best option moving forwards. Indeed, an expanded framework should be considered because of its potential broader applicability beyond just Arctic policy. The multifaceted approach to answering the research question renders the forecasting framework capable of helping Arctic policymakers in a wide range of decision-making scenarios as it approaches the question of a policy both domestically and abroad over different time horizons. The framework should thus be considered as a benchmark that all proposed policies must pass through before being enacted into policy. Moreover, it should continue to be tested against a broader array of foreign and defence policies.

The framework was developed in response to the research question regarding how might Canadian northern people, Canadian Allies, and Canadian competitors respond to the Government of Canada’s efforts to increase security over its Arctic region in the short, medium, and long term. The defence policy outlines the need for consultation with the academic community in order to remain conversant with the complexity of modern-day conflict and to better address the individual and collective perceptions of threats to national security (SSE 2017). This need, coupled with the policy’s need to adapt to the changing Arctic security environment, demonstrates the important role that a forecasting framework can play in ensuring that the Government of Canada puts forth Arctic security policies that are well received both domestically and abroad and will produce favourable outcomes for the Canadian people and their allies in the immediate, near, and distant future.

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