# MDMP OR CFOPP: A HUMAN REASONING AND GROUP REASONING ANALYSIS AND COMPARISON

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**ABSTRACT**

The past decade has seen an influx of research, analysis and discussion on improvements to military Operational Design (OD) and its inherent processes as a result of the changing contemporary operating environment (COE). A fall out from these discussions is a renewed look at military decision making processes and as such the capabilities of staff and commanders to be most effective within them. Military planning throughout history has relied on the ability of the commander and staff to frame a problem, apply human reasoning and develop a plan of action. Military decision making at its core is impacted by human reasoning capabilities and weaknesses.

Decision making for operational planning is the result of human logic, reasoning and the process of proving, followed by a combination of inductive and deductive reasoning by humans as individuals and as a group. Operational planning analysis through the inductive reasoning by a commander clashing with the staff's deductive analysis also poses a risk to operational planning if not mitigated accordingly. The risks from flawed reasoning, as individuals and as a group, is important to the military community in order to ensure that our planning processes are adaptable to the speed of the COE without exacerbating the flaws in human reasoning capabilities.

There has existed within the Canadian Forces community a healthy debate as to which operational planning process is better suited for operational design, and in fact which operational design framework is better suited within the COE. As a result of this debate, several papers have resulted comparing the U.S. Military Decision Making Process (MDMP) model and the Canadian Forces (CF) Operational Planning Process (OPP). However, few studies have

compared the models to evaluate which one is stronger than the other to mitigate the risks of human reasoning deficiencies within problem solving and which one better mitigates the risk of groupthink.

As a result of limited debate and analysis, this paper will discuss the relevance and potential risks of inductive reasoning, deductive reasoning and groupthink within CF and U.S. military planning. This paper will also compare the MDMP against the CFOPP for their suitability and strengths in mitigating the risks of human logic and group dynamics within the context of operational planning. The conclusion is this research paper is that MDMP is a stronger tool to mitigate the risks of individual and group reasoning than the CFOPP.

*Because individuals are an integral part of any organization, the study of organizations must begin with the individual.[1] Dr. Clifton Wilcox*

## INTRODUCTION

There is a consensus that the influx of capabilities and the new potential from technology innovation caused a Revolution of Military Affairs (RMA). This RMA according to Lieutenant-Colonel Giffen in 2002 was not merely improving our ability to wage war but "fundamentally changing the nature of the art" in which to plan for war.[2] The response to the RMA over the past decade has been a flurry of discussions and suggestions for doctrinal changes to support the military's ability to conduct operations and on the most effective planning. The increased involvement of Canadian and U.S. militaries in campaigns and operations in Iraq and Afghanistan has added additional fuel to these discussions and debates. It was argued that operation planning models needed changing to match to military strategy while being capable of significantly improving the probability of success.[3] From a philosophical and process analysis view point, the past decade has been extremely interesting to say the least.

Decision-making is the first step in implementing human will within operational planning and it is a prime human factor in warfare. Within NATO planning, a rational analytical decision-making model is the preferred decision method and is based on a comparison of quantitative options. The commonly understood framework is known as the estimate process – it is

[1] Clifton Wilcox, *Groupthink: An impediment to Success* (USA: Xlibris Corporation, 2010), 161.
[2] Lieutenant-Colonel R. Giffen, "Superstitious Rituals, Naïve inductivisim in command and control doctrine: Its causes, consequences and cures" (Department of Defence, 2002), 3.
[3] Journal of Defense Resources Management (JODRM) released by the Regional Department of Defense Resources Management Studies (DRESMARA) of Brasov, Romania is a biannual, scientific peer-reviewed publication. "The aim of JODRM is to disseminate the results of the theoretical and practical research investigations undertaken by reputable professionals worldwide in the holistic field of defense resources management." Available from: http://journal.dresmara.ro/issues/volume1_issue1/13_galusca_circiu_boscoianu.pdf: Internet; accessed 12 August 2012.

commander focused and command led. Factors that are closely linked to the personality of the commander, like intuition and creativity, are generally emphasized in doctrine as being important. Decision making is knowing if to decide, then when and what to decide. It includes understanding the consequence of decisions.[4] Decision making requires tools and human logic and interactions. Finally decision making requires human reasoning and the ability for humans to reason individually, and within a military planning context, as a group.

The role of decision making, critical thinking and impact of group dynamics is applicable to the military community as part of command and leadership. The study of these dynamics is important so that military leaders understand the influencers and limitations that their followers are limited by through human reasoning skills and interactions both as individuals and as a group; reasoning skills and group dynamics must be effectively understood and managed as tools to getting the best plan into action. As leaders, it behooves us to responsibly manage and lead those that work for us in operations and ultimately when at war. Leadership is essential for the effective management of information and people during planning processes while command is the glue that enables leaders to execute the best decision and resources at the more suitable time. Dr. A. Okros, a professor at the Canadian Forces College and Royal Military College has dedicated a significant amount of research into the function and relationship of command and leadership. In his paper *Leadership in the Canadian Military Context,* he identifies the relationship of command and leadership and the inherent responsibilities of which include the dynamics of group cohesion and human reasoning within a military context. According to Okros, command emphasizes rational, logical and deductive reasoning while leadership enables group

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[4] United States, Department of the Army, *Staff Organization and Operations No. 101-5* (Washington, DC, 31 May 1997), 5-1.

management and the associated dynamics.[5]  The study and understanding of reasoning and group dynamics within operational planning and the military environment is therefore a critical part of military education and growth.

The premise of this paper is that military planning processes are based on inductive and deductive reasoning skills and are executed within groups in order to resolve simple to complex problems. Planning processes and tools must be capable of providing frameworks to mitigate the weaknesses of human reasoning and the symptoms of groupthink to ensure that military plans result in successful operations. The Canadian Forces (CF) employs a planning model referred to as the Operational Planning Process (OPP) while the U.S. Military follows a Military Decision Making Process (MDMP) model. Although both models follow similar design, the stages and steps within them are different. Comparative studies between the two models have been conducted with a view to determine the suitability to the operational environment, but few if any studies have been specifically conducted to evaluate their comparability to human capabilities based on the latest research on human reasoning and group dynamics.

This paper conducts a preliminary comparative analysis of the two models from both a theoretical view point of logic and reasoning both as individual processes and how the dynamics of reasoning change within a group and a practical application of the key risks from human reasoning capabilities within MDMP and CFOPP that deserve mitigation.

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[5] Alan Okros, *Leadership in the Canadian Military Context*, Canadian Forces Leadership Institute, Canadian Defence Academy, (Department of National Defence, Ottawa, 2009), 9-10.

> ...Accordingly, conflict engagement will require intuition to understand the essence of complex problems, ingenuity to devise innovative solutions and strength of purpose to act effectively. Land Operations 2021[6]

## CHAPTER ONE – BACKGROUND CONCEPTS

Chapter 1 provides an outline on what a problem is within a military context and the frameworks in place to manage them within an operational planning context. In order to relate the impact of human reasoning capabilities and weaknesses both as individuals and as a group during military planning, it is necessary to highlight the terms related to operational planning and the context to which they are applicable to both the CF and U.S. military planning environments.

**The Nature of Problems**

The Canadian Forces released a guide for Land Force development through to the year 2021 in 2007, *Land Operations 2021: The Force Employment Concept for Canada's Army of Tomorrow*, also referred to as B-GL-310-001/AG-001.  B-GL-310-001/AG-001 begins with discussing the complex operational environment that Canada and her allies face over the next 15 years and the nature of the "international security arena marked by uncertainty, volatility, and risk".[7] Military problems will require frameworks that are capable of providing a methodical process for commanders and staff to plan and act accordingly in order to resolve them.

There are several theories that describe the nature of problems and the problem solving skills and processes required to resolve them. The skills and processes to resolve problems vary between individuals and therefore vary between military commanders and staff. The more complex a problem, the more skill and tools are required to resolve them. Simply put military

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[6] Canada, Department of National Defence, *Land Operations 2021: Adaptive Dispersed Operations the Force Employment Concept For Canada's Army of Tomorrow, B-GL-310-001/AG-001*,(Ottawa, DND, 2007), 9.
[7] Ibid., 5.

commanders address problems that require military action or a military-like solution. Understanding the nature of the different types of problems greatly assist the commander's and staff's efforts to understand (or frame) the problem that must be solved.[8] Problems can be thought of as ranging from simple or well-structured to complex or ill-structured as illustrated in Figure 1 below.
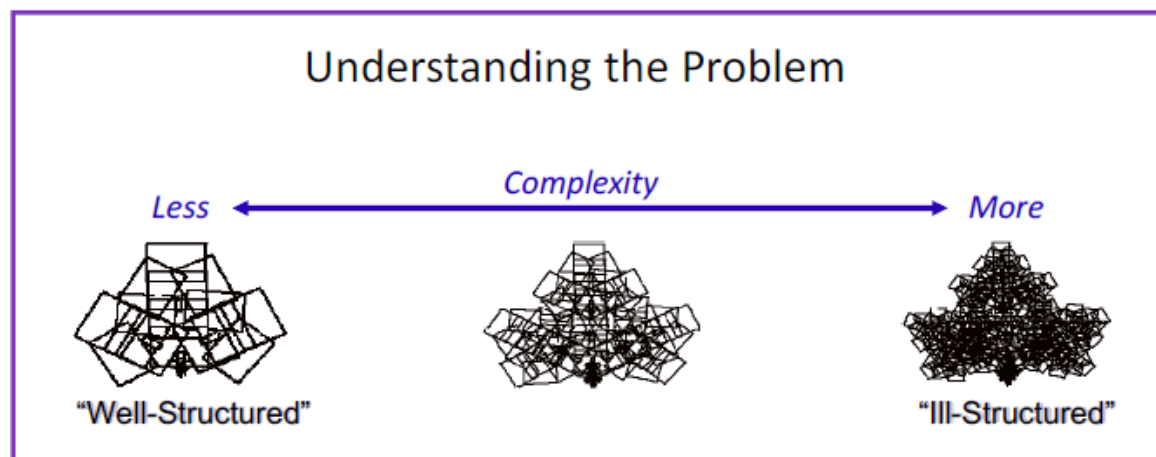


Figure 1 – Understanding the Problem

In 1973, Horst Rittel (former Professor of Science Design at Berkley University) and Melvin M. Webber (former Professor of City Planning at Berkeley University) formally described the concept of wicked problems in a research paper that contrasted "wicked" problems with relatively "tame," soluble problems in mathematics, chess, or puzzle solving.[9] The term 'wicked' in this context is not in the sense of evil as the term would imply, but rather as "an issue highly resistant to resolution".[10] Problem analysis experts argue that wicked problems cannot be easily resolved by a traditional approach to problem solving where a problem is defined, analyzed and

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[8]  United States, Department of Defence, *Planner's Handbook for Operational Design* Version 1.0 Joint Staff, J-7 Joint and Coalition Warfighting( Suffolk, Virginia, 2011),  II-7.
[9] H. Rittel and M. Webber, *Dilemmas in general theory of Planning* (Elsevier Sciences Publishing Company, Amsterdam, 1973), 163.
[10] Australia, *Tackling Wicked Problems: A Public Policy Perspective*. (Australian Public Service Commission. 25 October 2007) Available from: http://www.apsc.gov.au/publications-and-media/archive/publications-archive/tackling-wicked-problems; Internet: accessed 18 October 2012.

solved in sequential steps. The primary reason why the traditional approach is not feasible is that within the definition of a wicked problem, there is no clear problem definition. In a paper published in 2000 by a leading Professor of Strategic Management and Professor of National Security Affairs Professor N.C. Roberts identifies three strategies to cope with wicked problems which include an authoritative strategy, competitive or collaborative.[11]   According to Roberts an authoritative strategy is one where the wicked problem is resolved best by vesting the responsibility in the hands of few people. An authoritative strategy applies to military decision making and military operational problems. Roberts argues that the reduction of stakeholders reduces problem complexity by eliminating many competing view points at the start. A key disadvantage of this approach is that the person charged with solving the problem may not have an appreciation of all the perspectives nor have all the skills required to resolve the problem.

Whether the military problem is described as simple, complex or wicked, commanders must sufficiently understand the problem in order to successfully design, plan, and execute joint operations. The combination of design and planning is intended as a problem-solving approach that supports decision making, and this approach must address ill-defined problems. Lieutenant General (retired) Paul Van Riper currently holds the Donald Bren Chair on Innovation and Transformation at Marine Corps University.  He is a leading speaker on system theory and decision making. Van Riper links decision making to systems theory and the nature of problems with the following statement. "To make an effective decision a person must understand which of the two kinds of systems he or she is dealing with, one that is structurally complex or one that is interactively complex. The two systems require fundamentally different decision-making approaches. Structurally complex systems allow for analytical decision-making (while

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[11] N.C. Roberts, "Wicked Problems and Network Approaches to Resolution" The International Public Management Review., Vol. 1, 1 (2000).

interactively complex systems require intuitive decision-making. Extremely difficult problems—

sometimes called "wicked" problems" are always a result of interactive complexity; they call for

systemic decision-making".[12]

Decisions are the means by which the commander translates a vision of the desired end state

into action or a plan. The United States Department of the Army Manual 101-5, *Staff*

*Organization and Operations*, states that decision making is both a science and art.  It also states

that:

> Many aspects of military operations—movement rates, fuel consumption,
> weapons effects—are quantifiable and, therefore, part of the science of war.
> Other aspects—the impact of leadership, complexity of operations, and
> uncertainty regarding enemy intentions—belong to the art of war.[13]

In order to resolve wicked problems and complex problems in today's contemporary operating

environment, both art and science are required and the framework must be flexible.

**Operational Art**

According to U.S. Doctrine in the Department of the Army's *Field Manual 3-0*:

*Operations*, operational art is:

> is the application of creative imagination by commanders and staffs
> —supported by their skill, knowledge, and experience—to design
> strategies, campaigns, and major operations and organize and employ
>  military forces. Operational art integrates ends, ways, and means
> across the levels of war.[14]

According to U.S. Doctrine, commanders use operational art to envision how to establish

conditions that define the desired end state. It further states that actions and interactions across

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[12] United States, Department of Defence, *Planner's Handbook for Operational Design*…II-8.
[13] United States, Department of Defence, Staff Organization and Operations Manual FM 101-5. (Washington DC, 1997), 5-1.
[14] United States, Department of the Army, *Field Manual 3-0 Operations*. (Washington DC, 2008), 7-1.

the levels of war influence these conditions and those conditions are fundamentally dynamic and "linked together by the human dimension, the most unpredictable and uncertain element of conflict".[15] It is through operational art that commanders apply a comprehensive understanding of the complexity of the over-all environment in order to determine the most effective and efficient methods to influence conditions in various locations across multiple echelons of forces. Figure 2 illustrates a model to visualize the process of how operational art is applied to identify and understand the conditions to be evaluated, assessed and developed into a subsequent plan of operations.
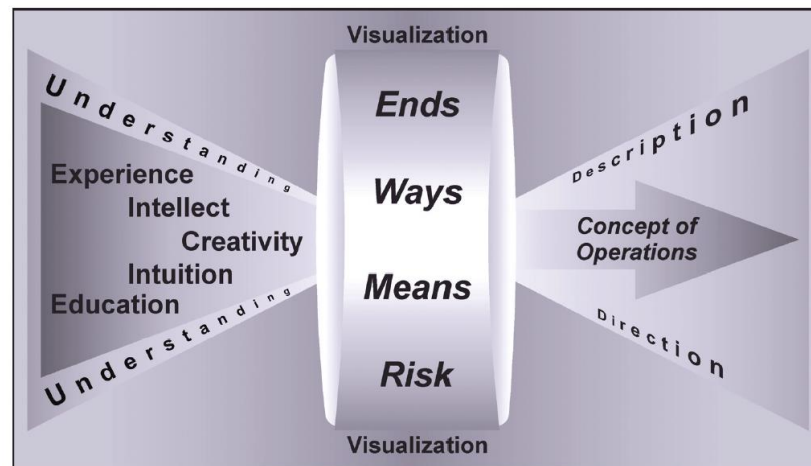


Figure 2 – Operational Art[16]

According to Canadian doctrine, operational art is defined as, "The skill of employing military forces to attain strategic objectives in a theatre of war or theatre of operations through the design, organization and conduct of campaigns and major operations."[17] This definition is based on the acknowledgement and understanding that conflict is a "human activity that is conducted under conditions of imperfect knowledge by multiple participants who act

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[15] United States, Department of the Army, *Field Manual 3-0 Operations*. (Washington DC, 2008), 7-4.
[16] Ibid.
[17] Canada, Department of National Defence, *Canadian Forces Joint Publication 5.0 (CFJP 5.0)The Canadian Forces Operational Planning Process*, B-GL-005-500/FP-000, (Ottawa, Department of National Defence), 1-3.

concurrently and react specifically against perceptions of probable actions and results of actions".[18] Operational art, according to Canadian doctrine, ultimately "requires the ability to visualize the synergistic effect of all available capabilities in the achievement of the strategic goal". [19]

**Operational Design**

Operational Design is essentially an intellectual exercise that commanders engage in through experience, intuition, judgment and creativity (through operational art) to develop plans for military operations. Operational Design according to U.S. Doctrine provides a specific methodology for creating a systemic and shared understanding of an operational problem and a broad approach to its solution.[20] The essence of operational design, according to Canadian doctrine, is to apply joint combat effects (Air, Sea, Land etc) in a manner in which friendly and/or allied forces strengths are brought to bear upon enemy forces (specifically enemy weaknesses), while friendly weaknesses and risks are shielded and the enemy is out-manoeuvred in time, space, and legitimacy, forcing the enemy into a position for which the only option is capitulation.[21]

Within the military and academic community there exists a multitude of elements of Operational Design, however, the most prevalent and relevant to Canadian doctrine and her Allies is the Classical Operational Design (COD).

COD is based on four key elements:

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[18] Ibid.
[19] Ibid.
[20] United States, *TRADOC Pam 524-5-500 Commander's Appreciation and Campaign design*, (Washington, D.C. Department of the Army, 2008), 13.
[21] Canada, Department of National Defence, *Canadian Forces Joint Publication 5.0...*, 2-8.

- end state;

- centre of gravity;

- lines of operation; and

-  decisive points.

Figure 3 is a common and useful graphic when illustrating the U.S. Joint Force Command's elements of Classic Operational Design within the context of Operational Planning and Operational Art.
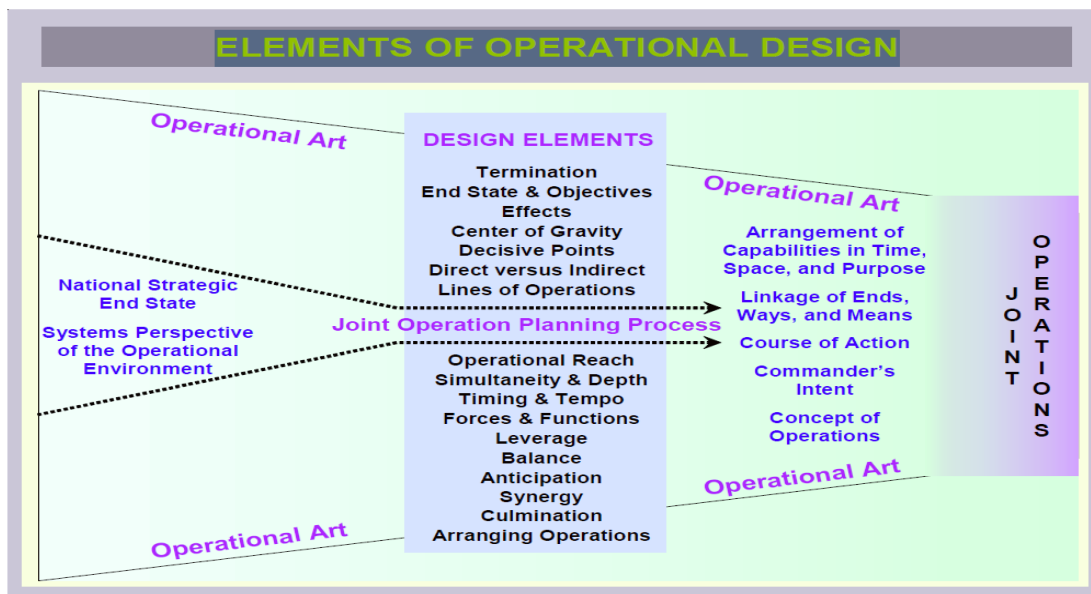


Figure 3 – Elements of Operational Design[22]

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[22] United States, Department of Defence, *Joint Publication 5-0, Joint Operation Planning*, (Washington DC; 2011) IV-5.

According to Canadian Forces Joint Publication 5.0, *The Canadian Forces Operational Planning Process,* Operational Design brings together all the military components involved in operations by designating which military force must be concentrated where. This "focus" is essential to ensure that there is a clear understanding amongst all the components (land, maritime, aerospace, and special forces) on the overall joint objective and plan.  It further states that each component must be continuously aware of the main effort for the overall operation.[23] Similarly, a designation of a main effort by phase makes understanding who is a supported commander and who is a supporting commander quite clear while maintaining operational focus on achieving the overall strategic goal. Operational Design is the framework based on common operational concepts from which this synchronization is made possible.[24] The campaign plan is the result of that which the Operational Design is aimed at accomplishing; national, strategic, and operational objectives.[25] "The essence of Operational Design is to apply joint effects in a manner in which friendly strengths are brought to bear on enemy weaknesses, friendly weaknesses are shielded and the enemy is outmaneuvered in time, space, and legitimacy, forcing him into a position from which the only option is capitulation."[26]

According to U.S. Doctrine, Operational Design is a product born of the U.S. military's experience in counterinsurgency and nation-building campaigns, and defined as a process best applied in the planning of campaigns and major operations.[27] According to FM 3-0, it is through Operational Art that commanders translate their concept of operations into an Operational Design and ultimately into tactical tasks. They then apply Operational Art to an array of forces

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[23] CFJP 5-0, 1-3 to 1-4.
[24] Ibid., 1-4.
[25] Ibid., 1-17.
[26] Ibid., 2-6.
[27] United States, Department of the Army, *FM3-Operations.* 7-4.

and maneuver them to achieve the desired end state.[28] Operational Design within the U.S. context balances the natural tension between tempo, endurance, and risk to increase operational reach and achieve mission success.[29]

**Operational Planning**

The way that a commander and staff implement a plan as part of operational design is through operational planning. Operational planning across NATO is quite similar and based on a process that consists of series of stages "to enable the commander to translate strategy and goals into a unified plan for military action by describing how operations and logistics will be used to achieve success within a given space and time".[30]  In both Canadian and U.S. doctrine, the process is one of stages and is commander-driven and staff supported.  Within Operational Design, both U.S. and Canadian operational planning processes include a key concept called centre of gravity (COG), introduced by Prussian war strategist Carl von Clausewitz.[31] Clausewitz defined COG as "the hub of all power and movement, on which everything depends."[32] While both the U.S. and Canadian militaries have reshaped some of Clausewitz's original concept of COG, the term has become a crucial part of operational art and planning. Figure 4 illustrates the concept of COG and its relation to the military problem and dependent influencers.

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[28] Ibid.

[29] Ibid., 8-5.

[30] Canada, Department of National Defence, B-GL-005-500/FP-000…, 2-5.

[31] Clausewitz was a professional soldier in the Prussian military and involved in numerous military campaigns. He is most famous as a military theorist and his work in the examination of war.

[32] Carl von Clausewitz, *On War*, trans. and ed. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1984), 485–486.
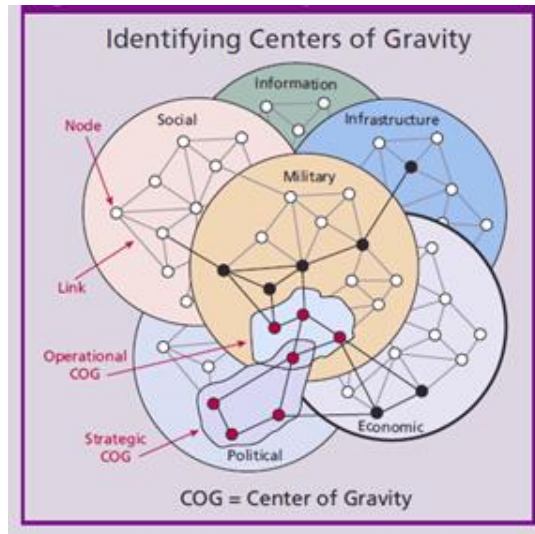
Figure 4 – Concept of Center of Gravity[33]

One method of identifying the COG is by adopting an analysis model designed by Dr. Joe Strange.  Dr. Strange's framework essentially assessed a COG by understanding critical capabilities, critical requirements and critical vulnerabilities calling them out as critical factors.[34] According to Strange, this process possesses tremendous planning and instructional utility because they establish a sensible hierarchy with logical relationships.   Figure 5 illustrates the deductive logical process applied to assess and identify COG within operational planning.

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[33] Jan L. Rueschhoff and P.D. Jonathan, "Centers of Gravity from the Inside Out", Available from: http://www.au.af.mil/au/awc/awcgate/jfq/rueschhoff_dunne_cog_inside_out.pdf, Internet: accessed 18 Nov 2012, 121.

[34] Joe Strange, *Centers of Gravity & Critical Vulnerabilities* (Quantico, VA: U.S. Marine Corps Association, 1996), 93-96.
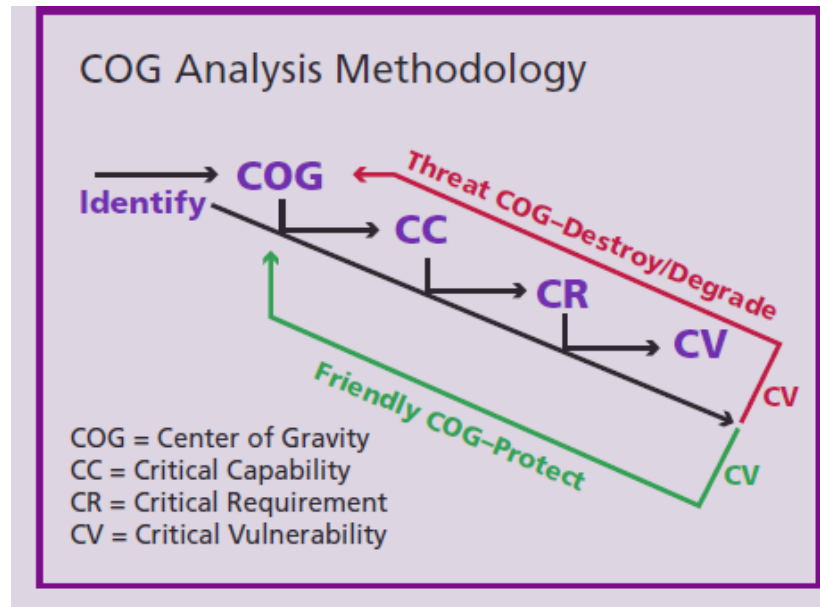
Figure 5 – Depiction of Strange's analytical model[35]

Operational Design, Operational Art and Operational Planning provide the framework to address simple and complex military problems. The means to address the problems including COG analysis are very much analytical and logical processes. Chapters Four and Five discuss in more detail how MDMP and CFOPP are employed as part of operational planning and where there may be pitfalls when compared to the risks of human reasoning and groupthink. However, before delving into the two models in more detail, a more in depth look at what human reasoning is, how it is applied and how it is impacted by group dynamics is necessary. This introduction and discussion follows in Chapters Two and Three.

> Knowledge management consists of the deductive reasoning and processes that provide the impetus for information collection and the Situational Awareness produced to meet the requirements of decision makers. Land Operations 2021[36]

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[35] Jan L. Rueschhoff and P.D. Jonathan, *Centers of Gravity…*, 121.
[36] Canada, Department of National Defence, *Land Operations 2021…37.*

**CHAPTER 2 – REASONING AND HUMAN LOGIC**

Chapter 1 provided a framework for how military problems are approached as part of operational planning. Chapter 2 provides an understanding of the underpinning influencers and roles that human logic and human reasoning plays individually in the people involved in operational planning.

As outlined in Chapter 1, the commander and staff focus on defining, analyzing, and synthesizing the characteristics of the operational variables pertaining to that environment through Operational Design. The understanding of the problem within the framework and the subsequent courses of actions are the result of human reasoning processes. These human reasoning processes enable a dynamic interaction and relationships amongst the many complex factors in the operational environment. The results of the analysis and human reasoning processes within Operational Planning produce inferences, deductions and conclusions that are organized into a plan. The study of analytical thought and its role in military planning is not new, academic fields such as decision sciences, management sciences, administrative sciences, social choice, psychology or naturalistic decision making are examples of the growing interest in modeling and understanding the individual and organizational decision making processes such as Operational Planning.

**Logic**

Logic is defined in several ways and in many definitions generalized as the science of correct reasoning. A definition that applies to the thought processes pertaining to the application of logic during military decision making is best explained as "the science that explains what

conditions must be fulfilled in order that a proposition may be proved, if it admits to proof".[37]

When discussing propositions within the confines of logic we speak to those that are qualitative

or quantitative. Those propositions that declare the equality or inequality of magnitudes (or

numbers) are quantitative while qualitative propositions deal with those that are exposed to in

conversation, literature, politics and those which are not mathematical.[38] Propositions that are

dealt with during the military decision making are mostly qualitative. It is within these

propositions that tell us something happened or will happen (satellite surveillance will deteriorate

during inclement atmospheric conditions), have a certain property (covered ground hinders

movement) or are some related to a class of things (Airborne soldiers are good at reconnaissance

patrolling). It is with qualitative propositions that logic is applied to so that the commander can

ascertain whether the proposition is true, false or doubtful.[39]

As part of military decision making processes, staff and commanders have the

responsibility of assessing a situation and providing the best method of accomplishing the

operational task and subsequently plan for possible future tasks.[40] In accordance with CFJP 5.0,

*The Canadian Forces Operational Planning Process*, the planning process has been designed to

optimize the logical and analytical decision making steps in times, and under conditions, of

uncertainty and ambiguity. CFJP 5.0 also states that a key objective of the planning process is "to

maximize the commander's and staff's creative thinking and associated thought processes".[41] As

part of the planning process then, commander and staff ultimately apply logic to determine the

best outcome of a scenario that satisfies the conditions of the task through the proving and

disproving of facts and scenarios.  They apply reasoning skills to resolve a problem logically.

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[37] Carveth Read, *Logic, deductive and inductive*, (London: Alexander Moring Limited, 1908), 1.
[38] Ibid., 1.
[39] Ibid.
[40] Canada, Department of National Defence, *B-GL-005-500/FP-000…*, 3-1.
[41] Ibid.

**Reasoning**

Reasoning is an everyday occurrence for humans. We consider options from what to wear in the morning, which route to take to work and concluding our day with considering if we should go to bed having successfully achieved enough for the day. We also apply reason to what we hear from others or whether what we read is valid or not.   One might conclude that to reason is to be human.  Reasoning is generally defined as the drawing of conclusions or inferences from known or assumed facts.

Ultimately though, the end product of a military decision making process is a decision leading to a plan. In the study of proof and reasoning there exists a blur between what is decision making and what is reasoning. One can exist without the other yet they may also be complimentary within human logic. In a text book argument, decision making usually involves forecasting; one action is taken over another because the chooser believes that the one end result is preferable.

There is a multitude of books and studies on reasoning and on the effects and impact of good and bad reasoning processes. The *Merriam-Webster Dictionary* defines *reason* as "the power of comprehending, inferring, or thinking especially in orderly rational ways: intelligence (2): proper exercise of the mind (3): sanity".[42] Anne Thomson is an Honorary Lecturer and Fellow of the School of Economic and Social Studies at the University of East Anglia. In her book, *Critical Reasoning: A Practical Introduction*, she states that the question about critical reasoning is not if we reason, but if we actually reason effectively.[43] The resulting question and foundation of this thesis follows that the question is not if military operational processes follow

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[42] Merriam Webster Collegiate Dictionary, *New Ways to Find the Words of Today*, (USA: Merriam Webster, 2008). 1128.
[43] Ann Thomson, *Critical Reasoning: A Practical Introduction* (New York: Routledge, 2009), 2.

reasoning patterns, but how well do they incorporate the limitation and strengths of reasoning within a planning context.

According to Thomson, critical reasoning is centrally concerned with giving reasons for one's beliefs and actions. Critical reasoning is resolved by analyzing and evaluating one's own and other people's reasons and as a result constructing better reasoning. A similar process exists in business case analysis and operational planning.  Common in these critical reasoning activities according to Thomson are:

> certain distinct skills, for example, recognizing reasons and conclusions, recognizing
> unstated assumptions, drawing conclusions, appraising
> evidence and evaluating statements, judging whether conclusions are
> warranted; and underlying all of these skills is the ability to use language
> with clarity and discrimination.[44]

In her book she outlines practical ways for improving reasoning abilities in order to master clear headed and critical reasoning abilities i.e., critical thought. The improvement of critical reasoning skills is essential in order to master the ability to evaluate ones or another's belief, proposal or plan. As a result of this statement, one could argue that a commander should be a master at critical reasoning. He or she must apply critical reasoning skills to assess the validity of the staff's recommendations and judging which conclusions are warranted.

Lance Rip, Ph.D., is a Professor Cognitive Psychology at Northwestern University and a leading author of several books and studies on reasoning and human psychology. His studies on deductive reasoning and human thinking summarizes human deductive reasoning as the mental transformational and decision making process in which new ideas are validated and created from old ones.[45] His definition lends itself towards reasoning as part of a deductive process and

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[44] Ibid.

[45] Lance Rip, *The Psychology of Proof: Deductive Reasoning in Human Thinking* (London: MIT Press: 1994), 10.

therefore one of deductive reasoning.  Reasoning is applied to prove "something" within the process of solving a problem.

**The Process of Proving**

Carveth Read was a 19th and 20th century British philosopher, logician and a professor of philosophy of mind and logic at the University College London from 1903 to 1911. He authored several studies and books on human logic and especially inductive and deductive reasoning. In what is considered his best work, *Logic: Deductive and Inductive*, Read presented an in-depth look at what logic is and its application to the sciences and to the arts as a general process.[46] He outlined that a key component of logic is the process of proving.[47] The intent, according to Read, is to assess the validity of propositions that must be proved. Further, he noted that during the process of proving deductions become so granular that at a certain point assumptions must be made and equally *some things* must be taken for granted.[48] In the process of justifying and validating our assumptions, our assumptions become valid parts of logical analysis. Read surmised that when *something* must be taken for granted it is referred to as an axiom or first principle and if we know of no exception to an issue, we are left to believe it as true.[49] Logic is then defined as *"the science of proof with respect to qualitative laws and propositions except those that are axiomatic"*.[50] This caveat is important in order to recognize that not all deductions are true; they are only deduced to be true due to a lack of evidence to the contrary.

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[46] Carveth Read, *Logic, Deductive and…*, 7.
[47] Ibid., 1.
[48] Ibid., 4.
[49] Ibid., 11.
[50] Ibid., 2.

The inference of logical analysis and its axioms are part of the process which leads to proof, or in the case of military planning, they lead to factors and deductions that result in the basis of a plan. There remains a risk within logical analysis that requires further consideration. All things considering, 1+2 does equal 3. However, the study of logic has shown that proof has different degrees and stages of completeness. There is *absolute proof* which concludes that 3 is the answer to the above statement and this is a result of all experiences and the systematic explanations of experiences. Because logic cannot always result in absolute proof as above, when a proposition or an argument under it and, or, to show that it agrees with them yet not absolute, it is considered logical proof.[51]

Logical proof is the outcome of most observations or conclusions that are made during operational planning. During military decision making we are not necessarily attempting to prove something, or not, absolutely (although in some cases this is achievable), but it is in the analysis of factors that we must be certain that we have proved it to be valid, invalid, achievable or unachievable. This analysis of the factors within operational planning is conducted through the application of inductive or deductive reasoning.

**Induction and Deduction**

Deduction and induction are the two commonly recognized approaches in the application of logic.[52] Deduction can be considered the proof from principles while induction is the proof from facts. Important to note is that although there are different methods of achieving proof the

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[51] Ibid.
[52] Ibid., 4.

approaches do not oppose each other and they are not fundamentally distinct methods of Logic – they are both valid methods of proving *something*.[53]

Induction and deduction may be applied separately or they may equally imply to one another. According to Read, deduction depends on induction when general propositions are only known through facts. Conversely, induction depends on deduction because one fact cannot prove another except by reference that it is known to be true. It is known to be true by a resemblance of facts and this is stated as a general proposition.[54]

**Inductive Logic**

Inductive logic is a reasoning process which looks at the specifics of a problem or question first and then concludes with a general statement. The conclusion in an inductive argument is never guaranteed. In an inductive assessment since the specific is first assessed there is more room for doubt and uncertainty than with deductive logic. As a result, an inductive process requires more structure to ensure the variables are clearly assessed. It is also considered a reverse analysis of a problem starting with first the observation, to a pattern, to hypothesis then a theory. It is in this reverse engineering process that factors and conclusions can be missed. More generally, induction is involved in a range of cognitive activities such as categorization, probability judgment, analogical reasoning, scientific inference, and decision making. Finally, inductive reasoning also involves making predictions about situations based on existing knowledge. For example, if I see a black and yellow flying bug I may assess that it is a bee and it may sting me. However, maybe it isn't a bee at all? Maybe this bug in particular is an insect of a different nature and poses no threat to me at all? This is a simple example yet demonstrates that

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[53] Ibid.
[54] Ibid., 6.

inductive reasoning relies on assumptions and assumptions can lead to false conclusions. The logical certainty of an inductive assessment is entirely dependent on the correct interpretation of the evidence. It is also dependent on the consistency of the evidence with the remainder of the phenomena which was not, is not, or may never be observed. Inductive reasoning is not hard merely for military officers, but for almost everyone.[55]

From within military planning processes, the conclusions that are drawn or identified from an inductive assessment are not certain and it is with this uncertainty that a reliance on known facts and assumptions are made. For example, if as a commander I know from my experience that it takes "x" resources to secure a "y" objective based on a specific setting I assume quickly a series of tasks and resources that I validate. I have applied inductive reasoning to the problem.  However, we know from history that no two objectives are the same, no two enemy commanders are the same, and no two political scenarios surrounding a conflict are the same. As a result, the assumptions or conclusions that were identified from the inductive assessment must be fully analyzed by a series of "so what" statements such that further validations can be effectively deduced.

The normally accepted strengths of inductive reasoning lie in establishing probability. It is only through more observation that you determine whether your premises are true. Induction is also related to the cognitive activities that include categorization, similarity judgment, probability judgment and decision making.[56] In military planning, the value of inductive reasoning is that it allows for an initial appraisal based on logical reasoning and provides staff or followers immediate direction or a sense of the direction or plan that will follow. There are of

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[55] Bethel Scott, "Developing Air Force Strategists Change Culture, Reverse Careerism", JFQ / issue 58, 3rd quarter 2010. Available from http://www.ndu.edu/press/air-force-strategists.html, Internet: accessed 9 November 2012.
[56] Evan Heit, Inductive Reasoning: Experimental, Developmental and Computational Approaches (Cambridge University Press, 2007), 1.

course key weaknesses and errors in inductive reasoning that the logician Stephen Barker (1989) calls pure fallacies of induction.[57] The greatest weakness of inductive reasoning is that it is limited by the experiences of the individual. A second critical flaw is that if your core assumption is incorrect and although the reasoning is sound your conclusion will not be valid. Inductive reasoning alone in military planning will ultimately result in a high number of unsuccessful plans and why planning models contain steps for deductive analysis.

**Deductive Logic**

Contrasted to inductive logic, deductive logic is concerned with drawing logically valid conclusions that must follow from a set of premises.[58] In simple words, deductive reasoning starts with a premise or theory, assumes them to be true and focusses on working out the consequences of those premises, if they are true. Deductive reasoning is sometimes considered a top down approach to a problem and works through a series of analytic steps from theory to hypothesis to observation and then conclusion. In deductive reasoning at a general sense one applies as series of "if" "then" statements to fully breakdown a statement or problem to a root recognition or conclusion. For example, if a soft drink from a vending machine costs one dollar and we want a drink, we deduce or conclude that if we deposit a dollar we will be successful in obtaining a soft drink. This would be a natural reasoning conclusion based on the factors and deductions we draw from the soda drink environment. In a military sense, deductive reasoning occurs when a commander or staff is faced with a series of statements or factors that once deduced, one can assume an outcome. The outcome can be assumed valid if a series of steps, or potential course of action (COA), is then further analyzed to validate or disprove the theory.

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[57] Stephen F Barker. *The Elements of Logic* (Fifth Edition.McGraw-Hill, 1989). 82.
[58] Ibid., 2.

A key strength and advantage of deductive reasoning is that the truths that it establishes are absolute. However, the disadvantage is that the truths must be accurate before continuing with the analysis. The truth of the conclusion of a deductive argument is dependent upon two things: the correctness (or validity) of the form of the argument, and the truth (or verity) of the premise. The validity of the form is determined by the application of established rules. As a result, the main weakness of a deductive argument is the truth value (verity) of its premises: your conclusions are only as good as your premises. According to most experts in the field and study of reasoning, deductive reasoning does not come naturally to humans and therefore most analysis is incomplete. Deductive reasoning alone in military planning would result in the propensity to "situate the estimate" to suit the general observation rather than resolving all the observations. Deductive reasoning alone will also result in incomplete plans.

**Relation of Induction to Deduction**

Evan Heit, Ph.D., is a professor at the University of California and a leading author into the research of inductive reasoning. In his book "Inductive Reasoning: Experimental, Developmental, and Computational Approaches*"*, he examines the similarity between the two methods of reasoning and highlights the importance to look at them from their entities when examining them. He states that researchers approach the entities and similarities when looking at induction and deduction from a process view and a problem view. According to Hiet, in the problem view induction and deduction refer to particular types of reasoning problems.[59] For example, when looking at a particular problem it should be possible to determine if it is an induction problem or a deduction problem. While according to the process view, the centre of the

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[59] Aidan Feeney and Evan Heit, *Inductive Reasoning: Experimental, Developmental, and Computational Approaches*, (London: Cambridge University Press, 2007), 1.

question is not in the problem but in the approach to the problem. In this statement the reference is on the psychological processes and not the statement or problem itself. When looking at the tasks and specifically the products of the military planning we find that they are problem views best resolved by deductive reasoning.

As stated, inductive logic is proof from facts. The formal study of inductive logic is infrequent with very few formal works about the subject and very little research has been conducted for over 25 years.[60] The reason why the study of inductive logic is important to military commanders and staff is because inductive reasoning (inductive logic) applies to probabilistic, uncertain and approximate reasoning and therefore corresponds closely to assessments conducted during military planning. Heit identifies that one of the top three reasons why inductive logic should be studied is because it is central to a number of key cognitive activities such as categorization, similarity judgment, probability judgment and decision making. He identifies that the most common and instinctive method people reason is through inductive reasoning. Heit also suggests that inductive reasoning correspondences to everyday activities such as how children ask questions or in probability analysis by adults.[61] Inductive reasoning is instinctive to human capabilities while deductive reasoning is less natural. Based on this premise, military planning processes must balance inductive reasoning against deductive reasoning to ensure that all factors and risks are fully identified and mitigated.

Figure 6 illustrates the premises and conclusions for deductive and inductive forms as a means of illustrating the similarities and differences of the two models.

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[60] Ibid., 4.
[61] Ibid., 2.

| | Deductive | Inductive |
|---|---|---|
| Premise(s) | Of all first-line supervisors in the agency, 95% have taken the basic supervisory course. | Of all first-line supervisors in the agency, 95% have taken the basic supervisory course.<br><br>Pat is one of 20 first-line supervisors in Sector X. |
| Conclusions | Nearly all first-line supervisors in the agency have taken the basic supervisory course.<br><br>Some people who have taken the basic supervisory course are first-line supervisors in the agency. | It is very likely that Pat has taken the basic supervisory course.<br><br>Probably some of the people who have taken the basic supervisory course are first-line supervisors from Sector X. |

Figure 6 - A Deductive and Inductive Comparison[62]

The first premise in the Figure 6 is the same for both the deductive and inductive columns. It is a statement that relates the two sets of "first-line supervisors in the agency" and "people who have taken the basic supervisory course." It states that 95% of first-line supervisors in the agency have taken the course. This statement is not quite a universal statement, but it has more information than a statement using the vague quantifier "some." Two deductive conclusions are drawn from this premise. In saying that "Nearly all first-line supervisors in the agency have taken the basic supervisory course," we are simply replacing the quantity "95%" with the expression "nearly all." Assuming that 95% meets our definition of "nearly all," we are essentially restating the same information as the original premise. The second conclusion, "Some people who have taken the basic course in supervisory skills are first-line supervisors in the agency," is a valid conclusion from the statement "Of all first-line supervisors in the agency, 95% have taken the basic supervisory course." Clearly, these conclusions are deductive; that is, they must be true if the premise is true. In the inductive column we have added a premise about an individual: "Pat is one of 20 first-line supervisors in Sector X." Then, we have drawn two conclusions that are inductive. The first says that it is very likely that Pat has taken the basic supervisory course. This

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[62] United States, *Manual of Job Related Thinking Skills, Office of Human Resources Management Personnel Research and Assessment* (Division Washington, DC 20536 Revised 2004), 57.

conclusion meets our criteria for inductive reasoning. First, it is based on incomplete

information. We do not have enough information to know for sure that Pat has taken the course.

Second, the conclusion is not true with certainty. Pat may be among the 5% of first-line

supervisors in the agency who did not attend the training. However, given our evidence that

nearly all first-line supervisors did attend, it is very probable that Pat attended, thus, the

conclusion.[63]

Within the context of operational planning, inductive and deductive reasoning are both

applied in the analysis of the problem.  As stated by U.S. Lieutenant General M. Vane, Director

Army Capabilities and Integration Centre in the forward of U.S. Army's Commander's

Appreciation and Campaign Design, both inductive and deductive logic play an important role in

operational planning:

> The complexity of today's operational environment requires a different
> approach to problem solving. It requires the commander's direct
> participation in a heavily inductive reasoning process upfront. This
> process must produce a well-framed problem hypothesis and an
> associated campaign design—a conceptual approach for the problem.
> This appreciation of the problem and the design of a solution can then
> be handed off to a deductive reasoning process executed by the
> staff under the commander's direction that, in turn, produces executable
> plans and orders for implementation.**[64]**

**Induction versus deduction in logical problem solving**

In discussing the conflict of inductive and deductive approaches within military planning

processes, the question of which approach is more useful has been debated for almost a century.

More recently in the 1990's, Canadian Lieutenant-Colonel Ralph Giffen published a paper

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[63] Ibid.

[64] United States, *TRADOC Pam 524-5-500 Commander's Appreciatio…, i.*

suggesting that the military estimate process is broken and problem solving should be deductive only.[65] Giffen's primary source and reference was Austro-British philosopher and professor at the London School of Economics, Sir Karl Raimund Popper. Popper was generally regarded as one of the greatest philosophers of science of the 20th century.[66] Giffen's focus and support to his theory that induction is ineffective references Popper's work in 1934 which identified key weakness of inductive reasoning and its flaws through inferences and assumptions that ultimately resulted unsuccessful plans.[67] Giffen concluded that planning processes should be deductively assessed by selecting courses of action, then looking at each course of action deductively to flesh out the mitigation measures to ensure of success thus bypassing inductive reasoning completely.

Contrary to Giffen's work, Brian Arthur, a leading economist and technology thinker who has applied human logical approaches to economic outcomes argues in his paper titled "Inductive Reasoning and Bounded Rationality (The El Farol Problem)" that that deductive reasoning demands more of human logic than it can deliver.[68] Arthur highlights two reasons why deductive rationality fails under complication. The first reason is that beyond certain complicatedness, Arthur states that our logical apparatus ceases to cope because human rationality is bounded. He further suggest that the end result of using deductive reasoning for complicated problems is a series of non-objective, ill-defined and shared assumptions result. He states that "In turn, rational, deductive reasoning—deriving a conclusion by perfect logical

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[65] Ralph Giffen, DND Periodical, "The Estimate is Broken: Induction Versus Deduction in Logical Problem-Solving" (DND, Canada, 1992) 4.

[66] Stephen Thornton, "Karl Popper", in The Stanford Encyclopedia of Philosophy (Summer 2009 Edition), Edward N. Zalta (ed.), Available from http://plato.stanford.edu/entries/popper/, Internet: accessed 28 October 2012.

[67] Ralph Giffen, DND Periodical, "The Estimate is Broken...", 47.

[68] Brian Arthur, *Inductive Reasoning and Bounded Rationality (The El Farol Problem)* (NM, Sante Fe Institute: 1994), 1.

processes from well-defined premises—itself cannot apply. The problem becomes ill-defined".[69]

Arthur's work would argue that Giffen's proposal is unnatural and successful would be unlikely.

A balance between the two reasoning methods continues to be employed within operational models today. Former CF Chief of Air Staff, Lieutenant-General Angus Watt, observed throughout his experiences in command and as senior staff, during domestic and international operations, that an effective planning process must incorporate a balance between deductive and inductive reasoning. According to Watt, commanders must be masters of providing clear intent resulting from their deductive analysis of the problem and then the process must allow for the an inductive analysis and test of the commander's intent by the staff.[70]

**Summary**

Logic, reasoning and the process of proving are inherent in decision making processes. Inductive and deductive reasoning play critical roles within military planning and complement each other when looked at from a commander and staff relationship. The ideal planning model should therefore capture the strengths of logical analysis by both the commander and staff while providing a framework that avoids one heavily influencing the other. Based on Heit's, Barker's and Popper's work, a successful planning model would include measures to mitigate a clash and provide a framework that begins with an inductive assessment which is then fully validated by deductive arguments and analysis. Arthur's research identifies that the process should be nonlinear and the validation of the inductive assessment by deductions should occur throughout the process avoiding over complication and a balance. These key measures, as identified by Heit,

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[69] Ibid.,1.
[70] Lieutenant-General (retired) A. Watt, telephone conversation with the author, 18 July 2012.

Barker, Popper and Arthur, will form the key criteria that will be assessed against MDMP and

OPP to determine if one model provides less risk than the other.

## CHAPTER 3 – GROUPTHINK

Chapter 2 outlined some of the risks and complications associated with human logic and human reasoning processes as individuals that could impact military decision making activities and operations. Chapter 3 introduces the concepts and risks associated with human reasoning within a group context and the key potential negative effects on military planning processes.

In military planning processes and models, the staff works as individuals within a group refining, deducing and validating feasible options for a commander based on his or her intent and as a result of inductive and/or deductive models. Theorists have studied group dynamics for over a century and the observations and risks of group dynamics is not a new phenomenon. Clifton Wilcox, Ph.D., is a Labor Relations Specialist for the federal government in Washington, D.C., and a college instructor at the University of Phoenix, Northern Virginia Campus. He holds a doctorate degree in management from the University of Phoenix, Phoenix, Arizona, and an MBA from Webster University, St. Louis, Missouri. Dr. Wilcox has over 25 years of managerial experience as a former Army aviator and Federal sector manager and a leading author on group dynamics.[71] His book *Groupthink: An Impediment to Success* is dedicated to the study of group dynamics with a view to educating those involved in group activities. His book highlights examples of groupthink, how it manifests and how it may or may not be similar to the Abilene theory. The Abilene Theory is also referenced as the Abilene paradox in which a group of people collectively decide on a course of action that is counter to the preferences of any of the individuals in the group.[72] The Abilene paradox is associated with scenarios where a common breakdown of group communication where each member mistakenly believes that their own

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[71] Clifton Wilcox, *Groupthink: An impediment to Success*.(Xlibris Corporation, USA, 2010)
[72] John McAvoy and Tom Butler, "The impact of the Abilene Paradox on double-loop learning in an agile team". Information and Software Technology, available from http://www.sciencedirect.com/science/article/pii/S0950584907000146,Internet: accessed 31 October 2012, 552.

preferences are counter to the group's and, therefore, does not raise objections. The Abilene paradox is commonly associated with the saying to not "rock the boat". Wilcox references the Abilene paradox and its significant risk in group planning. He concludes that the study of decision making and the impact of the group on it are deemed to be one of the most important areas in the study of organizational behavior.[73]

**What exactly is Groupthink?**

Groupthink is a term coined by Yale research psychologist Irving Janis in 1972 and describes a process by which a group can make poor or irrational decisions. Janis' studies proposed that groupthink was the evident in the decision making processes and outcomes of six major American events in history: The Bay of Pigs Invasion, the defence of Pearl Harbor, the Korean War stalemate, the escalation of the Vietnam War, the Cuban missile crisis and the development of the Marshall Plan.[74] The first four are deemed historically to be fiascos while the last two considered successes.[75] According to Janis:

> I use the term 'groupthink" as a quick and easy way to refer to a mode
> of thinking that people engage in when they are deeply involved in a
> cohesive in-group, when the members' strivings for unanimity override
> their motivation to realistically appraise alternative courses of action. "Groupthink" is a
> term of the same order as the words in the newspeak vocabulary George Orwell presents
> in his dismaying 1984-a vocabulary
> with terms such as "doublethink" and "crimethink." By putting groupthink
> with those Orwellian words, I realize that groupthink takes on an invidious connotation.
> The invidiousness is intentional: Groupthink refers to a
> deterioration of mental efficiency, reality testing, and moral judgment that
> results from in-group pressures.[76]

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[73] Wilcox, *Groupthink: An impediment to Success…*, 34.
[74] Irving L. Janis, Groupthink: Psychological Studies of Policy Decisions and Fiascoes. 2nd, rev. ed. (Houghton Mifflin, Boston, USA, 1983), 16.
[75] Ibid., 16.
[76] Ibid., 52.

The goal of groupthink is to explain how groups arrive at decisions and to identify conditions and factors that lead to defective decision-making. The theory of groupthink is based on the premise that there is a tendency for cohesive groups to become more concerned with the solidarity of the group that they fail to critically and realistically evaluate their decisions and more importantly the assumptions that lead up to those decisions.[77] Janis further defines groupthink as "a deterioration of mental efficiency, reality testing and moral judgements that results from in-group pressures."[78] Wilcox observed that when groupthink occurred, it normally occurred unconsciously to the group.[79]

Paul Hart is an Associate Professor, Department of Public Administration, at Leiden University and Scientific Director of the Leiden-Rotterdam Crisis Research Center. His research on groupthink and its impact on small planning groups refine Janis's work and builds on how group think manifests in stressful environments. Carl Von Clausewitz described this environment of war as consisting of four elements: "danger, exertion, uncertainty, and chance."[80] The conditions of war, or planning for war, naturally place enormous stress on the commander and staff. Based on Hart's studies, staff involved in operational planning will be susceptible to the symptoms of groupthink. Figure 7 represents how groupthink manifests in a stressful environment and within conditions that military planning teams can and are associated with.

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[77] Ibid.
[78] Ibid., 9.
[79] Wilcox, *Groupthink: An impediment to…*, 162.
[80] Carl Von Clausewitz, *On War*. Translated by Micheal Howard and Peter Paret. (Princeton: Princeton University Press, 1976), 104.
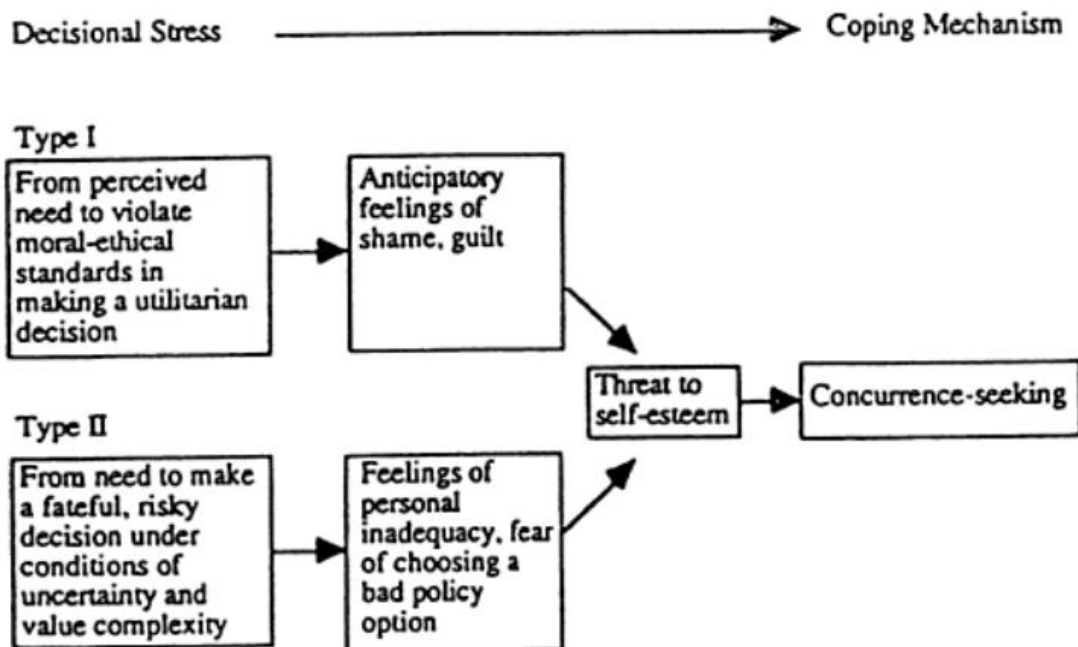
Figure 7 - Stress and Coping Manifestation[81]

**Groupthink Model**

The groupthink model is illustrated at Figure 8 and includes the conditions under which groupthink is likely to occur, the symptoms of groupthink and the resulting consequences.

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[81] Paul Hart, *Beyond Groupthink, Political Group Dynamics and Foreign Policy-Making* (Ann Arbor: University of Michigan Press, 1997), 97.
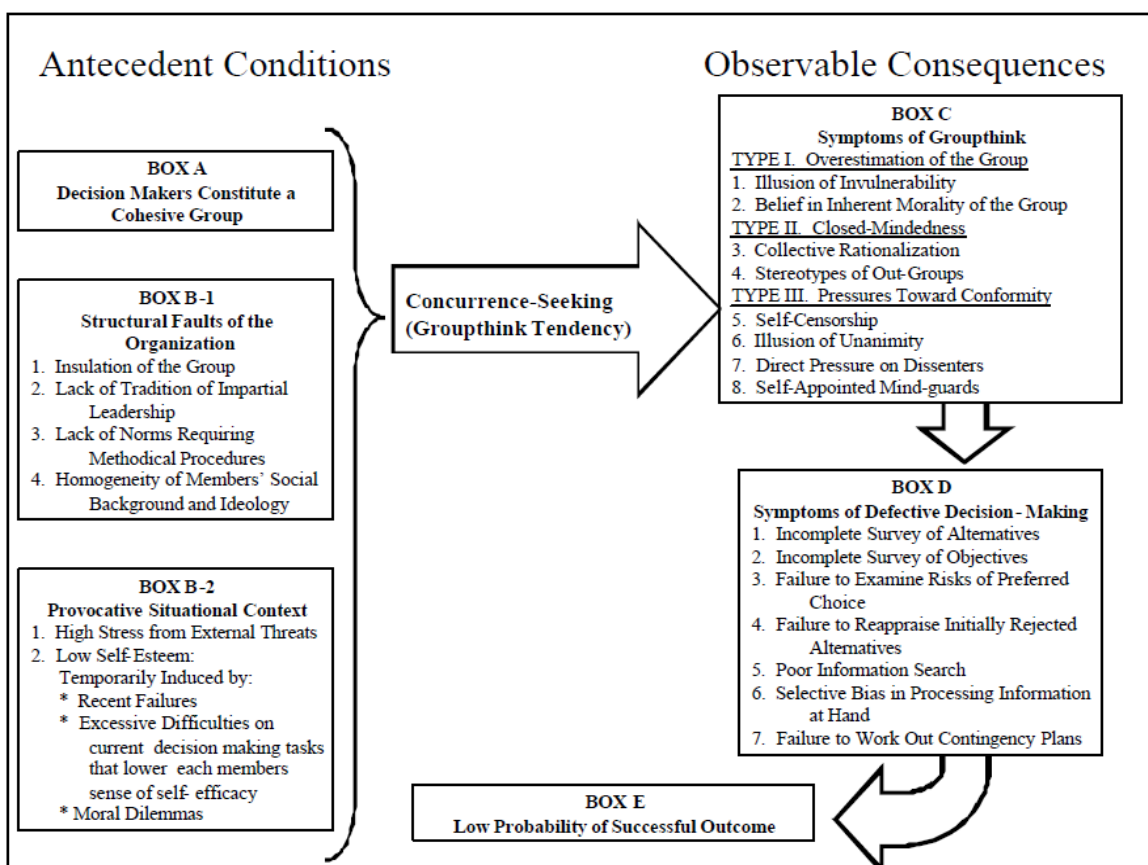
Figure 8 - The Theory of Groupthink[82]

The model highlights the conditions of a moderately or highly cohesive group (Box A) and how it interacts with other structural faults of the organization (Box B-1). Box B-2 highlights the situational context factors that increase the probability of the groupthink tendency. The groupthink tendency is then expressed in the observable consequences of the symptoms of groupthink (Box C). As a result, if a group displays some or most of the symptoms of groupthink, the model concludes that the group will also display symptoms of defective decision-making (Box D). Defective decision-making will then increase probability of a successful decision outcome (Box E).

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[82] Irving L. Janis, *Groupthink: Psychological Studies…* 9.

**The Role of the Group**

Wilcox identifies that there are two roles that individuals play in a group: the individuals who are primarily concerned with accomplishing a given task and the second role are the leaders and followers organized to best accomplish the goals of the whole group.[83] In essence, the roles are divided into individuals to task and individuals to collective goals.  Group success according to Dr. Wilcox requires the presence of both roles.  Based on his studies, Wilcox deduces that there is a natural anxiety that exists within these two roles and the anxiety is inherent to the roles themselves. The anxiety stems from several sources while the most important one is where a natural leader assumes the role of a follower – a circumstance common in the military planning groups made up of leadership ranks and experiences.[84] Dr. Wilcox highlights that when a group makes a decision, the group most likely will proves that its outcomes are more valuable than what the individuals could have produced individually; the sum being greater than the separate parts.[85] The crux of the matter is that these roles conflict and occur during group processes and this detracts from the value of a group output over its original intent.

An essential factor in positive group interactions and decisions is group cohesion.[86] This is also an essential trait in planning organizations or military groups.  Irving Janis, Ph.D., a research psychologist from Yale University highlighted that when group cohesion is high; all the members express solidarity, mutual liking and positive feelings about their motivations and tasks within the group.[87] W. Bion, Ph.D., was a leading analyst on group dynamics and the psychoanalysis of groups.  In the First World War Bion served as a tank commander and was

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[83] Ibid., 16.
[84] Ibid., 17.
[85] Hoover, K. *The Power of Identity:  Politics in the new Key*. (Chatham: Chatham House Publishers, Inc., 1997).
[86] Irving Janis, *Victims of Groupthink…*, 5.
[87] Ibid.

awarded the DSO and the Legion of Honour. During the 1940s his attention was directed to the study of group processes, his research culminated in the publication of a series of influential papers later produced in book-form as *Experiences in Groups*. Further to Janis' statements and observations, Bion argues that high cohesion in a group tends to preserve the group but fails to correct their shared misjudgments.[88]

**Social Impact and Group Cohesion**

The impact and influence by different people in a group has been studied by theorists for years. Their studies have concluded that there can be significant influence and power exerted by some individuals in some groups. Whether in a course scenario, a command post, headquarters or simply a working group environment, some military officers easily exert influence and power more than others. Groupthink theory challenges a common belief that the greater cohesion amongst a group, the better the decisions will be. Janis generalized that group cohesiveness was an important factor that when combined with other group conditions the combination could cause the groupthink tendency. Recent empirical evidence suggests that group cohesion and a strong social setting are critical in group success, but these attributes are equally groupthink symptoms. Bernthal and Insko (1993) conducted studies and found that the type of cohesion within a group setting was an important variable.[89] Their studies identified that social-emotional cohesion was more likely to contribute to groupthink symptoms than task-oriented cohesion. Studies by Annette Flippen also concluded that groups with low social-emotional cohesion combined with high task-oriented cohesion had the lowest levels of groupthink. [90]

[88]Wilfred Bison, *Experiences in Groups and Other Papers*.  (Rutledge: Tavistock Publications, 1961).
[89] Philip R. Bernthal and Chad A. Insko, "*Cohesiveness without Groupthink: The Interactive Effects of Social and Task Cohesion*." (Group and Organization Management 18:1993), 66-87.
[90] Annette Flippen, "*Understanding Groupthink from a Self-Regulatory Perspective*." Small Group

The importance of recognizing the influence of some individuals over others is important to understand the impact that this dynamic has on the group. In principle, and in the military planning teams, each individual is unique and in most cases has a unique role (logistics, intelligence etc.). Each participant brings value and a different perspective. However, the impact of the stronger individual plays a role in influencing conformity in the group as well as detracting from the value of each individual contributor. Dr. Wilcox identifies a key factor of rank or status that has a propensity to negatively impact conformity, which has significant relevance to the military planning processes. His studies also go further to outline that conformity exists more prominently when there the size of the group increases. In his studies he concluded that the larger the group, the less influence one individual has or the less conformity that takes place.[91]

**Conformity to Social Norms**

There have been numerous studies and examples of the influence of social norms on social clubs, small groups and even military units. Conformity is a significant pressure and has been frequently observed as a contributing factor in negative group performance. The process from which humans try to change the non-conforming is interesting. Janis observed then when an individual highlights or says something that is out of line with the group's norms the other members at first try to influence the non-conformer to the group norm rather than necessarily "listen" to what is being said. Attempts to influence the non-conformists will continue as long as the group believes there is chance of conforming. However, once the group concludes

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Research 10, no. 2 (Sage Publications, California, 1999), 140.
[91] Ibid., 18.

(collectively or as individuals) that the non-conformists is a lost cause, a process of alienation and avoidance follows. [92]

A final characteristic influential in group norms is a dominant need for humans to be loyal to their group. This loyalty stems further than defense and protection to sticking with decisions that the group has committed to even when during the process flaws in process become evident. According to Janis, members of a group can consider loyalty to the group as the highest form of morality.[93] Military environments already bread a high characteristic of loyalty and social norming that must be considered carefully during joint and operational planning situations.

**Factors and Symptoms leading to Groupthink**

Wilcox postulates that the potentially fatal flaw in group decision making occurs when there is a combination of moderate or high group cohesiveness along with specific antecedent factors. The provocative situational context of the task and the structural faults of the organization make up the two distinct antecedent factors.[94] Other antecedent factors include the lack of a tradition or impartial leadership, group insulation, a lack of norms requiring methodical procedure and when group homogeneity is present. Janis argued that groupthink is manifested by eight symptoms that include "illusions of invulnerability", a belief in inherent morality of the group, "collective rationalization", stereotypes of out-groups, "Self-Censorship", "illusion of unanimity", direct pressure on dissenters within the group, self-appointed mind-guards and "promotional leadership". [95] Dr. Robert S. Baron from the Department of Psychology, University of Iowa 2001, the symptoms identified by Janis essentially fall into three clusters;

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[92] Irving Janis, *Victims of Groupthink…*, 5.
[93] Ibid., 12.
[94] Ibid.
[95] Ibid., 36-37.

overestimation of the in-group (strong, smart, invulnerable, morally superior), with corresponding negative stereotyping regarding the out-group (as weak, immoral, vulnerable, stupid, and wrong), close-mindedness (e.g. rationalization of doubt) and pressures for uniformity (via mindguards, self-censorship, illusion of unanimity).[96] According Baron's research, the crux in groupthink is the impact on decision making processes. Baron identified a number of defective decision making processes which are significant to military decision making. Risks to plans included inadequate contingency plans for failure, inadequate consideration of worst case scenarios, incomplete consideration of the full range of decision options and failure to reconsider the extent to which original/fundamental objectives were served by the advocated action.[97] Baron's research consolidates a series of studies and experiments over thirty years that conclude that groupthink is a phenomena but identifying specifically which variable causes which symptom remains inconclusive. He does conclude that some variables are evident, such as directive leadership are a variable of concern within group dynamics, which directly relates to military planning and its processes. "In short there is reason to think that crisis, like directive leadership may be capable of amplifying groupthink effects provided that the manipulations are non-trivial."[98]

From a military perspective, group dynamics is a more complex environment due to the nature of military command and leadership. A military commander in operational planning, by authority, is responsible for the process and the outcome of the group's performance and actions.

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[96] Robert Baron, "So right it's wrong: Groupthink and the ubiquitous nature of polarized group decision-making." Available from http://ion.uwinnipeg.ca/~clark/teach/3480/Groupthink-Baron.pdf, Internet: accessed 11 Nov 2012, 5.
[97] Ibid., 5.
[98] Ibid., 39.

Ultimately regardless of the group's interactions, the commander, he or she, is responsible. [99]

Okros identifies these responsibilities under "leadership" and include:

- Leadership enablers (central to command and leadership but not management);

- cohesive groups with shared norms;

- compelling overarching goals;

- experienced subordinate leaders;

- skilled teams with significant anticipatory development;

- responsive reward and punishment system;

- an effective leader socialization model emphasizing selfless service; and

- a values framework to base decisions on the purpose of leader influence.

Okros' work is important when discussing groupthink within the military context as the effects and mitigation of the symptoms are very much a command responsibility.

**Summary**

Operational planning occurs within the context of a group and within the conditions of group leadership and group followers.  Groupthink as a theory has evolved enough to prove that it does exist and can cause negative outputs from group planning decision making processes. Military staffs and planning groups are susceptible to some of the symptoms of groupthink. As a result, the planning models must be structured accordingly to mitigate those symptoms. According to Hart, the ideal decision planning model would also include in its frameworks steps that allow for the planning group to be broken up often (with check points to validate that a plan is not conforming based on symptoms of groupthink) and as identified by Wilcox and Irving,

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[99] Alan Okros, *Leadership in the Canadian Military Context…*, 10.

every proposal would be assessed for validity by an opposing view and recorded. These two key groupthink mitigation measures when combined with the human reasoning mitigation measures from Chapter 2 will provide criteria for a comparison of risks between MDMP and CFOPP as analyzed in Chapters 4 and 5 that follow.

# CHAPTER 4 - CANADIAN FORCES OPERATIONAL PLANNING PROCESS

Chapters 2 and 3 combined together identified the problem and potential risks or weaknesses from human reasoning and the potential for groupthink to have an effect on the Operational Planning from the context of reasoning as individuals and as individuals reasoning with a group context. Chapter 4 describes the CFOPP process and the model used by the Canadian Forces for operational planning and decision making. CFOPP will be described followed by an analysis from the findings and criteria defined in Chapters 2 and 3.

## CFOPP Framework – An Introduction

As introduced, CFOPP is a planning framework followed by the CF to plan for and support military campaigns and operations. It is a planning process designed within a framework that allows for staff to execute planning process within a planning rhythm in order to produce the right deliverables and products at the right time. It is designed as a group process to support a leaders (commanders) intent and mission. In accordance with CF Joint Publication 5.0, its purpose is to "generate a plan at the operational level that takes into account the resources and functions required to meet operational objectives".[100]  Canadian Doctrine identifies that each campaign and/or operation is unique and as such, staff and commanders must clearly identify the priorities, tasks and missions while determining how these relate to the campaign.[101] This analysis and development is naturally accomplished through human reasoning and within a group environment. As such, the process is open to the risk for a clash of inductive and deductive reasoning and symptoms of groupthink.

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[100] Canada, B-GL-005-500/FP-000…, 1-14.
[101] CFJP 3.0, 1-6.

In accordance with CFJP 3.0, CFOPP is a coordinated process designed to determine the best method for achieving the desired end state in support of strategic guidance.[102] The process is designed to allow a commander to translate strategy and objectives into a unified plan for military action. According to CFJP 3.0, the process is further designed to produce plans, orders and directives for the execution of a campaign from analytical, practical and mechanical processes. CFC 230 goes further to establish that the process is led by the commander and he or she must be "intimately involved in the process from its start". The role of the commander as the leader of the process is designed to ensure that the staff remains focused on meeting the objectives that have been set up by higher authorities. CFC 230 states that "it is through the continuous interaction of the commander and planning staffs that the process will lead to the successful development of a winning plan". Canadian doctrine also states that the commander is the authority and has the responsibility to carry out an initial mission analysis and provide guidance to planning staff.[103] It is command centric process.

CFOPP consists of five planning stages which the commander and staff will interact in and work through. The first stage of the CFOPP is the "Initiation Phase". This phase is coined as the "why" of the process and focuses on conducting an initial assessment of the task(s), activates staff(the group) to organize for the process, issue original work flow requirements to the staff, identify immediate threats, dispatch reconnaissance teams if required to gather more information for planning purposes, produce the commanders initial guidance and issue a warning order to subordinate and supporting formations;[104] It is during this stage the a commander conducts an initial deductive assessment and then works with a select group of staff to evaluate the viability

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[102] Ibid., 5-2.
[103] Ibid., 5-1.
[104] Canada, Department of National Defence. *CFC 230, CFC Guide to CF Operational Planning Process* (Ottawa: DND Canada), I-1/4 to 2/4.

of the concept through inductive analysis. The result of this assessment is direction to staff for a more detailed and further inductive analysis. According to Lieutenant-General Watt, this is a critical component for success in the process. "…if the commander lacks experience and doesn't provide clear and concise direction to drive the inductive process within the CFOPP, the plan will be incomplete or fail."[105]

The second stage of the CFOPP is the "Orientation Phase" (the "what"). In this stage of the process the planning group's aim is to analyze the problem at hand and provide confirmation of an understanding of the results to be achieved. The group will review the commanders guidance provided in Stage 1, develop and analyze mission factors, develop the mission statement and formulate and provide the commander's planning guidance.[106] It is during this phase the commander has the primary responsibility for conducting mission analysis but with staff assistance. According to CFJP 5.0, it is very much a cognitive process and includes brainstorming activities with key staff. Logic outputs of this stage include critical facts and assumptions, constraints, restraints, key strengths and weakness (for both enemy and friendly sides), assigned and implied tasks, transition conditions, force capabilities and groupings, command and control structures, risk, timelines, and battle space effects. Stage one is also a complex and detailed stage that incorporates a combination of deductive reasoning applied from both the enemy and the friendly side of the problem. Intelligence staff conducts a separate analysis that called Intelligence Preparation of the Battlefield (IPB). IPB is a continuous process that includes a deductive analysis of the weather, terrain and enemy threat to the mission.

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[105] LGen A. Watt, telephone conversation with author, 18 July 2012.
[106] Canada, Department of National Defence. *CFC 230…*II-1/17 to 6/17.

The third stage in CFOPP is called "Courses of Action Development" (the "how"). In Stage 3, the planning team focusses on developing potential courses of action based on the analysis of the previous stage and the "war games" the most acceptable course of action. During the assessment of which courses of action are most suitable and worthwhile to war game, a sanity check is conducted by the staff. The group validates if the course of action fully answers the "who, what, where, why, how", compares the advantages and disadvantages of each and seeks out fundamentally different actions each course of action may contain. Staff assesses each potential course of action for exclusivity, acceptability, feasibility and suitability. CFOPP specifically calls for the staff to conduct a comparison of the proposed COAs in this stage. War gaming at the operational level is required in order to evaluate the potential of a course of action against the all types of opposition and identify and correct planning deficiencies. A critical analysis of each option is essential for plan refinement.[107] The comparison results in a formal brief given to the Commander called the "Decision Brief".[108] As a result of the decision brief from the staff after further analysis and wargaming of preferred COAs, the commander is briefed and selects the preferred COA. From this analysis the staff then develops the chosen COA into a concept of operations and ultimately the Operational Plan.

The fourth stage in the CFOPP is "Plan Development". In this stage the course of action most suitable to meet the mission objectives is formulated into an executable plan.[109] During plan development key events include developing and coordinating the production of a plan, seeking approval from higher authority and then issuing a plan or Operations Order.[110]

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[107] Ibid., III-1/10 to 10/10.
[108] Canada, B-GJ-005-500/FP-000…, 2-7.
[109] CFJP 5.0, 3-13.
[110] Ibid., 4-13.

The final stage in CFOPP is "Plan Review". According to CFJP 5.0, a plan must be reviewed regularly to evaluate its viability as factors change, and can change often between plan development and execution. At times there is a requirement to repeat steps 4 and 5 until execution occurs.[111] During this stage the commander and staff are assessing the development of situation and cross examining new factors to the developed plan. If changes are significant enough, the plan is refined to include branch plans in order to enable the operation to achieve its mission.[112] CFJP 5.0 does call out the benefit of allowing for an independent staff analysis by officers not directly involved in the development of the original plan as an effective evaluation method. Doctrine goes further to allude to the use of computer based tools to assist in wargaming.[113]

**CFOPP Analyzed**

According to a study by the Defence and Research Development Centre (DRDC) Toronto, "Development and Evaluation of an Intuitive Operations Planning Process" CFOPP was developed without any explicit relation to psychological theories at the time related to problem solving and decision making and it is consistent with analytic decision making. [114] The summary also highlights that the CFOPP conforms to two major premises of analytic decision making by evaluating multiple solutions to the problem prior to selecting the best and an evaluation of alternatives to the solution must be performed through exhaustive factor-by-factor comparison.[115] The study is the fourth of its kind by DRDC evaluating changes to CFOPP to better suit human reasoning and intuitive processes through changes to the CFOPP framework

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[111] Ibid., 3-13.
[112] Ibid., 4-15.
[113] Ibid., 3-13.
[114] Canada, Defence and Research Development Centre Toronto, *Development and Evaluation of an Intuitive Operations Planning Process* (Defence Research and Development Canada – Toronto: 2006), 1.
[115] Ibid., 1.

and computer automation.  According to their research "there may be a mismatch between CFOPP as laid out in doctrine and taught at training and education institutions within the CF, and the planning process as practiced by command teams in the field."[116] Their studies found that the framework although not linear by initial design, the fluidness and roles and responsibilities within the process were not clear and distinct. The study also found that role of the Commander in the application of the CFOPP was extremely significant. This approach to planning by the Commander can be considered intuitive, based on his experience and training. It was also apparent in the study that the Staff was 'looping' back and forth between different steps in the CFOPP, rather than following the CFOPP sequentially as identified in Figure 9 or methodically reevaluating previous stages.[117]
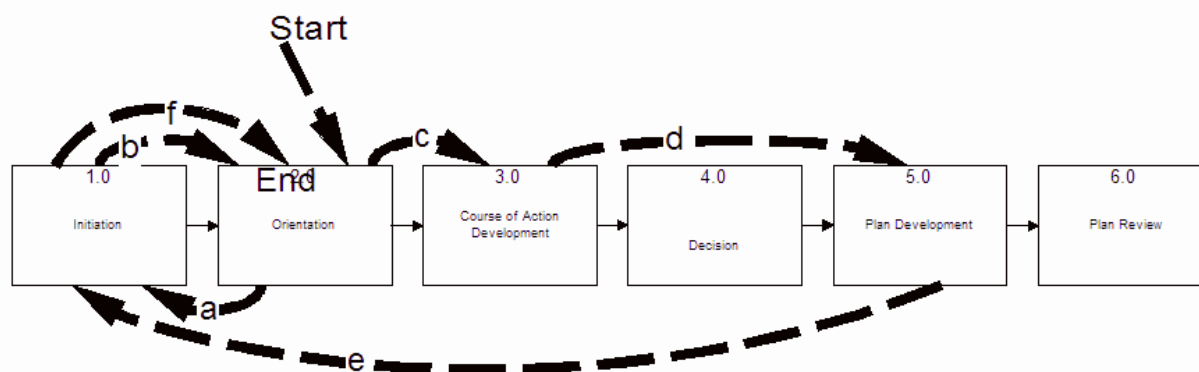


Figure 9 - Function flow between doctrinal functions[118]

The studies observations are key in demonstrating that the process between inductive and deductive cycles are fluid with several loop back points to validate findings and assumptions within the framework as identified by Heit and Barker. DRDC's observation demonstrated that this implied a more iterative process of COA and Plan Development then linear. CFOPP does

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[116] Ibid.
[117] Ibid., 2.
[118] Ibid.

follow a reductionist decision-making model by following a series of steps; however, the process is more one of being sequential or iterative when executed.[119] Major Greg Ivey, a CF Officer, in his paper on "Operational Design, a Viable Alternative to CFOPP" concluded that the CFOPP is very much a linear process which impedes the ability for commander and staff to validate assumptions and risks in a more fluid process. [120] DRDC's findings conclude that what is documented as a process and what actually takes place are quite different. The conclusion is that by design CFOPP is linear and as such it is not designed intuitively for a cross referencing of inductive and deductive assessments as part of its process except for during the stage of COA analysis.

CFJP 5.0 identifies that Stage One of CFOPP is a critical stage that demands close involvement by the commander. It further states that the commander's involvement must be balanced against the potential to confine the thinking process of the staff.[121] It does not identify the risks or symptoms of groupthink. The statement in its simple form would leave someone unfamiliar with groupthink to see this caveat to allow freedom of thought but not understand how groupthink can evolve into what is perceived as free thought, but in fact thought tailored towards the leader's intent or satisfaction.

The COA analysis and briefing stage articulates the capability of the process to allow for checkpoints back to the inductive assessment and mitigates what Arthur had called the theory of over complication which is a risk in decision making processes.

CFOPP is commander centric and places heavy emphasis on the commander's involvement throughout the process. The commander's influence continues throughout the stages

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[119] G.W. Ivey, "Systemic Operational Design: a Viable Alternative to the Canadian Forces Operational Planning Process" (Department of National Defence, Canadian Forces College,  2010), 56.
[120] Ibid., 61.
[121] CFJP 5.0, 4-4.

and is responsible for COA selection. This heavy influence is an enabler in resolving complex and/or wicked problems as identified in Chapter 1. However, the heavy influence can also cause disruption in the inductive process underway by staff in the COA development and war-gaming stages.

The heavy influence throughout the process could also produce symptoms of groupthink where staff lean towards satisfying the involved leader rather than develop and deduce factors that could prove errors in the design or direction.

As part of Step 3 in the CFOPP, the practice of war-gaming enables the planning team to be divided into groups for each friendly COA and a team dedicated to enemy COAs. As a result of this process, Hart's observation that a lack of opposing views allows for symptoms of groupthink is mitigated.

**CFOPP Summary of Analysis**

CFOPP is a mature process framed from rational decision making models.. The process in general is designed to be commander centric, with heavy involvement by the commander throughout the process. At the discretion of the commander the process can be staff led which can allow for further discussion throughout the process. The CFOPP is also by design a linear process in nature with a series of sequential steps that allow for limited interaction between start and finish. This linear model inhibits the ability to cross examine deductive findings during the inductive process. The process is at risk for inductive and deductive reasoning to clash. General Watt observed in his experiences that:

> In order to have a sound inductive argument you have to literally
> consider every factor that might have a bearing on the problem. Since
> this is impossible for most moderately complex problems, staffs make unconscious
> deductive choices about the selection and relative
> importance of factors causing a collision of inductive and deductive

logic.[122]

Although COA analysis and war-gaming mitigate some of this risk, this step is quite far down the decision making process and typically only one COA is war-gamed.

CFOPP is also at risk from groupthink. There are no documented measures to counter the symptoms of groupthink. The implied responsibility of the commander to be involved throughout the deductive analysis cycle also creates an environment and the symptoms for groupthink to develop. Again, the COA analysis through war-gaming allows for some mitigation to these risks, however, by stage 3 in CFOPP the factors that were deduced could already by the result of groupthink symptoms. CF doctrine and processes do not clearly acknowledge the risks of groupthink and as a result one would therefore not expect that measures would be clearly in place. Without acknowledgement there will be no countermeasures.

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[122] LGen A. Watt, email correspondence with author, 8 January 2013.

## CHAPTER 5 – U.S. MILITARY DECISION MAKING PROCESS

Chapter 4 provided an introduction of the CFOPP and an analysis of the criteria developed in Chapters 2 and 3. Chapter 4 describes the US MDMP and continues the analysis of the criteria from Chapters 2 and 3 against this process.

### MDMP Framework: An introduction

The MDMP is an adaptation of the U.S. Army's analytical approach to solving military problems. It is a tool used within operational planning at the battalion level and higher to assist a commander and staff in developing estimates and a plan. MDMP is a followed as part of a logical problem solving and decision making process to address either simple operational problems or ill-defined (wicked) problems. According to U.S. Army Field Manual 5-0, Army Planning and Orders Production, the MDMP is a detailed, deliberate, sequential and time consuming process and the process can be as detailed as time, resources, experience, and situation permit. Commanders can alter the MDMP to fit time-constrained circumstances and produce a satisfactory plan.[123] The staff plays a dominant role in MDMP. U.S. doctrine does not specifically state that the process is commander centric yet it identifies that the commander is the most important person in the process.[124] FM 5.0 also states that "commanders are responsible for planning and play a central role through the commander's intent and planning guidance".[125] FM 5-0 also states that MDMP as an analytical process is useful when experience is lacking because

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[123] United States. Department of the Army, *Field Manual 5-0, Army Planning and Orders Production*, (Headquarters No. 5-0 Department of the Army Washington, DC, 20 January 2005), 3-2.
[124] Todd Runyon, "A MDMP for All Seasons…", 18.
[125] United States, Department of the Army, Field Manual 5-0, vi.

it provides a framework to systematically break the problem down into solvable parts.[126] MDMP

follows a seven step problem solving model as depicted in Figure 10 below:
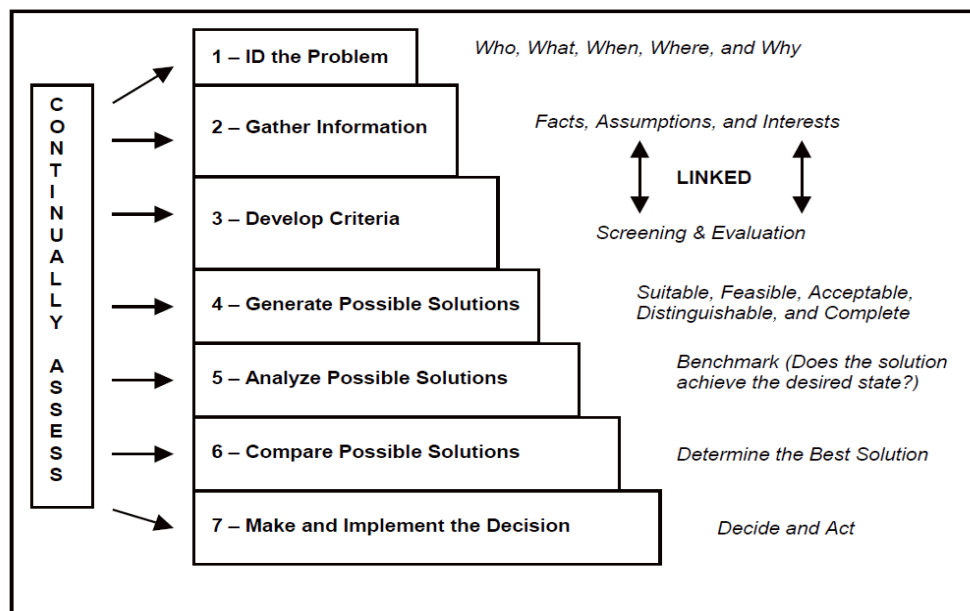


Figure 10 - Seven Step Problem Solving Model

The MDMP is essentially a process for problem solving and keys in on three essential

elements of defining the problem, developing a solution and validating the solution through a test

(wargaming). It is designed as a framework to help a commander and staffs organize their

thought processes and help them "apply thoroughness, clarity, sound judgment, logic and

professional knowledge to reach decisions.[127] The process begins with the receipt of a mission

warning order and concludes with the production of orders. The full framework is illustrated in

Figure 11.

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[126] Ibid., 1-9.
[127] Ibid., 3-1.
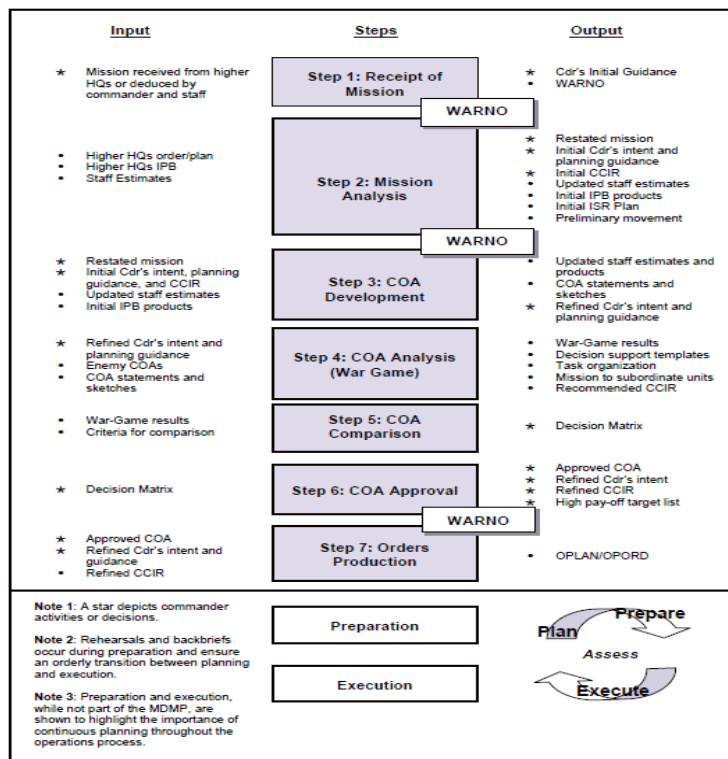
Figure 11 – MDMP Framework[128]

MDMP is based on rational decision making and can be abbreviated under time pressed conditions in which the process is similar yet slightly modified for simplicity and more involvement from the commander.[129]

Finally, the MDMP and planning process is also designed to alert commanders of the impact and potential for groupthink in staff and in the process. FM 5-0 identifies briefly what groupthink is and proposes a series following steps that a commander should implement to mitigate it:

- The leader should encourage members to express objections or doubts;

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[128] Ibid., 3-3.
[129] Ibid., 2-6.

- The presenter of a problem should refrain from expressing preferences about potential solutions:

- The leader should assign two independent subgroups to work on the problem;

- The leader should ask people outside the group for input;

- The leader should assign at least one member of the group the role of adversary to critically examine the group's decision process; and

- After reaching a preliminary consensus, the group should reconsider previously considered solutions. [130]

Major John Marr, a U.S. Officer, in his thesis on "The Military Decision Making Process: Making Better Decisions versus Making Decisions Better" highlights that the MDMP is designed for group analysis and effort and as such the overall ability to conduct clear analysis of all the factors and information is increased by group problem solving.[131] The U.S. military recognized the risk of groupthink in 1990 within operational planning:

> Do not fall victim to 'groupthink!' Widespread agreement among the staff is not necessarily a healthy sign. It could mean that the desire to find agreement is overriding critical thinking. In times of stress there will be a natural desire to reduce that stress by increasing group harmony and ignoring problems. Be alert for groupthink and when you suspect it is occurring, take a devil's advocate position and actively find the flaws that everyone is missing.[132]

**MDMP Analyzed**

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[130] Ibid., 2-4 to 2-5.

[131] John Marr, "The Military Decision Making Process: Making Better Decisions versus Making Decisions Better ", (Leavenworth: School of Advanced Military Studies, US Army Command and General Staff College, 2001), 20.

[132] United States, Centre for Army Lessons Learned, Newsletter 90-8, "Winning in the Desert I: Tactics, Techniques, and Procedures for the Maneuver Commander", (1990), Internet: accessed12 September 2012,  2.

In an article by two former U.S. military officers Adam Elkus and Crispin Burke titled

"Operational design: Promise and Problems", they identified that the MDMP and its disciplined

planning framework has guaranteed victory in engagements past and present. However, they

further identify that the MDMP is based on certainty and a process of turning assumptions into

either facts or falsehoods. As a result, they argue that MDMP does not lend itself easily to

ambiguous or complex problems or situations.[133]

In his book "Campaign Planning: Tools of the Trade", Dr. Jack Kem, U.S. Army Command

and General Staff College, identified that the success of the MDMP's outputs, as part of

campaign planning, hinge on the clear definition of the problem at the beginning. Kem identified

that clearly framing the problem is paramount to the planning process:

> A key question to ask when doing mission analysis and critical reasoning
> is "am I working on the right problem?" Do not become so wedded to
> your analysis that you are afraid to address this key question, even if it
> changes your whole plan.[134]

However, theory and practice often differ. "War planning for wicked problems: Where joint

doctrine fails", an article by T.C. Greenwood and T.X. Hammes (both former U.S. Marine

Colonels) posted in the U.S. Armed Forces Journal, identified that according to Joint Publication

5-0, "Joint Operation Planning," the planning process starts with "initiation" and quickly jumps

to "mission analysis." Greenwood and Hammes argue that this approach can be seen frequently

in the MDMP planning process and as a result commanders and staff completely overlook the

critical step of developing a working definition of the problem. Inductive reasoning naturally

takes precedence and the framework does not over tight enough controls. They argue that

military commanders and staff do not take the time for a full analysis and definition of the

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[133] C. Burke and A. Elkus, "Operational Design: Promise and Problems", Small Wars Journal (Small Wars Foundation 2010), 11.

[134] Jack Kem, "Campaign Planning: Tools of the Trade", (Fort Levenworth: U.S. Army Command and General Staff College 2009), 7.

problem relying on it to be clearly defined by higher echelons or political leadership, but recent

U.S. experience proves otherwise.[135] This process of quickly defining the problem contravenes

Popper's observation that the problem should be clearly defined at the beginning.

   Burke further identifies that MDMP is very much a linear, scientifically-based process to

solving and does not lend itself well to all situations, and comes with severe limitations.[136] The

linear process in MDMP doesn't allow for the balance required between inductive and deductive

reasoning as identified by Barker in which a conceptual approach must be maintained for full

deductive analysis. Burke cites the example that, despite the meticulous planning calculations

overseen by General Helmuth von Moltke and the German High Command into the Schlieffen

Plan's, the German's failed to properly deduce and understand the grand strategic picture

ultimately grossly underestimating  Russian mobilization that proved the plan to be unsuccessful.

Burke also cites the disastrous results from the mathematical formulas applied various Vietnam

operations by Robert McNamara's "whiz kids".[137] Captain David L. Walker in his paper

"Refining the MDMP for Operational Adaptability" also identifies that the MDMP is heavily

burdened by the linear process and not conducive to natural cognitive abilities:  "The human

brain is incapable of considering a problem one cognitive step at a time, and by trying to force

such thinking, the MDMP often becomes a barrier rather than a support to decision making."[138]

He references a significant amount of work done by two leading planning model experts, Schmitt

and Klein and one of their key observations that the MDMP process "views planning as an

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[135] Greenwood and Hammes, "War planning for wicked problems: Where joint doctrine fails"\, (US Armed Forces Journal) Available from: http://www.armedforcesjournal.com/2009/12/4252237/ Internet: accessed28 September 2012.

[136] Cripsin Burke, "Operational Design in Afghanistan". Small Wars Journal (Small Wars Foundation) Available from: http://smallwarsjournal.com/blog/operational-design-in-afghanistanInternet: accessed 29 September 2012

[137] Ibid.

[138]David Walker, "Refining the MDMP for Operational Adaptability", Small Wars Journal, available from http://smallwarsjournal.com/jrnl/art/refining-the-mdmp-for-operational-adaptability,Internet: accessed 29 September 2012, 2.

orderly, sequential process... [which] does not do justice to the non-linear complexity of real planning, and in many cases actually inhibit and degrade planning."[139] This linear process contravenes several of the factors identified earlier in this paper on the requirement to balance inductive and deductive logic through problem analysis.

War-gaming is a critical step in MDMP and used to validate the plan with respect to probable or possible courses of action, both friendly and enemy. According to FM5-0, war-gaming "stimulates ideas, highlights critical tasks, and provides insights that might not otherwise be discovered. It is a critical step in the MDMP and should be allocated more time than any other step."[140] War-gaming as an essential process in MDMP provides a tool to validate the original inductive assessment and the deductions that followed from a deductive analysis. In this sense war-gaming within MDMP, as an iterative and repetitive process, validates many of the observations from Arthur and Barker.

FM 5.0 recognizes that the decision making process includes both rational and limited rational decision making theory and highlights the strengths and weaknesses of both. It highlights that the limited rational and intuitive process relies on the commander's experience to identify key elements of a problem, quickly reject the impractical and select an adequate course of action.[141] FM 5.0 highlights that commanders and the MDMP combine both analytical and intuitive decision making during operational planning and model is structured accordingly.[142]

Colonel (Retired) Stephen J. Gerras, Ph.D., Professor of Behavioral Sciences at the U.S. Army War College authored a paper in 2008 titled Thinking Critically About Critical Thinking: A Fundamental Guide for Strategic Leaders. In his paper he assessed the recent discoveries of

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[139] John Schmitt and Garry Klein, *A Recognition Planning Model*, Report by Klein Associates Inc., (1999), 3.
[140] United States, FM 5-0.., 3-42.
[141] Ibid., 1-12.
[142] Ibid., 1-13.

critical thinking models and compared them to how the MDMP is framed. In his findings he clearly identified that the MDMP framework is rooted in several assumptions throughout the processes. Firstly he identified that the model assumes that the problem or goal is clearly definable. Secondly, the information that is required to make a decision within MDMP is available or can be acquired. Thirdly, Gerras found that there is an expectation that all options generated can be adequately considered, compared, and evaluated to identify an optimal solution. Fourthly he validated that the environment in which the problems being assessed through MDMP is presumed to be relatively stable and predictable, and finally, there is sufficient time for working through the decision making processes.[143] Gerras' findings were quite conclusive that the MDMP although a strong framework, it has significant flaws when evaluated against critical thinking and the impact of human reasoning:

> The Military Decision Making Process (MDMP) is a rational,
> methodological approach for making decisions. Followed correctly, it
> should lead to the best (or at least better) decision given the degree of
> uncertainty and complexity of the situation. The real challenge is that
> each step of MDMP is accompanied by a wide range of opportunities
> for a failure in critical thinking with a consequent bad decision.[144]

FM 5-0 clearly indicates that the role of COA war-gaming is an essential step within MDMP with an inherent role of validating a commander's initial intuition and his preliminary analysis. This step and process conforms to Popper's and Arthur's requirements for a cross analysis of inductive assessments through deductive activities. The process of validating a commander's initial guidance and intent also ensures that those COA are war-gamed as a cognitive test of their individual suitability.[145]

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[143] Stephen J. Gerras, Ph.D, *Thinking Critically About Critical Thinking: A Fundamental Guide for Strategic Leaders*, (Department of the Army, Department of Defense, 2008), 13.
[144] Ibid., 25.
[145] United States, FM5-0…, 3-42 – 3-53.

U.S. Major J.B. Vowell's Monograph "Between Discipline and Intuition: The Military Decision Making Process in the Army's Future Force", highlighted and identified that the MDMP's framework doesn't allow for enough validity testing throughout the process due to its linear nature allowing for groupthink to take place: "the MDMP need not be discarded nor that the RPD need to be adopted as is. Rather, the integration of course of action development and wargaming earlier into the process, by overlapping with mission analysis, lends to a formal acknowledgement of how commanders input their experience into the process."[146]

According to Arthur, a decision making process that incorporates both inductive and deductive reasoning it must have frequent checkpoints back to the inductive assumptions. The MDMP in its linear framework does not easily allow for this cross and frequent analysis. U.S. Major Christopher Otero in his article Reflections on Clausewitz and Jomini: "A Discussion on Theory, MDMP, and Design in the Post OIF Army", argues as a result of his studies into the conflicts of operational design within the MDMP framework, that MDMP is reductionist by the nature of its framework and not a particularly agile process when done in a deliberate manner or when handling undefined problem sets. [147] Again, its linear nature inhibits a process of cross checking and backwards validation between the two elements of human reasoning capabilities.

Another reasoning flaw within the MDMP framework, according to U.S. Colonel Christopher R. Paparone, Ph.D., from Pennsylvania State University, is that the MDMP framework can be over analytical, "creating a tendency toward premature closure in the process

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[146] J.B. Vowell, "Between Discipline and Intuition: The Military Decision Making Process in the Army's Future Force" (School of Advanced Military Studies United States Army Command and General Staff College Fort Leavenworth, Kansas, 2004)

[147] Christopher Otero, "Reflections on Clausewitz and Jomini: A Discussion on Theory, MDMP, and Design in the Post OIF Army " (Small wars journal), available from http://smallwarsjournal.com/blog/journal/docs-temp/772-otero.pdf, Internet: accessed Nov 12 2012. 7.

of formulating stratagems."[148]According to Paparone, decision makers may give inadequate attention to the less-structured, but more important, step of generating stratagems in the first place and the process could enable commanders to let MDMP's procedures to cause convergent thinking too early. This observation also highlights the potential for the deduction process of MDMP to end prior to full evaluation as observed by Popper.

Groupthink is a recognized theory and risk within U.S. Army doctrine which in itself is positive to addressing the potential problem. The Department of the Army Pamphlet 525-5-500, *Commander's Appreciation and Campaign Design*, describes groupthink as "the antithesis of healthy discourse."[149] Field Manual 5-0 also identifies the risk and impact of groupthink within the context of military planning by stating "Groupthink is a common failing of people or groups who work together to make decisions or solve problems. It is a barrier to creativity that combines habit, fear and prejudice."[150] U.S. Major R.D. Walck in his monograph "Integrating Staff Elements, Personality Type and Groupthink" he researched the personnel selection process and requirements for staff officers within the U.S. Military and those working within planning groups using MDMP. He clearly identified Janis' risk of personnel selection and specific criteria to mitigate groupthink symptoms. Walck states that:

> the fact that at least four of the eight symptoms of groupthink that Janis describes are extant in the U.S. Army culture is troubling. More troubling is the fact that U.S. Army culture actively pursues the maintenance of those conditions. The more symptoms a group of decision-makers displays, the more likely they are to become victims of groupthink. U.S. Army decision-makers are hamstrung by their culture before they begin.[151]

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[148] Christopher R. Paparone, "U.S. Army Decision Making, Past and Present", Military Review Jul-Aug, 2001: Internet: accessed 18 Oct 12, 50.

[149] U.S. Army TRADOC Pamphlet 525-5-50, *Commander's Appreciation and Campaign Design* (Fort Monroe, VA: Headquarters, United States Army Training and Doctrine Command 2008), 15.

[150] U.S. Army, Field Manual 5-0, *Army Planning and Orders Production*. (Washington DC: Headquarters, Department of the Army, 2005), 2-4.

[151] R.D. Walck, "Integrating Staff Elements, Personality Type and Groupthink ", (School of Advanced Military Studies United States Army Command and General Staff College Fort Leavenworth, Kansas, 2009), 20.

A monograph by U.S. Major Phillip Johnson, "Effects of Groupthink on Tactical Decision-Making", identified validated that the MDMP theoretically provides the framework for a task-oriented environment which should minimize the symptoms of groupthink.  Johnson supports his claim by referencing work by two professors at the University of North Carolina, Paul R. Bernthal and Chester A. Insko where their findings validate the two generalizations about the role of cohesion during military decision-making.  Johnson observes:

> Firstly, the deliberate use of the MDMP; with judicious information
> search and analysis (within the constraints usually imposed by the time
> available, mission, threat, and organizational resources) should
> generally result in fewer occurrences of groupthink, and therefore better
> mission outcomes. Secondly, the development and adherence to standard operating
> procedures within the staff that focus each member on the
> planning tasks at hand should aid in keeping the staff task oriented and
> therefore reduce the likelihood of groupthink occurrences.[152]

Since the MDMP has steps to evaluate each COA by an opposing view, as identified by Hart, Johnson concludes most symptoms of groupthink are mitigated within MDMP.

**MDMP Summary of Analysis**

MDMP is deep rooted in the U.S. Military with over 200 years of experience.  It is however not without its flaws. The process like CFOPP begins with an inductive assessment followed by a detailed deductive analysis within a group environment.  Although it is commander led, MDMP provides a framework to allow staff to work independently to conduct a deductive analysis for comparison back to the commander's initial estimate. MDMP does not, however, include steps to allow for independent cross examination of preferred COAs to confirm selected COAs have not been influenced by the symptoms of groupthink. Despite a multitude of

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[152] Phillip Johnson, "Effects of Groupthink on Tactical Decision-Making", (School of Advanced Military Studies United States Army Command and General Staff College Fort Leavenworth, Kansas, 2001), 27.

studies, research papers and monographs over the years it remains a linear process and as such does not allow for a thorough deductive analysis cross comparison to inductive assessments and it does not allow for independent sub group thought and analysis amongst its stages.

MDMP does not put an equal emphasis on the focal role of the commander as in CFOPP. As a result its framework is more structured for independent staff effort facilitating a better deductive analysis without influence from the original inductive estimate. This model also mitigates the potential for the clashing of inductive and deductive reasoning throughout its process. MDMP and U.S. Doctrine clearly identify the risk of groupthink in operational planning and the processes are structured to provide some specific measures to mitigate the symptoms of groupthink.

> The emphasis is shifting somewhat from a focus on logical reasoning, science, and empirical methodologies towards a balanced process that includes greater flexibility and individual initiative, with a greater concentration on complex problem solving, innovation, and flexible social skills. For institutional leaders overseeing their own succession, this new paradigm requires a fundamental shift in how future leaders are developed, with both the institution and the leader having shared investment and responsibility in the process. [153]
>
> *Leadership in the Canadian Forces*

## CONCLUSION

The recent Revolution in Military Affairs has generated a vigorous review of the processes and frameworks that NATO and her Allies operate under in the new Contemporary Operating Environment (COE). Canada and the U.S. have seen an influx of studies, postulations and research into their operational planning models with great success and healthy debate. Discussion on the operational design models, whether classic or systemic, have sparked fervent discussions and academic papers over the past decade on how militaries can best succeed in this new environment of distributed cell and non-static warfare. There has also been significant analysis on whether the existing operational planning models are best suited for the COE and where Effects Based Operations and Planning has a role. This debate continues to influence doctrine and studies across NATO and her Allies. Finally, studies on the relationship of command and leadership continue to be at the forefront of military academia as Canada and her Allies grapple with the changing cultures and societies and the changes in education and officership.

Regardless of the path that is chosen, for operational design and the models, processes and frameworks that support it, human reasoning capabilities and its limitations as individuals or

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[153] Canada, Department of National Defence, *Leadership in the Canadian Forces: Leading the Institution*, (Ottawa, DND), 2007, 132.

as a group will impact planning outcomes. Education on reasoning and the impact of group dynamics has percolated underneath this change for framework redesign and has caused more review of officer education with limited changes. Humans are limited by their cognitive abilities and humans are not perfect. Reasoning is at the core of how a commander and staff can address the complex and "wicked" problems they are faced with at present and will be confronted with in the future. Decision making is not always an inherent skill and further study into how humans make decisions must continue to be a focus for the military education community. Studies by Okros and the leadership institutes of both the Canadian and U.S. Militaries continue to elevate the roles and relationship of leadership and command as key functions within military environments. As such there is an inherent responsibility for the military community to further this research in order to maximize the human potential to plan for and execute operations quickly and effectively if we are to be victorious in operations.

The ability and effectiveness of deduction and induction within operational planning remain unclear and Giffen's postulations and Popper's theories continue to spark murmured debate in the quiet corners of military institutions and messes. Reasoning and the ability to reason, either deductively or inductively, have pro's and con's within the context of a human's capability. A balance of both remains the best solution to effective planning during operational processes. The debate will continue. In the meantime, the introduction of computer assisted tools by the Defence Research and Development Canada and like organizations across NATO are providing solutions to the deductive processes within operational planning to mitigate some of our human limitations.

Induction and inductive reasoning will remain critical to operational planning. The reason is based on commander centric and command focused processes. A commander owns the

problem, leads the solution and through inductive reasoning sets staff and planning processes in a direction for deductive analysis. The experience of senior leaders such as General Watt demonstrates that a commander's intuitiveness, leadership and intellect are essential to success within operational design. However, the influence and skills of their staff is paramount to full success. Without induction, we will cease to execute intuitively which Clausewitz, Sun Su and the other military greats have proven is a key to both war and operational success. A balance must continue to be struck with mitigation and support as an essential part of the framework.

The impact of groupthink is the newest debate having only gained momentum in its study over the past 50 years as a result of Janis' first studies after the Cuban missile crisis and other failed policy planning initiatives in the 1960's. A commander must trust their staff and the staff must not provide advice and recommendations influenced by the symptoms of groupthink. The findings and relevancy of groupthink to operational planning is evident. However, which of the symptoms most apply and the mitigation of them has not yet been fully embraced. As such, groupthink could be a high risk to operational planning.

The intent of this paper is to facilitate a comparison of human reasoning limitations as both individuals and as a group within the U.S. Military Decision Making Process (MDMP) and the Canadian Forces (CF) Operational Planning Process (OPP) to determine which one is more robust to mitigate the risks. As a result of this paper's research, the comparison identifies that both CFOPP and MDMP share similar strengths, with regards to complexity and structure, to analytically create and generate deductions stemming from an original inductive estimate. CFOPP is more command centric and although MDMP is command led, it allows for more influence and input from staff effort. Neither model incorporates a strong structured framework to allow for a more dynamic and non-linear analysis of the problem. Despite an

acknowledgement by both doctrines that the processes need not be bound by their linear nature, in practice the linear sequences occur. When the processes are executed the linear models are not fully effective in balancing deduction versus induction. When the models are not followed sequentially, experience has demonstrated that the process is less effective. As such, both models could suffer from what Arthur termed "over complication" and at the same time allow for the symptoms of groupthink to take hold as identified by Irving and Heit.

MDMP is stronger in its framework as it includes extensive wargaming of every course of action (COA) not just the preferred COA as in CFOPP. In practice of course, time dictates the luxury of COA wargaming and MDMP allows for abbreviation. Both models include COG analysis and solutions through Dr. Strange's detailed deductive framework. As such, both rely heavily on deductive analysis which does not come naturally to most people. Finally, both models are based on a rational decision making theory and both models rely heavily on group effort. The U.S. Military has clearly invested more energy and research into decision making processes and into striking a balance between inductive and deductive reasoning. As a result, MDMP as a process is more mature and contains a better balance to leverage both the strengths and weaknesses of inductive and deductive reasoning. There is considerable potential for the CFOPP to be the stronger model if the CF incorporates more steps in its framework that include checks and balances and to be a more structured iterative process (less linear) with more frequent checkpoints. This solution would allow for the process to better validate deductive findings against the inductive analysis (ultimately without command influence until the findings are conclusive) to avoid a clash of inductive reasoning situating deductive findings and avoid the symptoms of groupthink.

Wilcox and Janis concluded that groups often experienced groupthink when they are involved in a cohesive group which has a direct correlation military planning groups engaged in MDMP or CFOPP.  Empirical validation of all of Janis' groupthink symptoms remains inconclusive. However, it is clear that some of the symptoms of groupthink can negatively impact military planning groups. Tactical and operational level decision making is vulnerable and poor decisions may result. MDMP and CFOPP are command centric and as such the solution to mitigating groupthink rests with the commander.   Some commanders will be aware of groupthink and mitigate accordingly, some will not.  Education and further analysis at all levels within military communities is paramount to the full mitigation of groupthink within military planning and operations.

Groupthink appears several times in U.S. Army doctrine and is described as the antithesis of healthy discourse. U.S. doctrine also identifies groupthink as a barrier to creativity that combines habit, fear and prejudice. As such, its process and doctrine are more evolved and therefore MDMP better identifies measures and steps to mitigate the risks of human reasoning and group dynamics than CFOPP. The theory and open acknowledgment of groupthink within Canadian doctrine is limited. Leadership studies and other non-operational publications are starting to reference the impact of human reasoning within group dynamics. In time, perhaps, Canadian doctrine and specifically CFOPP will include direct mitigation measures, such as cross examination of preferred COAs and staff assessment prior to employment, to fully mitigate the symptoms. Time will tell if this is an acknowledged risk and worth improving.

From the research of this small piece of the complex operational environment puzzle there clearly still exists a high level of dissatisfaction and discord between the operational designs models best suited for today's COE and which framework or model is therefore best

suited for the design. Various authors, both academically and within the military profession, have invested significant time and research attempting to find the right solution and the right balance. Evidently, if it was a simple task a solution would have been found.  Lieutenant-Colonel Giffen and his observations that the evolving RMA was very complex are as accurate today as they were during his statement in 2002. What has changed since then is the increased research, discussion and actual experience with operational design and the decision making processes. As military officers and leaders, the models are in place to serve as guidelines and frameworks, which require a level of experience and skill to manage the problems within them. Ultimately, the best planning will result from commanders who are able to adapt these models to their teams and to the situations they are confronted with.

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