

*Military Stalemate and the Sunk Cost Fallacy: How Prior
Actions Biased Prospective Decision-making in the First World
War*

Adam T. Biggs*

Military actions often seek to achieve a decisive victory in combat.¹ However, not every military action can achieve this vaunted goal, and the consequences may result in the conflict becoming stalemated. Dynamic battlefield conditions devolve into a static deadlock as the very nature of surprise and planning begins to shift. Among the many different factors that could affect decision-making at this critical juncture, there is one particular bias that warrants special attention—the sunk cost fallacy. This notion describes how individuals may attempt to follow through with a particular course of action based on the resources already expended in its pursuit, even if the added costs and risks do not outweigh the possible benefits.² Basically, someone allows a prior

* This work was prepared by a military servicemember of the US Government as part of the individual's official duties and therefore is in the public domain. The opinions and assertions expressed herein are those of the author(s) and do not necessarily reflect the official policy or position of the Uniformed Services University of Health Sciences or the Department of War. Adam.t.biggs@usuhs.edu

¹ Kevin D. McCranie, Mahan, Corbett, and the Foundations of Naval Strategic Thought. Annapolis, MD: Naval Institute Press, 2021. pp. 85-89.

² Hal R. Arkes, , and Catherine Blumer, "The psychology of sunk cost." Organizational behavior and human decision processes 35, 1 (1985): pp.124-140.

expenditure of time, money, effort, or other resources to influence their future actions. When applied to a military scenario, possible sunk costs can be exorbitantly large, including human lives, destroyed equipment, and territory lost. Decision-makers may continue to pursue similar actions, desperate to break the stalemate, because it would seem to make worthwhile the efforts and sacrifices of those who lost their lives.

Still, during a deadlocked conflict, the goal should be to find an asymmetric course of action that creates some critical advantage. More importantly, asymmetric advantage is achieved both by undertaking some new action to change battlefield conditions and ensuring the military force capability to follow up—a combination that makes the enemy vulnerable while ensuring the subsequent strike hits hard. This challenge, too can be exacerbated by the sunk cost fallacy. Some proposed courses of action at the tactical level may be more favourably received because they purposefully align with the cognitive bias, albeit tactical asymmetry can also compound sunken costs. Conversely, strategic proposals may have an even higher bar to clear in seeking consensus as they work against the bias. These considerations briefly illustrate how the sunk cost fallacy affects decisions differently at different levels of operations while also complicating the process of gathering consensus among decision-makers.

The current inquiry will explore how the sunk cost fallacy affects military decision-making during a deadlocked conflict. Foremost, the discussion will review multiple sources of empirical evidence about the sunk cost fallacy, including its core tenets and how sunk costs affect the estimation of prospective costs. Novel actions to achieve asymmetric advantage will then be explored through perhaps the most notorious example of stalemate in military history—trench warfare in World War I. Notably, actions will be evaluated through both strategic attempts and tactical attempts to break the stalemate. Overall, the goal is to help future leaders understand the influences that can affect military decisions during deadlocked conflict so that predictable cognitive biases do not produce critical errors.

The Sunk Cost Fallacy: An Overview

Multiple fields of study have evaluated the sunk cost fallacy, including economics, business, and psychology. As such, there are several related concepts that convey similar messages, such as separability³ or marginal cost pricing.⁴ Here, the focused description will involve sunk costs, which represent resources previously expended in the pursuit of

³ Robin Cubitt, Maria Ruiz-Martos, and Chris Starmer. "Are bygones bygones?." *Theory and decision* 73, 2 (2012): pp. 185-202.

⁴ Kahn, Alfred E. *The economics of regulation: principles and institutions*. Vol. 1. MIT Press, 1988.

some goal.⁵ For example, economic investments can easily illustrate irrecoverable resources versus recoverable resources. Consider an initial stock market investment of \$100,000 that declines in value to \$75,000. Neither the initial nor the remaining funds would truly represent sunk costs, as there is a substantial recoverable portion if the investment is sold at its remaining value. Instead, the sunk cost would be the \$25,000 that cannot be recovered. This value can then influence future investment decisions if the proposed course of action becomes biased to waste further resources trying to recover the lost funds. Other resources, such as time, immediately represent sunk costs since they can never be recovered, whereas resources such as effort can be ambiguous since these sunk costs may either be difficult to quantify or may represent a combination of resources. For a military application, lives lost become a particularly important sunk cost as killed in action can never be recovered, while the loss itself is likely to provoke an exceptionally strong reaction among the surviving force. This idea has been demonstrated empirically as presenting war casualty information can produce stronger support among a population for continuing the war effort.⁶

The fallacy arises when people allow sunk costs to bias future decisions. Specifically, fallacious decision-making occurs when the current disadvantages outweigh the benefits, yet the choice is to remain with an unchanged course of action. A logical or economically rational actor would re-evaluate the situation without taking the sunk costs or losses into account, thereby choosing not to continue when the cost-benefit analysis becomes negative or counterproductive.⁷ The fallacy exists because sunk costs should no longer be a motivating factor, as future action cannot recover them. A prominent euphemism would describe these conditions as "throwing good money after bad." Thus, sunk costs represent the characterization of the lost resources, and the fallacy occurs in subsequent decision-making. Aligning with the multiple fields of study evaluating this phenomenon, empirical research has identified multiple factors with a potent influence on how subsequent decisions become biased by the sunk cost.

In a military conflict, especially large-scale combat operations, senior leadership should survey the information available and decide on a course of action most beneficial to their forces based on some cost-benefit analysis. This approach would be a wholly rational application of classical military ideas that were prominent in the works of von

⁵ Arkes, Hal R., and Peter Ayton. "The sunk cost and Concorde effects: Are humans less rational than lower animals?" *Psychological Bulletin* 125, 5 (1999): p. 591.

⁶ John Paul Schott, Laura D. Scherer, and Alan J. Lambert. "Casualties of war and sunk costs: Implications for attitude change and persuasion." *Journal of Experimental Social Psychology* 47, 6 (2011): pp. 1134-1145.

⁷ Roch Parayre, "The strategic implications of sunk costs: A behavioral perspective." *Journal of Economic Behavior & Organization* 28, 3 (1995): pp. 417-442.

Clausewitz.⁸ Although his general premise asserted that wars were fought by rational actors, there is a long discussion about what Clausewitz meant by rationality, worth a separate discussion.⁹ Of course, the sunk cost fallacy directly contradicts this general premise. Individuals regularly engage in fallacious decision-making by allowing unrecoverable costs to bias their future decision-making. The sunk cost fallacy then creates scenarios where decision-makers are behaving irrationally, even despite the life-or-death implications of warfare. Nevertheless, countless examples demonstrate how irrational decisions can be made again and again with a high degree of predictability. This predictability warrants a deeper discussion and understanding of how seemingly irrational choices in warfare, like succumbing to the sunk cost fallacy, can have reliable psychological influences.

Making Sense of Rational and Irrational Decisions

Two theories, rational choice theory¹⁰ and prospect theory,¹¹ explain how rational and irrational ideas substantially motivate decision-making behaviour. Rational choice theory is the first to consider, and it posits that behaviour will be dictated through a cost-benefit analysis by the individual concerning what will be best for that individual. Essentially, human beings are supposedly rational actors who will make decisions best aligned to their personal interests. Unsurprisingly, this idea has roots in the economics of Adam Smith¹² and the political ideas of Thomas Hobbes,¹³ although the idea has been explored through so many academic disciplines that the core premise can be found in discussions about criminology,¹⁴ sociology,¹⁵ morality,¹⁶ and more. Expected utility is

⁸ Carl von Clausewitz, *On War*. (1832). (Ed./trans. M. Howard and P. Paret.) Princeton: Princeton University Press, 1989.

⁹ Thomas Waldman, "Politics and war: Clausewitz's paradoxical equation." *The US Army War College Quarterly: Parameters* 40, 3 (2010): p. 13.

¹⁰ Durlauf, Steven, and Lawrence E. Blume. *The new Palgrave dictionary of economics*. Springer, 2016.

¹¹ Amos Tversky, and Daniel Kahneman. "Advances in prospect theory: Cumulative representation of uncertainty." *Journal of Risk and Uncertainty* 5 (1992): pp. 297-323.

¹² Smith, Adam. (1776) *The Wealth of Nations*. New York: Penguin Classics, 1986.

¹³ Hobbes, Thomas. (1651). *Leviathan: Or, the matter, forme and power of a commonwealth Ecclesiasticall and civil*. Oxford, England: Blackwell, 1946.

¹⁴ Nagin, Daniel S., and Raymond Paternoster. "Enduring individual differences and rational choice theories of crime." *Law and Society Review* (1993): pp. 467-496.

¹⁵ Douglas D. Heckathorn, "Overview: The paradoxical relationship between sociology and rational choice." *The American Sociologist* (1997): pp. 6-15.

¹⁶ David Schmidtz, *Rational choice and moral agency*. (Princeton: Princeton University Press, 1995).

another descriptor for rational choices, and while there are some differences, the underlying tenets remain highly similar.¹⁷

However, the sunk cost fallacy directly contradicts rational choice theory since future decisions should not be so dependent upon bias from prior choices. Instead, prospect theory is one way to explain some seemingly irrational decisions related to sunk costs. This theory posits that people will engage in asymmetric decisions relative to their perceptions.¹⁸ Essentially, decisions are influenced by probability weighting, where individuals weigh decisions based on their perceptions concerning gains and losses rather than by the objective probabilities. Thus, prospect theory explains human behaviour through a more complex lens of interacting factors in addition to rationality that provides a holistic explanation of decisions. Whereas rational behaviour presumes predictable responses to scenarios based on expected values and outcomes, prospect theory produces a non-linear relationship when describing human behaviour responses to scenarios of different expected values and outcomes.

Under conditions with a high probability of loss, decision-makers are likely to be risk-seeking. People become inclined to pursue courses of action with lower expected utility if said action has the potential to avoid greater losses. One battlefield comparison might be the commander who sees little chance to win and decides to risk a major loss with the tactical plan. If the commander truly believes there is a high probability of losing the war with current operations, then a risky battle plan becomes proportionately more worthwhile despite the inherent gamble. Conversely, under conditions with a high probability of gains, decision-makers are likely to be risk-averse. People become inclined to pursue courses of action with lower utility if a riskier action might require sacrificing their gains. A battlefield comparison might be the commander who is already winning an engagement and decides upon tactical plans with less risk that might allow them to consolidate existing gains.

Prospect theory subsequently incorporated two features to further explain seemingly irrational decisions, including diminishing sensitivity and loss aversion.¹⁹ Diminishing sensitivity describes how people weigh decisions differently based on distance from the reference point. That is, the risk-taking curves are non-linear when

¹⁷ Rachael Briggs, "Normative Theories of Rational Choice: Expected Utility", *The Stanford Encyclopedia of Philosophy* (Fall 2019 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/fall2019/entries/rationality-normative-utility/>.

¹⁸ Daniel Kahneman, & Amos Tversky. "Prospect theory: An analysis of decisions under risk." *Econometrika*, 47 (1979): pp. 263–291.

¹⁹ Amos Tversky, and Daniel Kahneman. "Advances in prospect theory: Cumulative representation of uncertainty." *Journal of Risk and Uncertainty* 5 (1992): pp. 297-323.

explaining the relationship between value and outcomes. People are exceptionally risk-seeking when possible losses remain small, but as the expected utility invokes greater losses, the extent of risk-seeking becomes mitigated. Loss aversion describes how losses can loom larger in perception for individual decision-makers relative to possible gains.²⁰

In the context of the sunk cost fallacy, prospect theory helps establish a basis to understand seemingly irrational decisions. Weighting and probability influence perception, which subsequently influences individual bias in decision-making. Even a rational actor may then succumb to bias in a way that leads to suboptimal decisions. Moreover, the importance of mechanisms is that they help an individual understand and predict the likely response to a given scenario, whether the response comes from an ally or enemy—both perspectives of biased decisions are important to military leaders.

Biased Decision-Making in the Sunk Cost Fallacy

These theoretical positions provide context for several of the myriad factors that can exacerbate how sunk costs bias decision-making. Several more precise factors warrant special attention based on the existing literature and how each factor influences human behaviour. Especially when considering the sunk cost fallacy in a military context, there are at least 5 factors that should be considered highly influential: 1) loss aversion, 2) waste aversion, 3) personal responsibility, 4) framing effects, and 5) probability bias. Notably, these factors can apply to either prospect theory in decision-making or a specific subset of irrational decisions related to the sunk cost fallacy. The primary purpose of this section is to interpret these factors within the context of the sunk cost fallacy.

Foremost, loss aversion depends greatly upon the reference point, which an individual uses to contrast potential losses and gains—whether something counts as a gain or loss ultimately depends upon initial values. The principle of loss aversion is that losses feel disproportionately worse than gains.²¹ That is, a \$100 loss would be perceived as worse than a \$100 gain. The sunk cost fallacy is specific to a situation wherein an individual is effectively trying to recover or justify losses that cannot actually be replaced. There is also a largely theoretical debate concerning loss aversion and the sunk cost fallacy as being distinct psychological phenomena since loss aversion describes losses and gains being treated differently and sunk costs representing an inability to accept

²⁰ Amos Tversky, and Daniel Kahneman. "Loss aversion in riskless choice: A reference-dependent model." *The quarterly journal of economics* 106, 4 (1991): pp. 1039-1061.

²¹ Ibid.

prior losses.²² Post hoc justification becomes especially important when applying these ideas to a military context.

A related influence, waste aversion, should be contrasted against loss aversion. Whereas loss aversion describes the propensity for losses to loom larger than gains in decisions, waste aversion describes the desire for decisions not to appear careless, unnecessary, or otherwise wasteful.²³ Waste aversion is therefore a byproduct of concern about how others will view the decision rather than individual weighting of decision variables. All military decisions are likely subjected to some level of oversight, and so there is an obvious mechanism for an external force to have an influence, whether that external group represents an immediate superior, higher headquarters, or media outlet. The desire not to appear wasteful can be a powerful factor guiding decisions, as these actions may exacerbate the sunk cost fallacy for different reasons. Especially in a military context, waste aversion overlaps with a need for accountability in decision-making.

As a third influence behind the sunk cost fallacy, personal responsibility can influence individual decision-making. Essentially, the person who made the original cost feels responsible for the decision and becomes potentially biased in subsequent situations.²⁴ A prime example comes from entrepreneurs who started their own business rather than expanding the business from others.²⁵ If the individual started the business, then they might feel more responsible for all elements of its operations and become more susceptible to the sunk cost fallacy because they feel responsible for the previous investment. This aspect further makes commanding officers susceptible to sunk cost fallacies, as their strategic or tactical choices may have led to the error that produced the lost personnel or resources, as well as a current stalemate. Still, the sunk cost fallacy will apply more strongly to the individual who feels personally responsible, which is why the business example well-illustrates the problem. If the person providing feedback could not be responsible for the initial investment or decision, then this perspective will reduce how much a prior investment biases subsequent decisions.

Framing effects are a fourth method to produce biased decisions that could exacerbate the sunk cost fallacy. Specifically, framing addresses the reference point and how information is presented to the decision-maker. Positive framing can lead to risk-

²² David Gal, and Derek D. Rucker. "The loss of loss aversion: Will it loom larger than its gain?." *Journal of Consumer Psychology* 28, 3 (2018): pp. 497-516.

²³ Arkes, Hal R. "The psychology of waste." *Journal of Behavioral Decision Making* 9, 3 (1996): pp. 213-224.

²⁴ Barry M. Staw, "Knee-deep in the big muddy: A study of escalating commitment to a chosen course of action." *Organizational behavior and human performance* 16, 1 (1976): pp. 27-44.

²⁵ Anne M. McCarthy, F. David Schoorman, and Arnold C. Cooper. "Reinvestment decisions by entrepreneurs: rational decision-making or escalation of commitment?" *Journal of Business Venturing* 8, 1 (1993): pp. 9-24.

averse decisions, while negative framing can lead to risk-seeking decisions. The classic example comes from a problem presenting a way to manage an unusual outbreak affecting a village of 600 people.²⁶ In positive framing, participants were told to choose between Program A, which would save 200 people, and Program B, which would create a one-third probability that everyone would be saved. In negative framing, participants were told to choose between Program A, which would result in 400 deaths, and Program B, which would create a two-thirds probability that everyone would die. These options provide the same expected utility, and so mathematically, the options are equal. The difference comes in framing the choices positively (would save) versus negatively (would die). Participants chose Program A at a nearly 3-to-1 ratio with a positively framed decision, and Program B at a more than 3-to-1 ratio with a negatively framed decision. Moreover, its application to prospective battlefield decisions is relatively simple, as a commander might be biased by how other personnel are framing the decisions laid before them.

Probability bias also plays a major role in the sunk cost fallacy.²⁷ With probability estimates, people inflate the estimation that continuing the course of action can produce success with continued investment. However, this aspect is particularly important given the propensity to underestimate prospective costs. Sunken costs at least have the advantage of more precise quantification, given that they represent prior and unrecoverable losses. Prospective costs, on the other hand, are projections until the completion of the action. Commanders could underestimate the number of resources required to break the stalemate, inaccurately estimate enemy capabilities, or underestimate how long the conflict might take to a conclusion. Common underestimations are perhaps best depicted by the opinion that the war will be “over by Christmas.”²⁸ Prospective costs can be exceptionally difficult to estimate accurately, and when combined with an existing loss of resources pursuing prior action, there is a high likelihood of underestimating the resources needed to break a stalemate. In turn, failed prospective cost estimations only cause more resources to be expended, thereby exacerbating the sunk cost fallacy.

Although these concepts outline the basic tenets of the sunk cost fallacy and prospect theory, they also only scratch the surface of decades of research and investigation. The most prominent consideration is that the sunk cost fallacy and prospect

²⁶ Amos Tversky, and Daniel Kahneman. “The framing of decisions and the psychology of choice.” *Science*, 211 (1981): pp. 453-458.

²⁷ Hal R. Arkes, and Catherine Blumer. “The psychology of sunk cost.” *Organizational behavior and human decision processes* 35, 1 (1985): pp. 124-140.

²⁸ Stuart Hallifax, “‘Over by Christmas’: British popular opinion and the short war in 1914.” *First World War Studies* 1, 2 (2010): pp. 103-121.

theory are related, but distinct ideas. Prospect theory applies to a wide variety of decisions with a cost-benefit analysis or value-outcome analysis. For example, scholars have applied prospect theory to international relations to debate its utility as a framework for international behaviour.²⁹ The same principles can easily be applied to adversarial decision-making at an individual level rather than a state level.³⁰ Meanwhile, the sunk cost fallacy is specific to a subset of irrational decision-making biases dependent upon the resources expended and decisions made prior to the decision posed at a given moment. There is considerable overlap in the underlying mechanisms despite a nuanced distinction in whether the decision involves sunk costs. From a military or strategic perspective, the question becomes how to use these concepts to guide future decision-making.

Breaking Stalemate: Sunken Costs and Asymmetric Advantage

The pervasive problem is how the sunk cost fallacy is self-feeding, where prior sunk costs lead to more sunk costs. Dynamic conflict becomes reduced to a military stalemate. Thus, the sunk cost fallacy has two problems when perceived in a military context. The first problem involves breaking the stalemate. This result will require some form of asymmetric advantage on the battlefield that can be exploited to some degree. In this sense, asymmetric should not be wholly confused with asymmetric or irregular warfare. The latter concept evokes conflict wherein enemy combatants may not be a part of regular military forces or even aligned with a particular nation-state.³¹ Asymmetric advantage instead denotes a change in conditions that permits favourable actions against an adversary. Creating this advantage is the first challenge, as altering a deadlocked conflict to one's advantage represents a significant hurdle. The second problem involves the psychological biases associated with the sunk cost fallacy. Even if an individual can devise some strategic or tactical plan to break the stalemate, this plan must be approved by the military leadership. Their perspectives and biases might likewise be biased by sunk costs, and so the problem becomes both devising a plan to break the stalemate and convincing senior leaders that the plan is worthwhile.

²⁹ Jack S. Levy, "Prospect theory, rational choice, and international relations." *International Studies Quarterly* 41, 1 (1997): pp. 87-112.

³⁰ Adam T. Biggs, and Kyle A. Pettijohn. "Prospect theory and its implications for adversarial decision-making." *The Journal of Defense Modeling and Simulation* 18, 2 (2021): pp. 125-134.

³¹ David L. Buffaloe, *Defining asymmetric warfare*. (Arlington, VA: Institute of Land Warfare, Association of the United States Army, 2006).

Perhaps the best contrast to asymmetric advantage would be relative superiority. As used by von Clausewitz,³² relative superiority involved applying sufficient force at the decisive point for any conflict. It could be attained against an adversary despite general parity of forces if maneuver elements or surprise could be effectively employed, where the side with relative superiority managed to position their forces in shorter order so as to produce a combat advantage. However, relative superiority applies to more than the effective application of general-purpose forces. A prominent theory of special operations posits that relative superiority is how smaller and better-trained special operations forces gain a decisive advantage against larger or well-defended enemy positions.³³ As a concept of special operations, relative superiority requires the 6 principles of simplicity, security, repetition, surprise, speed, and purpose. A smaller force will achieve a decisive advantage if it adequately employs these factors on the battlefield. Still, this concept explicitly applies to special operations, and McRaven notes without ambiguity that relative superiority remained the purview of smaller forces.³⁴ Further conflating the terms would not be productive, as they apply to different levels of the conflict—that is, relative superiority reveals the methods used by special operations forces to achieve a tactical advantage, whereas asymmetric advantage represents the ability of the larger military force to break stalemate in the conflict.

To provide clarity in concept, asymmetric advantage will be defined here as having 3 core components. First, a force must undertake some novel action to alter battlefield conditions. This concept requires initiative, but also establishes that military stalemate cannot be broken by the rote application of continued operations. After all, if the current course of action could achieve victory, then some measurable objective should have been achieved before that point. Breaking stalemate first and foremost requires change. Second, the initiator must have the capacity to follow-up the changed conditions in such a manner as to achieve an advantage. A weakness in the line could be exploited, a novel technology could be employed, or surprise maneuver elements could follow the initial assault to break through the lines to achieve tangible gains—any of these examples and others would represent the capacity to take advantage of changed battlefield conditions. These actions represent the one-two punch to achieve asymmetric advantage. However, there is also a third component that should be considered. If the hostile force can readily neutralize the advantage in subsequent action, then it is not truly an asymmetric advantage. The initiating force would only have achieved some likely nominal gain without truly having changed battlefield conditions. Nominal gains are not

³² Carl von Clausewitz, *On War*. (1832). Ed./trans. M. Howard and P. Paret. (Princeton: Princeton University Press, 1989). Ch 3., Book 8.

³³ William H. McRaven, *The theory of special operations*, (Naval Postgraduate School, Monterey CA., 1993).

³⁴ Ibid.

equivalent to asymmetric advantages. As such, the third component of asymmetric advantage is that the enemy force cannot be immediately prepared to neutralize the advantage with some counteraction. These ideas are best illustrated through the ultimate exemplar of stalemate in military history — trench warfare in World War I.

Trench Warfare on the Western Front: Characterizing the Problem at the End of 1914

The assassination of Archduke Franz Ferdinand in June 1914 may have been the flashpoint that set off the war,³⁵ yet it remains the last in a series of events that set dominoes falling. Europe had been divided into two core factions: the Triple Entente, consisting of Britain, France, and Russia; and the Triple Alliance, consisting of Germany, Austria-Hungary, and Italy. Austria-Hungary, the Archduke's home, blamed Serbia for the assassination due to the principal assassin, Gavrilo Princip, being Serbian. The murder led to the July Crisis, which served as a last-ditch effort to avoid war.³⁶ Negotiations ultimately failed as multiple nations began to mobilize despite the ongoing talks. Alliances became activated as nation after nation claimed a side for the oncoming conflict, and the war began in earnest.

The most notable change in the alliance structure concerned Italy. They had been a member of the Triple Alliance, yet chose to remain neutral at the outset of the conflict. Instead, the Triple Alliance entered World War I as the Central Powers. The Ottoman Empire would join the Central Powers with a surprise attack on Russia in late 1914 and an alliance with Germany.³⁷ On the Western Front, German action began with the Schlieffen Plan.³⁸ Essentially, the concept of operations involved an invasion of France through the Netherlands and Belgium rather than through the shared border. Two assumptions were critical to this endeavour and its ultimate failure. First, the assumption would be to engage and defeat France first, prior to any substantial conflict in Russia. Because the shared border had stronger defences, flanking maneuvers through northern territories would produce the decisive victory sought by the German army. This approach would avoid both the strength of the French defenses and the tough terrain of the Alps in Central Europe near the Swiss border. Because the plans were initially posited around 1905, this assumption functioned due to the Russian losses in the Russo-Japanese War. The Russians would be weak enough not to offer a significant threat on the Eastern Front, making France the more immediate threat. Second, the Schlieffen Plan depended

³⁵ Hew Strachan, *The First World War: Volume I: To Arms*. Vol. 1. (Oxford University Press, 2003). pp. 8-10.

³⁶ *Ibid*, pp. 8-18.

³⁷ Hew Strachan, *The First World War: Volume I: To Arms*. Vol. 1. (Oxford University Press, 2003). pp. 99-115.

³⁸ *Ibid*, pp. 44-48.

on certain manpower requirements and speed. German strategic miscalculation underestimated how quickly the army would be able to move through the terrain given the transportation methods available, thereby leading to a stalled advance. Furthermore, the German army did not have sufficient divisions available for the maneuver at the time of its execution.

As the Schlieffen plan faltered, both sides began a race to the sea as trench warfare took hold on the Western Front. Technological advances in machine guns and artillery, coupled with liberal use of defensive fortification tools such as barbed wire, had enabled the building of exceptionally strong defensive positions. Prior battlefield formations had used tactics such as the line and column, which depended upon massed infantry advances. With these defensive techniques, any infantry advance could be easily thwarted by powerful artillery and other firepower developed by 1914. Taking a heavily defended position would thus require suffering immense casualties on the offensive side, to the relatively light casualties of the defender. In essence, technology had supercharged the Clausewitzian premise that defence was a superior form of war despite its posture serving a negative object.³⁹ Trenches became a logical extension of this posturing as they afforded the defenders the most protection by minimizing the targets available to offensive action. More importantly, trenches were not a singular line that could be attacked or broken. Trenches, once established, became a complex series of interconnected trenches, tunnels, and bunkers better resembling a maze than the metaphorical Western Front might engender when appearing on a map. This thinking produced a deadlock as neither side could achieve a decisive victory by assailing fortified enemy positions in the trenches.

Trench warfare became an almost too literal extension of the sunk cost fallacy. The core consideration involves a contrast of sunk costs and prospective costs. Sunk costs would be represented by the fortifications as they existed, and prospective costs would be the efforts, resources, and projected casualties as anticipated from offensive action. As soon as the first trench begins, there is a sunk cost that cannot be recovered in the development of the fortifications. The prospective costs are important to consider, given the asymmetric danger inherent to offensive versus defensive actions in trench warfare. Any offensive action will incur massive losses compared to defensive patience, although defending the trenches would become just as perilous later in the war. Therefore, it becomes advantageous to enhance the defensive fortifications rather than plot offensive action. Even if positions were intended to be temporary initially, subtle enhancements over time only made it more dangerous to approach the defensive position or to try to launch an offensive action from that spot. Trench warfare literally creates a sunk cost by

³⁹ Von Clausewitz. *On War. Book 6, Defense*. pp.356-522.

adding layer upon layer to the trench network. Prospective offensive costs become higher, whereas the defensive position only becomes stronger. The sunk cost fallacy and its comparison of sunk costs versus prospective costs best explain how trench warfare inevitably produces stalemate, as the prospective losses only continue to favour defensive action over offensive action as the trenches become more established.

Nearing the end of 1914, the Triple Entente and Central Powers had enough sunk costs in trench warfare along the Western Front to make virtually any offensive action unpalatable. Defensive fortifications delved into the earth from the North Sea to the Swiss borders. Even if Italy had been a belligerent at this point, the Alps provided a natural fortification that would be difficult to traverse for any massed infantry advance. As such, the Western Front devolved from kinetic conflict into a stalemate that favoured defensive action. Now, the question becomes what strategies and tactics could have been pursued to break the stalemate. Both sides pursued different actions, with varying degrees of success, that had the potential to achieve decisive victory. Based on these efforts and their possible alternatives, the best contrast can be derived from strategic actions from the Triple Entente and tactical actions from the Central Powers.

Strategic Asymmetry: Next Steps for the Triple Entente

Upon reaching an impasse on the Western Front, the Triple Entente had several strategic actions it could have undertaken. Foremost, policymakers can and should have sold strategies for breaking the deadlock through the lens of prospective costs and sunk costs. Any offensive action on the Western Front would incur massive losses, whereas maintaining their defensive positions could be accomplished without substantial loss of life or reinforcement. This prospectus meant that maintaining the status quo on the Western front would require minimal investment while freeing resources for other strategic pursuits. If viewed through this lens, asymmetric action through altered strategy emerges as a far more sensible option than continued bloodshed across an unmoving border.

In determining alternative actions, naval superiority gave them greater mobility throughout all theatres of combat operations. Here is where classical military thinking seems to have informed their military strategy. Sun Tzu wrote about disrupting alliances as second only to attacking the enemy's strategy as a means of offensive warfare.⁴⁰ Accordingly, the Triple Entente formed a strategy to disrupt the Central Powers by cutting the Ottoman Empire off from its alliance structure. A campaign through the Dardanelles could connect the Triple Entente with warm water ports and enable a better

⁴⁰ Sun Tzu. (1963). *The Art of War* (Oxford University Press).pp. 77-84.

flow of troops and supplies throughout their alliance. These actions could have, in theory, disrupted the Central Powers by removing a critical ally and enhanced the Triple Entente by strengthening their supply lines.

Unfortunately, this strategy yielded disastrous consequences.⁴¹ The first failure came as naval action led the way into the Dardanelles. The Entente had a naval advantage, but geography and preparation could not be ignored. Seeking a waterway to connect Russia to the other Entente nations represented an obvious strategy with several choke points along the way. This geography reduced any surprise or advantage of naval action as ships would likely come under attack from land-based artillery. Additionally, the narrow passages allowed for extensive mines to be placed within the region. Minesweepers could not clear effectively under such bombardment, and so while a naval approach through the Dardanelles appeared to embrace an advantage held by the Entente, geography and preparation thwarted any opportunity for their advance. Poor understanding of mine warfare in the era of battleships and dreadnoughts could also be blamed. The commanders should have known that they were sending their fleet into a predictable trap inside a known choke point. Still, the quality of equipment might have played a role in guiding them to this decision. Naval commanders remained more concerned with countering German naval forces, and so the battleships they sent to the Dardanelles were considered to be of lower quality, possibly not even worth facing the German fleet. This outdated equipment may have been another reason that the Entente remained willing to charge forward despite obvious preparations from the Central Powers. That is, people are more willing to make risky decisions with assets they believe that they can afford to lose.

Again, consider the context of the sunk cost fallacy. The military leadership had broken the deadlock by shifting the strategy away from the Western Front. This approach does avoid further embracing the sunk cost fallacy by highlighting a greater prospect for success in offensive action elsewhere. However, it fails in several regards. Prospective thinking about a new theatre of war cannot always accurately highlight the potential costs or logistical hurdles. Military conflict has demonstrated time and again that logistical planning in far-flung fields of conflict will always be more complex than the initial projections permit. Prospective costs become underestimated in this context due to optimistic assumptions. Likewise, devalued equipment altered the perceived losses that would be suffered should the advance fail. When prospective costs become biased toward underestimation, the context promotes alternative action rather than pursuing the sunk cost—yet the failure is simply another type of cognitive bias. Another concern

⁴¹ E.A. Cohen, & J.Gooch, . “Failure to Adapt: The British at Gallipoli August 1915” as published in *Military Misfortunes: The Anatomy of Failure in War*, (1990) pp. 133-164.

involves the asymmetric nature. Breaking a conflict requires an asymmetric attack that avoids re-engaging enemy strength or pursuing further sunken costs. The Dardanelles campaign did not represent an asymmetric action because the Central Powers had well-prepared the region before the engagement. They knew the Entente would likely pursue this course of action, and therefore the strategy represented a shift in the theatre of conflict without truly producing an asymmetric advantage. Thus, a final lesson is that achieving asymmetric advantage requires thinking several steps ahead—not simply envisioning what steps an advancing army or naval force might undertake, but also accounting for enemy countermeasures and counter-movements.

As an alternative possibility, the Entente could have embraced the work of Alfred Thayer Mahan.⁴² Perhaps ironically, given the notoriety of Mahan as a naval scholar, the proposed alternative action would have been to seek a decisive victory on land through their naval advantage. The Entente should have first sought to secure naval supremacy by attacking the German fleet. By first securing dominance on the waters, they would achieve the ability to move troops more swiftly to a different theatre of conflict. The Battle of Jutland⁴³ would eventually demonstrate the viability of this necessary first step. Although the conflict itself did not yield a decisive victory in the sense of casualties and operational losses, the battle did yield a meaningful victory by effectively restricting the German surface fleet to their home ports and granting Entente naval superiority throughout the North Sea.

With naval supremacy, the Entente could have moved troops over water to Russia with projected landings near Lithuania, Poland, or further north. The question there would be whether an amphibious landing would be easier or more advantageous than landing deeper into Russian territory. Here is where Mahan's strategic principles support other military theorists. His writings speak about not dividing the fleet, but rather attacking with strength for decisive victory. The concept evokes von Clausewitz and relative superiority,⁴⁴ where the tyranny of numbers often produces decisive advantage in conflict. In essence, the Triple Entente faced as many challenges from dividing their forces as Germany faced from fighting on multiple fronts. One possible solution, assuming naval supremacy could be achieved to secure troop movements, would be to shift the theatre of operations to a combined assault on the Eastern Front. Unlike its Western counterpart, the Eastern Front did not devolve into trench warfare. More open conflict permitted a more dynamic war. In turn, they would be able to pursue greater

⁴² A. T. Mahan, . *Mahan on Naval strategy: selections from the writings of rear admiral Alfred Thayer Mahan*, (Naval Institute Press,2015).

⁴³ Hew Strachan,. *The First World War: Volume I: To Arms. Vol. 1.* (Oxford University Press, 2003), pp. 208-214.

⁴⁴ Von Clausewitz. "On Strategy in General," *On War. Book 3*,. p.pp. 177-224.

open field movements. Executing this plan could have looked similar to the Brusilov offensive in 1916, albeit with sufficient manpower this time to execute its goals.

These combined ideas illustrate the underlying lesson about breaking stalemates in war. Strategic asymmetry circumvents the sunk cost fallacy by shifting action away from the theatre of operations where sunk costs were incurred. As such, decision-makers have the advantage of not succumbing to sunk cost biases in their rationale, yet they can become subject to other biases involving the estimation of prospective costs and the resources required to preserve stalemate in existing operations. Granted, there remains a disadvantage because the sunk cost fallacy will bias decisions to continue operations where the sunk costs were incurred.

Tactical Asymmetry: Next Steps for the Central Powers

On the Western Front, the Central Powers pursued tactical asymmetry as a means to break the stalemate. This lens provides an opportunity to explore how the stalemate produced by trench warfare could have been broken in the trenches themselves rather than by a larger shift in strategy or operations. From a psychological perspective, tactical asymmetry has the advantage in that it does not work against the sunk cost fallacy. If anything, tactical asymmetry embraces sunk costs by justifying action consistent with prior efforts. Likewise, these projections will seem viable given that the individual actions are likely smaller and seem to appropriately follow previous expenditures. Prospective efforts thus have the benefit in planning decisions because they become bolstered by sunken costs, whereas for strategic asymmetry, sunken costs typically work against prospective decisions as they make prior efforts seem less worthy or wholly ineffective. The irony is that this perception further causes more sunken costs and promotes strategic stagnation. Tactical asymmetry may permit greater innovation and risk-taking given the smaller scale compared to strategic asymmetry, but these efforts are a primary mechanism bolstering the overall sunken cost fallacy in decision-making. Therefore, pursuing tactical asymmetry could be one mechanism that counterintuitively produces stalemate.

For trench warfare, the simplest approach to tactical asymmetry would be the efforts tried throughout the entire war. Reconnaissance teams and occasional charges sought to find and exploit any weaknesses in the enemy lines. However, this logic would not be sound based even upon the evidence at the time. If simply smashing through the lines with the forces and logistics at hand had worked, then the Schlieffen Plan would likely have been successful. Smashing through entrenched lines would have been a viable option during the late phases of 1914, but as trenches became more and more complex along the Western Front, a massive offensive became less and less viable.

Among novel tactics pursued to break the stalemate, the deployment of chemical weapons is perhaps the most notable. Despite international treaties promising not to use these weapons, the Germans used chlorine gas during the Second Battle of Ypres in 1915. These weapons do fit the definition of tactical asymmetry in trench warfare. Chemical weapons could, theoretically, cause enemy personnel to leave the safety of their trenches as the gas dispersed throughout the trench. Likewise, gases could subsume and traverse trench networks more effectively and easily than any corporeal invading force. Bombardment could then inflict devastating casualties on the enemy positions, as leaving the trenches denied them the safety and security of their fortifications. These ideas fit tactical asymmetry because the presumption follows that a dramatic change in tactical operations could supplement the prior efforts in such a way as to augment their effectiveness as offensive weapons.

Although chemical weapons fit within the broad definition of tactical asymmetry, they failed to be effective for several reasons. Foremost, the ethical concerns make them ineffective on a propaganda front. Any nation willing to utilize chemical weapons immediately suffers a crisis of trust in the eyes of other nations for the ethical violations involved in their use. Additionally, chemical weapons are likely to inflict damage to both civilian and military personnel, as their release may not be contained solely to a battlefield. This possibility furthers the horrors and ethical violations inflicted by the use of chemical weapons. Another reason for their ineffectiveness involves the quickly implemented countermeasures. An advantage is not truly asymmetric if the enemy forces can immediately neutralize it, which the Entente forces demonstrated through gas masks. So, any advantage offered by chemical weapons evaporated almost as quickly as the gases themselves. Finally, the Germans demonstrated another logistical failure by not having the resources or plans to take advantage of the opportunities afforded by these weapons. Assuming that their deployment had worked as intended, they could not immediately send their own troops into these regions to occupy the deserted trenches due to the possibility of harming their own personnel. An offensive force cannot thus exploit chemical weapons unless they have countermeasures to prevent the weapons from inflicting damage upon the advancing force, which is yet another reason why it cannot produce an asymmetric advantage.

The last-ditch German Spring Offensive in 1918 provides the best evidence for tactical asymmetry in breaking stalemate along the Western Front—both in the novel tactics deployed and its ultimate failure.⁴⁵ For the Central Powers, the situation had changed dramatically after 1917. Russia exiting the war brought much-needed relief, as it could not concentrate its entire effort on breaking the stalemate on the Western Front

⁴⁵ Hew Strachan, *The First World War: Volume I: To Arms*. Vol. 1. (Oxford University Press, 2003), pp. 269-300.

rather than having to fight on multiple fronts. However, the impending entry of the United States into the war made timing a critical issue. Waiting would allow American troops to enter the Western Front and risk breaking the stalemate in favour of the Entente. As such, Germany moved its troops from the Eastern Front and concentrated on collapsing the Western Front before the Americans arrived. This urgency provided the impetus for pursuing new courses of action.

To that point, trench warfare utilized long-range bombardment in conjunction with massed infantry advances as an effort to break the lines. For the Spring Offensive, they engaged a new series of infiltration tactics developed by General Oskar von Hutier. Smaller, specially trained troops would infiltrate enemy lines and attack key points to collapse resistance rather than large-scale engagements. Modern military operations similarly utilize special operations to help shape a battlespace prior to operations. Moreover, the approach worked quite well. Germans were able to penetrate French lines so far that they came within 100 miles of Paris. Their failure, again, came to logistics. Even after they had broken the line, the nature of trench warfare and technology at the time prevented a coordinated advance quick enough to secure the victory. These special-operations-inspired tactics demonstrate something important about breaking the stalemate. Namely, creating an advantage required more than simply shifting entrenched lines a few meters forward. The ultimate break required shattering the entire front through speed and consolidated operations, which allowed a force to drive its gains deeper into enemy territory. Mechanized infantry thus emerged as the answer to breaking the stalemate of trench warfare.

Conclusions

World War I provided perhaps the most iconic example of stalemate through the trench warfare that emerged along the Western Front. Kinetic warfare devolved into a static conflict as entrenched lines sat only hundreds of yards apart from one another. Moreover, the situation began in 1914 and changed little until the last, desperate actions brought about in the closing year of the war. As such, for the purposes of military learning and education, trench warfare in World War I provides numerous lessons about the nature of deadlocked conflict.

A critical issue worthy of further study involves how military decisions are made in the face of stalemate or stagnation. Specifically, the contribution here is how the sunk cost fallacy can bias decision-making in warfare. This psychological phenomenon describes how individuals are unwilling to abandon a course of action, given the effort and resources invested to pursue it, even when alternative courses of action could prove more desirable. Its practical military application is that military decision-makers

may attempt to pursue strategy and tactics without clear gain because they believe that succeeding now could justify their prior losses. Another practical application involves the development of stalemate. Along the Western Front, trench warfare produced a literal sunk cost as both sides built and enhanced a network of trenches along the front lines. Advances in defensive technology had made the defensive position a far superior form of warfare than assaulting a fortified position supplemented by barbed wire, artillery, and without clear targets to engage above ground.

Ultimately, stalemate presents a substantial challenge to military conflict. Decision-making must innovate some novel method to break the deadlock, and the sunk cost fallacy is merely one possible cognitive bias at play while seeking solutions, albeit a particularly salient issue in the context of stalemate. Asymmetric action is the solution to breaking such stagnation, which in turn produces its own problems. Suggesting strategic asymmetry may lead to disaster through underestimated prospective costs associated with the proposed actions, whereas tactical asymmetry could deepen the sunken costs and make future maneuvers more difficult. Still, each approach has ways in which, by taking the cognitive bias into account, the stalemate can be effectively broken. World War I provided several examples of these ideas, with the Entente demonstrating attempts at strategic asymmetry and Germany demonstrating attempts at tactical asymmetry. For future military decisions, the primary takeaway should be to consider the psychological biases associated with the sunk cost fallacy to avoid exacerbating poor command decisions in a stalemated conflict.

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