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Place Over Politics: Power, Strategy, Terrain, And Regime Type In Interstate War Outcomes, 1816-2003

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PLACE OVER POLITICS: POWER, STRATEGY, TERRAIN, AND REGIME TYPE IN INTERSTATE WAR OUTCOMES, 1816-2003

by

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DEDICATION

Dedicated to my wife, Joanna, and to the pursuit of peace locally and globally.

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I end this dissertation on war with confidence, knowing "our hope is not based on Caesar's missiles or Caesar's treaties but on the name of the lord who made heaven and earth" (Hauerwas and Willimon 1989, 89)

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"Now, philanthropists may easily imagine there is a skillful method of disarming and overcoming an enemy without great bloodshed, and that this is the proper tendency of the Art of War. However plausible this may appear, still it is an error which must be extirpated; for in such dangerous things as War, the errors which proceed from a spirit of benevolence are the worst." – Clausewitz, *On War*

Introduction

Witnessing the slaughter at the Battle of Fredericksburg, General Robert E. Lee stated to James Longstreet, "it is well that war is so terrible, lest we grow too fond of it." Yet the costs of war, which have only increased over time, have done little to deter humans from returning to the fray. In every corner of the world, organized peoples of every faith, creed, and nation have repeatedly engaged in this destructive pursuit. Indeed, it is the brutality and great cost in blood and treasure of war which, for millennia, has driven its study. While interstate war is a relatively rare form of political violence, its import is paramount to international relations. As a result, war is the single most studied topic in the field of international relations and we know a great deal about war – but the puzzle remains incomplete. The inquiry on the nature of war generally stops when war begins. Entire paradigms center around a basic question: why do states go to war? However, we know relatively little about the determinants of war outcomes. This dissertation explores the latter.

The gravity of understanding war and its correlates forms the *raison d'etre* of the field of international relations. The past several decades of world politics scholarship have been centered on seeking empirical explanations to a host of questions related to war occurrence. These questions have largely been influenced by potential sea-changes wrought by the dramatic third wave of democratization, the fall of the Soviet Union, and the subsequent transition into

unipolarity with the end of the Cold War – what Fukuyama (1992) dubbed "the end of history."

Yet, empirical evidence casts doubt on the degree of change in a post-Cold War and relatively

more democratic world. While the most contentious debate surrounding the topic is that of the

democratic peace, the proposition that democracy substantially constrains war occurrence, a

growing body of research relates to democracy and war *outcomes*. This work suggests that

democracies not only win the majority of the wars they fight, but that they win because they are

democracies. 'The democratic victory', like the democratic peace, proposes that democracies are

functionally differentiated units; responding to international anarchy in ways that set them apart

from other regimes types. While numerous authors suggest that through "selection effects" and

"military effectiveness" democracies usually win the day, the question, like the democratic

peace, remains unsettled and caught between competing and central paradigmatic assumptions

about the nature of world politics. In part, the unsettled nature of this topic stems from the vast

complexity that is the course of a war and a dearth of quality data. This dissertation introduces a

novel set of terrain metrics and, in turn, presents a general critique of the democratic victory

proposition and seeking a unified theory of war outcomes built on the interaction of capabilities,

strategy, and terrain.

What Do We Know About War Outcomes?

War occurrence dominates study in the field, yet outcomes have been largely ignored.

This is not to say that outcomes are of secondary importance. Rather, quality inquiry on the topic

is especially difficult. To paraphrase Kuhn ([1962] 2012), imagine collecting random jigsaw puzzle

pieces from separate puzzle boxes. Regardless of one's skill or time spent, completing this puzzle

is nigh impossible. Even if some pieces fit together, we are no closer to a coherent product.

Paradigms, the constellation of interrelated ideas and conceptions which structure scientific inquiry, tell us which pieces to choose, and serve as the proverbial picture on the box to guide the fitting of pieces together. In the question of war occurrence, scholars have ample direction. Be it in first image human nature explanations, second image domestic institutional explanations, or third image structural explanations, paradigmatic assumptions suggest an answer to the question. States go to war because of human nature, problematic domestic politics, or international anarchy. Traditionally, there have been no such paradigms to structure our answers to the question of outcomes. Thus, scholars typically decided the question did not have a scientific answer, instead assuming chance, or left the study to other fields – such as military sciences.

With the crystallization of neoliberalism as a distinct paradigm in the 1980s, the contemporary study of war outcomes in international relations began. Simply, we started to explore outcomes again because it was assumed there was an answer. Neoliberalism suggests that domestic political institutions shape and predict international political outcomes. The greatest example of this rests with the democratic peace. While not a novel proposition – with roots as deep as Kant's *Perpetual Peace* [1795] – the democratic peace proposition drove decades worth of paradigmatic competition. In this sense, liberalism suggests that democracies are a unique set of actors on the world stage (Russett 1993). Whereas realism, arguably the dominant paradigm in international relations,[1] suggests a general unit functional homogeneity (Waltz 1979). That is, the anarchic structure of the international system produces like units across time

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[1] The statement is on dominance is not necessarily a comment on quality but on volume. In this sense, the longevity of political realism in explaining international outcomes suggests that realism is the mean by which all other paradigms are measured.

and place (Buzan, et al. 1993). The democratic peace, a mid-level theory, is the most tested proposition in the whole of the field (Brown, Lynn-Jones, and Miller, 1996). In turn, the competing evidence and work by realists and liberals evaluate the paradigmatic theory which first prescribed the work.

While classical iterations of realism and liberalism previously facilitated this course of science in the study of war occurrence, only recently was this process possible in studying outcomes. The same neoliberal paradigmatic assumption which predicts peace predicts victory. Beginning with Lake (1992), the democratic victory proposition suggests that democracies, by virtue of being democratic, are more likely to win wars. Again, the core assumption that democracies are functionally differentiated units in anarchy suggests an answer to the outcomes puzzle. Stam (1996) further articulated the proposition by suggesting two theses upon which the victory is predicated. The first, the selection effects thesis, suggests that democratic leaders are cautious in their selection of war, fearing electoral retribution if the war is unpopular, unwinnable, or overly costly. The second, the battlefield effectiveness thesis, posits that democratic soldiers enjoy superior effectiveness on the battlefield given traits concomitant to democratic societies, such and greater individualism and leadership. While certain caveats have been added by proponents of the victory, the causal logic remains largely unchanged. In short, the democratic victory contends that democracy is an endogenous cause of victory because democracies are superior in realizing capabilities in war – either by choosing when to apply them via selection effects or how they apply them through battlefield effectiveness.

Anarchy, Democracy, and War

Democracies behave differently than other regimes. This basic proposition has fueled several decades of empirical, theoretical, and paradigmatic debate. Broadly, this debate responds to a fundamental quandary in the study of international politics: How do states respond to international anarchy? The condition of international anarchy is a valence point between both neorealism and neoliberalism, with divergence instead in the consequences of this anarchy. Neorealism, on one hand, suggests "self-help is necessarily the principle of action in anarchy" (Waltz 1979, 111). Neoliberalism, on the other, contends that the condition of international anarchy "does not imply that it entirely lacks organization," and while anarchy may be constant, responses to it vary by actor – and type of actor (Axelrod and Keohane 1993, 86). While this difference has spurred competing theories and findings on multiple issue areas, such as the prospect for meaningful cooperation, the divergence is perhaps most pronounced relating to topics surrounding conflict.

This is in large part a product of the field's foundational normative concern with war. From Thucydides to modern scholars, the field of international relations has been driven by this concern and seeks to explain *why* war happens. Waltz (1959) famously categorized explanations for war occurrence into three images. First image classical realists such as Morgenthau (1948), Carr (1939), and Niebuhr (1952) argue the causes and course of war "have their roots in human nature" (Morgenthau 1948, 4). In the second image, international trends are the result of domestic political outcomes and diverse actors (Hoffmann 1978). Waltz's (1959; 1979) third image posits the international system, characterized by persistent international anarchy, structures state behavior. These states may be diverse in construction and composition, but maintain a foundational unit functional homogeneity – namely the jealous guarding of

sovereignty. That is, all states exist in anarchy and the "survival logic of self-help" pushes states toward sovereignty (Buzan, et al. 1993). Anarchy precipitates like-units and these like-units create an anarchic structure (Buzan 1991). Given the constant nature of anarchy and units, variation in the distribution of capability serves as the primary predictor of international political outcomes. Second image explanations suggest that organization of the units themselves, as well as international institutions, have a defining influence on international political outcomes – to the point that, when paired with constructivist first image explanations, "anarchy is what states make of it" (Wendt 1992). That is, despite system structure, certain regime types are functionally different. The gulf between these images of explanation have precipitated substantially different and competing explanations and predictions relating to war occurrence and outcomes.

The democratic peace proposition is among the greatest examples of this divide. The proposition suggests that democracies are less likely to fight wars with other states, or at least other democracies. Its causal explanation traces its roots back to a Kantian second image explanation (Kant 1795; Doyle 1983). Through a combination of norms and institutional constraints, democratic peace theorists contend that domestic political processes and outcomes make democracies more peaceful despite the condition of international anarchy. The proposition is among the most widely researched theories in political science, largely because of its immense theoretical and policy implications. Put simply, if the democratic peace is valid, then much of the debate between second and third image explanations would be settled. Democratic dyads would be demonstrated to exist beyond the reach of the anxiety concomitant to anarchy.

However, this question is far from settled as empirical tests of the proposition yield mixed results. These findings suggest democracies, at the monadic level, are no less war-prone than

non-democracies, but are less likely to go to war with other democracies (Small and Singer 1976; Bremer 1991, 2000; Chan 1984; Moaz and Abdolali 1989; Rummel 1983, 1995; Weede 1984). The inconsistency of results between the monadic and dyadic levels raise several important critiques. If democratic institutions – and a public opinion which pacifistically reflects this democratic *ethos* electorally and this ethos is reflected institutionally – constrained democracies from going to war, then one would expect to see it reflected at the monadic level. Layne (1995) states, "if citizens and policy makers of a democracy were especially sensitive to the human and material costs of war, that sensitivity should be evident whenever their state is on the verge of war, regardless of whether that adversary is democratic: the lives lost and money spent will be the same" (12). The weight of explaining democratic dyadic peacefulness thus rests heavily on the *ethos* of democratic norms and culture. Yet this explanation has been plagued by definitional and methodological issues, while other factors such as contiguousness and variable changes in power have proven a more robust explanation. Beyond this, *democratizing* states are proven to be more belligerent than those which have not undergone transition (Mansfield and Snyder 1995). In short, the substantial evidence in favor of the dyadic democratic peace remains inconclusive given its numerous flaws.

Democracy and War Outcomes

The prominent debate on the democratic peace spawned related research on the nature of democracy and conflict – namely that of democracy and war outcomes. Recent scholarship suggests democracies behave differently *in* war. That is, democracies both initiate and settle wars for different reasons than nondemocratic regimes – which would be expected if democracies are functionally different. This proposition stems from the assumption, again, that the internal

structure of democracies influences the outcome of their international interactions. Classically, Tocqueville (1835) suggested democracies were less successful in war given their internal structure. Later classical realists, such as Carr, Kennan, and Lippmann shared this position. However, current research demonstrates the opposite: democracies win the large majority of the wars they fight – some eighty percent of them (Reiter and Stam III 2002).[2] While various works provide nuance to this proposition (Valentino et al, 2010; Graham et. al, 2015), this scholarship again suggests that the internal structure of democratic states heavily predicts international level political outcomes.

In the democratic victory literature, what causes a democracy to be successful in war? Reiter and Stam (2002) provide two basic propositions. First, democratic leaders are painfully aware that their positions and power are dependent upon popular support. As wars progress and costs continue to accrue, public support for conflict decrease. Therefore, democratic leaders are more selective when initiating war so to only enter conflicts with a high probability of victory and which can be resolved quickly – dubbed 'selection effects'. In this sense, democracies win more wars because they are relatively more cautious at choosing when, where, and who to fight (Reiter and Stam III 2002; Bennett and Stam III 1998; Bueno de Mesquita, et al. 2004; Bueno de Mesquita and Smith 2010). Second, soldiers within democratic societies enjoy greater individuality. This emphasis provides superior initiative and leadership to democratic soldiers, or 'military effectiveness' (Reiter and Stam III 2002). Democracies may also enjoy other advantages in fighting wars. Democratic states may be more efficient in organizing resources during times of

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[2] This is something of a misrepresentation of the data by proponents of the victory: democracies only win around 60% of their wars when draws and transformations are included in this count.

war, while adopting strategies that decrease the costs of war, both in blood and treasure (Lake 1992; Valentino, et al. 2010; Bueno de Mesquita and Smith 2010). Graham, et. al. (2015) argue democracies enjoy war advantages due to their tendency to participate in larger coalitions. Democratic war goals often are less costly to apportion, thereby decreasing the costs associated with joining and participating in coalitions. The authors maintain that fighting with larger coalitions accounts for most – if not all – of the advantages democracies enjoy in war. These points, again, put forward a second image explanation for democratic war success: state-level political structures and processes of functionally different units predict international political outcomes. In this conception, democracy is an endogenous cause of victory.

Beyond Regime Type: Alternative Explanations

Democracies may win the large majority of their wars but, like the democratic peace, propositions surrounding democracy and war outcomes are not without their faults. Given the complex nature of war, a wide range of factors interact to determine a war's outcome. *Strategy* is a significant predictor of both a war's duration and outcomes (Mearscheimer 1983; Stam 1996). Bennett and Stam (1998) define strategy, at length, as:

> "We define military strategy as the general way in which a state uses its military forces in a war, classified into the three basic types of strategy as maneuver, attrition, and punishment. Maneuver strategies (sometimes referred to as blitzkrieg strategies) are those where states focus on the use of speed and mobility to disarm the opponent by disrupting the opponent's ability to organize effectively its own forces. Attrition strategies, by contrast, do not focus on speed and movement but instead seek to destroy or capture opposing forces, making them incapable of continuing to fight. Typically, an attrition strategy seeks large confrontations with the enemy (Mearscheimer 1983, 34) that wear down the opponent. Finally, punishment strategies attempt to inflict such high costs on an opponent that it ceases to attack or surrender, although its military forces may not actually be defeated in battle" (354).

Intuitively, certain strategies relate to certain outcomes. A strategy of attrition, seeking to outlast an enemy, may lead to a longer war than a maneuver strategy, which seeks rapid disruption. Strategy, as well as outcomes and duration, are also linked to a state's *doctrine*. Doctrine, as distinct from strategy, is intersection of a state's goals and policy. Doctrine can be either offensive or defensive, whether the goal is to revise or defend the *status quo* (Bennett and Stam III 1998). Taken in tandem, there are 18 strategy-doctrine combinations. Strategy is then the application of capabilities in the attempt to bring power to bear on an opposing actor. Further complicating outcomes and durations, terrain influences the cost and effectiveness of strategies and doctrines. Relative *distance*, proximity, and the loss of strength[3] gradient likely influence on outcomes as well, despite changes in the technology and tools of war (Boulding 1963; Webb 2007).

Beyond this, variables traditionally associated with war outcomes maintain strong predictive power. The structural assumptions surrounding the third image contend, given constant international anarchy and unit functional homogeneity, that variations in the distribution of power serve as the primary predictor of international political outcomes (Waltz 1959; Waltz 1979). Military capability is indeed a powerful predictor of war outcomes (Desch 2002; Henderson and Bayer 2013). From 1800 to 1998, the more militarily capable state won some seventy-percent of all contests (Arreguin-Toft 2001; Mearscheimer 1989). World War II, an obviously important case, demonstrates this point: While democratic France was quickly defeated by Nazi Germany's blitzkrieg (maneuver strategy) and the democratic United Kingdom

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[3] Boulding (1963) famously suggests that power decays over distance, meaning the further a state is from a given place, the less effective their application of power will be.

retreated *en masse* at Dunkirk, it was totalitarian Soviet capability, aided by terrain, which held

the Nazi onslaught. By the time Germany was fighting the Allies from both the east and west, the

Allies enjoyed a fourfold advantage in iron and steel (Desch 2002)). A similar "gross mismatch"

existed, to the benefit of the American's in the Pacific (Desch 2002). Beyond aggregate capability,

wealth has a strong effect on war outcomes, to the point that Henderson and Bayer (2013)

contend that the relationship between democracy and outcomes is irrelevant when military

capability and wealth are taken in tandem.

Place over Politics: Power, Terrain, Strategy, and Regime Type

Like the democratic peace, the democratic victory literature challenges the validity of the

core assumptions of realism, specifically, the foundational concept that international political

outcomes are primarily explained by changes in the distribution of power amongst functionally-

similar state actors in anarchy. In turn, realist scholarship challenges the validity of the victory

proposition. As coined by Desch (2002), realism responds with a general "democratic pessimism."

Analogous to the faults in the core assumptions of the peace – be it discrepant evidence and

cases, methodological problems, or lasting questions of definitions – a host of issues with the

democratic victory proposition call for a general pessimism. First, given the rarity[4] of war itself

and the limited number of democracies populating the system – especially before the crest of

third wave and concomitant to the end of the Cold War – every case is highly important to the

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[4] Geller and Singer (1998) note the rarity of war, writing "if we note that the number of territorial states in the global system has ranged from fewer than 30 after the Napoleonic Wars to nearly 200 at the end of the twentieth century, that gives us about 400 nondirectional pairs of states in 1816 and about 18,000 pairs today. And even if we recognize most wars are between neighbors, and thus reduce the possible pairs at war in a given year to the 40 bordering neighbors in 1816 and 317 in 1993, the potential is never approached. There were no wars in 81 of the 180 years since the modern interstate system came into being, and seldom more than one in any given year" (1).

validity of the victory. Yet, as Desch (2002; 2008) notes, the removal of Israeli victories in three cases, the 1948 Arab-Israeli War, the 1967 Six-Day War, and 1973 Yom Kippur War, renders democracy insignificant in the prediction of victory. Second, definitions of democracy derived from Gurr's (1990) and Marshal, et al.'s (2013) *Polity* data potentially exclude cases. Alternative regime type indices provide some 30 cases where a state is coded as democratic by *Polity* and not by another or vice versa. This casts doubt on the causal logic that questionably democratic institutions promote victory. Third, alternative explanations suggest that democracy is not an endogenous cause of victory. As Henderson and Bayer (2013) suggest, wealth also predicts outcomes in war. Democracies tend to be wealthier and therefore are more often successful in war. But this does not imply that wealth produces democracy as the weight of evidence suggests that wealth is exogenous to democratization.[5]

Fourth, and most germane to this study, there are missing pieces of the outcomes puzzle. Namely, previous work glosses over the seminal importance of terrain. This is not to say previous authors have not sought to reckon with the role of terrain, but rather have not assigned it enough importance. This is less a fault of their work than a fault of their data. Major developments in the field of spatial analysis and the generation of novel and readily available terrain data, there is no longer an excuse for not fully exploring the role of terrain in outcomes. Terrain features in nearly every facet of a war – defining the landscape of a given place, changing the cost of movement, and potentially aiding the weak and humbling the strong. While intuitively essential, previous work took an overtly general measurement of terrain. Replicated in nearly every work on the

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[5] But this does not imply that wealth produces democracy as the weight of evidence suggests that wealth is exogenous to democratization. Rather wealth supports regime stability – regardless of type (Przeworski and Limongi 1997; Morrison 2009; 2015)

democratic victory, including works critical of the proposition, Stam's (1996) terrain data is generated from the 1983 New York Times' *Atlas of the World*. While highly detailed, this atlas was never meant to provide such data. Largely, the classifications taken from the atlas are weakly operationalized and haphazard amalgamations of very different types of terrain features. Again, this is less a fault of the author as it is the source material. Of course, this was never the purpose of the source material.

Given these issues and the paradigmatic weight of answers to the outcomes question, the topic is hardly settled. The question of what drives war outcomes demands an answer. States and societies constantly prepare for the rare event that is war, but it is war itself which often rewrites power relationships – either dyadically, regionally, or globally. Pragmatically, there are policy implications as well. Knowing that the odds of victory are low, even if capabilities are mismatched in a state's favor, may restrain a state's decision to go to war in folly. Combined, I find the normative motivation for my study. From a theoretical position, my work fills in a gap in realist thought. The democratic victory presents a concise and consistent theory of war outcomes from a neoliberal prospective. No such theory exists in realist thought. The prevailing realist-democratic pessimism is less an alternative than a repudiation with addition. In this sense, my study is a work of realist thought, but the data itself is not party to a specific paradigm. However, the implications support the realist position. The question of war outcomes is firmly in the realm of normal science in a Kuhnian sense, and therefore is separated from grand paradigmatic debates. Yet it is conclusions in normal science which ultimately evaluate paradigmatic theory. Thus, my work is necessarily a roundabout paradigmatic evaluation and my results cast doubt on the validity of the democratic victory and supports the essential assumptions of neorealism. This

debate is of secondary importance in a topic that is still relatively incipient given the dearth of published work on the topic.

My theory of war outcomes is predicated on third image explanations of war, but necessarily engages first image realism. In this sense, I propose that we must consider the agency of states, but this agency is constrained and informed by structural considerations. To this end, I turn to an updated version of Clausewitz's first image theory of war outcomes. The anarchic nature of the international system and unit functional homogeneity are constant features of the system structure. Given the variable distribution of capabilities across state actors, states necessarily enter war in unequal positions. This inequality, even when small, allows for the prediction of outcomes on the basis on capabilities. Put simply, the most powerful state will win the war if we take power to be the ability to get other actors to do what they want. Capabilities are the means of realizing power.

However, there are two primary factors which impact this realization. The first is strategy. Strategy is the scheme by which states apply capabilities – at times giving states either strategic advantage, disadvantage, or neither. The second is terrain. Terrain is felt in every facet of the application of strategy. War occurs in place and therefor the features of that place impact the application of capabilities. Terrain may facilitate a state's application of strength or hinder it.

In war, opposing states generally engage the same terrain, at least conceptually, as armies occupy the same broad space. Locally, terrain may be very different, but given the scale of this study and the attempt at general results, we can assume that terrain is a static and structural variable in each individual war. However, the impact of terrain is often unequal. The primary

difference is how states choose to strategically engage terrain. One cannot effectively blitz through a mountain range and one cannot fight pitched battles in dense jungles. The second difference relates to capabilities. A state with quick and mobile capabilities may more easily traverse open areas than a state reliant on foot traffic.

In summary, a state's ability to win war is dependent on their ability to realize power. Capabilities are the means of power, strategy is the application of power, and terrain impacts the application of capabilities in realizing power. Unless democracies inherently possess or can produce more capabilities, more effectively choose how to apply them, or more wisely engage terrain than non-democracies, there is little reason to suggest that democracies enjoy advantages concomitant to democratic regime type.

Plan of the Dissertation

The goal of this study is to provide a deeper insight into the study of war outcomes. My primary addition to the field is the generation of novel terrain metrics, both specific to each war and generally comparable among all interstate wars. By mapping every interstate war in the *Correlates of War* population and engaging new elevation and landscape data from *Global Multi-resolution Terrain Elevation Data 2010* (GMTED2010) and *History Database of the Global Environment* (HYDE), I generate three novel indices of terrain features. The first measure is spatial extent or an approximation of the total area of a given conflict. No other work on war outcomes has produced a similar measure. This allows us to know where a war was and was not fought. Given the diversity of terrain features, even regionally within a state, knowing the spatial limits of a war increases the accuracy of the other indices. The second measure is terrain ruggedness. I

generate a terrain ruggedness index (TRI) for every war, capturing the degree of topographic heterogeneity.[6] The third measure is one of land cover class heterogeneity, which I take to measure trafficability.[7] Be it forests, plains, tundra, crops, or urban landscape classes, armies necessarily move across space, either in the actual course of battle or between contests. In turn, the dominant make-up of a given place can be measured by percentage trafficable when the twenty-eight HYDE classes are coded as a binary trafficable or non-trafficable by cost of movement.

Terrain analysis is coupled with replication and reimagining of previous work on outcomes. The first step in this process begins by testing the various correlates of war outcomes. My work expands the temporal frame of previous works on the topic, and in doing so I add further data to earlier work. I test two basic models of war outcomes. The first, the neoliberal model, suggests democracy promotes victory. The second, the neorealist model, suggests capabilities promote victory. I find mixed support for the democratic victory model. When Israeli victories in 1948, 1967, and 1973 are removed from the population, regime type fails to predict victory in multinomial logistic models. This suggests that the democratic victory is predicated not on democracy per say, but on one democracy: Israel. The unique factors which determine these wars – some combination of Israeli or Arab strategy, capabilities, and motivations – do not necessarily translate to other wars, settings, or actors.

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[6] A terrain ruggedness index is generated by calculating the difference in elevation (in meters) from a center cell and eight adjacent cells (in this study, cells are 1 km^2 in area). These differences are then squared and averaged, then the square root of this value produces a TRI (Riley, et al. 1999).
[7] HYDE data is presented as a gridded time series of 28 unique landscape classes, spanning some 12,000 years. This allows for a best-approximation of these classes by year for each year between 1816-2003.

Beyond this, the introduction of terrain raises further doubts on the endogenous claims of victory proponents as cursory evidence suggest democracies are not superior in selecting strategy on the basis of terrain. I find consistent support for the realist model. In every model, state capabilities and alliance capabilities predict victory. However, I suggest that this is only part of an incomplete picture. In twenty-two wars, states which are grossly outmatched win the day. Granted these are a complex set of anomalies, but in nearly every of these mismatches, evidence suggests terrain plays a significant role. Beyond this, our measures of capabilities may overstate some advantages held by states. For instance, Desch (2002) notes America enjoyed a gross mismatch against Japan during WWII, meaning capabilities, not democracy, best explains American victory. I agree, but in reality, the capabilities mismatch is overstated in the CINC dataset. The sheer power projection necessary to island-hop, and the jointly rugged and non-trafficable terrain, means that the war was never so simple as a threefold capabilities advantage held by the Americans. Our explanation is incomplete without the addition of agency and terrain.

This dissertation is divided into four chapters beyond this introduction. Chapter two presents both theory and operationalization. I introduce a general realist theory of war outcomes and detail the essential elements of the liberal theory. I then identify and describe the population of cases, detail the operationalization of relevant independent variables, and discuss novel data collection. Chapter three presents findings from multinomial logistic regression. Broadly, these findings suggest that capabilities are the primary predictor of war outcomes, with mixed support for regime type as a predictor of victory. In the fourth chapter, I present a classification of terrain and demonstrate the impact of terrain on the application of capabilities through a series of mini-case studies and the comparative method. I conclude this chapter with a preliminary test of a

strategy selection model. This model suggests that both regime type and capabilities do not predict strategic advantage or disadvantage, whereas terrain does. Given this, there is reason to doubt that democracies are superior in applying capabilities. This point also calls for deeper exploration and future research on strategy selection models. Chapter five presents a general summary of the dissertation while discussing practical implications of the work.

Chapter 2: Toward a Theory of War Outcomes

"War… is the continuation of political intercourse, carried on with other means" Clausewitz, *On War*

Introduction

      This dissertation seeks to explain interstate war outcomes, with a particular consideration for the effect of regime type. This, in itself, is nothing novel – but this dissertation introduces novel elements which are lacking in the broader study of war. The field's preoccupation with war is something of a paradox. War is among the most studied of political events, yet is an extremely rare event. While rare, the consequences of war in blood, treasure, and politics, underwrite its prominence in the field of international relations and political science writ large.

      War is firmly a political activity, assuming as Morgenthau (1948) does, that "international politics, like all politics, is the struggle for power" and, as Clausewitz ([1832] 2007) does, that "that war is not merely a political act, but also a real political instrument" (1.1). The politics of states are consumed with preparation for this rare event, driven by an anxiety concomitant to the reality that states must prepare for war or pay the cost of weakness in a self-help system. The threat of war is so pervasive that preparations for war may be, as James (1968) suggests, the "real war." Given the gravity of war, especially its impact on state behavior, the majority of works relate to war occurrence – i.e. the decision made by states to go or not go to war. Less attention has been paid to war outcomes, despite the fact that it is a war's outcome that largely determines the political realignment following the conflict.

      Largely, this is a problem of the complexity of warfare itself. Once slipped, the dogs of war create a havoc that is difficult to measure. The cost of acquiring quality information increases

proportionately with the complexity of political phenomena. This is evidenced in relatively low-information rational and relatively high-information models of war occurrence, with the former's eminent and the latter's limited use (Geller and Singer 1998; Allison and Zelikow 1999). When considering war outcomes however, the complexity of the event – seemingly bound by an indefinite combination of uniqueness, a multiplicity of variables, and the winds of fortune – makes for difficult science. As Thucydides (*History of the Peloponnesian War* [1972]) writes, "consider the vast influence of accident in war, before you engage in it. As it continues, it generally becomes an affair of chances from which neither of us are exempt, and whose event we must risk in the dark" (1.74.2). Gilpin (1981) contends, "leadership, calculation, control over events – these are merely the illusions of statesmen and scholars. The passions of men and the momentum of events take over and propel societies in novel and unanticipated directions" (202). It is likely impossible to create a model which entirely and satisfactorily predicts the course and outcomes of wars.

Paradigms and the Puzzle of War Outcomes

This difficulty does not mean that paradigms have not addressed war outcomes. The problem of war and theoretical responses to it form the foundation of the two major paradigms in international relations thought and have done so since their earliest inceptions and have continued this centrality –with some variation - throughout gestalt switches from classical realism and liberalism to neorealism and neoliberalism (Holsti 1985; Baldwin 1993). Differences in paradigmatic assumptions about the nature of war, stemming from differences in assumptions on the nature of world politics, gave rise to the greatest debates in the field.

Now, nearly thirty years after the end of the Cold War, paradigmatic gestalt switches, and American unipolarity, the field of international relations has settled into normal science – or the closest equivalence to normal science when simultaneous and competing paradigms exist in the same field. Instead of the grand debates of the 1980s on ontological questions and the image of the world, normal science has instead sought to defend mid-level theories, born of these core assumptions. The democratic peace, the prospects for cooperation, terrorist mobilization, and other questions have risen to prominence. In some sense, the importance of war outcomes in relation to changes in the distribution of power and standing amongst the members of the international system suggests that war outcomes should be at the forefront of paradigmatic debate. Yet the difficulty in studying war outcomes and the rarity of the event itself – as well as the frequency in which states *prepare* for it – relegates war outcomes to the realm of mid-level theory.

Yet it is mid-level theory – the realm of normal science – which evaluates the validity of paradigms in a Kuhnian sense or research programs in the language of Lakatos. Normal science is puzzle-solving. It was only recently that war outcomes became a puzzle to be solved in the field. This is not because of the unimportance of the puzzle. As Kuhn (2012) writes,

> "The really pressing problems, e.g., a cure for cancer or the design of lasting peace, are often not puzzles at all, largely because they may not have any solution. Consider the jigsaw puzzle whose pieces are selected at random from each of two different puzzle boxes. Since that problem is likely to defy even the most ingenious of men, it cannot serve as a test of skill in solution. In any usual sense it is not a puzzle at all. Though intrinsic value is no criterion for a puzzle, the assured existence of a solution is" (37).

The challenge of studying an almost inexplicable puzzle left scholars, at least in political science, to assume it was not worth their time, was too complex, or better left for other fields.

The crystallization of two new paradigms, neorealism and neoliberalism, mandated that war outcomes was a puzzle worth solving – not because of a suddenly increased normative or empirical importance in solving it in a post-Cold War world – but because there was an assured existence of a solution. Neoliberalism suggests that democracies are functionally different units and produce reliably different outcomes than non-democracies.

Take, for instance, the democratic peace proposition. It proposes that democracies are, at minimum, less likely to enter into wars with other democracies given democratic norms and institutional constraints (Russett 1993). In the course of normal science, this proposition is among the most tested in the whole of political science. Findings are mixed: at the monadic level, there is very limited support and at the dyadic level strong support – with dyadic findings contested on definitional, methodological, and theoretical grounds (Layne 1995; Singer and Wildavsky 1996). The core assumptions of paradigmatic theory, in this case competing conceptions of anarchy and its consequences, form the basis of the democratic peace as well as the critiques leveled against it. In turn, evidence – or problems with evidence – evaluate paradigms and fuel debate at the center of paradigms and research programs (Vasquez 2003; Waltz 1997). The goal of normal science, even when competing paradigms and programs coexist, is confirmation, not anomaly. Yet anomaly is the very thing that drives paradigmatic change and revaluation and in a field with two paradigms with competing core assumptions; one's confirmation is the other's anomaly. The paradigm selects the problem and normal science is the puzzle-solving mechanism. The democratic victory is no different. The puzzle is worth answering, even if imperfectly, because of the assumed existence of an answer as inferred by the core assumptions of neoliberalism.

Proponents of the democratic victory, especially the works of Stam (1996), Bennett and

Stam (1996; 1998), and Reiter and Stam (1998; 2002), contend that democracies, by virtue of

being democratic, enjoy advantages in war. These advantages are hypothesized to result from

selection effects and military effectiveness theses. The validity of these claims speaks to a basic

point of contention within paradigmatic debate: are democracies functionally differentiated

units in world politics? The implication being, if democracies enjoy advantage in war because of

democratic institutions – beyond certain functional efficiency – then the puzzles proposed by the

paradigm can be answered because they are assumed to have an answer. In turn, this answer

allows for evaluation of the proposition, it's given answer, and alternative explanations.

Towards a Theory of War Outcomes

My causal logic rests on a basic assumption: war is an incredibly complex phenomenon

and its outcomes are influenced by a host of factors, to the point that no two wars are perfectly

alike. Indeed, the uniqueness of war means no monocausal explanation will ever entirely explain

war outcomes generally. War is the most extreme form of human political behavior. It "is not

merely an act of policy but a true political instrument, a continuation of political intercourse,

carried on with other means" (Clausewitz 2007, 28). If this is true, its outcomes must have

political correlates. War outcomes, thus, can be predicted, albeit imperfectly, along political lines.

Evaluation of these predictions then have implications at the paradigmatic level.

I suggest that structural considerations – at the interstate level - are of the utmost

importance in predicting a war's outcome. As Clausewitz (2007) writes, "The political object is

the goal, war is the means of reaching it, and means can never be considered in isolation from

their purpose" (29). War is a result of the international anarchy which shapes the system and places like-units into a system of self-help. In this sense, power is the primary consideration in predicting a war's outcome. Indeed, it may well be the only consideration if we could divorce war from place, time, and agency. If power is the ability to get other actors to do what one wants, victory in war is the realization of power. Capabilities are then the means of power. We must both consider a state's capabilities, the execution of those capabilities, and the factors that impact the application of capabilities to understand and predict war outcomes.

Since wars happen in time and place, the factors that impact the execution of power are of secondary but immediate importance as they influence the efficacy of capabilities. Specifically, factors like terrain (where wars are fought) and time (when wars are fought), serve as power multipliers or inhibiters; aiding or impairing a state's ability to bring power to bear on another actor.

The final consideration is state agency. This would include regime type, but Waltz's third image suggests that states share a general unit functional homogeneity – all states in anarchy are shaped by structural pressures to be like-units. Regime type, then, should have little to do with war outcomes outside of the fact that some states are more efficient in the extraction of resources from society. Put more simply, some states are superior in accumulating capability. This operates under the assumption that regime type is not an endogenous cause of either state capability or effective use of capability. If there is a relationship between democracy and victory, the factors that promote victory also promote democracy (i.e. wealth). The greatest function agency has on a war's outcome would be selection of strategy, which dictates *how* capabilities are used to reach political ends. The efficacy of agency – evident in strategy selection and the

application of capabilities – is determined by its interaction with place and time.[8] This logic suggests that power, manifested in coercive capability, expressed strategically by agency, and altered by terrain, is the primary predictor of war outcomes generally. However, we cannot discount the complexity of war. Abstract unquantifiable and unpredictable elements still impact outcomes. Be it the bold and brave actions of a few soldiers or an irregular occurrence like a flood or avalanche, unpredictable elements may radically change the prospects of victory, either locally in a battle or even an entire war. We may well say that the final variable in war outcomes is Fortuna's rudder.

War:

This study will use Small and Singer's (1982) prominent definition of war. The founders of the *Correlates of War* (COW) operationalized war "…in terms of violence. Not only is war impossible without violence (except of course in the metaphorical sense), but we consider the taking of human life the primary and dominant characteristic of war" (Small and Singer 1982, 205-206). Famously, Small and Singer provided two key criteria to define war. First, a war must have a minimum threshold of 1,000 battle-related deaths. Second, war is sustained violence between organized participants. Small and Singer used this definition to then differentiate types of wars, based largely off their second criteria: type of participant.

While their first works emphasized the most dominant actor in the international system – states – later COW data expanded into the realm of extra-state and civil wars (Sarkees and Wayman 2010a). Intuitively, there should be ample similarity in the correlates of war outcomes

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[8] While detailed later in the work, time can be taken to mean the historical setting – including technology available to the participants.

between different types of wars, or even in lower intensity conflicts such as militarized interstate disputes, but given the distinction of state actors as the dominant actors on the world stage, only interstate wars will be considered in this study.

Inter-state *wars* are periods of sustained violence between state actors with a minimum threshold of 1,000 battle-related deaths. Battle-related deaths, or fatalities, include those dying later from combat injuries and or from diseases contracted within the theater of war. The minimum threshold in interstate wars of 1,000 deaths is shared among all participants per year (beginning at the start date of a given war). Civilian deaths are excluded from this count (Sarkees and Wayman 2010a, 14-16). *COW* counts all states meeting had to meet basic criteria including having population, territory, independence, sovereignty, and enjoying diplomatic recognition. States also, almost universally, have organized armed forces – a basic requirement to qualify for war participation. States are considered to be a participant in a given war if they meet the requirements of suffering a minimum of 1,000 battle-related deaths or have a minimum of 1,000 armed forces personnel engaged in a conflict reaching the threshold of 1,000 battle related deaths (18). To qualify as an interstate war, states must do the 'bulk' of the fighting and be the primary combatants. Initially, this determination was largely a qualitative judgement by the *COW*, but at present, the determination is made by measuring which actor (s) (or type of actor) causes the most deaths (19).

Between the 1823 French Invasion of Spain (COW #1), following the Napoleonic Wars, and the 2003 American-led Invasion of Iraq (COW #227 227), the *Correlates of War* identifies a population of 94 interstate wars. This dissertation will use a variation of this measure,

disaggregating especially complex wars, such as World War I and II, as discussed in further detail below. The analysis here covers a total of 104 wars.

The coding of *war duration* has remained unchanged since Singer and Small's (1972) initial publication. The start date of a war may be determined in several ways. A formal declaration or equivalent may be used as long as sustained violence begins immediately. If sustained combat begins in advance of a declaration, the first day of combat is used to demarcate the start date. The end date, again, may use a formal armistice or ceasefire if that date marks the end of sustained hostilities. If it does not, the date which most closely relates to the end of hostilities will mark the end date. Each war participant's entrance and exit from a war is individually recorded (Sarkees and Wayman 2010a, 20-21). The length of the war is generally calculated by subtracting the start date from the end date and is measured in days or months. In this study, length is recorded in months. If a cessation of hostilities, resulting from an armistice or truce, occurs but is not longer than thirty days, no break is counted. If a break does occur and surpasses the thirty-day mark and sustained hostilities later resume, then the war duration will discount the time of the cessation. *War transformations* occur when something occurs to fundamentally change the nature and course of a war. This may be an escalation in intensity to a war from a MID, the entrance of additional actors – thus making it an interstate war – or some other transformation.

Models of War Outcomes

Given the complexity of war and war outcomes, and their position in a larger paradigmatic debate, I present two models explaining war outcomes. The first, the realist model, emphasizes

the relative power of actors in a war as the primary predictor of war outcomes, as well as the execution of this power via strategy. This follows the basic assumptions of the realist paradigm – that in an anarchic world and with unit functional homogeneity, changes in the distribution of power determine international political outcomes. The second, the liberal model, suggests that while power may be a primary consideration, state-level characteristics found in democracies (selection effects and military effectiveness), give advantage to democracies in war. These models are briefly detailed below and at length in the following chapter. The dependent variable for each model is war outcome. While there are differences in the data between the prominent works on the democratic victory and in this analysis given the inclusion of original data, there are also minute differences given the dates of the studies. Numerous works (Polity and National Material Capabilities Index) have been updated since initial publication of the various cited by Stam, Bennet, and Reiter. As such, small discrepancies exist in shared data, as well as added cases and years. Rather than use previous data, I use the most recent data available on the assumption that this data is improved.

Realist Model

The realist model includes variables related to the measure of relative capabilities in a given war and the use of this power to defeat an enemy state. The realist paradigm is predicated on the assumption of international anarchy. In this setting, there is no higher authority which states can appeal to adjudicate disputes when they inevitably arise between self-interested actors. Given this, states must prepare for war or pay the cost of weakness. These states are concerned with their continued survival and security. In a self-help system, states consider themselves relative to other states and the currency of this consideration is power. Given this, I

include the following predictor independent variables in the realist model: military capabilities, strategy, and loss exchange ratio. I include the following variables as controls: alliance assistance, initiator, distance, terrain roughness, land cover class, trafficability, spatial extent, and length.

Liberal Model

The liberal model includes the above variables but adds considerations relating to regime type. Liberalism in international relations thought is built on the edifice of neorealism, acknowledging the importance of anarchy and the self-help nature of the system. However, liberalism diverges in the assumption that democracies are functionally different from their peers on the world stage. The internal structure of states predicts international political outcomes. In the democratic peace, this includes institutional constraints and democratic political norms (as well as valence characteristics shared among democracies). The democratic victory proposition assumes that selection effects and democratic military effectiveness give advantages to democracies in war. To test this model, I include the following predictor variable in addition to the realist model: regime type. I also add the following control variable: democratic initiator. These variables all are detailed at length in chapter two.

Dependent Variable and Population of Cases

This study employs the single-state as the unit of analysis. This work seeks to explain a state's success and failure in interstate war. The dependent variable is then interstate war outcomes. The following details the dependent variable and the population of cases

War Outcomes and Wars, 1816-2003

If war is never accidental but purposeful behavior, then war outcomes are also purposeful. In this sense, outcomes are politically purposeful relative to objectives and doctrine in war. In other words, no state is willing to accept an outcome it does not agree to – unless totally conquered. More often, an outcome is purposeful as determined by the course of a conflict as previously out of reach or previously unacceptable terms. A state's ability to reach a desired outcome is a measure of its political power vis-à-vis an opponent's. Winning a war is not necessarily the defeat of an enemy – i.e. killing more enemy soldiers, razing cities, capture of territory, destruction – but rather the realization of goals. Conversely, defeat is the inability to realize goals or the acceptance of previously unacceptable terms. The terms of victory and defeat vary by goals and motivation of the states. A war's outcome is then a political decision. At the most basic level, war ceases when fighting ceases and state interactions are reinstated to at a level of violence below the threshold of war severity. This study's dependent variable – interstate war outcomes – is difficult to operationalize given its polysemous nature. To simplify this inherently complex phenomena, I follow COW operationalization of outcomes. Victory means the capitulation of opposing states and defeat is the inability or unwillingness to maintain opposition to the victor. A state then can win, lose, or draw (either in stalemate, tie, or compromise). In some cases, wherein a state may withdraw from a conflict without the other side realizing their goals, wars are transformed as a state continues hostilities with a non-state actor. All transformations are recoded as win, lose, or draw.

Operationalization of war outcomes also determines the population of wars available to study. *COW* presents a population of 94 interstate-wars between 1816 and 2007. This coding provides 337 total cases with the single-state as the unit of analysis and 74 wars with winners

and losers, two wars ending in compromises, eight transformations, and eight stalemates. Following Stam's (1996) coding, I also disaggregate three wars – World War I, World War, II, and Vietnam. These wars, especially the two World Wars, are exceptionally complex. Their aggregated form provides utility in the onset of war -i.e. the study of *why* states go to war – but their aggregated form over simplifies the course of these wars. World War I is disaggregated into three separate wars: German-Belgian, Eastern Front, and Western Front. World War two is disaggregated into 11 wars: American-Japanese, German-Belgian, German-Danish, German-Dutch, German-French, German-Greek, German-Norwegian, German-Polish, German-Soviet, Western (USA/UK vs. Germany/Italy), German-Soviet, Italian-Greek, and German-Yugoslav. The Vietnam War is disaggregated into two wars: by American involvement and the subsequent Northern victory over South Vietnam following American withdrawal. This too entails a degree of simplification. Following Stam's coding, several parties to the World Wars are not included in set of actors. For instance, British soldiers participated in the French, Greek, and Norwegian theaters of WWII (as well as in the Pacific) but are excluded from the analysis. While Stam applies this simplification to Vietnam and Korea as well (omission of several states in each), I maintain COW war participation in these two wars. This simplification is a response to the challenge of studying multilateral wars. Wherever possible, I yield to COW coding for the sake of consistency.

There are four cases present in Stam's dataset which are purposefully omitted from my analysis. These wars include the Serbo-Bulgarian War (COW extra-state war #391), German-Czech (not included in any COW data), German-Austrian (not included in any COW data), and the First Indochina War (COW extra-state war #457). These conflicts are inconsistent with the operationalization of interstate war provided by the COW. The Serbo-Bulgarian and First

Indochina Wars are both extra-state wars, with a primary participant in the conflict not being a sovereign member of the interstate system. The German-Czech and German-Austrian Wars are not included in COW data in any form. This is largely a consequence of COW's definition of war. While the Germans acted coercively in Czechoslovakia and Austria – i.e. moving armed forces into these states – there was little formal resistance. This resistance fails to reach the severity necessary to constitute a war. These four discrepant cases are coded by Stam following Dupuy and Dupuy (1986), but this source is purposefully less cautious in its operationalization of wars and system membership. Stam also deviates from COW coding by aggregating the Sino-Vietnamese Punitive War (COW #193) and the Sino-Vietnamese Border War (COW #208). While violence below the threshold of war continues among the PRC and Vietnam between these two dates, I follow COW coding by treating them as two distinct conflicts with two distinct outcomes. Stam also codes the duration of the Vietnamese-Cambodian War (COW #189) beyond the COW end date and with a Vietnamese victory. COW ends this war with a transformation outcome (Khmer Insurgency, extra-state war #479).

There are also several wars included in this analysis which are not included in Stam's work. The first set are wars which are omitted from Dupuy and Dupuy's (1986) history – and therefore Stam's analysis – but are present in COW coding. These include the Conquest of Egypt (COW #65), Second Central American War (COW #70), Sino-Russian War (COW #83), War of Estonian Liberation (COW #107), War of Latvian Liberation (COW #108), Franco-Turkish War (COW #116), Lithuanian-Polish War (COW #117), Saudi-Yemeni War (COW #125), Ifni War (COW #158), Second Laotian War, Phase Two (COW #170), War of the Communist Coalition (COW #176), and the War over Angola (COW #186). The second set are wars which occurred after 1982, the end date of

Stam's analysis. These wars, as coded by the COW, include: War over the Aouzou Strip (COW #207), Gulf War (COW #211), War of Bosnian Independence (COW #215), Azeri-Armenian War (COW #216), Cenepa Valley War (COW #217), Badme Border War (COW #219), Kargil War (COW #223), Invasion of Afghanistan (COW #225), and Invasion of Iraq (COW #227).

Finally, I make several changes to COW coding. First, I omit four wars from the analysis: The Naval War (COW #52), Off-Shore Islands War (COW #153), Taiwan Straits War (COW #159), and War for Kosovo (COW #221). These wars are fundamentally different than other wars. The former three are primarily naval conflicts, and where fighting occurs on land, the area is extremely small. This makes capturing terrain metrics – the primary control variable of interest and source of original data in this analysis – difficult. The latter is primarily waged in the air by NATO states. While sea and air power are crucial elements of modern warfare, the lack of measurable ground fighting presents unique challenges in measurement. Secondly, I alter the COW outcome coding of several wars originally coded as transformations. I code Mexico as the victor of the Franco-Mexican War (COW #40), Cuba and Ethiopia as victors in the Second Ogaden War (COW #187), and Vietnam as the victor in the Vietnamese-Cambodian Border War (COW #189) following Stam. I also code Cuba and Angola as victors in the War over Angola (COW #186), Bosnia and Croatia as victors in the War of Bosnian Independence (COW #215), Coalition forces as victors in the Invasions of Afghanistan and Iraq (COW #225; COW #227). Finally, I code War of the Communist Coalition as a draw. I make these changes for two reasons. First, the relatively small number of transformations in the COW data make them challenging to study independent of other outcomes. Secondly, in each of the above cases, the transformation occurs only when one state abandons the fight or is defeated, but war-level hostilities continue between a state

actor and a non-state actor. In the cases of Cambodia, Afghanistan, and Iraq, the state is defeated and replaced with a new government.

In the case of the War of the Communist Coalition, the NVA, fighting alongside the Khmer Rouge, controlled roughly half of Cambodia before withdrawing in 1971 after growing tensions with an increasingly powerful and autonomous Khmer Rouge. The bulk of the fighting occurred between the Cambodians, Americans, and South Vietnamese against the NVA. The NVA was not defeated in Cambodia (evident in their victory in Vietnam) – just as the Americans and Cambodian State failed to achieve victory given the ongoing civil war (intra-state war #785) following NVA withdrawal. Neither side was victorious and neither side was defeated. Similarly, in Bosnia, Yugoslavia withdraws its forces in June of 1992 facing international pressure. Bosnia maintains its independence and system membership – thereby achieving its doctrinal goals. Bosnia would continue to fight against the Yugoslav sponsored Serbian-Bosnians and former JNA members through 1995 (intra-state war #877), but maintained its independence following in the interstate portion of the war.

Transformations as originally coded are immediately relevant to the liberal model and the democratic victory proposition. If democracies are superior in selecting their wars, then their selection should extend beyond the simple consideration of victory over an opposing state. Transformations entail the continuation of conflict after an opposing state withdraws or is defeated. Given this, the efficacy of selection must also consider the implication of continued war against non-state actors. The cases of the American led Invasions of Afghanistan and Iraq detail this point. The United States quickly defeated the Taliban government and the Hussein regime respectively, making these particularly short wars. The conflicts would continue however

as costly quagmires against insurgent forces. However, the relatively limited number of transformations involving democracies (COW #176 Communist Coalition, COW # 225 Invasion of Afghanistan, COW #227 Invasion of Iraq) makes this point difficult to study beyond qualitative analysis. This point is further addressed in chapter four and five.

Outcomes are coded simply by the *Correlates of War* consensus among historians on who "won" (Sarkees and Wayman 2010b). This is aided by the fact that, in most cases, there are clear victors – those who achieved the preferred war outcome. Only two inter-state wars in the COW dataset are coded as 'ties' (Korean War and Egyptian War of Attrition). Concomitant to the complexity of war, some ambiguities exist in coding of outcomes. Specifically, some states are defeated at some point in a war or win only Pyrrhic victories – where in "victors suffered far more than the vanquished" (182). Regardless, their position within the winning coalition and ability to enjoy the spoils of victory – even if at great cost – include these states as victors. There are also cases of states 'switching sides' during the course of a conflict which adds to the complexity of coding outcomes. In these cases, states are given two separate records of participation and thus separate outcomes. Fascist Italy initially fought with Axis powers before being defeated by the Allies. It then joined and won the Second World War with the Allies – albiet, not in the disaggregated form of these data. The sole case present in my dataset is Germany in the War of Latvian Liberation. Germany both wins and loses this war. Pertinent to this study, these data code outcomes as:

Outcome (Original COW Coding; disaggregated WWI, WWII, Vietnam; 105 Wars; 322 cases)
1. Win
2. Lose
3. Compromise (both sides gain something)

War Name	COW Number	Sutton Number	Stam Number	COW	Sutton	Stam
Franco-Spanish War	1	1	1	X	x	x
First Russo-Turkish	4	2	2	X	x	x
Mexican-American	7	3	3	X	x	x
Austro-Sardinian	10	4	4	X	x	x
First Schleswig-Holstein	13	5	5	X	X	x
Roman Republic	16	6	6	X	X	x
La Plata	19	7	7	X	x	x
Crimean	22	8	8	X	x	x
Anglo-Persian	25	9	9	X	x	x
Italian Unification	28	10	10	X	x	x
First Spanish-Moroccan	31	11	11	X	x	x
Italian-Roman	34	12	12	X	x	x
Neapolitan	37	13	13	X	x	x
Franco-Mexican	40	14	14	X	x	x
Ecuadorian-Colombian	43	15	15	X	x	x
Second Schleswig-Holstein	46	16	16	X	x	x
Lopez	49	17	17	X	x	x
Naval War	52		18	X		x
Seven Weeks	55	18	19	X	x	x
Franco-Prussian	58	19	20	X	x	x
First Central American	60	20	24	X	x	x
Serbo-Bulgarian			25			x
Second Russo-Turkish	61	21	21	X	x	x
War of the Pacific	64	22	22	X	x	x
Conquest of Egypt	65	23		X	x	
Sino-French	67	24	23	X	x	x
Second Central American	70	25		X	x	
First Sino-Japanese	73	26	26	X	x	x
Greco-Turkish	76	27	27	X	x	x
Spanish-American	79	28	28	X	x	x
Boxer Rebellion	82	29	29	X	x	x
Sino-Russian	83	30		X	x	
Russo-Japanese	85	31	30	X	x	x
Third Central American	88	32	31	X	x	x

Fourth Central American	91	33	32	X	x	x
Second Spanish-Moroccan	94	34	33	X	x	x
Italian-Turkish	97	35	34	X	x	x
First Balkan	100	36	35	X	x	x
Second Balkan	103	37	36	X	x	x
World War I	106			X		
WWI_German_Belgian		38	88		x	x
WWI_Eastern_Front		39	88		x	x
WWI_Western_Front		40	88		x	x
Estonian Liberation	107	41		X	x	
Latvian Liberation	108	42		X	x	
Russo-Polish	109	43	37	X	x	x
Hungarian Adversaries	112	44	38	X	x	x
Second Greco-Turkish	115	45	39	X	x	x
Franco-Turkish	116	46		X	x	
Lithuanian-Polish	117	47		X	x	
Manchurian	118	48	40	X	x	x
Second Sino-Japanese	121	49	41	X	x	x
Chaco	124	50	42	X	x	x
Saudi-Yemeni	125	51		X	x	
Conquest of Ethiopia	127	52	43	X	x	x
Third Sino-Japanese	130	53	44	X	x	x
Changkufeng	133	54	45	X	x	x
German_Czech			46			x
German_Austrian			47			x
Nomonhan	136	55	49	X	x	x
World War II	139			X		
WWII_American_Japanese		56	57		x	x
WWII_German_Belgian		57	51		x	x
WWII_German_Danish		58	53		x	x
WWII_German_Dutch		59	52		x	x
WWII_German_French		60	55		x	x
WWII_German_Greek		61	61		x	x
WWII_German_Norwegian		62	54		x	x
WWII_German_Polish		63	48		x	x

WWII_German_Soviet		64	59		x	x
WWII_Western		65	58		x	x
WWII_Italian_Greek		66	56		x	x
WWII_German_Yugoslav		67	60		x	x
Russo-Finnish	142	68	50	X	x	x
Franco-Thai	145	69	62	X	x	x
First Kashmir	147	70	63	X	x	x
First-Indochina War			64			x
Arab-Israeli	148	71	65	X	x	x
Korean	151	72	66	X	x	x
Off-Shore Islands	153			X		
Sinai War	155	73	68	X	x	x
Soviet Invasion of Hungary	156	74	67	X	x	x
IfniWar	158	75		X	x	
Taiwan Straits	159			X		
Assam	160	76	69	X	x	x
Vietnam War, Phase 2	163	77	70	X	x	x
Vietnam_N_S		78	79		x	x
Second Kashmir	166	79	71	X	x	x
Six Day War	169	80	72	X	x	x
Second Laotian, Phase 2	170	81		X	x	
War of Attrition	172	82	73	X	x	x
Football War	175	83	74	X	x	x
Communist Coalition	176	84		X	x	
Bangladesh	178	85	75	X	x	x
Yom Kippur War	181	86	76	X	x	x
Turco-Cypriot	184	87	78	X	x	x
War over Angola	186	88		X	x	
Second Ogaden War, Phase 2	187	89	81	X	x	x
Vietnamese-Cambodian	189	90	80	X	x	x
Ugandian-Tanzanian	190	91	82	X	x	x
Sino-Vietnamese Punitive	193	92	87	X	x	x
Iran-Iraq	199	93	83	X	x	x
Falkland Islands	202	94	85	X	x	x
War over Lebanon	205	95	86	X	x	x

War over the Aouzou Strip	207	96	X	x
Sino-Vietnamese Border War	208	97	X	x
Gulf War	211	98	X	x
Bosnian Independence	215	99	X	x
Azeri-Armenian	216	100	X	x
Cenepa Valley	217	101	X	x
Badme Border	219	102	X	x
War for Kosovo	221		X	
Kargil War	223	103	X	x
Invasion of Afghanistan	225	104	X	x
Invasion of Iraq	227	105	X	x
			95 Wars	**105 Wars**	88 Wars

4. War transforms into different category
5. War ongoing
6. Stalemate, fighting stops/no satisfactory agreement
7. Conflict continues at intensity below war-level fatalities

This study simplifies this coding with the following variation:

Win, Lose Draw 2 (*WLD2*) (105 Wars, 322 Cases)

- Includes all (disaggregated WWI, WWII, Vietnam) but codes outcomes following Stam: #40 Franco-Mexican – Mexico wins, #187 Second Ogaden War – Ethiopia/Cuba Win, #189 Vietnamese-Cambodian – Vietnam wins. Also recodes: #176 Communist Coalition - draw, #186 War over Angola – Angola, Cuba wins, #215 Bosnian Independence – Bosnia, Croatia wins #225 Invasion of Afghanistan – coalition win, and #227 Invasion of Iraq – coalition win
  1. Win
  2. Lose
  3. Draw

Table 1: Population of Interstate Wars, 1816-2003

Hypotheses:

Informed by the literature, I present the following hypotheses:

H_1: States with a higher proportion of a conflict's total capabilities are more likely to win their wars

H_2: States with a higher ratio of soldier quality are more likely to win their wars

H_3: States fighting with higher levels of capability assistance from alliances are more likely to win their wars

H_4: Democracies (Polity IV scores of 6 or higher) are more likely to win their wars

H_5: States which initiate a war are more likely to win their wars

H_6: Democracies are more likely to win wars as the initiator

H_{7a}: States with strategic advantage are more likely to win their wars

H_{7b}: States with strategic disadvantage are more likely to lose their wars

H_8: States with lower loss exchange ratios are more likely to win wars

H_9- States which are further away from the theater of war are less likely to win wars

H_{10}: Punishment strategies are more effective in rugged and non-trafficable terrains

H_{11}: Mobility strategies are more effective in level and trafficable terrains

Predictor Variables:

Military Capability

By its nature, war outcomes are inexorably linked to military capability. This reality was as relevant to Thucydides as it is to this study. Put simply, every element of war – from the decision to inaugurate it and the strategies employed in fighting, to its duration and outcomes – is impacted by the relative military capability of participants. Proponents on both sides of the democracy and war outcomes debate recognize this point. Indeed, this basic assumption forms the foundation of some of the most simple and lasting theories within political science, such as balance of power theory. This aside, the question remains, to what extent, when other variables are considered, does relative capability determine war outcomes? Henderson and Bayer (2013) and Desch (2002; 2008) both emphasize that military capability serves as the primary predictor of war outcomes in response to the democratic victory literature but the democratic victory suggests democracies are superior in their application of capabilities (Reiter and Stam 1998). To

explore this question, I use data from the COW *National Materials Capabilities* (NMC) dataset

(Singer 1987). The following details the relevant variables present in the NMC data, specifically

the *Composite Index of National Capability* (CINC) as discussed in Greig and Enterline's (2017)

MNC Data Documentation, Version 5.

The goal of the NMC data is to operationalize and measure power. While power and

capabilities are not synonymous, capabilities are placed in operational terms in the effort to

measure power (2). Given the temporal scale of the data, there is a good deal of ambiguity in

measuring power across states and across time. For this reason, these measures are specifically

selected for their ability to translate across time, place, and state. This raises several important

considerations when using this data. First, comparison in the data is not perfect. It is questionable

to suggest that "equal values of the same indicator make equal contributions to capability" (2).

Secondly, possible alternatives exist for coded values. Third, multiple sources were consulted in

compiling the NMC data. In ideal cases, several sources provided overlapping information.

Fourth, given limitation in available data, some values are estimated in these cases. Fifth, there

are inevitable errors within the dataset. This may arise from inaccurate source data or errors of

estimation. This risk necessarily increases with temporal distance (2-3). Despite these

considerations, this dissertation will benefit from the recent (2/2017) update to the NMC. I will

use several basic measures from the NMC data as aggregated in CINC, listed below:

The *Composite Index of National Capabilities* (CINC) is an aggregated measure of six elements

of a state's capability. These include, military personnel (*milper*; in thousands of people), military

expenditures (*milex*; 1816-1913 – in thousands of current year British pounds; 1914-2012 – in

thousands of current year U.S. dollars), iron (pig iron, 1816-1899) and steel production (1900-

2012) (*irst*; in thousands of tons), energy consumption (*pec*; in thousands of coal ton-equivalents), total population (*tpop*; in thousands of people), and urban population (*upop*; 1816-2001 in thousands of people living in cities greater than 100,000 people; 2002 to 2012 in thousands of people living in cities greater than 300,000 people). A state's CINC score is a measure of a state's relative share of capabilities, each component separately weighted. As a result, a state's CINC score always ranges between 0.0 and 1.0 and is reported by state per year. Each composite score is individually computed per year, before being aggregated. A state's score is created by placing their capabilities in the numerator and total system capability in the denominator, giving the percent share (7-8) (Sarkees and Wayman 2010a).

In war, a state's military capability is only relevant in relationship to an opposing state's or states' capabilities. A state's relative capability (*concap*) is measured by dividing a state's capability by the total capability of all actors in the war (State A Capability / State A Capability + State B Capability). Simply, conflict capability is a state's relative capacity to employ relative capabilities coercively against another actor. This is in turn filtered through other factors – such as distance, terrain, and strategy. It serves as a baseline for a state's potential for coercive action against another state. I also measure the relative quality of a state's military by measuring spending per soldier by each participant. This is calculated by dividing military expenditures (*milex*) by military personnel (*milper*). This value is then divided by the opposing states spending per soldier ([State A milex/milper]/[State B milex/milper]) to create a ratio of troop quality (*qualrat*). The inclusion of troop quality ratios follows their inclusion in various works in the democratic victory literature.

Democracy

Are democracies more successful in war by virtue of being democratic? The democratic victory proposition rests on two assumptions. First, selection effects: Democratic states are more cautious than non-democracies when selecting conflicts because leaders are both more constrained and are fearful of electoral retribution if a war is long or unsuccessful. Second, military effectiveness: Democratic soldiers enjoy the advantages concomitant to democratic societies, such as a higher degree of individuality and superior leadership. These basic theses form the logical and theoretical foundations of the democratic victory. To this end, I engage Polity IV to measure regime type by state. Polity is unique in its preeminent use in the field, given its wider temporal frame that alternative regime type indices,.

How democracy is defined largely impacts the answers authors find. The most basic definition of democracy is a procedural one. Schumpeter (1976) famously suggests such a definition of democracy as an "institutional arrangement for arriving at political decisions in which individuals acquire the power to decide by means of a competitive struggle for the people's vote" (Schumpeter 1976, 269). This seemingly simplistic definition differentiates a procedural version of democracy from a more substantive one. More specifically, Schumpeter provides this definition to differentiate it from an "eighteenth century" definition of democracy as "that institutional arrangement for arriving at political decisions which realizes the common good by making the people itself decide issues through the election of individuals who are to assemble in order to carry out its will" (250). Increasingly substantive definitions of democracy provide the "analytic differentiation" necessary to study the substantial diversity which exists between modern democracies (Collier and Levitsky 1997, 430). This gap has only widened as membership in the democratic club grows. Whereas many first wave democracies were defined substantively

by their liberalism, the third wave of democracy often precipitated tenuously liberal or entirely

illiberal democracies (Zakaria 1997; Schmitter 2015; Diamond 2002). Identifying "democracy with

adjectives" provides differentiation but simultaneously risks "conceptual validity" (Collier and

Levitsky 1997, 340).

Each time an additional substantive qualifier is added – such as "authoritarian democracy,

neopatrimonialism democracy, military-dominated democracy, and proto-democracy" – the

conceptual link to the essence of what a democracy 'really is' weakens (Collier and Levitsky 1997,

341). Sartori (1970; 1984) suggests a remedy for this problem of "conceptual stretching" (1034).

One can move up or down, when appropriate, the ladder of "abstraction" (or in Collier and

Levitsky's [1997] terms, "generality"). As one moves down the ladder, the number of cases

decrease and the specific number of characteristics needed for inclusion increases, with the

inverse being true as one climbs it. These categories are subordinate and superordinate

respectively. Procedural definitions of democracy are high up the ladder and firmly in the

superordinate. This procedural definition is applied generally to literature surrounding both the

democratic peace and democratic victory. The notion that democracies are less likely to go to

war or, in soberer, dyadic claims, less likely to go to war with other democracies, assumes that

this is the case because of two traits found in democracies generally: institutional constraints and

democratic norms. Likewise, democratic triumphalism rests on selection effects and military

effectiveness.

The democratic peace is consistently plagued by definitional problems. If the democratic

peace is to be akin to a law – a great rarity in the social sciences – and democracy has a 'low N,'

then each deviant case is highly important. These difficult cases, ranging from the War of 1812

to World War One, cast serious doubt on the validity of the argument. In response, democratic peace's proponents have made use of diminished subtypes of democracy. For instance, Doyle (1983) explains away the discrepant evidence of Wilhelmine Germany by classifying it as a "bifurcated democracy," with democratic domestic politics and non-democratic foreign policy (216). Ultimately, this "definitional tinkering," as dubbed by Layne (1995), risks committing the sin of conceptual stretching. Each additional case which is explained away by a moving a case into a subordinate, diminished subtype moves us further away from a definition of democracy which accurately defines the concept. This method of defining away important and costly deviant cases has created something of a 'head I win, tails you lose' operationalization of democracy in the democratic peace.

Bearing these definitional concerns in mind, this study operationalizes the concept of democracy using the Polity IV measure because of its prominence in the field and inclusion in every quantitative study of the democratic victory, but does so conscious of the problems associated with it. Works related to democracy and war outcomes have the benefit – or perhaps more aptly, suffer the pitfall – of having less published work on the topic. In this sense, less discrepant evidence has been uncovered to this point, therefore there has been less temptation to resort to endless diminished subtypes.[9] Reiter and Stam (1998; 2002), Stam (1996), Bennett and Stam (1998), and Lake (1992) make use of POLITY III scores (Jaggers and Gurr 1995). POLITY III rates states on a ten-point democracy or autocracy scale, with ten values being a high

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[9] See Vasquez (2003) and Waltz (2003) for debate along similar lines relating to grander paradigmatic theory.

democracy or high autocracy respectively. The more recent POLITY IV (Marshall, et al. 2013) rates states from a -10 low (high autocracy) to a 10 (high democracy).

There exist, however, doubts about the objectivity of the POLITY scores as detailed by both Oren (1995) and Gleditsch and Ward (1997). Oren (1995) notes that POLITY scores are overtly normative and value laden, rather than being objective indicators of democratic quality. The case of Imperial Germany highlights this point. Imperial Germany consistently receives scores far below The United States, France, and the United Kingdom, despite its own democratic characteristics and the flaws present in the democratic institutions of the French Third Republic, Imperial United Kingdom, and Jim Crow America. In recent years, the perception of Imperial Germany is now relatively higher, not because new facts about the nature of the Imperial German regime have emerged, but because the normative perception of Germany under the Kaiser became increasingly favorable as perception of contemporary Germany improved. The perception of democracy has not changed over time to encompass a deeper understanding of what truly constitutes a democracy but rather changes so to "subtly redefine our kind to keep our self-image consistent with our friends' attributes and inconsistent with those of our adversaries" (Oren 1995, 147). While reprisals abounded for German-Americans during WWI (let alone interned Japanese-Americans during WWII) and Upton Sinclair was arrested for publicly reading the *Bill of Rights* under the *Sedition Act*, no such actions were taken upon English speakers in Imperial Germany. This is reflected in the fact that the United States, as well as many other Western democracies, have near universal 'perfect' scores of '+10' in the POLITY index (during these times). These perfect scores are equally applied to America historically as well, and "American values are projected backward and other polities, past and present, are ahistorically

compared to the present American ideals" while "considerable historical experience suggesting that political norms are elastic over time is ignored" (Oren 1995, 150). It is hard to imagine that a slave-holding America, a Jim Crow America, or a pre-19th amendment America being scored a "10" on Polity scores, yet it consistently does. In this sense, POLITY scores are potentially less about valence democratic characteristics, but rather normative perception.

Gleditsch and Ward (1997) echo similar sentiment, albeit more generally. The authors note, as does Gurr et. al. (1990; 106), that most authors who use POLITY data take its reliability as a "given" (362). That is, POLITY data has not been subject to extensive empirical verification of the reliability and validity of its measures; nor have the analytical construction of its variables. Their study draws a number of important conclusions. First, POLITY variables are categorical – intentionally – but often are not treated as such in the literature in which they are employed. Compounding this, states with the same score are not equivalent, but broadly comparable. The authors note "vastly different temporal, spatial, and social contexts support the same democracy and autocracy scale values" (380). POLITY data also present autocracy scores which are "highly nonlinear, asymmetric, and intransitive," democracy scores are also intransitive (albeit less so than autocracy scores), are overdetermined (given the weight of executive recruitment in determining democracy scores), and scores change very slowly (with little change to either democracy or autocracy score over short periods of time, averaging about a decade for changes to occur) (380). Gleditsch and Ward conclude this discussion by suggesting that those using POLITY data should pay careful attention to the categorical nature of these data, especially democratic peace scholars.

With these points in mind, this dissertation will engage POLITY IV regime scores, while recognizing Gleditsch and Ward's (1997) advice on the treatment of POLITY data as categorical and considering alternatives to POLITY. However, the limited number of cases makes alternatives problematic. Despite the novel approach of alternatives, such a the Varieties of Democracy (*V-Dem*), the temporal frame would dramatically reduce the temporal scale of this study. Beyond this, purely treating Polity IV as categorical is equally problematic given the relative diversity of possible scores, as well as the relative dearth of democracies. Regardless, this suggests that Polity data should be taken with some skepticism in final results.

Initiator

States often enter wars with an inequality in preparation. The state which inaugurates a war likely makes the decision to initiate war on the basis of a perceived advantage present at the time (Organski and Kugler 1980; Gilpin 1981; Blainey 1988). Germany's WWI Schlieffen Plan demonstrates the logic of this advantage: German forces would seek to initiate war with France, seeking quick and decisive victory in the west, before engaging Russia in the east – thereby enjoying the advantages of initiation as the Russian military machine was slow to mobilize. The execution of the plan also demonstrates the limitations of this advantage. Through a combination of the fallibility of the plan, its execution, and the defensive strategy of French targets, Germany found itself mired in trench warfare in the west. Regardless of the eventual outcome in this war of attrition, the initial successes in Belgium and Eastern France allowed for Germany to seek to preserve the battlefield status quo – meaning German soldiers enjoyed more permanent trenches and camps relative to the British and French forces. The Germans enjoyed a favorable loss exchange ratio (.85:1), in part due to this advantage.

Initiators also enjoy the advantage of choosing the initial location of the war. The Germans again demonstrate this advantage with the Manstein Plan in 1940. Rather than engage the Maginot Line along the French-German border, the Germans selected the location of fighting with their Blitz through Belgium – bypassing the French fortifications and eventually flanking the east-facing defensive installations from the west. In the same sense, Western Allied forces enjoyed the advantage of initiation with the invasion of Normandy. German command was duped by Operation Bodyguard – with inflatable tanks and phony aircraft in Kent (the closest point to Pas de Calais), false radio chatter detailing skis to be used in an imagined invasion of Norway, and other deceptions – and were relatively ill prepared for a landing on the beaches of Normandy.

I predict, following a range of works, including Stam (1996), Bennett and Stam (1996), Reiter and Stam (1998; 2002), Desch (2002; 2008), Henderson and Bayer (2013) and Cochran and Long (2017), that initiators enjoy advantage in war. This is given their advantage in choosing when and where a war is fought. Initiation follows coding by the COW (Sarkees and Wayman 2010b). However, proponents of the democratic victory suggest that one of the primary reasons democracies seem to be successful in war is due to their superior selection of the wars they fight. These "selection effects" suggest that democratic leaders are fearful of possible electoral retribution when engaging in long, costly, or difficult wars. Following the coding of Reiter and Stam (1998) I generate an interaction of a state's POLITYIV score and initiation variable.

While proponents of the democratic victory proposition suggest this advantage is owed to both selection effects and military effectiveness, I am primarily focused on selection effects in quantitative analysis. This is due to the work of Cochran and Long (2017), which demonstrates a lack of democratic military effectiveness when loss exchange ratio data is included in analysis of

outcomes. The question then is, are democracies superior in their selection of wars. Interaction effects are generated in several ways. First outcomes are recoded from the original COW coding (1 = initiator; 2 = target) to Stam's coding (*Initiator_2;* 0 = target; 1 = initiator). The first measure (*Poli_Init)* is generated by multiplying a PolityIV score and initiator dichotomous coding (*PolityIV*Initiator_2)*. Second, following Stam's non-monotonic politics and initiation interaction variable, recodes COW initiators (1 = target; 0 = initiator), then multiplies PolityIV and initiation, before transforming into *Poli_init_1* as $x^{-.5}$ (x=(poli_init+11)/10). Third, the variable is transformed into *poli_init_2* [$(x^{-.5})ln(x)$]. This creates a variable which with a median value at -10, decreasing as the score increases, until it rises again as PolityIV scores approach ten (see Reiter and Stam III 2002, Appendix 2.1).

Strategy

Strategy, as defined by Mearscheimer (1983), is "how a nation's armed forces are employed to achieve specific battlefield objectives" (28). Decision makers must choose *how* to do this effectively or pay the cost of failure. In this sense, "decision makers attempt to foresee the nature of the war" (28). Intuitively and by definition, strategy has a significant impact on the course and outcome of a war – and a number of studies have demonstrated this point (Mearscheimer 1983; Stam 1996; Reiter and Stam III 1998; 2002; Desch 2002; 2008 Bennett and Stam III 1998; Henderson and Bayer 2013). Strategy is an essential piece of the war outcomes puzzle. A state may have vast wealth, spend that wealth on military capability, and be in a relatively advantageous position, but if these elements are not deployed well, they are all for naught. This section will first detail, then operationalize strategy as it will be used in this dissertation.

This study codes three distinct strategies: *maneuver, attrition,* and *punishment*. While a strategy used in a given war is specific to that war, these three broad categories of strategy encompass the general spirit and direction of these choices – and are well represented in the literature (Mearscheimer 1983; Bennett and Stam III 1998; Reiter and Stam III 2002). These strategies are detailed, using definitions from Mearscheimer (1983) and Bennett and Stam (1998), below:

- Maneuver (M): this strategy makes use of both relative speed and mobility to defeat an opponent. Specifically, speed and mobility are used to disrupt an opponent's ability to organize their forces and resources (Bennett and Stam III 1998, 354). Maneuver strategies may seek to surround, encircle, or divide enemy forces with speed and position.[10]
- Attrition (A): this strategy seeks to erode and destroy an enemy's capacity to continue fighting. While maneuver strategies use speed to interrupt a state's ability to organize, attrition actively seeks to destroy and capture an opponent's forces. Attrition is further unique in that it seeks large-scale confrontation with enemy forces (Mearscheimer 1983, 34).[11]
- Punishment (P): this strategy seeks to force high costs on enemy forces – with or without tactical victories – to the point that continuing the conflict is not politically possible. That is, to make the choice of continuing to participate in the conflict so costly as to outweigh the benefit. Bennett and Stam (1998) note this seeks "the erosion of political resolve among elites or mass publics, or both" (354). This includes targeting primarily civilians.

In addition, doctrine is distinct from strategy. Whereas strategy is the plan for *how* a state seeks to meet their objectives, doctrine describes a state's goals and their general orientation toward reaching them. Doctrines can be, broadly, either offensive (O) or defensive (D). Taken in tandem, there are 18 possible doctrine-strategy combinations in warring dyads:

Table 2: Strategy-Doctrine Combinations

Initiator Doctrine	Initiator Strategy	Target Doctrine	Target Strategy	Code
Offensive	Maneuver	Defensive	Maneuver	*OMDM*

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[10] Maneuver strategies also include Fabian hit and run styled defenses, such as those employed by Mannerheim's Finnish forces during the 1939-40 Russo-Finnish War.

[11] Attrition is the modal strategy employed by states between 1816 and 2003

Offensive	Attrition	Defensive	Attrition	OADA#
Offensive	Punishment	Defensive	Punishment	OPDP#
Offensive	Maneuver	Defensive	Attrition	OMDA*
Offensive	Attrition	Defensive	Maneuver	OADM+
Offensive	Punishment	Defensive	Maneuver	OPDM*
Offensive	Maneuver	Defensive	Punishment	OMDP+
Offensive	Attrition	Defensive	Punishment	OADP+
Offensive	Punishment	Defensive	Attrition	OPDA*
Defensive	Maneuver	Offensive	Punishment	DMOP+
Defensive	Attrition	Offensive	Punishment	DAOP+
Defensive	Punishment	Offensive	Attrition	DPOA*
Defensive	Maneuver	Offensive	Attrition	DMOA*
Defensive	Attrition	Offensive	Attrition	DAOA#
Defensive	Punishment	Offensive	Maneuver	DPOM*
Defensive	Maneuver	Offensive	Maneuver	DMOM#
Defensive	Attrition	Offensive	Maneuver	DAOM+
Defensive	Punishment	Offensive	Punishment	DPOP#
*Strategic advantage for initiator	+ Strategic advantage for target	# No strategic advantage to initiator or target	Bennett and Stam 1998, 355	

I make use of doctrine and strategy data as compiled by Reiter and Stam (1998) and used in Bennett and Stam (1996; 1998), Reiter and Stam (2002) and Desch (2002). Doctrine data were synthesized from Dupuy and Dupuy (1986) and Holsti (1991). Maneuver, attrition, and punishment strategy classifications were synthesized from Dupuy (1983), Dupuy and Dupuy (1986), and Clodfelter (1992). When multiple strategies are employed in a conflict, the strategy which "absorbs the majority of the state's military assets" is used. If there is more than one state party to the conflict on a given side, the strategy of the state with larger capability is used (6). Given the incredible diversity of war, there are difficult cases which do not immediately 'fit' one of the three strategy categories. Bennett and Stam (1996) code the three cases disagreed upon by the above strategy sources (Germany in WWI, Germany against the U.S. and U.K. in WWII, and

Israel in the Yom Kippur War) in the modal strategy of attrition (247).[12] For the nineteen wars not included in Stam's strategy coding, I provide original strategy-doctrine coding following narrative descriptions by the COW (Sarkees and Wayman 2010a) and Clodfelter (Clodfelter 2017). The modal strategy of attrition was applied in difficult cases.

Loss Exchange Ratio

A loss exchange ratio (LER) details the ratios of losses between opponents in wars. Put simply, the deaths suffered by one side relative to the other. This calculation serves as measure of a state's military efficacy or the rate at which it incurs costs relative to the enemy. In bilateral wars, this calculation is particularly simple (State A battle deaths/State B battle deaths). It is a measure of the cost of war in blood. In multilateral wars, LERS have traditionally been more difficult to measure given the complexity of 'who is killing whom.' This is compounded in cases where non-state actors are major participants, such as the National Liberation Front (NLF) or Viet Cong in the Vietnam War. Introduced by Cochran and Long (2017), the *Loss Exchange Ratio Dataset* (*LERD)* is unique in its capture of this measure by using battle-level data to capture LERs in multilateral wars. This measure of efficacy is an important alternative to the problematic *HERO* and *CHASE* data used in previous studies on the democratic victory. Cochran and Long find that when LERs are included, democracies do not enjoy inherent advantages in war, thereby casting doubt on the military effectiveness thesis. I include LERs as provided by Cochran and Long. Given

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[12] I consciously exclude the 'leadership' variable(s) which are employed by the democratic victory literature. It is an important question and holds weight relative to the validity of the democratic victory but, simply put, the evidence presented by Stam and his coauthors is not convincing. Desch (2002) effectively dismantles it, showing major inconsistencies present in the leadership coding in the Combat History Analysis Study Effort (CHASE) and Historical Evaluation Research Organization (HERO; see Dupuy 1983 and its updates). Beyond this, Cochran and Long (2017) adequately express LERS as an alternative measure of effectiveness apart from CHASE and HERO data.

that the authors replicate Stam's work, I generate LERs for bilateral wars missing from the published data. In missing multilateral wars, the data is coded as missing. I then generate natural logs (*ln*) of LERs (*lnLER*) for use in my analysis.

Control Variables:

Coalition Capabilities

States with larger coalitions have an advantage in war (Gartner and Siverson 1996). Larger coalitions bring more to the table, be it material resources or troops, all while reducing cost to individual participants. Graham, et al. (2015) note that democracies are more likely to fight wars in relatively larger coalitions than nondemocracies. In this sense, the authors suggest democratic victory is the result of "quantity (not quality)" (2). They argue democracies are more likely to form coalitions because of their valence interests by nature of being jointly democratic; fighting for similarly 'democratic' motivation. More tangibly, they contend that the spoils of war are more easily divided among fellow democracies. The study's strongest example of a democratic coalition – the allies during World War Two, comprised of democratic Australia, Canada, New Zealand, and Britain in 1939 and later democratic America in December of 1941 – is deeply flawed. For one, the state which provided highest support in lives lost was the Soviet Union, a totalitarian regime. They, like the United States following Pearl Harbor and subsequent German declaration of war, joined the fight because it was pragmatic policy – that is, fighting against a state which had aggressed against them. Certainly the U.S. had engaged in material support for the British and Allied cause prior to 1941, but this can be equally explained by the basic premise of balance of power theory – states actively seek to correct perceived dangerous concentrations

of powers (Waltz 1979, 117-118). This would mean collaboration was an ad-hoc response to the distribution of power (Grieco 1993). Even if we do not assume this is balancing behavior resulting from a position of self-help, the U.S., Australia, New Zealand, and Canada's actions could potentially be explained by their history as British settler colonies (see Fails and Krieckhaus 2010 for a critique along similar lines of Acemoglu, et al. 2001).

Regardless of possible propensity of democracies to join coalitions, coalition size remains a proven corollary of victory – to the point that Graham et al. (2015) suggest coalition size "actually accounts for much of the empirical relationship between regime type and victory and, in many specifications, subsumes any direct effect of regime type on victory" (3). However, Graham et. al (2015) use a set of militarized interstate disputes (MIDs), as opposed to interstate wars – as a population of cases (Moaz 2005). These authors use MIDs of both low and moderate intensity (9). This is problematic because it implies that states join coalitions in relatively low intensity conflicts for the same reasons they do in high intensity conflicts. Presumably it is easier to participate in a low risk, low intensity MID than a war. Instead, I will use coalition data from the COW dataset. Relative alliance capabilities are calculated, following Stam's coding, by adding additional participants' CINC scores divided by total opponent capability (total side CINC score-unit of analysis state/total opponent capabilities).

Distance

Power decays over distance. Boulding (1963) suggests that the further a state is from the place it seeks to exercise its power, the weaker it will be. This occurs for a number of reasons: distance compounds organization and command problems, lowers morale, increases domestic

dissent, and weakens soldiers and equipment (Bueno de Mesquita 1981, 41). This may also exacerbate unfamiliarity with terrain, leading to less efficient strategy selection. Distance decreases morale and it is possible that this could have a more pronounced impact on democracies (under the assumption that there is a strong sense of the rule of law) in that the spoils of war are less accessible to soldiers. Put simply, as distance from a conflict increases, a state's efficiency in fighting there should decrease. There is some evidence to suggest that this effect in less pronounced in recent history. This would assume, as Boulding did, that innovation in transportation and air and missile capability have mitigated the loss of strength gradient (Boulding 1965). Martin (2016) suggests that today there *is not* a loss of strength gradient, but rather a "loss of time gradient" (91-101). Specifically, Martin suggests that with proper afloat-support logistics – and their speedy use – power is not lost with distance. On the contrary, Webb (2007) suggests that only with the use of forward-positioned bases can a state mitigate the loss of power by decreasing relative distance from a target. Both Webb (2007) and Martin (2015) have noticeable normative agendas: preserving American forward-positioned bases to more efficiently serve interventions and promoting policy beneficial to British afloat-support, respectively.

Regardless, recent history, such as the Argentine invasion of the British Falkland (Malvinas) Islands, seems to support the notion that distance still decreases the ability to bring power to bear on another actor and necessitates careful consideration in this dissertation. Major technological developments, especially in ocean transportation, likely mitigated some of the impact of oceans over time – if a state maintained a blue-water navy. The presence of oceans, regardless, is a permanent obstacle to power projection that has long been speculated to

decrease a state's ability to project power, to the point of dramatically shaping world political outcomes (Mahan 1890; Modelski 1987). I diverge from traditional coding of distance in the democratic victory literature. The majority of works measure distance between capitals. This is often a fine measure of power projection. However, in some cases, states project power to a front, which is either shared contiguously between states fighting or in a separate state all together. In these cases, I count distance in kilometers to this front. In cases where this is not possible, either because there are multiple fronts or the war is especially complex, I code distance by kilometers to capitals. Defending states, fighting in their own territory, are coded as 1 km.

Terrain

Like time, politics happen in place. More specifically, war happens in place and the place in which war occurs has a dramatic impact on the course, duration, and outcome of the conflict. Would Finland have been able to fight numerically superior Soviet forces in the Winter War to a LER .2:5.1 of without the aid of its remote and harsh landscape? Would Germany have been able to blitz through Belgium and France were the terrain not agreeable to such a strategy? Terrain impacts nearly every facet of a war. As Clausewitz (2007) states, "one cannot conceive of a regular army operating except in a definite space... Its [terrain's] importance is decisive in the highest degree, for it affects the operations of all forces, and at times entirely alters them." The influence of terrain "may be felt in the very smallest feature of the ground, but it can also dominate enormous areas" (56). The largest original source of data and novelty in this dissertation is in the introduction of new terrain data – as well as new *types* of terrain data – into

the question of war outcomes. Terrain data will act as a control variable, given that both parties to the war fight nominally in the same terrain. This variable should alter predictor variables – acting as a power multiplier, changing the efficacy of strategy, and the course of wars.

Recent work on war outcomes has addressed the importance of terrain. Reiter and Stam (1998; 2002) – and replicated by Henderson and Bayer (2013) – find that terrain has a substantial impact on the efficacy of certain strategies and, as a result, a war's outcome. These sources use *The New York Times Atlas of the World* (1983) to measure the "ruggedness" of terrain in a given war. While the authors confirm that increasingly rugged terrains lead to longer wars and benefit certain strategies, there exist doubts about the precision of these claims. This source is problematic for several reasons. First, the authors are flawed in their operationalization of "ruggedness." Reiter and Stam (1998) write:

> "Terrain codings come from New York Times Atlas of the World (1983) and correspond to the location of the majority of battles fought during a war (Dupuy and Dupuy 1986). We then scaled the terrain types to match the predicted movement times, using data from Dupuy (1979, 1983) that estimate movement speed over various terrains. In cases involving more than two actors on one side, we used the average of terrain scores weighted by the size of the forces fighting in particular terrain. The final terrain index ranges from 0.3 to 1.2; 1.0 corresponds to the speed at which vehicles and troops can move on open rolling terrain, similar to the plains of Eastern Europe. Higher scores correspond to desert areas with flat, hard-packed surfaces. A score close to 0.3 indicates very difficult movement for vehicles, such as rugged mountains and dense jungles. (Reiter and Stam 1998, 382)

These authors confuse the concepts of "ruggedness" with "cover type." In part, this is a problem of the technical jargon of various fields and a lack of communication between the fields of political science and geography, but the failure to operationalize the term ruggedness leaves the term confused. The authors use ruggedness to imply trafficability – again without considering the use of that concept in military studies and without explicit definition of the term. Trafficability

is the ease of traversing a land cover type – with certain types being easier to traverse than others (Engineers 1961). Hard pact covers, such as the lightly undulating hills and plains of Eastern Europe, are more trafficable than the jungles of Vietnam. There is no doubt this measure is important to war outcomes but Reiter and Stam's (1998) treatment of cover is limited in its examination of this important correlate of war outcomes.

These authors use landscape categories as defined by (Dupuy and Dupuy 1986) then code terrain by war using the New York Times *Atlas of the World* (1983) – which is primarily published for a popular audience, with an emphasis on visual and aesthetic representation of land cover classes. Second, the data is outdated to a fault. That is not to suggest that there have been major changes in terrain – although in some ways there certainly have – but in the some thirty-five years since publication, major advances in *Geographic Information Systems* have transformed our capacity for measuring terrain. In this sense, previous authors treatment of terrain may have been appropriate for the time but it is far behind the times today. As such, I will include not only additional measures beyond land cover classes but substantially more detailed and accurate data. These variables will include a *terrain roughness index (TRI)* and *trafficability*. Put simply, these measures will serve as a proxy for how easy it is to move across a defined space.

In landscapes with high scores on the *TRI* and low trafficability, I predict that strategies which lead to more decisive wars (namely maneuver) will be less effective. This may also mitigate certain advantages in asymmetrical wars, aiding the weaker state. This gives armies the chance to hide or limit exposure while facing strong opponents. These novel data demonstrate that Stam's terrain coding does not adequately capture terrain. While there is a significant linear correlation between Stam's terrain variable and this study's trafficability variable, the

relationship is very weak (not shown). There is no significant relationship between elevation and Stam's terrain variable. This implies that Stam's terrain variable fails to account for elevation ruggedness and may be inaccurate in its treatment of land cover as reported in the studies which employ this measure.

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The geographic assessments of ruggedness and trafficability, which enable the quantitative measurements of discrete regions on the earth's surface (in this case, within spatial extents derived from a variety of sources), are grounded in the field of geographic information science and spatial analysis. In the context of geographic information science, spatial analysis refers to the mathematical, statistical, and geometric techniques that can be utilized to assess spatially explicit data. Bunge's *Theoretical Geography* (Bunge 1966) effectively codified spatial analysis as a field of study in and of itself, and since then, the broader field of geographic information science has grown rapidly as authors such as Goodchild (1987) and Mark (2003) have continued to provide a theoretical framework for the assessment of spatial data. Technological advancements allow for massive amounts of spatial data to be processed and analyzed rapidly using cutting edge computer systems and increasingly allow for complex analyses of localized areas or broader assessments on continental or global scales. For the purposes of this project, this includes the assessment of global elevation and land cover data derived from satellite borne optical and radar sensors and their analysis within a Geographic Information System for spatial extents determined through cartographical representations of historical and narrative descriptions of interstate wars.

Spatial extent can be taken to mean the boundaries of a conflict as determined by political and military actors during the conflict and estimated by cartographers after the event – or more simply, where a war is fought. The first challenge in collecting this data is determining where a

war was fought – as well as where it was not fought. Wars are spatially limited affairs with relatively clear boundaries. The nature of sovereignty in interstate war suggests that there are maximum boundaries of conflicts at or near the borders of non-participant states. In this sense, interstate wars almost universally take place within participant borders. Thus, determining spatial extent begins by determining war participants as coded by the COW. War entails combat, movement of armed forces, as well as positioning and repositioning in light of opposing movement. Combat occurs in fixed locations (battles, skirmishes, etc.) but movement between these points is essential to the outcomes of wars. Combat locations and lines of movement then establish the minimum boundaries of a given war.

To determine spatial extent, I first turned to narrative descriptions found in Sarkees and Wayman (2010), as well as Clodfelter (2017) and Dupuy and Dupuy (1986), to determine the general course of the war – including major battles and campaigns. Secondly, I compiled a range of maps detailing these battles and campaigns, as well as the general course of troop movements. This task was complicated by the diversity of quality in these sources – largely a result of the historical nature of these conflicts. Whenever possible, I use academic or professional sources. When such sources were unavailable, I turned to open-source maps hosted on Wikimedia or elsewhere. For every map, I ensure that the cartographical representation fits the COW narrative as well as Clodfelter (Clodfelter 2017) and Dupuy and Dupuy (1993).

The maps, while usually in digital form, were not spatially enabled to allow for analysis within GIS software. Therefore, the maps were then georeferenced (associating the maps with geographic coordinates) using Quantum Geographic Information System (*QGIS*) software and open-source satellite global images provided by Google. The Google satellite image collection,

like nearly all web-mapping services, uses a pseudo-Mercator projection (WGS 84: EPSG 3857), so the gathered maps were all transformed to that coordinate system. Maps were georeferenced using ground control points (GCP) referencing either cities or prominent landscape features (such as peninsulas, volcanoes, bays, etc.) then transformed using linear or polynomial transformations. Then, using these georeferenced versions of the source data, I create vectorized-polygons in shapefile format representing war extent. This was done by manually digitizing the boundaries that encapsulated the extent of military activities for each war. This process was repeated for all 94 wars in the COW population, as well as the various disaggregated versions; bringing the total count of these shapefiles to 105. The polygon for the First Central American War was also used for the Third Central American War given a lack of cartographical representations and a similar spatial narrative by the COW. In generating these files, I made the decision to act conservatively in the spatial extent of wars – erring on the side of smaller extents, rather than larger, more inclusive extents. On only one polygon is a pure estimate informed by the COW narrative: The Nomohan War.[13] These polygons (or groups of polygons in some cases), each representative of a single war's spatial extent, were then used to generate topographic and landscape heterogeneity metrics. To compile trafficability data, I first transformed shapefiles from EPSG 3857 to EPSG 4326 to match the input land cover data.

The Terrain Ruggedness Index (TRI; Riley, DeGloria, and Elliot 1999) provides a relative measure of an area's ruggedness, and as such, was used to measure topographic heterogeneity for this research. Digital elevation models (DEMs) are the only requisite input data for calculating

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[13] This conflict is likely exaggerated by spatial extent, as the war was generally limited to a single engagement at Nomohan. Thus, the spatial extent of this conflict should be taken with some caution. However, elevation and land cover data is reliable in the sense that the surrounding region shares a relatively homogenous terrain.

TRI. DEMs are available from numerous sources at a wide range of resolutions. For our purposes,

where measuring relative terrain ruggedness on a large scale was the primary goal, high

resolution datasets were not required. Therefore, I use the Global Multi-resolution Terrain

Elevation Data 2010 (*GMTED2010*) – jointly produced by the National Geospatial Intelligence

Agency (NGA) and the United States Geological Survey (USGS). In this dataset, elevation data is

presented globally in one square kilometer pixels, with height relative to sea level in meters

(Danielson and Gesch 2011). Although the elevation data is recent and not modelled to be

concurrent with the historical cases presented here, it was deemed acceptable for analysis due

to the relatively slow nature of changes in topography. While natural catastrophes and sea level

change may alter the landscape quickly, those changes are unlikely to manifest as noticeable

discrepancies in coarse resolution elevation data, and I assume that the GMTED2010 dataset is

representative of the landscape for the time range under analysis. TRI for each pixel is calculated

by measuring the difference in elevation between it and its eight adjacent neighbor pixels. These

differences are then squared and averaged, with the square root of this value producing a TRI

(Riley, DeGloria, and Elliot 1999, 25). Once the global TRI dataset was processed I compiled

statistics for each war extent polygon, including total area, mean TRI*,* minimum TRI, maximum

TRI, and TRI standard deviation. These data measure ruggedness presented in one square

kilometer sections (~30 arc second resolution) of each war in the COW dataset. The primary

variable of interest is the mean TRI of a given war but variations are also presented in TRI

minimum values, TRI maximum values, and TRI standard deviations. Mean TRI data is also

presented as a categorical variable following Riley, DeGloria, and Elliot (1999): 1) level (0-80 m),

2) nearly level (81-116 m), 3) slightly rugged (117-161 m), 4) intermediately rugged (162-239 m),

5) moderately rugged (240-497 m), 6) highly rugged (498-958 m), and 7) extremely rugged (959-4367 m). No wars occur in the extremely rugged TRI category.

The second terrain variable, trafficability, measures the cost of traveling over a given space. Trafficability, in the spirit of Clausewitz, will be a literal measure of the 'nature of the ground'. This variable is calculated using the *HYDE 3.1 spatially explicit database of human-induced global land-use change over the past 12,000 years* database (Goldewijk, et al. 2011)*. HYDE* details land use trends from 1770 to 2010. It presents twenty-eight landscape classes for the entire planet for each year, using recent moderate resolution remote sensing data to calculate a baseline and hindcasting land use and land cover changes based on a variety of historical sources. *HYDE* data is presented at a .5-degree resolution (~55 km^2), with a percentage of area covered for each of the twenty-eight land classes for each .5-degree grid cell. Although the spatial resolution is significantly lower than that of the elevation data, the HYDE data was selected because of its high temporal resolution. Using higher resolution data (such as *GlobCover*) would provide only a single snapshot of current or recent land cover and would not consider the vast anthropogenic changes that have altered the landscape over past two centuries. I use the war extent polygons to select each .5-degree grid cell that falls within, and calculate the average percentage for each of the 28 land cover classes in each war. I then further collapse classes into two broad categories for this study: trafficable and non-trafficable. Trafficable classes are cover types which can be easily traversed, such as hard pact terrains, plains, tundra, and cropland. Non-traversable classes are cover types which are difficult to traverse, such as forests, dense shrublands, and water. Land cover trafficability coding follows *HERO* coding (Dupuy 1983). For multiyear wars, I select *HYDE* data from the first year of the war.

Table 3: Trafficability and Landcover Classes from HYDE Data

Land Cover Type	Trafficable	Non-Trafficable
Tropical Evergreen Broadleaf Forest	0	1
Tropical Deciduous Broadleaf Forest	0	1
Temperate Evergreen Broadleaf Forest	0	1
Temperate needleleaf Forest	0	1
Temperate Deciduous Broadleaf Forest	0	1
Boreal Evergreen Needleleaf Forest	0	1
Boreal Deciduous Needleleaf Forest	0	1
Savanna	1	0
C3 Grassland/Steppe	1	0
C4 Grassland/Steppe	1	0
Dense Shrubland	0	1
Open Shrubland	1	0
Tundra	1	0
Desert	1	0
Polar Desert/Rock/Ice	0	1
Secondary Tropical Evergreen Broadleaf Forest	0	1
Secondary Tropical Deciduous Broadleaf Forest	0	1
Secondary Temperate Evergreen Broadleaf Forest	0	1
Secondary Temperate Evergreen Needleleaf Forest	0	1
Secondary Temperate Deciduous Broadleaf Forest	0	1
Secondary Boreal Evergreen Needleleaf Forest	0	1
Secondary Boreal Deciduous Needleleaf Forest	0	1
Water/Rivers	0*	1
C3 Cropland	1	0
C4 Cropland	1	0
C3 Pastureland	1	0
C4 Pastureland	1	0
Urban land	0	1
*coded as trafficable during Russo-Finnish War given winter conditions Goldewijk, Kees Klein, Arthur Beusen, Gerard van Drecht, and Martine de Vos. 2011. "The Hyde 3.1 Spatially Explicit Database of Human-Induced Global Land-Use Change over the Past 12,000 Years." *Global Ecology and Biogeography* 20: 73-86.	11	17

Time

Politics is necessarily temporal. Pierson (2004) effectively illustrates this point with an allegorical 'social sciences kitchen'. This restaurant boasts only the finest ingredients and the most nuanced methods of measurement. It does not, however, place any stock in when the 'perfect' and painstakingly measured ingredients are combined, in what order, and over which period of time. All too often, political scientists have committed similar sins. Given that science seeks theory which approaches law, there is temptation to engage in the ahistorical; to make the assertion that when the necessary conditions exist, regardless of temporal setting or even place, that the expected outcome will occur. That A will always lead to B. That democracies will never go to war against democracies. The neorealist paradigm itself is often subject to this basic criticism – although Buzan, et al. (1993) effectively speak to the use of historical evidence by structural realism. Specifically, the authors note realism looks to history to identify moments of continuity – for instance, imperialism – as evidence of the static international system and its continued consequences. Buzan, et al. write, "the structure of the system is so powerful that it will generate common patterns of behavior among very different types of units," (87) while Waltz (1990) concludes "the logic of anarchy obtains whether the system is composed of tribes, nations, oligopolistic firms or street gangs" (37).

Similarly, the effects proposed by democratic victory proponents that democracy has on war outcomes should occur whenever and wherever democracy occurs. In this sense, whenever two states meet in a fair fight and all else is equal – assuming one state is democratic and the other is not – the democracy should hold an advantage. This advantage should hold regardless of *when* war occurs. Specifically, it should hold whenever an elected executive fears retribution in the court of public opinion – therefore such executives would more cautiously select their wars

– and whenever democratic soldiers enjoy the advantages of superior leadership and initiative concomitant to democratic societies. Time should be largely irrelevant because folly is constrained through democratic institutions.

This dissertation considers time to be a central element of the outcomes puzzle, with both selection effects and military effectiveness in mind. If both benefits are tied to regime type and the notion that democracies are functionally differentiated units, time *should not* strongly influence democratic war outcomes. However, there is just reason to be skeptical. The modes of warfare itself evolved dramatically over the course of the 19th and 20th centuries. The engines of war, once driven by horses and black powder, are now highly mechanized and even autonomatized. I predict that these changes likely have a profound impact on soldiers and their efficacy – certainly more than the supposed benefits wrought by participation in a democratic army. Cannons ended the castle. Barbed wire and the machine gun ended the cavalry charge. Tanks rolled over trenches. Each development dramatically changed the way soldiers fight wars. What made the three most effective militaries of the twentieth century – Imperial Germany (WWI), Nazi Germany (WWII), and democratic Israel (1948-1973) – so successful? I hypothesize the temporal setting is essential to understanding the battlefield effectiveness – more specifically, temporal setting in relation to terrain and strategy choices. This is not to say that war itself fundamentally changes. As Alfred Thayer Mahan (1890) wrote at the turn of the 20th century, "when the march on foot was replaced by carrying troops in coaches, when the latter in turn gave place to railroads, the scale of distances was increased, or, if you will, the scale of time diminished; but the principles which dictated the point at which the army should be

concentrated, the direction in which it should move, the part of the enemy's position which it should assail, the protection of communications, were not altered" (Introduction).

Time, as operationalized here, is a component, even if in a limited sense, of the CINC data. More specifically, the unequal effects of time are a component of the CINC data. States generally have an unequal access to the benefits of changing technology in war. Whereas one state quickly deployed tanks, another may not have (or did not have the capability to do so). These effects are pronounced in various conflicts, especially in those surrounding the introduction of period-defining weaponry. In 1934, the Saudis engaged the Yemeni with tanks in a foreshadowing of mismatches to come across WWII – with the Italians using armor against foot soldiers in Greece, Germany in Poland, Russia in Finland, among other cases. Given this, I do not include further tests of time in quantitative data (preliminary tests yield statistically insignificant results – not shown) beyond CINC data. These points are considered in qualitative analysis in chapter four. Broadly, I consider three distinct periods of time as they relate to military effectiveness: 1816-1869, 1870-1938, 1939-2003 as informed by Clodfelter (2017) and Dupuy and Dupuy (1993). These periods are limited to available data on war, namely *Correlates of War* data, but offer an interesting test of the impact of the weapons and technology of war on the strategies used therein. While further explained in the section *strategy*, the claim here is not that time (i.e. temporal modes of war) determines strategy used, but rather efficacy of a given strategy vis-à-vis terrain. Each period has a unique *modus operandi* in the form of a combination of weapons and mobility. While the dominant tool(s) always have some showing prior to the period of its dominance (i.e. the tank in WWI, dominant in WWII), these periods mark a major war which were altered by a new mode of war (start of data → Franco-Prussian War →World War II → end of data). The first period (1816-

1869) was dominated by the muzzle-loading flintlock rifle and horse-drawn cannon. The second (1870-1935) saw the widespread adoption of the breech loaded, smokeless cartridge and new actions (both of which saw limited action in previous conflicts); with the influx of the railroad providing rapid troop movement. Additional developments in this period include the machine gun and barbed wire– which effectively castrated the cavalry change. The third period (1936-2003) ironically saw the greatest leaps in military technology, including the development of the nuclear bomb, but has largely been static in its mode of war. The greatest development of this period, arguably, is the tank (see Mearscheimer 1983, chapter 2).

I will make the conscious decision to largely disregard the possession of nuclear weapons. While there is no doubt of the destructive capabilities associated with nuclear weapons, the third time-period (1939-2003) only saw the use of nuclear weapons twice: at Hiroshima and Nagasaki on August 6th and 9th of 1945, respectively. During this period, only one war, the 1999 *Kargil War,* occurred between a nuclear dyad. Several schools of thought have developed surrounding the use of nuclear weapons in war. The first, nuclear revolution – as best represented in the work of Waltz (1983) – contends that the nature of nuclear weapons has ended war among their possessors. That is, the sheer destructive capability of nuclear weapons raises the cost of a nuclear war to the point that no actor would dare enter such a war. No state would readily commit such inevitable suicide. The second, nuclear irrelevance – detailed at length by Mueller (1988) – suggests that the unbearable cost of using nuclear weapons *en masse* against major population centers (and an equally unbearable second strike) makes their possession largely irrelevant. Their irrelevance dictates that the conventional balance of power remains the primary consideration – even if nuclear weapons are used tactically on the battlefield. The final school,

roughly labeled crisis escalation, risk manipulation, and limited war – exemplified in the work of Geller (1990) and, more recently, Powell (2015) – contends that nuclear dyads use the risks associated with nuclear weapons to manipulate their interactions. Consequently, these dyads accelerate crisis quicker than other dyads, short of war (or to the point of limited war or MIDs). While these schools of thought offer a rich vein of important debate, they primarily address the prospects of war occurrence as opposed to war outcomes. Beyond the *Kargil War*, no nuclear dyad has gone to war during the period in question. Further, the possession of nuclear weapons has not prevented or necessarily changed the course of wars between asymmetrical dyads – in that wars still occurred in Korea, Hungary, Vietnam, the Falklands, Afghanistan, and Iraq and were fought with conventional arms, tactics, and strategies. The use of nuclear weapons, including their tactical use on the battlefield, would be transformative and necessitate a new period of study and, until that happens, it is not necessary to include nuclear weapons in this study.

Interaction Variables:

Terrain Interactions

I predict that specific strategies will be more effective in certain terrains. Given the fallibility of military and political leadership, states will, at times, choose a poor strategy for a given terrain. Over the course of the two hundred years of this study, this error will no doubt repeat itself numerous times. However, if democratic soldiers are indeed more effective soldiers, their efficacy should mitigate some of the effects of a poor strategy. This may be impossible to isolate, given that when a democracy is successful in a war while using an appropriate strategy, it may appear to be caused by democratic effectiveness. It can only be tested if democracies tend to win war in strategy combinations that are not as effective for nondemocracies. Regardless, to

test the efficacy of a given strategy in a specific terrain – efficacy being the ability to bring the war to a preferred conclusion – I interact strategy and terrain variables. Interactions all become increasing costly to traverse as the score increases. This is achieved by using percent non-trafficable (*Ntraff*), terrain ruggedness (*TRI*), and spatial extent (*area*). I will then, like Bennett and Stam (1998), rank strategies by presumed speed, before interacting strategy and terrain. I reverse the ranking of Stam's strategy scale, with the strategies pairs the most dependent on movement ranked at 1 and the least movement dependent strategies ranked at 9. Attrition-attrition pairs are ranked at 5 and are the model score.

Chapter 3: Capabilities, Democracy, and Interstate War Outcomes

"Once the belligerents are no longer mere conceptions, but individual States and Governments, once the War is no longer an ideal, but a definite substantial procedure, then the reality will furnish the data to compute the unknown quantities which are required to be found." Clausewitz, On War

No question has received more attention in international relations than "why do states go to war?" A fraction of that work has addressed the question war outcomes. This chapter asks, "why do states win, lose, or draw wars?" While this question is the natural dovetail of the first, answers are hard to come by. Largely, this reflects the complexity of war. Whereas a relatively low amount of information is needed to construct basic models of war occurrence, the complexity of war calls for substantially more information to study outcomes. The goal of political science – the development of general theory approaching law (no small feat in the social sciences) to explain political behavior – is difficult to realize in such a complex process. War is both rare and each war is arguably a unique affair. There are moments where the bravery of a few people or a fluke event like an avalanche or flood might dramatically change the course of a battle and even a war. Few general political phenomena are so challenging to study. With such complex topics, science needs a framework through which to frame a response. This framework came with the crystallization of new paradigms in international relations thought, in the form of neorealism and neoliberalism in the 1980s.

Specifically, neoliberalism suggest that democracies are functionally differentiated units. There is then an answer provided by this paradigm: if democracies conduct themselves differently in the course of war, then there should be a predictable difference in outcomes when democracies are involved. Beginning with Lake (Lake 1992) and taking final form in the works of Stam (1996), Bennett and Stam (Bennett and Stam III 1996), and Reiter and Stam (1998; 2002),

this difference is articulated in the democratic victory proposition. The democratic victory proposes that democracies are more likely to win their wars by virtue of being democratic, explained by two points: selection effects and battlefield effectiveness. The selection effects hypothesis suggests that democratic leadership is more effective in choosing interstate wars – only choosing wars which they are likely to win, and win quickly given the fear of electoral retribution and the court of public opinion. The battlefield effectiveness hypothesis suggests that, on the battlefield, democratic soldiers and leadership are superior on the basis of individualism, leadership, and organization.

This chapter responds to the democratic victory proposition with a test of realist and liberal models using multinomial logistic regression. The democratic victory is part of two larger questions. First, the most basic, what predicts interstate war outcomes? The second, a paradigmatic question, does liberalism provide a superior explanation of the complexity of interstate war? Given this, my answer is part of a larger polemic on the nature of international relations. Theoretically, I suggest that power is the primary predictor of war outcomes. Power is applied via strategy but ultimately hinges on the translation of applied power in place – which is physically defined by the terrain of a given space and given meaning by the peoples and politics in this space. As there is little evidence to suggest that democracies are superior in their selection of wars by terrain – or selection of strategy by terrain – then democracy has little to do with war outcomes. The empirical evidence confirms the first point, that power is the primary predictor of war outcomes. This point is largely a valence characteristic among paradigms, however the reasons for this shared position vary. Realism suggests that power is the primary consideration in predicting international political outcomes as both anarchy and unit functional homogeneity

are constant. States then enter contests with varying levels of power, measured by capabilities.
If power is the ability to realize outcomes, then states with more power are more likely to win
wars. Capability, however, does not always translate into power and is affected by its application
(strategy) and the factors which impact its application (terrain). Neoliberalism shares these
positions but suggest that democracies are functionally differentiated units in anarchy, and
therefore, respond to international anarchy differently. In this sense, liberalism and the
democratic victory suggest democracies are more effective in the exercise and the application of
capabilities – meaning they are more powerful.

My work finds a complex relationship between democracy and interstate war but
suggests that democracy is not endogenous to the effective exercise of power. Of course, there
is never a clean answer in such a challenging topic. Democracy, represented by *POLITY IV* data
(Marshall, et al. 2013), remains predictive of war outcomes when all wars and states are
considered. However, the removal of three wars, Israel's 1948, 1967, and 1973 victories, render
POLITY IV insignificant. Even when these wars are considered, there are issues in the
operationalization of democracy which make the answer unclear. The inclusion of loss exchange
ratios, following Cochran and Long (2017) render democracy measures insignificant. Regardless,
my work calls the democratic victory into question because I find little support for selection
effects and LERs suggest that democracies are no more effective on the battlefield. If democracy
predicts victory, it does not cause it. While not falsified, inconsistencies in the democratic victory
suggest that either novel methods of study and data are necessary in support of the proposition
or, at an extreme, dismissal of the proposition is necessary. The subsequent chapter on the role

of strategy and terrain in war suggests the latter as I find no support for the selection of appropriate strategy for various terrains by regime type.

Competing Conceptions of War Outcomes

Democracy and War

The democratic victory proposition is predicated on the basis of democracies winning a sizably higher proportion of their wars. Stam (1996), Reiter and Stam (1998; 2002), and Bennett and Stam (1996) suggest democracies win around 80 percent of their wars. This is only conditionally true. In a binary classification of wars, democracies are indeed this successful. However, when draws and transformations are considered, that number falls to around 60%. This still suggests that democracies are more likely to win wars, and even more so, are less likely to lose wars.[14] Given either that democracy itself is a relatively modern feature of regime types or the monadic democratic peace proposition[15], democracies have fought a smaller number of wars (50 of 131 states participating in wars between 1816-2003 or 38%). These proportions hold when alternative classifications of democracy are considered, including the *Lexical Index of Democracy* or *LEID* (Skaaning, et al. 2015), *the Dichotomous Coding of Democracy* (Boix, et al. 2014), and the most novel source, *Varieties of Democracy* or *V-Dem* (Coppedge, et al. 2016)[16]

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[14] At least in the sense of outright defeat. Transformations may denote victory against one opponent, but certainly the American experience in Afghanistan and Iraq suggest that victory against a very durable insurgency is fleeting. Still, the American's have not been defeated either.

[15] There is overall little support for the monadic peace but Rummel (1995) strongly maintained this position. Rummel's work does suggest that democracies, or liberal states, are certainly more peaceful in their interactions with their own populace. Democide is rare amongst these actors, at least compared to the massive death toll in twentieth century totalitarian states (Rummel 1994).

[16] Tables here include aggregated WWI, WWII, and Vietnam, as well as the Naval War, Taiwan Straits War, Off-Shore Islands War, and Kosovo War.

Table 4: War Outcomes by Regime Type

Marshall et al, 2013	Win		Lose		Draw/Stalemate		Transform		Total	
Democracies (+6-+10)	50	*63.3%*	8	*10.1%*	12	*15.2%*	9	*11.3%*	79	*100%*
Anocracies (-5 - +5)	32	*39%*	40	*48.8%*	8	*9.8%*	2	*2.4%*	82	*100%*
Autocracies (-10 - -6)	49	*39.2%*	51	*40.8%*	13	*10.4%*	12	*9.6%*	125	*100%*
All regimes	131	*45.8%*	99	*34.6%*	33	*11.5%*	23	*8%*	286	*337 wars/countries (1816-2003)*

Skanning, et al, 2016	Win		Lose		Draw/Stalemate		Transform		Total	
Democracy (4-6)	53	*58.9%*	11	*12.2%*	15	*16.7%*	11	*12.2%*	90	*100%*
Autocracy (0 - 3)	96	*39.2%*	112	*45.7%*	22	*9%*	15	*6.1%*	245	*100%*
All regimes	149	*44.5%*	123	*36.7%*	37	*11%*	26	*7.8%*	335	*337 wars/countries (1816-2003)*

Boix, et al, 2014	Win		Lose		Draw/Stalemate		Transform		Total	
Democracy (1)	52	*61.18%*	10	*11.8%*	13	*15.29%*	10	*11.76%*	85	*100%*
Autocracy (0)	100	*40.3%*	106	*42.7%*	21	*8.5%*	21	*8.5%*	248	*100%*
All regimes	152	*45.7%*	116	*34.8%*	34	*10.2%*	31	*9.3%*	333	*337 wars/countries (1816-2003)*

Coppedge et al, 2017	Win		Lose		Draw/Stalemate		Transform		Total	
Democracy (.75-1.0)	36	*60%*	6	*10%*	9	*15%*	9	*15%*	60	*100%*
Ambivalent (.5)	8	*50%*	3	*18.8%*	5	*31.2%*	0	*0%*	16	*100%*
Autocracy (0 - .25)	63	*37.5%*	69	*41.1%*	20	*11.9%*	16	*9.5%*	168	*100%*
All regimes	107	*43.9%*	78	*32%*	34	*13.9%*	25	*10.2%*	244	*253 wars/countries (1900-2003)*

There are inherent problems in quantifying and classifying regime types. Regime types can be categorized into broadly comparable classes but, as Marshall, et. al. (2013) readily note, these classes are a diverse lot. A one-point increase, say from 2 to 3, is not necessarily the same as an increase from 3 to 4. The threshold for democracy, at 5, covers a wide range of individual governments and types of governments. There is a loss of the local and peculiar when using such data. This may be unavoidable and *POLITY* certainly serves as the standard for the field. However, alternative classifications of democracy suggest equally viable answers to hard cases. Taking the three alternatives listed above, there are a combined 31 discrepant cases from *Polity*. Foregoing *Polity* given this is akin to "throwing the baby out with the bathwater," but there is at least reason to doubt that *Polity* gets every case "right." This is especially important when every case matters given the small number of wars and the even smaller number of wars involving democracies.

This is not an indictment of *POLITY* nor an endorsement of alternatives but this a major cause for concern in the democratic victory proposition. Detailed below, the removal of just three wars, the Arab-Israeli War of 1948, Six-Day war of 1967, and Yom Kippur War of 1973 render democracy insignificant in the prediction of war outcomes. The democratic victory is then predicated not on democracy but on three wars fought by one democracy – a democracy which

has been alternatively conceptualized in 1948 by Coppedge, et al. (2016) and is problematic in

Polity IV as Israel was invaded on the date of *COW* system membership, meaning its infant quasi-

democratic features had little to with victory.[17] Given this, the democratic victory is predicated

on two wars fought by one democracy. This is hardly a position of strength upon which to build

such a bold theory. If we take further caveats to the democratic victory, presented by its

proponents, the position is even weaker. Bennett and Stam (1998) suggest democracies assumed

advantages are fleeting over time.[18] Taken together and at face value, the democratic victory is

a provocative theory, predicated on second image paradigmatic assumptions in neoliberalism,

that is overly dependent on a very small number of cases and on one actor (Israel).

Table 5: Discrepant Cases from POLITY IV

Discrepant from POLITY IV	Year & War (Year at Close of War)	*VDEM*	*Dichot.*	*LEID*	Total Cases
France	1871 – Franco-Prussian	NA	0	1	1
United Kingdom	1900 – Boxer Rebellion	1	0	0	2
France	1900 – Boxer Rebellion	1	0	0	3
United States	1900 – Boxer Rebellion	1	0	0	4
Greece	1913 – First Balkan	1	0	1	6
Greece	1913 – Second Balkan	1	0	1	8
Portugal	1917 – World War I	1	0	0	9
Belgium	1917 – World War I	1	0	0	10
France	1917 – World War I	1	0	0	11
United States	1917 – World War I	1	0	0	12
Germany	1919 – Latvian Liberation	1	0	0	13
Lithuania	1919 – Lithuanian-Polish	1	1	1	16
Finland	1940 –Russo-Finnish	1	0	0	17
Finland	1945 – World War II	1	0	0	18
South Africa	1945 – World War II	0	0	1	19
India	1949 – First Kashmir	1	0	0	20
Israel*	1948 – Arab-Israeli	1	0	0	21
Greece	1953 – Korean	0	1	1	23

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[17] This point is further explored in Chapter four.
[18] This proposition is not tested in this study but warrants further research. The authors disaggregate each war by year and using multinomial logistic regression, test a dependent variable of win, lose, draw, or continue.

Philippines	1953 – Korean	1	0	0	24
Cyprus	1974 – Turko-Cypriot	1	1	1	27
South Africa	1976 – War over Angola	0	0	1	28
Croatia	1992 – Bosnian Independence	0	0	1	29
Armenia	1993 - Azeri-Armenian	0	1	1	31
		17 **Cases**	**4** **Cases**	**10** **Cases**	**31** **Cases**

Power and War Outcomes

Generally dubbed the realist model, or democratic pessimism by Desch (2002), an alternative model to the democratic victory conceives of capabilities as the primary consideration in determining war outcomes. The democratic victory itself does not discount the structural role of capabilities, but rather suggests that democracies are superior in realizing power. Again, the democratic victory is a second image explanation. The realist model suggests that power itself is a component of the system structure. Concomitant to disparities in the distribution of power, states vary in their efficacy of fulfilling state functions. However, there is no element of structural realist theory which suggests that one regime type - which can be taken as the domestic distribution of power and regular channels of exercising political power within a state – are superior in either accumulating power vis-à-vis their system peers or exercising that power. Taken from comparative politics, theorists have posited that this efficiency is an endogenous source of democracy (Lipset 1959). This work has proven empirically problematic. Rather, modernization seems to support regime stability, regardless of regime type (Przeworski and Limongi 1997). This also appears to be the case beyond modernization, including wealth – especially non-tax revenue (Ross 1999; Dunning 2008; Morrison 2009; Morrison 2015). Given this combination, we can assume a general exogeneity of wealth and capabilities to regime type, as well as the exercise of these elements as it relates to regime type.

Still, realism does not enjoy a concise theory of war outcomes. The greatest example of a realist model of war outcomes, in Clausewitz's *On War* (1832), is a first image explanation of international relations. A reasonable assessment of this stems from the core assumptions of structural realism. Waltz (1979) presents three essential elements of the system structure: constant anarchy and unit functional homogeneity, and variable distribution of capabilities. As the distribution of capabilities is the sole variable in this conception, changes in this distribution act as the primary predictor of international political events. It would be fair to apply this to war outcomes, i.e. more capable states are increasingly likely to win wars. Substantial discrepant evidence calls the universality of this into question. Weaker states often win wars or fare better than anticipated. Indeed, there are some 22 wars where grossly mismatched states achieve victory in war against powerful opponents. Meaning, not only do to the weak win, but the strong lose. To square this circle, I suggest lessons in classical realism are broadly applicable to neorealism's third image position.

Clausewitz's theory of war, in its simplest form, suggests the following. To achieve a desired end (victory), actors apply means (capabilities). These ends are political goals and the entire act of war is itself an extension of political intercourse by alternative means. These means can be taken broadly as the application of power. While this is somewhat tautological, if power is defined as the ability to what one wants, the second element of Clausewitz's theory suggests a deeper meaning. Power is realized through the application of means (capabilities) and quantifiably so. Clausewitz suggests a series of elements impact the application of the means. Clausewitz writes, "If we desire to defeat the enemy, we must proportion our efforts to his powers of resistance. This is expressed by the product of two factors which cannot be separated,

namely, the sum of available means and the strength of the Will" (Clausewitz 2007). This presents

both a third image and first image explanation. The first image explanation, will, is abstract but

may be best simplified into two categories: a combination of leadership and individual resolve,

and strategy. The former is likely unquantifiable, beyond being especially reductionist. Attempts

to quantify leadership variables and will, notably the Combat History Analysis Study Effort

(*CHASE)* and Historical Evaluation and Research Organization (*HERO*) datasets, are highly

inconsistent and largely fail in the pursuit of replicability (Desch 2002, 38-39).[19] Strategy,

however, has room in third image explanations – albeit imperfectly. Structure, seen in an unequal

distribution of capability, shapes and limits agency in war by the capabilities available to a warring

party.

A common criticism of neorealism reads that it is overly deterministic and ahistorical,

overlooking the role of agency. Yet constructivist approaches to neorealism effectively preempt

this criticism. The most famous example rests in Walt's (1987) balance of threat theory. Departing

from Waltz's initial approach to balance of power, that states respond to dangerous

concentrations of power on the basis of the inherent danger of unbalanced power, Walt suggests

that state perception of power is key to explaining alliance formation. While this perception is

predicated on aggregate power and proximity, intent – rooted in agency – partially explains

balancing behavior. This suggests a major element of state decision making is explained by

statesmen responding to structural concerns. They do so with varying efficiency, but there is no

suggestion that an element like ideology, trumps structural concerns. Anarchy produces like-

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[19] These sources form the basis of Reiter and Stam's (1998) leadership variables. Desch (2002) provides a succinct criticism of these sources and findings built upon them.

units but like-units are not identical. They are players in positions with uneven capabilities but are functionally the same. These actors perceive, interpret, and respond to their surroundings. We can apply a similar logic to the selection of strategy from a third image position.

Strategy is the application of means in war. It is strategic in that states apply capabilities with the intent of achieving specific goals. The agency inherent in strategy selection is fertile ground for the second image – i.e. that certain regimes are more likely to choose an efficient strategy. This is an essential element of the war outcomes puzzle as the correct strategy vis-à-vis an opponent's strategy and terrain gives a state advantage in the application of means. However, there is no relationship, at face value, between regime type and strategic advantage.[20] There is also no relationship, again at face value, with power and strategic advantage.[21] This suggests two basic points: one, second image explanations do not explain this essential element in war. The second point is fairly abstract, but fitting with the above constructivist third image explanation. States make decisions about the application of power on the basis of the perception of the power environment, not strictly power. As stronger states occasionally find themselves in positions of strategic disadvantage, this suggests selection is inconsistently effective – at times states choose the correct strategy and at others, choose incorrectly. For instance, the democratic United States selected an ineffective strategy against a much weaker North Vietnam. They do so with varying degrees of effectiveness that, at least at this point in time and in this study, are unidentified.[22]

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[20] An admittedly informal test of this using multinomial logistic regression, with strategic advantage, strategic disadvantage, or neither as a dependent variable and conflict capabilities, alliance capabilities, and POLITYIV returns no significance for any of the IVs. This model is discussed in the following chapter. Terrain variables return significance, suggesting states partially select strategy on the basis of terrain.

[21] While the same test returns significance for strategic disadvantage and alliance capabilities.

[22] In the conclusion of this dissertation, I suggest that this study is fertile soil for future research and detail a potential avenue to answer questions pertaining to strategy selection.

Here we approach the second element of Clausewitz's theory. A host of factors influence the application of the means. The primary factor this study is concerned with is terrain. Capabilities are exercised through strategy but terrain influences the efficacy of strategy.[23] Terrain, broadly taken to mean permanent features of a place including changes in elevation and the characteristics of a landscape, may empower the weak or humble the strong. Terrain may also have an equal impact on armies, leaving capabilities as the primary determinant of a contest. In the broadest sense, terrain is a structural element of the war puzzle as both sides of a fight engage in the same terrain. Actors occupy different places in the local sense but operate in the same space. Difference in outcomes partially stems from actors engaging the terrain differently.

Research Design

To answer this question, why do states win wars, as well as the secondary question, are democracies more successful in war by virtue of being democracy, I engage multinomial logistic regression (MNL). As previously discussed, the dependent variable and population of cases are drawn from the *COW* dataset and population of interstate wars, with limited variations. The dependent variable, *outcome*, has three nominal categories: win, lose, and draw. All models set lose as the reference category. MNL produces a set of odds ratios by each outcome relative to a reference category per each independent variable. MNL operates under the assumption of the independence of irrelevant alternatives, meaning, in this case, there is no meaningful alternative available to states beyond win, lose, or draw. There are limited amounts of missing data among independent variables, with the exception of loss exchange ratios. Cochran and Long's (2017)

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[23] This point is explored in greater detail in the following chapter. What follows here is an oversimplification of terrain to demonstrate its broad relationship with the third image.

Loss Exchange Ratio Dataset demystifies the fog of war surrounding LERs in multilateral wars but is temporally limited. Given this, I calculate LERs for remaining bilateral wars but remaining multilateral wars are coded as missing. Therefore, there are only 270 cases with LER data of 322 total cases (83.5%).

Hypotheses:

H_1: States with a higher proportion of a conflicts total capabilities (*concap*) are more likely to win their wars (confirmed)

H_2: States with a higher ratio of soldier quality (*qualrat*) are more likely to win their wars (unconfirmed)

H_3: States fighting with higher levels of capability assistance from alliances (capassist) are more likely to win their wars (confirmed)

H_4: Democracies (Polity IV scores of 6 or higher) are more likely to win their wars (unconfirmed)

H_5: States which initiate a war are more likely to win their wars (confirmed)

H_6: Democracies are more likely to win wars as the initiator (unconfirmed)

H_{7a}: States with strategic advantage (*winstrat)* are more likely to win their wars (mixed)

H_{7b}: States with strategic disadvantage (*losestrat*) are less likely to win their wars (supported)

H_8: States with higher loss exchange ratios are less likely to win their wars

H_9- States which are further away from the theater of war are less likely to win wars

H_{10}: Punishment strategies are more effective in rugged and non-trafficable terrains

H_{11}: Mobility strategies are more effective in level and trafficable terrains

Simple Models

As an initial test, I present three simple models – all using win, lose, draw (*WLD2*) as the dependent variable and lose as the reference category (meaning odds ratios are relative to lose category). Model One includes two measures of capabilities, state capabilities (*concap*) and alliance capabilities (*alliasst*), and a binary initiation variable. All three IVs are significant in this

model, where increases in state capabilities, and alliance capabilities increase the odds of winning relative to losing – as does initiation. Model two adds regime type data as an independent variable. Here we see initial support for the democratic victory. The previous IVs maintain their significance, and increases in *PolityIV* scores increases the odds of winning relative to losing. Alliance capabilities and regime type also predict draws.[24] While regime scores have lower significance relative to capabilities and initiation, model two supports the democratic victory proposition. Both models one and two have 322 cases, including every state in every war in the population.[25]

The picture changes in model 3. Model 3 removes three wars from the population: The 1948 Arab-Israeli War, 1967 Six-Day War, and 1973 Yom Kippur War, including a total of 18 cases between the three wars. In this revised population, regime type (measured with Polity IV) has no support. This immediately casts a degree of doubt on the democratic victory as it appears the previous support was dependent not on democracy but on Israeli democracy.[26] These models establish a simple measure of support for the foundational idea that capabilities are primary predictors of war outcomes. The lack of support for regime type sans Israel places the burden of proof on triumphalists to demonstrate that Israeli democracy aided victories in the three wars

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[24] The relatively low number of draws relative to victory and defeat cast some doubt on this issue. The 1950-3 Korean War includes nearly as many cases as all other draws combined. As a result, the results here a skewed. The following chapter suggests that terrain had a substantial impact

[25] Seven cases have missing *PolityIV* data as these years or states are not included in Marshall, et al.'s reporting (2013).

[26] Beyond this point, Israel only engages what could be conceived of selection effects via initiation in 1967. Still, the writing of war was on the wall. The selection was not so much war, but when was would be initiated. Israel's Arab neighbors had more or less selected the war but Israel's surprise inauguration of that war would prove the deciding factor in the conflict. There is room to suggest that Israeli victory, upon which the democratic victory is predicated, has little to do with selection effects but rather strategy. The following chapter suggests an alternative, the interaction of strategy and terrain.

(while coming to terms with their stalemates in 1969 and 1982 against relatively weaker opponents). The pseudo R^2 – presented as Nagelerke R^2 – are relatively low in these simple models, at .196, .234, .298 respectively. While interpreting a pseudo R^2 is always a challenging endeavor and should always be taken with some skepticism, the low Nagelerke score suggests that additional elements are necessary in building to a full model of war outcomes.

Model 1		B	Sig.	Exp(B)
Win	*State Capabilities*	2.359	.000	10.580
	Alliance Capabilities	2.739	.000	15.478
	Initiator	1.006	.001	2.735
Draw	*State Capabilities*	-------	--------	----------
	Alliance Capabilities	2.155	.001	8.626
	Initiator	-------	--------	---------
N=322	**Nagelkerke R^2: .196**			
Model 2		B	Sig.	Exp(B)
Win	*State Capabilities*	2.281	.000	9.784
	Alliance Capabilities	2.765	.000	15.877
	Initiator	1.047	.000	2.849
	PolityIV	.053	.009	1.054
Draw	*State Capabilities*	--------	--------	--------
	Alliance Capabilities	2.109	.002	8.241
	Initiator	--------	--------	--------
	PolityIV	.085	.002	1.089
N=322	**Nagelkerke R^2: .234**			
Model 3*		B	Sig.	Exp(B)
Win	*State Capabilities*	2.557	.000	12.903

	Alliance Capabilities	3.891	.000	48.949
	Initiator	1.170	.000	3.223
	PolityIV	-------	-------	-------
Draw	*State Capabilities*	-------	--------	-------
	Alliance Capabilities	3.064	.000	21.411
	Initiator	-------	--------	-------
	PolityIV	.070	.016	1.072
N=304	**Nagelkerke R²:** .298	*1948 Arab-Israeli War, 1967 Six-Day War, 1973 Yom Kippur War excluded from analysis*		

To establish the elements to be included in full and substantially more complex models, I present additional independent variables in simple models built on the foundational elements of the above model – including capabilities, initiation, and regime type. I then compare these models between two populations of cases, with and without Israeli victories. These IVs include terrain variables (*count[27], TRIMean[28], NTrafficability),* strategic advantage and disadvantage (with neutral strategy removed to prevent perfect multicollinearity), measures of soldier quality (qualrat), and distance.

Models 4, 5, and 6 test terrain variables. The models produce limited significance for terrain. This is expected as terrain is measured equally in each case by war. In this sense, these limited models simply provide a spatial frame for power and democracy – reiterating that power is the primary predictor and democracy conditionally predicts victory. While the weight of the Korean war is an issue with the accuracy of results in the draw category, the inclusion of terrain

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[27] A variation of count is included in models called count1000. This measure divides count by 1000 km², thereby removing potential rounding errors in odds ratios.
[28] A variation of TRIMean is included in models called TRIMean10. This measure divides TRIMean by 10m, again removing potential rounding errors in odds ratios.

provides some insight in this category. Only two draws, the Iran-Iraq War and the War of

Attrition, are fought in low ruggedness – high trafficability settings. As most draws occur in

challenging environments, in which terrain should have an unequal impact, and by their nature

all states involved in a draw share the same outcome, we can see initial significance in the role

of terrain in predicting war outcomes. However, the role is ultimately quite complex – serving an

intervening variable in the exercise of capabilities via strategy.

Model 4		B	B*	Sig.	Sig.*	Exp(B)	Exp(B)*
Win	State Capabilities	2.293	2.564	.000	.000	9.906	12.985
	Alliance Capabilities	2.691	3.804	.000	.000	14.746	44.871
	Initiator	1.028	1.153	.001	.000	2.795	3.169
	PolityIV	.054	--------	.008	--------	1.055	--------
	TRIMean10	--------	--------	--------	--------	--------	--------
Draw	State Capabilities	-------	--------	--------	--------	----------	
	Alliance Capabilities	2.419	3.424	.001	.000	11.235	30.689
	Initiator	-------	--------	--------	--------	---------	--------
	PolityIV	.081	.031	.008	.040	1.084	1.066
	TRIMean10	.066	.070	.000	.000	1.068	1.073
N=322/304*							
Nagelkerke R²: .305/.376*							
Model 5		B	B*	Sig.	Sig.*	Exp(B)	Exp(B)*
Win	State Capabilities	2.283	2.596	.000	.000	9.808	13.413
	Alliance Capabilities	2.683	3.882	.000	.000	14.623	48.517
	Initiator	1.016	1.135	.001	.000	2.763	3.111
	PolityIV	.052	-------	.010	-------	1.054	-------
	NTraff	-------	-.015	-------	.013	-------	.985
Draw	State Capabilities	-------	-------	--------	-------	----------	-------

		B	B*	Sig.	Sig.*	Exp(B)	Exp(B)*
	Alliance Capabilities	2.122	2.978	.003	.000	8.350	19.644
	Initiator	-------	-------	--------	-------	---------	-------
	PolityIV	.081	.068	.005	.026	1.085	1.026
	NTraff	.027	.025	.001	.005	1.027	1.590
N=322/297*							
Nagelkerke R²: .299/.376.*							
Model 6		**B**	**B***	**Sig.**	**Sig.***	**Exp(B)**	**Exp(B)***
Win	State Capabilities	2.305	2.594	.000	.000	10.026	13.389
	Alliance Capabilities	2.816	3.965	.000	.000	16.710	52.698
	Initiator	1.044	1.175	.001	.000	2.841	3.237
	PolityIV	.053	-------	.008	-------	1.055	-------
	Count	-------	-------	-------	-------	-------	-------
Draw	State Capabilities	-------	-------	--------	-------	---------	-------
	Alliance Capabilities	2.014	3.008	.003	.000	7.490	20.246
	Initiator	-------	-------	--------	-------	---------	-------
	PolityIV	.084	.068	.002	.020	1.088	1.071
	Count	-.016	-.019	.050	.032	.985	.981
N=322/304*	*1948 Arab-Israeli War, 1967 Six-Day War, 1973 Yom Kippur War						
Nagelkerke R²: .258/.324*	excluded from analysis						

Models 7 and 8 establishes the role of strategy in predicting war outcomes. Model 7 introduces strategic advantage. States with strategic advantage engage in a strategy that provides relative advantage when compared to an opponent's strategy (i.e. offensive-mobility v. defensive-attrition) are more likely to win relative to lose. Similarly, in model 8, states with strategic disadvantage are less likely to win relative to lose. While intuitive, strategic advantage and disadvantage should be largely conditional. The Soviet Union prevailed despite strategic disadvantage against Nazi blitzkrieg. Strategic advantage may also overcome power disadvantages, as Chadian mobility strategy against Libyan attrition in the War over the Aouzou

Strip demonstrates. The relationship becomes more complex in draws. Strategic advantage fails

to reach significance, but strategic disadvantage decreases the likelihood of drawing relative to

losing.

Model 7		B	B*	Sig.	Sig.*	Exp(B)	Exp(B)*
Win	*State Capabilities*	2.664	2.799	.000	.000	14.350	16.434
	Alliance Capabilities	3.036	4.055	.000	.000	20.824	57.700
	Initiator	1.141	1.239	.000	.000	3.130	3.454
	PolityIV	.063	-------	.003	-------	1.065	-------
	WinStrat	2.406	2.183	.000	.000	11.090	8.871
Draw	*State Capabilities*	-------	-------	--------	-------	----------	-------
	Alliance Capabilities	2.200	3.260	.002	.000	9.027	26.060
	Initiator	-------	-------	--------	-------	----------	-------
	PolityIV	.089	.073	.002	.015	1.093	1.076
	WinStrat	---------	---------	---------	---------	---------	---------
N=322/304*							
Nagelkerke R^2: .346/.381*							

Model 8		B	B*	Sig.	Sig.*	Exp(B)	Exp(B)*
Win	*State Capabilities*	2.852	2.911	.000	.000	17.328	18.375
	Alliance Capabilities	4.317	4.663	.000	.000	74.946	105.963
	Initiator	1.162	1.246	.000	.000	3.195	1.036
	PolityIV	.057	-------	.013	-------	1.058	-------
	LoseStrat	-3.080	-2.306	.000	.000	.046	.080
Draw	*State Capabilities*	-------	-------	--------	-------	----------	-------
	Alliance Capabilities	3.512	3.699	.000	.000	33.503	40.421
	Initiator	-------	-------	--------	-------	----------	-------
	PolityIV	.090	.076	.002	.013	1.094	1.079
	LoseStrat	-2.881	-2.306	.000	.002	.056	.100
N=322/304*		*1948 Arab-Israeli War, 1967 Six-Day War, 1973 Yom Kippur War excluded from analysis*					
Nagelkerke R^2: .399/.392*							

Models 9 and 10 introduce distance and loss exchange ratios[29] respectively. Distance returns limited support, only showing significance in draws. As the distance a state must project power increases, here measured in hundreds of kilometers (*distance*/100), the odds of a draw, relative to losing increases – likely skewed by the Korean War in this category.[30] Loss exchange ratios (LERs) present a far more interesting picture. Cochran and Long (2017) introduce loss exchange ratio to the question of democracy and war outcomes, defining them as the rate of battle deaths suffered by battle deaths caused. Model 10 confirms their findings, as the inclusion of LERs is not only significant – with the odds of victory relative to losing decreasing as ratios increase – but renders regime type insignificant. Lastly, several variables – intuitively important to the puzzle – fail to reach significance, including troop quality ratios (*milex/milper*).

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[29] Loss exchange ratio is taken from Cochran and Long (Cochran and Long 2017). Missing bilateral LERs are calculated using COW battle death data (Sarkees and Wayman 2010a). However, calculating loss exchange ratios in multilateral wars is a challenge, as the question of who kills who is difficult. As a result, the number of available data for LERs only reaches 266 of 322.

[30] A relatively low number of draws occur in the COW data and the Korean War – given its "collective security" nature – includes a large number of states in the contest. In this sense, there are more draw score for this conflict than the total of all other draws combined.

Model 9		B	B*	Sig.	Sig.*	Exp(B)	Exp(B)*
Win	State Capabilities	2.146	2.511	.000	.000	8.552	12.315
	Alliance Capabilities	2.611	3.842	.000	.000	13.617	46.607
	Initiator	1.030	1.164	.001	.000	2.800	3.203
	PolityIV	.049	-------	.020	-------	1.050	-------
	Distance100	-------	-------	-------	-------	-------	-------
Draw	State Capabilities	-------	-------	-------	-------	-------	-------
	Alliance Capabilities	1.319	2.319	-------	.005	-------	10.165
	Initiator	-------	-------	-------	-------	-------	-------
	PolityIV	.058	-------	.050	-------	1.019	-------
	Distance100	.018	.016	.007	.024	1.366	1.444

N=322/304*

Nagelkerke R^2: .257/.317*

Model 10		B	B*	Sig.	Sig.*	Exp(B)	Exp(B)*
Win	State Capabilities	1.830	2.486	.000	.000	9.349	12.011
	Alliance Capabilities	1.292	3.816	.001	.000	8.321	45.434
	Initiator	.859	.916	.009	.009	2.360	2.500
	PolityIV	-------	-------	-------	-------	-------	-------
	Loss Exchange Ratio	-.568	-.528	.000	.000	.567	.590
Draw	State Capabilities	-------	-------	-------	-------	-------	-------
	Alliance Capabilities	2.024	3.565	.009	.000	7.570	35.356
	Initiator	-------	-------	-------	-------	-------	-------
	PolityIV	.075	-------	.015	-------	1.078	-------
	Loss Exchange Ratio	-------	-------	-------	-------	-------	-------

N=322/304*

Nagelkerke R^2: .335/.389*

*1948 Arab-Israeli War, 1967 Six-Day War, 1973 Yom Kippur War excluded from analysis

Departing from the simple models, model 11 presents terrain interaction variables. Generally, these interactions provide mixed results. When compared to Stam's terrain

interaction variables, the results are less clear – given the increased complexity of the variables themselves. Trafficability x strategy fails to reach significance – an odd point when one considers the numerous wars in which weaker states achieved victory in such terrain (e.g. Vietnam) with effective strategy (e.g. punishment). Interestingly, trafficability, without interactions, reaches significance sans Israeli victories in model 5. This may be because these wars are fought in highly trafficable settings. Strategy x TRI reaches significance, with a negative coefficient – decreasing the odds of victory relative to defeat. Similarly, area reaches significance with a negative coefficient.

Several variables fail to reach significance. Soldier quality, or a ratio of dollars spent per soldier, remains insignificant. Distance fails to reach significance in victory (model 9). However, distance does correlate with capabilities. This suggest that states may only engage in wars in which substantial power projection is necessary when they are capable of doing so. This intuitive point suggests that distance is most important in considering war frequency, not outcomes. Interestingly, regime type and initiation interactions fail to reach significance in simple models, with or without Israeli victories (results not shown). This stands at odds with the basic premise of Reiter and Stam (1998). An increase in the number of cases may explain the failure of significance as they report significance as $P = <.05$.

Model 11		B	B*	Sig.	Sig.*	Exp(B)	Exp(B)*
Win	*State Capabilities*	3.364	3.599	.000	.000	28.892	36.573
	Alliance Capabilities	4.513	5.339	.000	.000	91.232	208.238
	Initiator	1.095	1.222	.002	.001	2.988	3.394
	PolityIV	.062	-------	.020	-------	1.064	
	Count1000	-.033	-.024	.000	.007	.967	.976

	NTraff	-------	-------	-------	-------	-------	-------
	TRIMean10	.479	.373	.004	.016	1.615	1.452
	StratScale	-.809	-------	.009	-------	.446	-------
	Stratxcount	.007	.005	.000	.006	1.007	1.005
	StratxNTraff	-------	-------	-------	-------	-------	-------
	StratxTRI	-.098	-.077	.002	.013	2.988	.926
Draw	State Capabilities	-------	-------	-------	-------	-------	-------
	Alliance Capabilities	4.038	5.062	.000	.000	56.739	157.889
	Initiator	-------	-------	-------	-------	-------	-------
	PolityIV	.099	.091	.004	.011	1.104	1.095
	Count1000	-------	-------	-------	-------	-------	-------
	NTraff	-------	-------	-------	-------	-------	-------
	TRIMean10	.500	.411	.008	.024	1.648	1.508
	StratScale	-------	-------	-------	-------	-------	-------
	Stratxcount	-------	-------	-------	-------	-------	-------
	StratxNTraff	-------	-------	-------	-------	-------	-------
	StratxTRI	-.088	-.068	.018	.057	.916	1.748

N=322/304*
Nagelkerke R^2: .586/.593*

*1948 Arab-Israeli War, 1967 Six-Day War, 1973 Yom Kippur War excluded from analysis

A number of lessons can be garnered from these simple models. First and foremost, capabilities predict war outcomes, holding significance as every other IV is tested. As an individual state's capabilities increase vis-à-vis their opponent's capabilities, the odds of victory increases. Similarly, as the capability contributions of partner states increase, the odds of victory increases. The exponents of alliance contributions are disproportionately higher than capabilities. This has an intuitive explanation. Most multilateral wars center around two competing powerful actors. Only in major wars, like the World Wars, do states with relative capability parity fight on same side. In this sense, the inclusion of weaker states in wars may increase the odds of victory, but the inclusion of strong states certainly increases the odds of victory. For example, Wuerttemberg's .6% capabilities contribution to the Germanic alliance in the Franco-Prussian

War likely does little to explain Prussian victory, but Prussia's capabilities contribution of 44% almost entirely explains Wuerttemberg's victory over France. Regardless, the two variables suggest that the primary and most consistent predictor of war outcomes is capability.

The second lesson is that the democratic victory is predicated on Israel's victories in 1948, 1967, and 1973. Removing the three wars, individually, we can see a quick progression toward statistical insignificance. As seen in model 1, significance sits at .009. Removing 1948 lowers significance to .013, removing 1967 lowers significance to .022, and lowering 1973 lowers significance to .41. In pairs, removing 1948 and 1967 lowers significance to .32, removing 1948 and 1967 lowers significance to .062, and removing 1967 and 1973 lowers significance to .095. Without these cases, simply, the democratic victory does not hold. It is also curious that the case which has the largest impact on significance is 1973, not 1967. The Yom Kippur War was not "selected" by Israel, whereas the Six-Day War better fits the selection effects thesis – even then Israel enjoyed only tactical surprise, not strategic surprise, as the course towards war was clear via mobilization and buildup by both parties to the conflict. Given this, we are forced to take findings for the democratic victory as what they are: mixed. If there is support, it rests in predicting draws – which is again problematic because of the disproportionate weight of the Korean War. The failure of politics and initiation interactions to reach significance also casts doubt on the selection effects hypothesis, with the implication being that democracies do not enjoy any heightened benefits from initiation. In short, these simple models suggest that democracies may be more likely to win wars, but not because they are democracies. They are more likely to win wars because they enjoy higher gross capabilities, but these models do not

suggest they are superior is exercising them. This is especially important if capabilities are exogenous to regime type.

The third lesson suggests that both strategy and terrain impact outcomes. States with strategic advantage are more likely to win wars and states with strategic disadvantage are more likely to lose wars. The mixed results relating to terrain indices are more difficult to interpret. At once, we can see that all terrain variables return significance, either in victory or draws, but the piecemeal nature of this significance suggests a more complicated and, ultimately, conditional relationship. Partially, the challenge here is twofold: one, the number of wars is low, and two terrain applies equally to both states in the data – though unequally in reality. This inequality stems from how states choose to interact with terrain via the application of the means (strategy). As the modal strategy is dually attrition, the data discounts the role of terrain. The significance of both strategy and terrain is exemplified in cases where underpowered states win wars or overpowered states lose. While the low N and wide diversity of these cases, are best suited to qualitative study, statistical significance in strategy, terrain, and their interactions, as well as increase in pseudo R^2 scores, suggest that there is a relationship between strategy, terrain, and war outcomes. This point is further explored in the following chapter. As the division of opinion on the democratic victory cleaves along paradigmatic lines, testing realist and liberal models evaluate the assumptions of the paradigms themselves. Below, I present two models which test the basic premises of a liberal and realist model.

Towards a Realist and Liberal Model of War Outcomes:

The democratic victory proposition is itself a product of the basic assumptions of neoliberalism – that despite a general unit functional homogeneity across state actors, democracies are functionally different types of state actors. Anarchy may be a constant feature of the interstate system, but the consequences are unequal amongst actors and democracies, by virtue of democracy, respond to anarchy in predictably different ways. These differences manifest in distinct international political outcomes along the lines of regime type. Like the democratic peace, the democratic victory is predicated on domestic political institutions. In turn, the primary outcome in question, victory, is an endogenous product of the parties to the conflict. The democratic victory assumes selection effects and battlefield effectiveness are endogenous products of democracy which make democracies wield capabilities more effectively.

The first test of this proposition is demonstrating that a relationship exists between democracy and outcomes. We see support of this in all models except those including loss exchange ratios or those excluding Israel's three victories. This mixed support continues with full models, including all independent variables except loss exchange ratios. Below, I use a binary regime type indicator derived from *Polity*. While this is a more restrictive measure and therefore overly reductive and dismissive of the great diversity within both democracies and non-democracies alike, it fits the spirit of the democratic victory proposition as the benefits should only be produced by states with democratic features – not states which approach but do not reach democratic scores. In models with binary coding of democracy, the exclusion of Israeli cases does not render democracy insignificant (not shown). The exclusion of loss exchange ratios is necessary for regime type to reach significance.

Combined Liberal Model		B	Sig.	Exp(B)
Win	State Capabilities	3.092	.000	22.026
	Alliance Capabilities	4.366	.000	78.749
	Initiator	.859	.034	2.360
	Binary Democracy	1.342	.005	3.826
	Count1000	-.036	.000	.964
	NTraff	-------	-------	-------
	TRIMean10	.569	.002	1.766
	StratScale	-.794	.016	.452
	Stratxcount	.007	.000	1.007
	StratxNTraff	-------	-------	-------
	StratxTRI	-.115	.002	.891
	Distance	-------	-------	-------
	Length	-------	-------	-------
	Politics x Initiator	-------	-------	-------
Draw	State Capabilities	-------	-------	-------
	Alliance Capabilities	3.342	.001	28.274
	Initiator	-------	-------	-------
	Binary Democracy	1.577	.011	4.841
	Count1000	-------	-------	-------
	NTraff	-------	-------	-------
	TRIMean10	.575	.004	1.777
	StratScale	-------	-------	-------
	Stratxcount	-------	-------	-------
	StratxNTraff	-------	-------	-------
	StratxTRI	-.103	.010	.902
	Distance	-------	-------	-------
	Length	-------	-------	-------
	Politics x Initiator	-------	-------	-------
N=322				
Nagelkerke R^2: .639				

While there is no unified realist theory of war outcomes, the paradigm adopts a general pessimism relating to the role of democracy in outcomes. That is, regime type has little to do with war outcomes. Rather, realism assumes that capabilities are the primary predictor of war outcomes. Whereas neoliberalism assumes that democracies are more effective at choosing when to apply and how to wield capabilities, realism makes no such claim. That is not to say that one individual democracy may, at a given time, be aided by their democracy, but rather, for

realists, that no general democratic principle promotes victory. If there is a benefit given by democracy, is it exogenous to the causal process -i.e. wealth promotes both capabilities and democratic stability but democracy does not promote capabilities or wealth. The same logic holds amongst non-democracies. In this sense, unit functional homogeneity is constant but effectiveness and organization vary on a state-by-state basis. Individual states choose when and how to accumulate capabilities as a response to system level changes in the distribution of power – and do so with variable efficacy. Where there is agency, it is limited and exogenous; a response to the system. This agency is manifested in the application of capabilities via strategy. The following realist model includes all IVs but excludes regime type. The model demonstrates the role of capability in predicting outcomes and suggests a host of factors influence the exercise of capabilities

Combined Realist Model		B	Sig.	Exp(B)
Win	*State Capabilities*	3.437	.000	31.080
	Alliance Capabilities	4.189	.000	65.934
	Initiator	.768	.045	2.156
	Count1000	-.025	.005	.975
	NTraff	-------	-------	-------
	TRIMean10	.375	.020	1.454
	StratScale	-------	-------	-------
	Stratxcount	.005	.002	1.005
	StratxNTraff	-------	-------	-------
	StratxTRI	-.076	.018	.927
	Distance	-------	-------	-------
	Length	-------	-------	-------
	Loss Exchange Rate	-.638	.000	.528
Draw	*State Capabilities*	-------	-------	-------
	Alliance Capabilities	3.120	.003	22.654
	Initiator	-------	-------	-------

Count1000	-------	-------	-------
NTraff	-------	-------	-------
TRIMean10	.407	.027	1.502
StratScale	-------	-------	-------
Stratxcount	-------	-------	-------
StratxNTraff	-------	-------	-------
StratxTRI	-.071	.050	.931
Distance	-------	-------	-------
Length	-------	-------	-------
Loss Exchange Ratio	-------	-------	-------

N=322

Nagelkerke R^2: .578

Conclusion

The underlying question in the democratic victory debate is deceptively simple: what explains war outcomes? While neither paradigm suggests a monocausal explanation, the division between the paradigms can be summarized with a simple hypothetical. If two states went to war, and were equal in every sense except regime type, liberalism assumes a democracy is more likely to emerge as the victor – either based on some selection effect (i.e. choosing the war) or a superior battlefield effectiveness. For this assumption to hold, democracy must, at least in a significant number of cases, produce the conditions necessary for victory. The above models demonstrate one consistent, albeit imperfect, predictor of victory: capabilities. Therefore, democracies must either be superior at choosing when to apply capabilities or wield them more effectively than non-democracies. Democracies must also enjoy a predictably different degree of agency. This agency either manifests itself in a restricted decision-making process, where democratic leaders are fearful of electoral retribution and therefore increasingly cautious in

avoiding folly, or in a superior application of capabilities via strategy[31]. In the former, there is at least a reasonable doubt given a dearth of support for the monadic democratic peace (Layne 1995). Perhaps then, these institutional restraints do not constrain war itself, but folly in selection. In the later, democratic decision makers must select appropriate strategies, both against an enemy strategy and in light of terrain. If the efficacy of a strategy is decided, at least partially, by terrain, then selection effects must predict not only "what wars are fought" but also "where and how wars are fought."

As the following chapter details, there is little reason to suggest this is the case. Be it American attrition in the dense and unforgiving tropical broadleaf forests of Vietnam or the rugged mountains spanning the Korean Peninsula, democracies have hardly been perfect in selecting strategies for terrain. India fought in the Himalayas in 1962 equipped with cotton uniforms and little knowledge of the local topography. The democracies of Western Europe failed at every turn to anticipate German blitzkrieg across favorable flat and trafficable terrain, choosing instead to build fortified east-facing defensive installations. These missteps are hardly unique to democracies. The Nazis mistook the steppes of Eastern Europe as trafficable, which turned to rasputitsa or "general mud" with autumn rain and the movement of a million men. Fascist Italian forces, invading through Albania, were halted in the mountains of Eastern Greece. Today, when western democracies enjoy gross advantages in capabilities, terrain continues to stymie the powerful and aid the weak. American-led mobility devastated state opponents in Afghanistan

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[31] Alternative military effectiveness, but Cochran and Long (2017) and the replication of their findings in the above models demonstrate that democracies are not more effective on the battlefield.

and Iraq only to be rendered ineffective against weak non-state insurgents in mountainous Afghanistan and urban (and inherently non-trafficable) settings such as Fallujah in Iraq.

The complexity of war warns that we should be cautious in suggesting what promotes victory. It is fair and intuitive to suggest that capabilities predict success but capabilities do not always translate into power. Rather, we must consider the factors which impact the application of capabilities to realize power. For the democratic victory to be supported, democracies must predictably apply these means more efficiently than non-democracies – choosing when, where, and how to wage war. Given the reality that place, and therefore terrain, can rarely be selected independently of cause and motivation and never can be changed except in extremely local instances, the impetus is on strategy selection in light of both capabilities and terrain. Democracies and non-democracies alike have selected to fight wars across the globe and in both easy and difficult settings – with and without appropriate strategy. This raises two further questions essential to the democracy and victory debate. First, what is the relationship between terrain, strategy, and capabilities and second, how do states choose to apply capabilities in light of terrain and their own and opposing capabilities? Without evidence that democracies more effectively engage terrain, there is little reason to support democracy as an endogenous cause of victory.

Chapter 4: Strategy and Terrain in Interstate War Outcomes

"Geometry and movement are the two inseparable problems in geographic theory. Regardless of the movement, they leave their mark on the terrestrial surface. They produce a geometry, then the geometry produces movements: circulations in states are created by national frontiers, and in return they contribute to create these frontiers." – William Bunge

After gaining independence from France in 1960, Chad found itself engaged in a series of conflicts (#771 FROLIAT Rebellion and #820 Habre Revolt). The Aouzou Strip, which forms the border of Northern Chad and Southern Libya, was seized by Libyan forces in the late 1970s. In response to the Habre Revolt, in which the Libyans had sided with President Goukouni Oueddei and ultimately declared the territorial unity of the two states, Libya maintained a sizeable military presence in the disputed region. After the downing of a Libyan plane and the initiation of sustained violence in mid-November 1986, the War over the Aouzou Strip began in earnest. Libya, fueled by its immense oil wealth, enjoyed a sizeable advantage in capabilities over its southern neighbor. Indeed, Ghaddafi's Libya exceeded Chadian capabilities in four of five COW *National Material Capabilities* indicators (Singer 1987). In military expenditures, Libya outspent Habre's Chadian forces 33:1, in military personnel, Libya held a 3.5:1 advantage, consumed 77:1 more per capita energy, and outnumbered Chad in urban population 5.8:1. The only indicator in which Chad exceeded Libya was total population (17.4:1) – hardly a meaningful measure in a state previously consumed by civil war and still gripped by partisanship. By every measure, the contest between Libya and Chad was a gross mismatch. Chad which decisively won the war, with Libya suffering a loss exchange ratio of 7:1 and relinquishing territorial control of the Aouzou Strip.

The previous chapter details the importance of capabilities above all other considerations – including regime type - in determining war outcomes. If power is so central to understanding

war outcomes, why do weak states sometimes win wars and powerful states sometimes lose wars? In fair fights with relative power parity, what explains one state's success and another's failure? While there is never a monocausal explanation for war outcomes, concomitant to the complexity of war, discrepant cases, like the one above, are important in detailing an understudied facet of the war outcomes puzzle: terrain. Beyond a simple understanding of the space in which wars have occurred (e.g. topographic heterogeneity, landscape heterogeneity, spatial extent), terrain impacts every other variable in the war equation – including capabilities and strategy.

The War over the Aouzou Strip details this basic proposition. The war was highly asymmetrical in terms of capabilities, but capabilities only matter relative to the *application* of force. The Libyan armed forces engaged in a general attrition strategy – seeking to overwhelm the greatly outnumbered Chadian military. Gifted a large number of Toyota pick-up trucks from France and benefiting from American intelligence, Chadian forces engaged a maneuver strategy – effectively neutralizing Libyan numerical superiority by disrupting their ability to organize resistance – in a strategy only enabled by the uniquely trafficable setting of the conflict. Terrain is a "permanent factor" in war and "terrain determines the peculiar character of military action" (Clausewitz 2007, 109). The Aouzou Strip is essentially level ground, with a mean topographic heterogeneity of only 50m across the 3,050 KM^2 theater. The desert landscape (approximately 97% desert landscape, 3% grass and shrubland) was essentially entirely trafficable. The combination of a relatively large and level space and a terrain void of difficult features, determined the efficacy of competing applications of uneven capabilities. Taken in tandem with

inherent leadership problems in a predominantly mercenary Libyan army[32], Habre's Chadian forces suffered minimal losses on a highly strategy-terrain dependent path to victory.

This chapter addresses the role of terrain and strategy in war. First, I provide further operationalization of terrain as it relates to interstate war. Secondly, I present a basic theory of the role of terrain in war following Clausewitz's classical theory– detailing its complicated relationship with power, strategy, and battlefield effectiveness. This theory operates on the assumption that power is the primary tool of states in war and it is applied strategically to reach desired outcomes by all actors in an interstate war. The effectiveness of this application is partially determined by terrain. Third, I present classification of terrain into four classes based on ruggedness and trafficability. These classes include low ruggedness – high trafficability, low ruggedness – low trafficability, high ruggedness – high trafficability, and high ruggedness – low trafficability. Fourth, I provide analysis of the terrain features of interstate wars between 1816-2003 using a qualitative comparative method. I conclude with a basic summary of the findings. This analysis responds to a basic research question: what are the most effective strategies for these terrains? I suggest that terrain often impacts wars unequally. In rugged and non-trafficable terrain classes, the ground may humble strong states and shelter weak states. In level and trafficable terrain, relative power is the primary consideration in understanding war outcomes, facilitating the strong. As the majority of wars occur in the easiest terrain class (low ruggedness – high trafficability), power remains the primary correlate of war outcomes.

Terrain as a "Permanent Factor" in War: Space, Place, and War

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[32] Ghaddafi purposefully maintained a non-professional army as a means of "coup-proofing" his regime, a policy with serious consequences relating to the military effectiveness of the Libyan armed forces (Gaub 2013).

In this study, terrain is defined as the physical features and characteristics of land within the spatial extent of where a war is fought. This definition is built and operationalized on the foundation of Clausewitz's definition of terrain: "Terrain… can be resolved into a combination of the geographical surroundings and the nature of the ground" (142).[33] This presents two important elements in the operationalization of terrain in this study: spatial extent and terrain features. Clausewitz writes, "one cannot conceive of a regular army operating except in a definite space" (109). Space has been alternatively conceptualized by a host of prominent thinkers – be it Kant ([1781] 1998), Leibniz[34] (Ballard 1960), Newton ([1687] 1846), or Descartes ([1644] 2017). Competing conceptions of space have persisted, but for the purpose of this study, the Cartesian position – that space is defined by length, breadth, and depth – is adopted. This adoption characterizes the handling of spatial extent (length and breadth) and elevation and landscape (depth).

War occurs in space – but the local and specific of a war means individual wars occur in place – and the primary actors in war, land forces, operate in these places. Place encapsulates both the physical characteristics of space – be it natural or built environments such as forests, cities, topographies etc. – and the meaningfulness of these physical spaces as imparted by the consciousness of the beings occupying them. Tuan (1977) writes, "Place incarnates the

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[33] There is a basic question worth asking here, as Shephard (1990) does, is Clausewitz still relevant? While Shepard suggests that nuclear weapons, the rise of non-state actors, and developments in statecraft render Clausewitz's operationalization of war obsolete. While the author raises valid concerns, it perhaps arises from an over estimation of the changes in the international system by the end of the Cold War. There is reason to believe that nuclear armed states will not go to war against one another, but there is compelling evidence that these states will still engage in conventional conflicts as Mearscheimer (1983; 1989; 1995) suggests as does the 1999 Kargil War. In response to the latter points, my use of Clausewitz primarily responds to his conception of terrain in ground warfare.

[34] Leibniz's conceptualization of space was primarily developed in correspondence with philosopher Samuel Clarke.

experiences and aspirations of a people. Place is not only a fact to be explained in the broader frame of space, but it is also a reality to be clarified and understood from the perspectives of the people who have given it meaning" (387). A state's decision to engage in war and how to engage in war are determined by these conceptions of place, as the resulting conflict is defined by the cultural, economic, or military values assigned to these places.

Germaine to this study, this can be taken to mean terrestrial surface. All but three interstate wars – The Naval War, Off-Shore Islands War, and Taiwan Straits War – prominently feature combat on land. Even in these cases, where a combination of naval (in the case of the Naval War) or missile and air combat predominantly caused the number causalities necessary to reach war severity, the political motivation and consequences of the war relate to control of land. Spatial extent can be taken to mean the boundaries of a conflict as determined by political and military actors during conflict and estimated by cartographers after the event – or more simply, where a war is fought. This has implications for who is fighting and what states are fighting for, not to mention the peoples who are impacted by the course and outcome of a conflict.

Further, terrain's "importance is decisive to the highest degree, for it affects the operations of all forces… its importance may be felt in the very smallest feature of the ground, but it can also dominate enormous areas" (109). From this, we can take that the features of the land influence every interaction in a war – meaning we must know these features, or the "nature of the ground," to gauge their impact on these interactions. In broad terms, I take these features mean characteristics which might influence the movement of peoples (e.g. armies, or tools of armies – horses, tanks, vehicles), provide cover (e.g. for Fabian and punishment strategies), or change the conditions of war in some other meaningful way.

Taken in tandem, these considerations drive the selection of terrain data in this study. If war happens in place, we must know that place. Still, these are relatively limited means of capturing the "nature of the ground," but are best approximations of the most essential elements of these places. As detailed in the last chapter, these include a terrain roughness index, landscape classification by trafficability, and approximations of area and place. Countless other measures of given place may be immediately relevant to a specific war – such as climate and weather – but few measures are as generally applicable to the nature of war. These features impact the way the humans interact with the land – by altering the cost of movement, sheltering weak actors, and discounting the ability to bring the cost of war to bear on opponents.

The Application of Means

As Clausewitz suggests, war outcomes are the products of the means. That is, the desired outcome – victory – are an output of means – capabilities. More specifically, the application of means. These means are exemplified in war through ground forces. This is not to discount the importance of air and sea power, especially in terms of support and projection of means, but only ground forces can control territory and occupy place. The important consideration in this chapter is the "factors that always accompany the application of the means" (142). The previous chapter demonstrates the preeminent role of capabilities in predicting war outcomes. Yet in 22 wars,[35]

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[35] Franco-Mexican, Mexico wins/transforms, France holds18.79:1 CINC advantage; First Sino-Japanese, Japan wins, China holds 5.43:1 CINC advantage; Russo-Japanese, Japan wins, Russia holds 2.68 CINC advantage; Estonian Liberation, Estonia/Finland win, Russia holds 33.06:1 CINC advantage; Russo-Polish, Poland wins, Russia holds a 3.61:1 CINC advantage; Franco-Turkish, draw, France holds 9.82 CINC advantage; Chaco War, Paraguay wins, Bolivia holds 2.16:1 CINC advantage; Franco-Thai War, Thailand wins, France holds 13.41:1 CINC advantage; First Kashmir War, draw, India holds 4.53:1 CINC advantage; Arab-Israeli War, Israel wins, Arab League holds 5.72:1 advantage; Vietnam War (Phase 2), Vietnam wins, American led coalition hold 40.78:1 CINC advantage; Second Kashmir War, Pakistan wins, India holds 4.68 CINC advantage; Six-Day War, Israel wins, Arab League holds 5.54:1 CINC advantage; Second Laotian (Phase 2), Vietnam wins, American led coalition holds 32.90:1 CINC advantage;

weak states either win or draw despite a gross mismatch. While these unexpected outcomes occur for a combination of reasons – such as asymmetrical power leading to asymmetrical political salience of the outcome (Mack 1975; Pape 1996) – it is the application of the capabilities through strategy which often explain these cases (Arreguin-Toft 2001).

In broad terms, "the factors that influence the application of means" determine the efficacy of that application. Capabilities are exercised via strategy – or how capabilities are applied to reach means. I present three strategies following Stam (1996). The modal strategy, attrition, seeks to use force to defeat the enemy. Maneuver strategies seeks to use movement and positioning to disrupt an enemy's ability to maintain opposition. On defense, this may mean a Fabian strategy. Punishment strategies seek to raise the cost of war beyond a bearable level – using guerilla or unconventional tactics – even if outright defeat of the enemy is not sought. These strategies are taken in tandem with a state's doctrine, as either offensive or defensive. There are 18 possible strategy-doctrine combinations, with 10 combinations employed. This is an admittedly limited generalization of the strategies available to a state in war[36] and only one

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War of Attrition, draw, Egypt holds 3.60:1 CINC advantage; War of the Communist Coalition, draw, American led coalition holds 34.49:1 CINC advantage; Yom Kippur War, Israel wins, Arab League holds 4.75:1 CINC advantage; War over Angola, Cuba/Angola win/transform, South Africa and Democratic Republic of the Congo hold 3.17:1 CINC advantage; War over the Aouzou Strip, Chad wins, Libya holds 3.98:1 CINC advantage; Sino-Vietnamese Border War, draw, China holds 8.60:1 CINC advantage; Cenepa Valley War, draw, Peru holds 2.10:1 CINC advantage; Badme Border, draw, Ethiopia holds 3.02:1 CINC advantage.

[36] Arreguin-Toft (2001) provides an alternative conceptualization of this, with a strategy typology in asymmetrical contests of "direct attack" and "barbarism" in attack strategies, and "direct defense" and "guerilla warfare" in defensive strategies. This typology (rightly) eliminates the distinction between doctrine and strategy. This is because the author's definition of asymmetrical war assumes the strong state is the initiator and has offensive intentions. The population of cases, with the inclusion of extra-state wars, suggests this is appropriate. Given that my population is limited to interstate wars, I follow Stam's coding of strategy.

strategy-doctrine is presented per state, per war (with alliances coded as following the dominant state by capabilities).[37]

The efficacy of power application via strategy is largely determined by terrain. Novelist Tim O'Brien recounts the following experience with terrain during his experience in Vietnam: "…we struggled through the sucking mud of the paddies. The banks of the streams were especially treacherous. Each step through the soft muck was torture, and every few steps a man would sink in mud up to his crotch. The gnarled roots of the mangroves could twist an ankle or a knee in a second. The putrid stench of rotting vegetation permeated the stifling humid air, and canteens were emptied quickly" (quoted in Tonsetic 2010, 173). This account speaks to the challenges certain terrains bring. Terrain influences nearly every facet of ground action. Certain landscapes classes, as in the above anecdote, or rugged terrain may impede the movement of forces, all while providing cover and protection for others. While the impact of terrain may always be unequal – aiding one state, while impairing another, even in close proximity – this inequality is most pronounced in mismatched strategies. For instance, if State A engages in a mobility strategy against State B's attrition strategy, we might assume that State A enjoys strategic advantage and State B suffers strategic disadvantage.

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[37] It is relatively rare that this is an issue in coding, given that the broad strategy employed rarely changes in the course of a war. There are issues here in difficult cases, such as WWII. Germans blitzed (offensive-mobility) into Poland, France, the Low Countries, Norway, and the Soviet Union but engaged in defensive-attrition strategies on the Western front in defense of their previous advances. This problem is avoided by the disaggregation of particularly complex wars (WWI, WWII, Vietnam). There are other challenging cases. For instance, during the Ifni War, Spain adopted a largely defensive-attrition position against offensive-attrition Morocco through 1957. In 1958, France entered the war on the side of Spain, and adopted a defensive-mobility strategy. In cases such as this, the dominant state's strategy – France, in the Ifni War – is coded as the strategy by that side. While this omits important elements as it relates to the course of a war, this is appropriate as it relates to final outcomes.

This is only conditionally true. The classic example of the above strategic advantage is Germany's blitz through Western Europe. This was partially facilitated by new tools of war in the form of the tank – but the German military was still largely and literally horse-powered. German forces engaged in "sweeping advance[s] which bypassed strong points for later reduction by slower-moving elements" (Dupuy and Dupuy 1993, 1113). It was with this "mobility versus attrition strategy" which defined early German successes against Polish, Belgian, French, Dutch, Danish, Norwegian, Greek, and Yugoslav forces. In all of these cases and places, with the exception of Yugoslavia and Greece, German mobility-strategic success was facilitated by terrain. In Poland (39.57m TRIMean/70.85% Traff), Belgium (61.86m TRIMean/67.81% Traff), France (58.66m TRIMean/77.68% Traff), Holland (20.25m TRIMean/75.53% Traff), and Denmark (9.03m TRIMean/70.56% Traff), German forces enjoyed considerable allowance from terrain that was level and predominantly trafficable. In Norway (160.81m TRIMean/25.07% Traff), German forces repeated the speed of previous and concurrent successes until they reached the mountainous area surrounding Narvik – where terrain and British and French support delayed German victory. Germany maintained this success in moderately more difficult terrain in Greece (232.68m TRIMean/61.42% Traff) – which had to that point made considerable advances against Italian[38] forces – and Yugoslavia (175.52m TRIMean/53.67% Traff). Terrain in the Italian-Greek War largely benefitted Greece's defensive-mobility strategy (328m TRIMean/ 56.13% Traff). The initial Italian offense, made through Albania, encountered fierce resistance in the mountainous Epirus region.

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[38] Terrain in the Italian-Greek War largely benefitted Greece's defensive-mobility strategy (328m TRIMean/ 56.13% Traff). The initial Italian offense, made through Albania, encountered fierce resistance in mountainous Epirus region. After Italian advances stalled, a Greco counteroffensive and mobility strategy quickly pushed Italian forces back into Albian territory. The tide would only change when Germany entered the fight.

After Italian advances stalled, a Greco counteroffensive and mobility strategy quickly pushed Italian forces back into Albanian territory. The tide would only change when Germany blitzed into Macedonia in relatively easier terrain (with Greek forces tied down in the east). In Yugoslavia, there was little to be done to stop the German invasion. Following a coup on March 27th, 1941, German forces invaded a mere ten days later on April 6th (Dupuy and Dupuy 1993; Clodfelter 2017). The million strong Yugoslav army failed to mobilize amidst the tumult and suffered an astounding loss exchange ratio of 179:1.


Picture 1: Danish Soldiers Don Ice Skates in 1940 to Quickly Traverse Ice (Public Domain, Algemeen Nederlands Persbureau)

The tide of German victory turned famously in the East, but not immediately. The German-Soviet War was among the most brutal in human history and the landscape contributed to this brutality (39.27m MeanTRI/69.94% Traff). At face value, the terrain seems favorable to German mobility strategy. However, several factors combined to remove strategic advantage.

The first is the massive spatial extent of the war. World War II is the largest of all wars in human history by spatial extent, with participants from every continent and fighting occurring across Europe, Asia, and North Africa. My approximation of the spatial extent of the war in its aggregated form is a massive 2,190,850 km2 – with a conservative estimation of the German-Soviet War comprising 1,148,208 km2. In this sense, the sheer scope of the war increased the cost of movement. Secondly, the contest was a "fair fight," with the Germans holding a small but comfortable CINC advantage (1.63:1).[39] In practice though, the parity was greater in that German forces were divided between several fronts and maintaining previous gains, both in earliest stages of the war in Yugoslavia and Greece, and later following the Allied campaigns in North Africa, Italy, and Normandy. The initial stages of Operation Barbarossa matched approximately three million Axis forces against three million Soviet forces, with roughly another million forces scattered through the Soviet Union. Third, while terrain was nominally level across the spatial extent of the war, the landscape was only conditionally trafficable. The dominant landscape classes, mostly various croplands, pasturelands, and grasslands transformed in wet weather and under the movement of massive armies into a muddy quagmire – slowing the movement of infantry, horses, tanks, and materiel.

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[39] Germany enjoyed advantages in four of six NMC categories: military expenditures (4.20:1), Military Personnel (1..69:1), Iron and Steel Production (1.34:1), and per capita energy consumption (1.80:1) – as well as a soldier quality ratio of 2.49:1. The Soviet Union held advantaged in total population (2.17:1) and urban population (1.28:1).
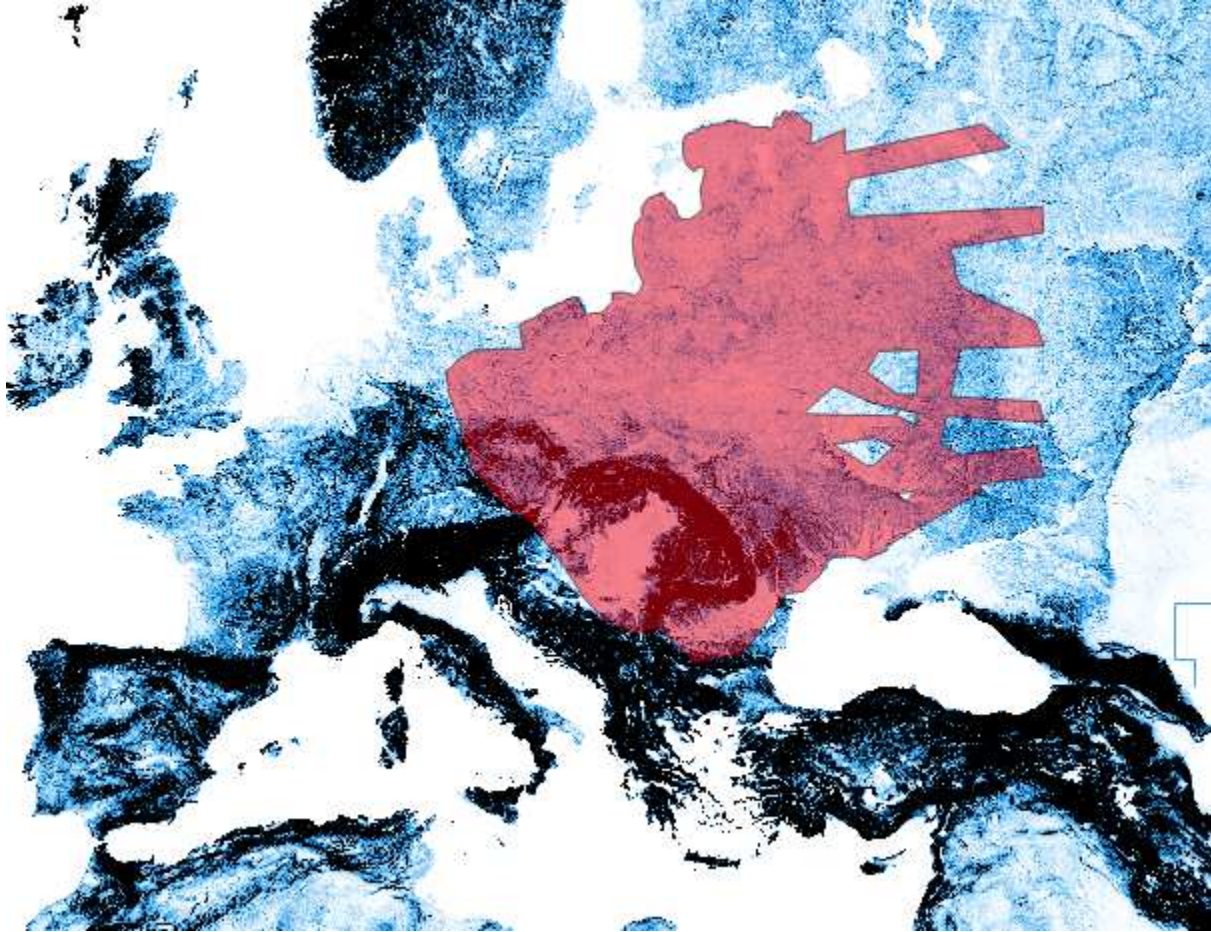
Map 1: German-Soviet War 1941-1945 (Sutton 2018)

These elements, taken in tandem, demonstrate the unique relationship between power, terrain, and strategy. While the Soviets expected invasion, Operation Barbarossa benefitted from tactical surprise. It commenced with a two-fold plan of attack: German and Romanian forces planned to blitz toward Kiev and on to the Dnieper Valley in the south, while the other prong would drive to Warsaw then onto Smolensk and Moscow. Finnish forces, following their defeat in the 1939-1940 Russo-Finnish War (Winter War),[40] were to threaten Leningrad from the north. The initial stages of the war between July and November 1941 were among the most impressive

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[40] Soviet victory over Mannerheim's Finnish forces was pyrrhic, with Russia suffering a 5.091 loss exchange rate despite a 53.40:1 CINC advantage. Ultimately, the USSR would gain a slight territorial buffer at a steep cost that demonstrated Soviet vulnerabilities to their now belligerent Nazi neighbors.

campaigns ever: German forces managed to inflict an astounding three million casualties (about a million and a half of these were prisoners), but they did so at a cost of 800,000 casualties (Dupuy and Dupuy 1993, 1183). Yet terrain and time caught up to Nazi forces. Unable to deal a killing blow given unexpectedly challenging terrain[41] – compounded by Hitler's decision to engage the Balkans[42] – and facing a seemingly endless supply of Soviet reinforcements, winter set in upon German forces in summer dress. The sheer spatial extent of the war, coupled with a surprisingly harsh landscape, proved a stumbling block to German mobility. Further attempts to regain mobility would falter into sieges in non-trafficable urban settings such as Stalingrad and Leningrad – all while the Soviet war machine slowly rumbled into gear.

We can summarize this theory of the role of terrain in war as such: War occurs in space, but individual wars occur in place. These places provide meaning and motivation for the actors involved as well as the people who define the place. Actors apply (strategy) means (capabilities) to achieve the ends (outcomes). The characteristics of place (Cartesian length, breadth, and depth) change the efficacy of this application. Length and breadth are quantified in spatial extent (approximate total area) and depth in terrain (topographic and landscape heterogeneity). Changes in these characteristics have serious consequences on the realization of the ends. The question, then, is how can we use these quantifiers to predict the efficacy of applied means? More simply, how does terrain impact strategy? In the following section, I attempt to classify the various terrains where interstate wars have been fought.

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[41] Especially in route to Moscow. The "general mud" or *Rasputitsa* made trafficability low across the conditionally trafficable terrain following autumnal rains.

[42] Finnish forces under Mannerheim also refused to continue their campaign beyond Finland's antebellum (Winter War) national boundaries.

Where Wars are fought: Classifying Terrain by Ruggedness and Trafficability

Between the Franco-Spanish War of 1823 and the 2003 Invasion of Iraq, interstate wars were fought in nearly every region of the world between a diverse range of states – with lower levels of violence or violence between alternative types of actors occurring in likely every state in the world. These 94 wars occurred across a wide set of places and, as a result, the diversity of these wars is immense. I remove four from consideration, the Naval War, Taiwan Straits, Off-Shore Islands, and Kosovo War given their detachment from terrain. The most basic classification is by geographic location. These wars were fought on every continent, with the majority fought in Europe and Southeast Asia. While this does little to detail the proverbial "nature of the ground," there are basic elements inherent in this – which actors are fighting, the political motivation of the fighting (especially great power competition and imperialism), and predicts some degree of landscape class. It also demonstrates that interstate wars seem to occur concomitantly to the existence of states. Perhaps this is tautological, but this point carries implications for the nature of world politics. Regardless, this classification has limited use in predicting war outcomes.

A second simple, but much more useful, classification is by ruggedness and trafficability compared to surrounding regions.[43] A terrain roughness index measures topographic heterogeneity – 1km^2 in these data.[44] Trafficability details the percent trafficable landscape classes in each. In this sense, wars can occur in one of four basic settings: low ruggedness and

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[43] See chapter 3 for operationalization and data collection methods for this original data.
[44] A terrain ruggedness index is generated by calculating the difference in elevation (in meters) from a center cell and eight adjacent cells (in this study, cells are 1 km^2 in area). These differences are then squared and averaged, then the square root of this value produces a TRI (Riley, et al. 1999).

high trafficability; high ruggedness and high trafficability; low ruggedness and low trafficability; high ruggedness and low trafficability. The binary classification of ruggedness (e.g. rugged or not rugged) is relatively arbitrary in this classification. I take ordinal ruggedness classes from Riley et al. (1999)[45] and set the threshold for ruggedness at 162m average change per km^2 (intermediately rugged). This choice was made relative to the distribution of ruggedness by cases. A relatively small number of cases exist in the ordinal class above the next class (moderately rugged). This is a largely a product of Riley et al.'s typology, as the elevation range for each class expands dramatically as each class increases. An average change of 0-80 km over the span of 1 km^2 might hardly be noticed by one traversing the area, but changes beyond 162m are very substantial.[46] Trafficability is also relatively difficult to classify. The measure is already an aggregate of 28 independent landscape classes coded in binary measures as trafficable and non-trafficable. I take the dividing line between a high trafficability and low trafficability at 50%. The implication here being that a landscape is comprised of trafficable or non-trafficable majority landscape class combinations.

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[45] 1) level (0-80 m), 2) nearly level (81-116 m), 3) slightly rugged (117-161 m), 4) intermediately rugged (162-239 m), 5) moderately rugged (240-497 m), 6) highly rugged (498-958 m), and 7) extremely rugged (959-4367 m). No wars occur in the extremely rugged TRI category.

[46] As a frame of reference for committee members and myself: the TRIMean of metro-Detroit is approximately 14m, Oxford, MS is 25m, Irvine, CA is 43m, Williamsburg, VA is roughly 16.5m, and Washington D.C. is 25.5m. Michigan's Porcupine Mountains State Wilderness Area – which do not qualify as mountains geologically but are as close as we come to mountains – has a mean TRI of about 100m. The most rugged landscape in Michigan fails to exceed the nearly level classification. Michigan Pictured Rocks also has a similar TRI. It would be impossible, outside of the city of Munising, to use serious mobile units here. The only place would be trails or engineered roads.

Figure 1: Classifying Terrain by Ruggedness and Trafficability

4) High Ruggedness; Low Trafficability	3) High Ruggedness; High Trafficability
2) Low Ruggedness; Low Trafficability	1) Low Ruggedness; High Trafficability

Applying this classification, a majority of wars are fought in the "easiest terrain" class of low ruggedness and trafficability with 53 wars (WWI and WWII disaggregated are included in this count). In the remaining three categories, there exists a relatively even distribution of wars. 14 wars occur in the high ruggedness – low trafficability class, 15 wars in the low ruggedness – low trafficability class, and 20 wars in the high ruggedness – high trafficability class. Intuitively, this suggests that war is more likely to occur is these environments. More importantly, it suggests that states are inclined to choose to fight in these places. In crafting measures of spatial extent, I determined the locations where the majority of fighting occurred. On one hand, this may suggest that armies choose to fight where the cost of movement is lowest. However, this is largely a luxury of the strong and those who initiate. When the cost of movement is equal, stronger states should enjoy the benefits of strength. Weaker states may, if possible, seek to move fighting away from these places. This should be especially true in mismatches of technology or materiel. A strong state may enjoy the advantage of mobile armor, such as Italy in the Italian-Greco War. Yet the tank was inconsequential in the intermediately rough terrain of North-Eastern Greece.

Limitations in Terrain Data

It is worth noting here inherent flaws in my operationalization and data collection. I code landscape class as either trafficable or non-trafficable. This is perhaps misleading. Human history demonstrates that our species is capable of not only living but thriving in incredibly challenging environments. Yet this binary classification provides a general disposition of each class as generally trafficable or non-trafficable based on the ease of movement. This is much more pronounced in the movement of armies (and the scale of participation needed for violence to amount to war dictates that large numbers of peoples are mobilized). While *HYDE* data is far more accurate and precise than previous attempts at classifying terrain, the classes themselves are fluid in their trafficability. That is, they are conditionally trafficable. An exogenous event, like weather or human modification (the Dutch destroying dikes and flooding their own country in response to Nazi threat), can make a normally trafficable environment non-trafficable. Beyond this, there are certain permanent features of the land which structure space: Lakes, rivers, valleys, hills, etc. These features are often present in the easiest of terrains yet their importance is profound. An entirely level and trafficable place may be easy to traverse until one of these points is reached – i.e. a river without a ford requiring either a permanent bridge, an ad hoc structure (such as pontoons), or tactical diversion to an easier crossing. The tradeoff capturing such an expansive measure of landscape is losing the peculiar. These are often prominent and defining features of specific battles, such as fords on the Rappahannock during the Battle of Chancellorsville, but do not define entire wars or landscapes. Thus, this measure is keeping with the general theme of explaining war outcomes writ large.

Beyond this, my terrain data offers a snap shot of the full spatial extent, rather than the tracking its evolution over time. The tides of war often change. For instance, in the Saudi-Yemeni

War, Saudi forces used mobile armor to route Yemeni forces across the desert landscape. However, once Yemeni forces were backed into Sanaa, the mountains halted Suadi movement. In this sense, the impact of terrain was unequal over time. This is general problem that exists in every case – but is largely an unavoidable one at this initial stage of data collection. These problems can be addressed through future iterations of data collection. Regardless, this simply suggests an intuitive point: just as war cannot be divorced from place, it cannot be divorced from time. This motivates the mixed methodological approach of this project by making the limitations of statistical analyses clear and necessitating further qualitative analysis and innovations in future data collection.

Prior to the following analysis, it is worth addressing the question of time period. The previous chapter suggests that the broad time periods are not predictive of the correlates of war outcomes but this is only on a macro level. Since wars occur in place and time, it is beyond doubt that the modes of war impact the course of war. The temporal range of this study, nearly 200 years, suggests that the modes of war change by war (i.e. horses to combustion engines, black powder to smokeless). These changes should impact strategy. On one hand, at least in major wars between great powers, the changes likely develop in tandem. Even at unequal levels, the effects should be similar. In asymmetrical war, the technological inequalities are likely more pronounced. While this is speculative, there are serious real-world examples. Israeli air superiority in 1967 enabled their major victory, but by 1973 mobile and static SAMs and infantry shoulder mounted missiles neutralized this superiority. Terrain again rears its head here. Non-trafficable terrain, like dense forests, or rugged terrain, like mountains, limit disparities in technology and weaponry. Operation Rolling Thunder in Vietnam dropped more ordinance than

all of World War II combined but did little to break the NVA just as insurgents in Afghanistan have evaded American air strikes in vast mountains. While this is not explicitly considered in the following sections, this issue is implicit. The cost of movement, especially in easy terrain, should decrease with mechanization. In tough terrain, that point is more ambiguous and likely conditional. Helicopters and paratroopers may quickly advance but tanks, trucks, and other vehicles still cannot climb mountains and pass through dense forests, swamps, or other obstacles (at least not without the presence of roads). There is room to suggest here, that despite all the advancements in movement and weaponry, infantry remain the dominant unit in warfare. Granted the role of infantry has evolved – as infantry may now operate antiaircraft weaponry, have improved equipment, and can operate unique communications tools – their primary purpose has remained static: to occupy and control territory.

Secondly, changes in technology have drastically reduced the number of deaths related to war's greatest killer: disease. Where warfare exists, there is fertile environment for disease. This basic reality has defined warfare since the beginning of civilization. World War I, for all of its tremendous and unprecedented bloodletting, cost fewer lives than the Spanish Flu. This trend would only change with the development and adoption of antibiotics – specifically penicillin – following WWII. Certain regions hold diseases which are particularly problematic, such as Malaria. In these regions, terrain often facilitates transmission of these diseases. For example, malaria transmitting mosquitos breed in standing water. Parasites like Schistosomatidae are endemic in various water supplies. There is no simple way to measure this problem but it is again relatively implicit in the terrain data. Regardless, like time, there is room for further study on this topic.

Terrain Classifications in Comparison

The following presents a qualitative and comparative analysis of varying classes using mini-case studies. The purpose here is not the demonstration of exact causes of war outcomes but rather the identification of an existing relationship between power, strategy, and terrain. This goal is more modest than the previous chapter but perhaps more important. If the previous chapter demonstrates that power is the primary predictor of war outcomes, then discrepant cases are of importance. Unless otherwise noted, cases are synthesized from Sarkees and Wayman (2010a), Clodfelter (1992; 2017), and Dupey and Dupey (1993).

Figure 2: Scatterplot of Wars by Terrain Classifications

Low Ruggedness – High Trafficability

This is the "easiest" terrain to fight a war in and is the modal class by number of wars. These spaces are all "level," "nearly level," or "slightly rugged" by ruggedness index. It is notable that many of the largest wars fit this class. There is a small but significant relationship between roughness and spatial extent. As spatial extent (*count*) increases, ruggedness decreases. This is summarized by Tobler's (1970) first law of geography. Tobler writes, "everything is related to everything else, but near things are more related than distant things" (236). Given this, wars with larger extents are generally waged on level or near level ground. This carries implications for the nature of wars in this class that pivot in two directions. Wars in this class are best suited to mobility strategies given the low cost of movement, but the scale of larger conflicts often demands attrition strategies. This suggests a possible conditional relationship between terrain and strategy selection. That is, states do not always employ the most efficient strategy for a given terrain. Alternatively, certain strategies may cause wars to increase in spatial extent.

The first point, that larger wars are often fought in low ruggedness – high trafficability terrains, is likely more than a product of spatial relativity and a quirk of geography.[47] As war is purposeful behavior, it is fair to assume that the locations that wars are fought are equally purposeful. A number of reasons may explain this point. First, many of these large wars are European conflicts. Disaggregated WWI[48] and WWII, Franco-Prussian War, and Seven-Weeks Wars are all fought in the metropole of world power during each of the years of these wars. In

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[47] There is no hard and fast metric to classify wars by size but an intuitive means of distinguishing wars by size is relativity. Larger wars are wars above one standard deviation from the mean of all wars minus outliers.

[48] The Eastern Front and Western Fronts covered approximately 479,873 km^2 and 90,877 km^2 respectively. The largest spatial extents of WWII included the German-Soviet War (1,148,208 km^2, larger than all of WWI), Western (456,538 km^2) German-French War (155,691 km^2), and German-Polish (127,589).

this sense, they are locations of extreme territorial importance and near or adjacent to major population centers. Further adding to this point, with the exception of the Franco-Mexican War, power projection is relatively limited and distance between the initiator and target is small. Conceptualized alternatively, many of these wars involve contiguous participants. While contiguity is almost a natural feature of war (and the highest correlate of war occurrence), contiguity is more abundant in spatially larger wars.[49] Finally, these wars are often longer conflicts (the exception being The Vietnam and Laotian Wars, with both being medium conflicts by space but particularly long). This suggests that spatially 'big' wars evolve and grow into their size over time. This adds to the complex relationship between spatial extent and strategy.

Mobility strategies are best suited for use in high trafficability – low ruggedness terrains. Conceptually, the dominant landscape classes present in this terrain class provide for low cost movement. These classes, ranging from hard pact deserts and grasslands, to sparse shrublands and croplands, are generally open spaces, void of major and persistent obstacles. That is not to say they do not exist – as the threshold for trafficability this classification is 50%. This class also avoids major changes in elevation. While this class captures a wide range of ruggedness (0m-161m), these terrains are generally level. This does not mean that they are void of major geological features – an errant hill, pit, or even sizeable peak – but ruggedness does not define the whole of the landscape. These odd features may structure or divide a space though and have a large impact on tactical advantages or disadvantages locally.

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[49] Contiguity here including Japan and China, contiguous through the Sea of Japan and East China Sea.

The examples of Nazi Germany and Israel embody the benefits of mobility in easy terrains and present something of an opportunity for a least-similar cases comparison (authoritarian and democratic regime types). As previously discussed, Nazi German forces achieved quick and decisive victories against France, Belgium, Norway, Holland, Denmark, Greece and Yugoslavia – faltering only when conditionally trafficable terrain and time halted Operation Barbarossa. Beyond this, these fights (with the exception of the Soviet Union) were gross mismatches. Given this, the case of Israel provides an even more intriguing look at this terrain class as Israel prevailed in three of their five major wars at a major capabilities disadvantage. The implications also comment on the validity of the democratic victory. As Desch (2002; 2008) notes – and my work replicates in the previous chapter – the significance of democratic regime type is rendered null when the Arab-Israeli, Yom Kippur, and Six-Day wars are removed from the population of wars. The suggestion here is that the significant relationship between democracy and victory is largely a relationship between *one* democracy and victory. Importantly, Israel's democracy[50] had very little to do with their success. Rather, as discussed below, Israel overcame dramatic disadvantage in capabilities given a favorable terrain-strategy combination – a benefit not derived from selection effects.

Table 14: Israeli Wars, 1948-1982

Arab-Israeli Wars	State	Initiator	Concap	Trafficability	TRI	Count	Doctrine-Strategy	Outcome
Arab-Israeli (1948)	Israel	Target	14.89%	84.34%	96.08m	~3,854 km^2	Defensive Mobility	*Israel Wins*

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[50] Like many states in the POLITY data, Israel's scores are potentially problematic. Alternative measures of democracy call Israel's consistent democratic standing into contention. VDem scores for 1948 code Israel as an autocracy in 1948 and as a democracy in 1967, 1969, 1973, and 1982 (Coppedge, et al. 2016).

|								
	Arab League: Egypt, Syria, Lebanon, Jordan, Iraq	Initiator	85.11%				Offensive Attrition	
Six Day War (1967)	Israel	Initiator	15.30%	85.44%	59.01m	~6,122 km²	Offensive Mobility	*Israel Wins*
	Arab League: Egypt (U.A.R.), Jordan, Syria	Target	84.70%				Defensive attrition	
War of Attrition (1969 – 1970)	Israel	Target	21.77%	90.78%	27.61m	~2,615 km²	Offensive Attrition	*Draw*
	Egypt	Initiator	78.23%				Defensive Attrition	
Yom Kippur (1973)	Israel	Target	17.38%	96.24%	60.73m	~2,389 km²	Defensive Mobility	*Israel Wins*
	Arab League: Egypt, Saudi Arabia, Jordan, Syria, Iraq	Initiator	82.62%				Offensive Attrition	
War over Lebanon (1982)	Israel	Initiator	52.35%	81.63%	205.74m	~359 km²	Offensive Attrition	*Draw*
	Syria	Target	47.65%				Defensive Attrition	

Map 2: Arab-Israeli War, 1948
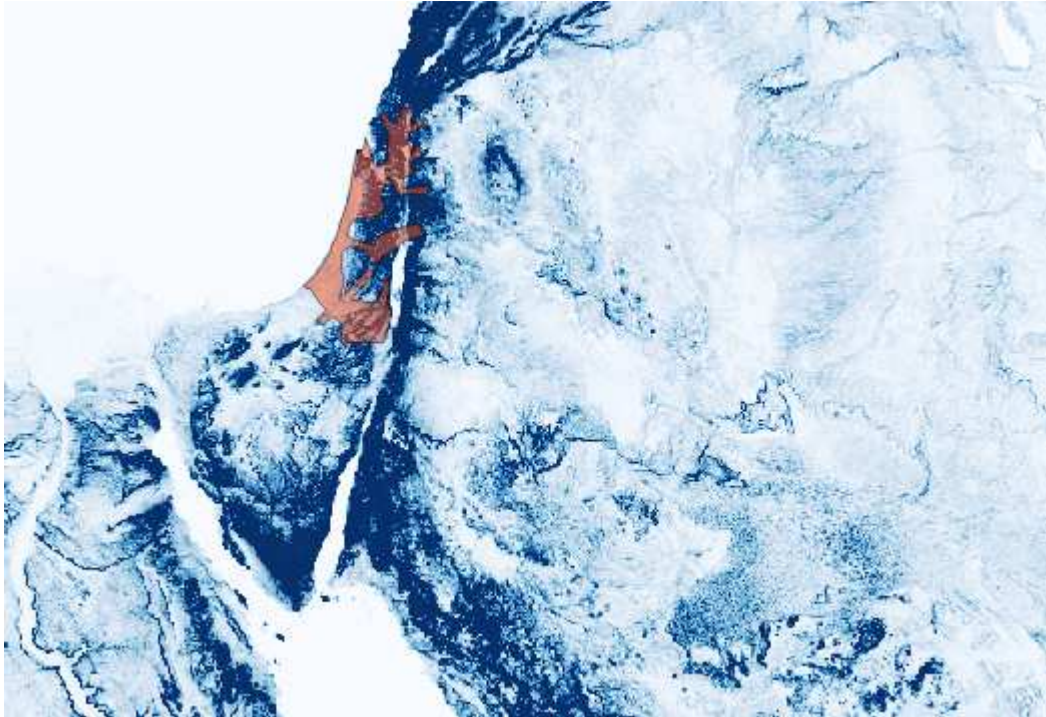
In the Arab-Israeli War (1948), Six-Day War (1967), and Yom Kippur War (1973), Israel faced significant power disadvantages yet managed to win decisive victories – though this may be overstated given inherent disadvantages in attempting to combine alliance capabilities into a coherent effort (in this case, the Arab League). The initial war, the First Arab-Israeli War, has deep and complex roots which came to a head on May 15th, 1948 (Sarkees and Wayman 2010a; Clodfelter 1992; Dupuy and Dupuy 1993). The United Kingdom, which held a mandate over Palestine following the Sykes-Picot Agreement (1916) and fall of the Ottoman Empire in World War I, failed to achieve agreement between Arab and Jewish parties. The issue was turned over to the newly formed United Nations which agreed to partition Palestine. Arab and Jewish groups, rejecting the Partition Plan, engaged in a series of violent engagements through May 1948 (non-state war #1572), until the termination of the British mandate on May 14th of 1948. One day later,

on May 15th, Israel declared independence and was immediately recognized internationally, marking the beginning of the interstate war between Israel and the Arab League (Egypt, Syria, Jordan, Lebanon, Iraq). It worth noting here, that a state aged one day receives little benefit from democratic features. Rather, Israel's war would be defined by survival.[51] Bloody fighting would continue, despite two U.N. orchestrated truces,[52] through October 31st, 1948 when Iraq, Syria, Lebanon, and Jordan withdrew from sustained fighting. Israel then turned its full attention to the Egyptian front in the south, where on January 7th 1949, Egypt withdrew from hostilities. The war was defined by Arab advances, which were then stymied by Israeli mobility – a strategy aided by errs and difficulties in Arab League organization and Israel's ability to reorganize and mobilize during breaks in fighting.

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[51] Perhaps the greatest example of "undemocratic" activity in pursuit of survival on behalf of Israeli forces, is the assassination of the Swedish U.N. mediator Count Folke Bernadotte during a U.N. mediated ceasefire. This assassination was likely orchestrated by the Stern Gang. While not approved by the young Israeli government, the presence of such paramilitary organizations, suggests fledgling state capacity at that time.

[52] Making this one of few COW wars which have sizeable gaps in fighting and thus two start dates.

Map 3: Six-Day War, 1967
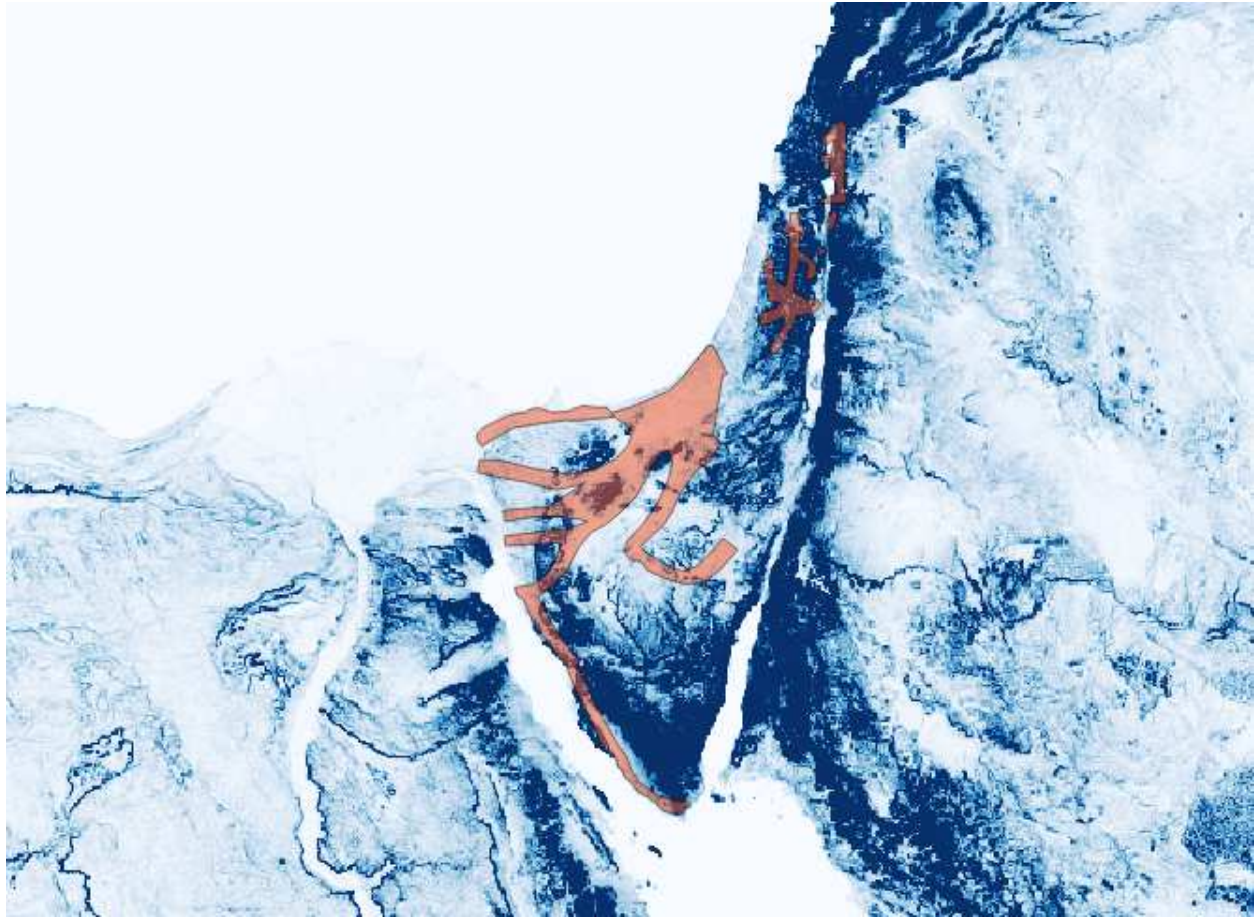
The end of the first Arab-Israeli War hardly settled the causes of the first war, adding over a million displaced Arab Palestinians. These problems were exacerbated by British, French, and Israeli victory against Egypt in the Sinai War of 1956 (interstate war #155), the subsequent U.N. peacekeeping mission (withdrawn in 1967), and the closing of the Straits of Tiran to Israeli shipping. In response to growing tensions in the region – including the formation of the PLO and Fatah in 1964 and 1965 respectively, limited Israeli attacks in Syria and Lebanon, and Pan-Arabism – Israel launched a preemptive attack against Egypt on the morning of June 5th, 1967. The Egyptian air force was largely destroyed on the ground on the first day of the war and the Sinai fell to Israeli control in four days. On the Jordanian front, the Old City of Jerusalem fell on

the second day of fighting, with Bethlehem, Hebron, and Etzion on the third day. Against Syria,

Israel maintained its success by storming the Golan Heights. Israel demonstrated a masterful use

of mobility, combining air strikes, amphibious landings, deception, and speed. Israel's use of

speed was best exemplified in the Sinai, when Egyptian Field Marshall Amer ordered a general

withdrawal and Israeli forces turned the retreat into a route.

Map 4: War of Attrition, 1969
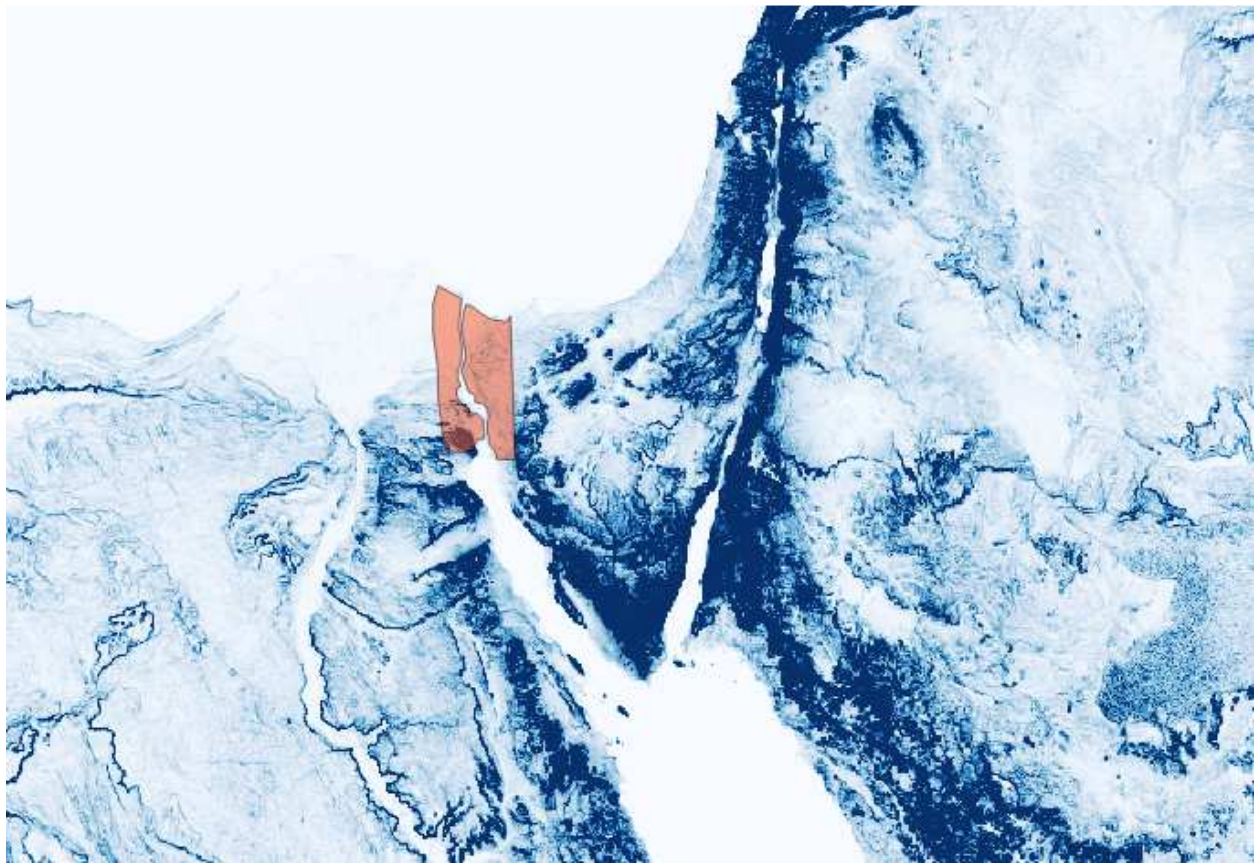
Despite the 1967 war being quick and decisive in favor of Israel, the underlying political

issues in the region were far from settled – and ultimately exacerbated by Israeli gains in the

Sinai, Gaza, and Golan. President Nasser declared a War of Attrition on March 6th, 1969. Various

Arab leaders hypothesized that advantages in capabilities held by the Arab states, especially in

population, could only be actualized in a longer conflict. The war would be defined by a year and

a half of artillery shelling along the Suez, with sporadic Israeli commando raids. While Israel enjoyed a significant air advantage, Egyptian SAMs, delivered by the Soviet Union, proved costly. The war would end in a stalemate, with Israeli costs mounting and Egypt unable to break Israel's hold of the Sinai. The joint attrition strategy, coupled with defensive terrain advantages provided by the Suez, made the war efforts especially futile without a much larger escalation.

Map 5: Yom Kippur War, 1973
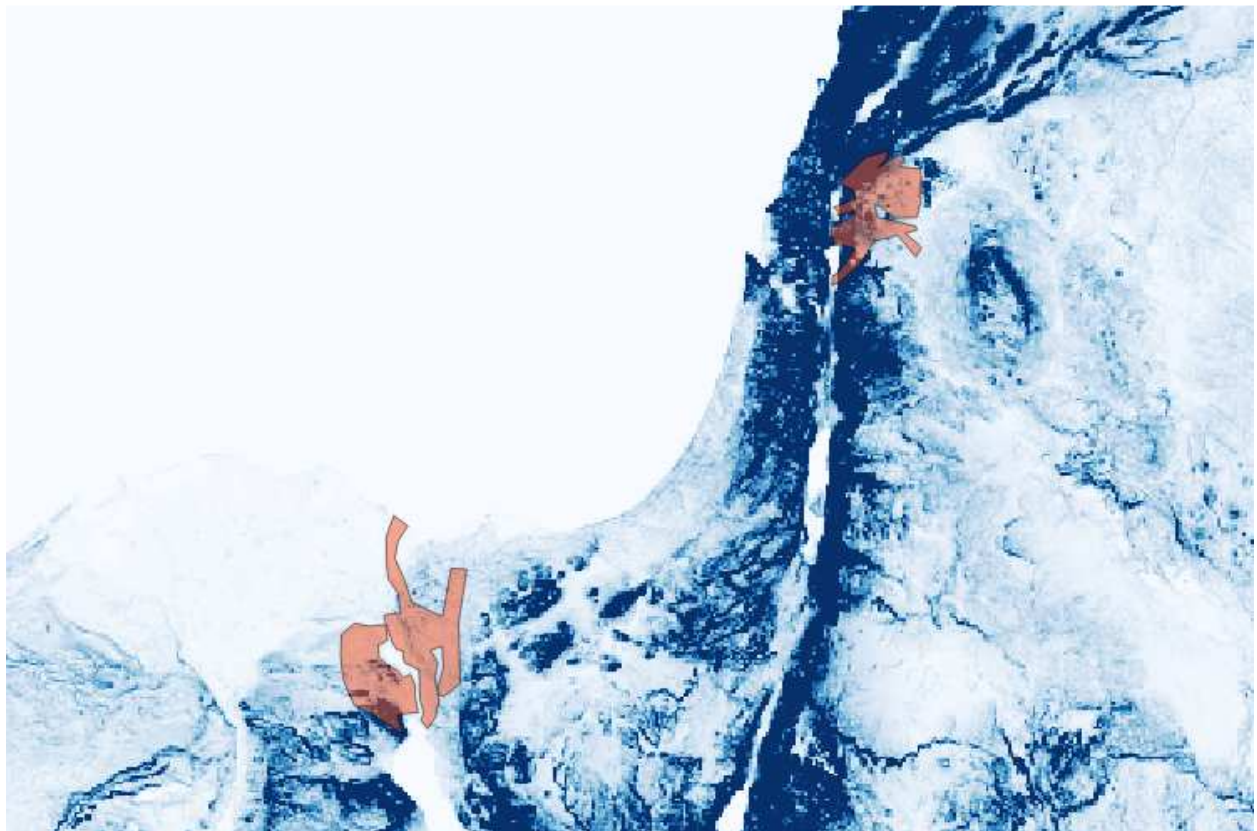
Hostilities would again flare up to the point of war in 1973, bolstered by recurring tensions in Palestine, a limited Israeli invasion of Southern Lebanon in response to Fatah, and continued Israeli occupation of the Golan Heights and the Sinai. Arab states, primarily Egypt and Syria, sought two basic objectives: at minimum, to restore credibility lost in the 1967 war and, at maximum, the reconquest of Israeli occupied territory (Clodfelter 1992, 1051). The Arab League

achieved a rare tactical surprise on Israel, duping Mossad. On October 6th, 1973 Egypt and Syria launched a daring two-front invasion of Israel – armed with an array of new weaponry that diminished Israeli air and mobile armor advantages.[53] Following an astounding aerial and artillery bombardment, Egyptian armies crossed the Suez – paddling at first, then across pontoons.[54] Syrian forces quickly advanced into the Golan Heights, until reaching the Israeli "purple line", a defense-in-depth of 20km including an exterior minefield, antitank ditch, and over 100 pillboxes and blockhouses. While initially successful at playing Israel's own game, Israel would make a dramatic stand. In the Golan Heights, Israel repelled Syria forces, as well as limited Jordanian, Moroccan, and Iraqi forces, driving deeper into Syrian territory. On the Sinai Front, forces engaged in a series of brutal fights – including the largest tank battle since 1943. Israel forces were again able to use a defensive mobility strategy to lead enemy forces into disarray – including the use of paratroopers into Africa.

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[53] These weapons included a range of static SAM II missiles, mobile SAM III missiles, SAM VI missiles mounted on tank chassis, infantry SAMVII Strella missile launchers, and ZSU-23 antiaircraft guns. Clodfelter (1992) writes, "the two weapons that had so dominated the battlefield in 1967 – the Israeli fighter-bomber and tank – would come up against [Soviet supplied] new weapons that would greatly diminish that dominance. In many ways the new antiaircraft and antitank missiles would have as revolutionary an impact on modern warfare as has the longbow and arrow on Medieval battlefields at Crecy in 1346 and Agincourt in 1415. This represented a new emphasis on defense and defensive weapons" (1053-1054).

[54] In an interesting anecdote relating to trafficability, the Suez formed a barrier between Africa and Asia. The dunes in the Israeli held Sinai were 18-30 feet high. Egypt overcame this challenge through the use of high pressure water cannons to clear a landing area.

Map 6: War over Lebanon, 1982
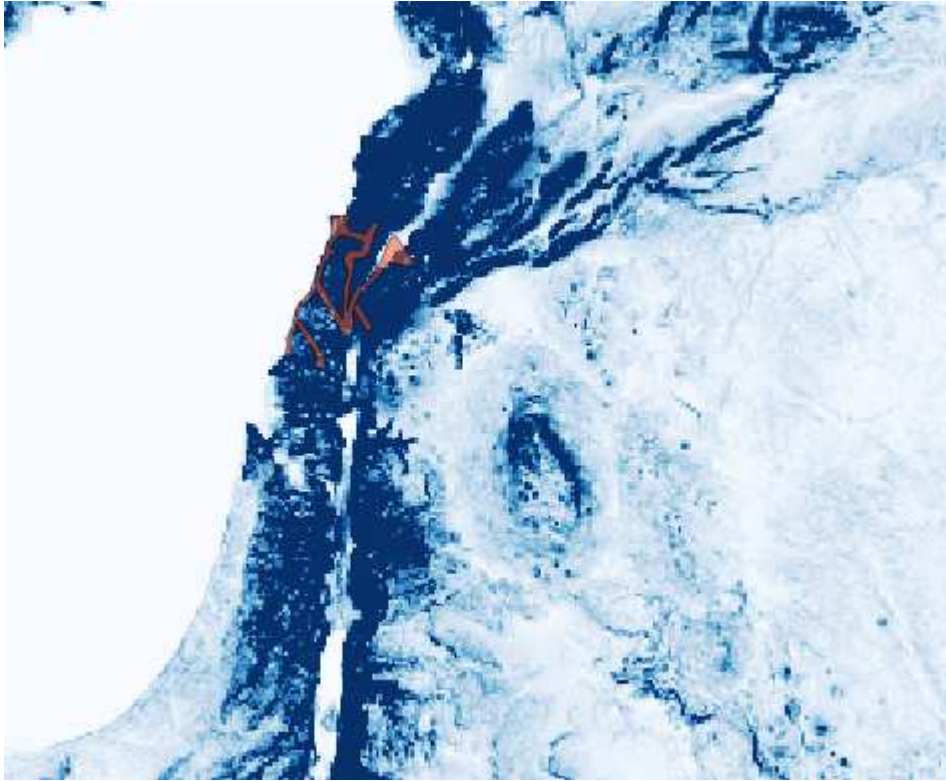
In the final interstate war to date between Israel and its neighbors, Israel faced off against traditional foe Syria over Lebanon in 1982. This war occurred in terrain class three, high ruggedness – high trafficability. Both Syria and Israel had previously intervened in Syria, in response to a litany of political issues salient to these states. Israel initiated when both states reinforced their positions in Lebanon. While the war is notable for its aerial combat (the highest volume since the Korean War), extensive ground fighting occurred, with Israeli forces pushing closer and closer to Beirut. The war would conclude with a sustained siege of the city, with thousands of Lebanese civilians killed in the process. The war would end in stalemate between Israel and Syria – but the PLO was driven from the city after much of West Beirut was destroyed. Still this victory against the non-state actor was pyrrhic. The PLO had killed less than 1,400 people

(only 326 were Israeli) in 12 years. Israel would lose 455 soldiers and suffer another 2,380 wounded in action in the war – mostly from Syria (Clodfelter 1992, 1075).

These five cases raise several questions, with important answers speaking to the nature of war outcomes. The first, did Israel benefit from its democratic regime? The short answer is no. Israel declared independence and was invaded by its Arab neighbors on the same day in 1948. Not only did the state of Israel not select the war, it would only formalize its democratic institutions after the cessation of hostilities – thus victory was not aided by selection effects. While Israel did select its most decisive victory in 1967, this selection was a bold gamble. Perhaps this demonstrates some foresight, but war itself was imminent. The selection was that of tactical surprise – not strategic surprise. While the war was among the most swift and decisive in modern military history, it failed to resolve any of the underlying political issues – and ultimately exacerbated them leading to three additional wars in the next fifteen years. Israel would not again "select" a war until its 1982 war with Syria over Lebanon in rugged terrain, leading to stalemate. In the only case where selection supports victory, the advantages are best explained by strategy. However, there may be some inherent benefit which Israeli democracy promoted: support from the United States. Advantages in technology greatly aided Israeli mobility in 1948, 1967, and 1973. However, by 1973, these technological advantages were partially negated by the Cold War power politics of Soviet support for Egypt and Syria. This too may be better explained by power competition and geopolitics than ideology and valence democratic norms.

The second question is, did strategy influence war outcomes? Again, the answer is simple: yes. Israel engaged a mobility strategy in its three victories and attrition strategies in its two stalemates. In 1948, 1967, and 1973, Israel used speed – facilitate by paratroopers, amphibious

landings, and mobile armor – to disrupt enemy organization and supply lines. At times, especially

in the Sinai in 1967 and 1973, this speed caused major routs against numerically superior forces.

The answer becomes more complicated when terrain is considered. The major theaters of these

wars are broadly level and trafficable. This is especially true of the northern Sinai – and across

the Suez in North Africa. This was partially facilitated by a geographic disconnection from war

goals. The modis operandi of Israel was survival. In 1948 this threat was existential, and while

this was less so in 1967 and 1973, continued existence was strategically tied to the maintenance

of a geographic buffer found in occupied territories. In this sense, holding place beyond the

antebellum boundaries of Israel was objectively tertiary. This freedom allowed Israeli forces the

latitude to out maneuver Egyptian and Syrian forces. The tables would turn in 1969 and 1982.

The man-made terrain boundary of the Suez partitioned the War of Attrition and the defensive

weaponry (especially SAM antiaircraft missiles) and offensive artillery made trafficking the

boundary challenging. Israel adopted a similar attrition strategy and accepted stalemate when

limited moves to challenge Egyptian positions halted. Compared to 1948, 1967, and 1973, Israel

was tied to place – maintaining the status quo. In similar sense, Israel sought the control of a

major urban center in the 1982 War over Lebanon and faced rugged terrain. The control of place,

rather than outright defeat of an enemy over a relatively wide space, proved to limit the

incredibly successful Israeli war machine.

Taken in tandem with the case of Nazi Germany, a terrain-strategy relationship is

apparent. These states, in low ruggedness – high trafficable settings, quickly and decisively

defeated opponents with haste using mobility strategies. Only when facing the indefinite

combination of non-trafficable terrain and seeking political to gain or maintain control over

specific place – beyond the defeat of enemy forces – did these states falter. This is true in the case of Nazi Germany (Stalingrad, Leningrad, Normandy) and Israel (the Suez, Beirut). This also suggests that the modal strategy for this class and all wars, attrition, is best suited for longer, drawn out fights over political control. This is especially true of non-trafficable terrains in this broadly trafficable terrain class - specifically cities and urban areas. The primary predictor of these attrition fights remains power – as the impact of terrain is relatively equal rather than as an equalizer.

Low Ruggedness – Low Trafficability (2)

The second terrain class, low ruggedness – low trafficability, is the class of some of the most devastating, consequential, and unequal wars of the twentieth century. Notable wars in this class include the Russo-Japanese War of 1904, the Russo-Finnish War of 1939-1940 (Winter War), and Vietnam War. An additional ten wars populate this class – including World War II's German-Norwegian War and the final phase of the Vietnam War between North and South (after American withdrawal). This class is perhaps the most diverse of the terrain classes. While all share generally level terrain, the landscape classes which make these places non-trafficable are wildly different. In part this makes analysis challenging but there is broad room for comparison. For example, in the Lithuanian-Polish, Estonian Liberation, and Latvian Liberation Wars, the landscape classes are majority non-trafficable. The landscape classes here are dominated by a single class, temperate evergreen broadleaf forests (*tmpenf*). In general terms, these forests make travel more difficult but hardly impossible. These forests are not particularly challenging for infantry and vehicles can, with some difficulty, pass through the intermediately dense forest – especially via roads, which are not challenging to construct in such settings. However, other

landscape classes are entirely different. In Vietnam, the dominant classes include tropical

deciduous broadleaf forests (*trpebf*; 12.15%) and tropical evergreen broadleaf forests (*trpdbf*;

52.03%) are much denser. Infantry must labor through the flora, and even contend with

challenging fauna,[55] and the propensity for these environments to become flooded or saturated

with water in rainy seasons exacerbates this problem even more.

This environment provides a unique setting for weak opponents. In fact, of the 14 wars in

this setting, six are victories by weak states facing gross mismatches (First Sino-Japanese,

Estonian Liberation, Latvian liberation, Franco-Thai, Vietnam Wars), with an additional one draw

in a gross mismatch (War of the Communist Coalition). The Russo-Finnish War is also notable for

the gross inequality in the loss exchange rate suffered by the dramatically stronger Russians (5:1).

I suggest that this environment acts as a power equalizer for weaker states, especially those

fighting at home. It does so by limiting the use of advanced technologies (mobile armor and air

power) and placing an emphasis on small scale skirmishing. I present three cases which

emphasize this hypothesis: the Russo-Japanese War of 1904-5, the Russo-Finnish War of 1939-

1940, and the Vietnam War of 1965-75. These cases provide a unique insight into the role of

terrain, as well as the influence of strategy and terrain. The first fight matches attrition strategies,

the second Russian offensive-attrition against Finnish defensive-mobility (Fabian), and the third

North Vietnamese offensive-punishment against American and coalition defensive-attrition. We

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[55] Vietnam is home to an array of venomous snakes (Asian Cobras, King Cobras, Coral Snakes, Kraits, Vipers). There are tales of the NVA and Viet Cong booby trapping areas with snakes, occasionally tied from low hanging branches to surprise unsuspecting American G.I.s. A myth arose about "two-step" snakes. A soldier was bitten and two-steps later, the soldier would die. While this is an exaggeration, these challenges certainly made these landscapes increasingly difficult.

see relatively equal effects from terrain, less on strategic efficacy, but rather on the application

of power.

Table 14: Russo-Japanese War, Russo-Finnish War, and Vietnam War

Terrain Class 2 Wars	State	Initiator	Concap	Traffic ability	TRI	Count	Doctrine-Strategy	Outcome
Russo-Japanese (1904-5)	Japan	Initiator	27.16%	39.01%	94.58 m	~9,519 km²	Offensive Attrition	*Japan Wins*
	Russia	Target	72.84%				Defensive Attrition	
Russo-Finnish (1939-40)	Finland	Target	1.84%	23.79%	41.14 m	~227,701 km²	Defensive Mobility	*Soviet Union Wins*
	Soviet Union	Initiator	98.16%				Offensive attrition	
Vietnam War, Phase 2 (1965-1975)	North Vietnam	Target	2.40%	31.18%	145.25 m	~23,555 km²	Offensive Punishment	*Vietnam Wins*
	USA, South Vietnam, Cambodia, Philippines, South Korea, Thailand, Australia	Initiator	97.60%				Defensive Attrition	

The cliché surrounding sports upsets, when a true underdog defeats a powerhouse

program, reads, "that is why we play the game." This is the narrative usually associated with the

Russo-Japanese War. On paper, the Russians were stronger and more capable than the Japanese,

enjoying a 2:68:1 CINC advantage. However, the million-plus man Russian army was thousands

of miles from the two-front war and the only connection between the men and action was a

5,500 mile ride on the single-track Tran-Siberian Railroad toward Port Arthur (not to mention a

100 mile gap at Lake Baikal. These realities suggest a fair-fight. In this sense, this war is the

weakest link to the previous hypothesis, but the role of non-trafficable terrain at the Siege of Port

Arthur and at the Battle of Mukden in Manchuria – not to mention the gravity of this war shaping

the early twentieth century balance of power – suggests that the role of terrain must be

explained here. There are also, horrific as they may be, Machiavellian lessons to be found in

Japan's imperial barbarism in the region following the conflict.

Map 7: Russo-Japanese War, 1904-05
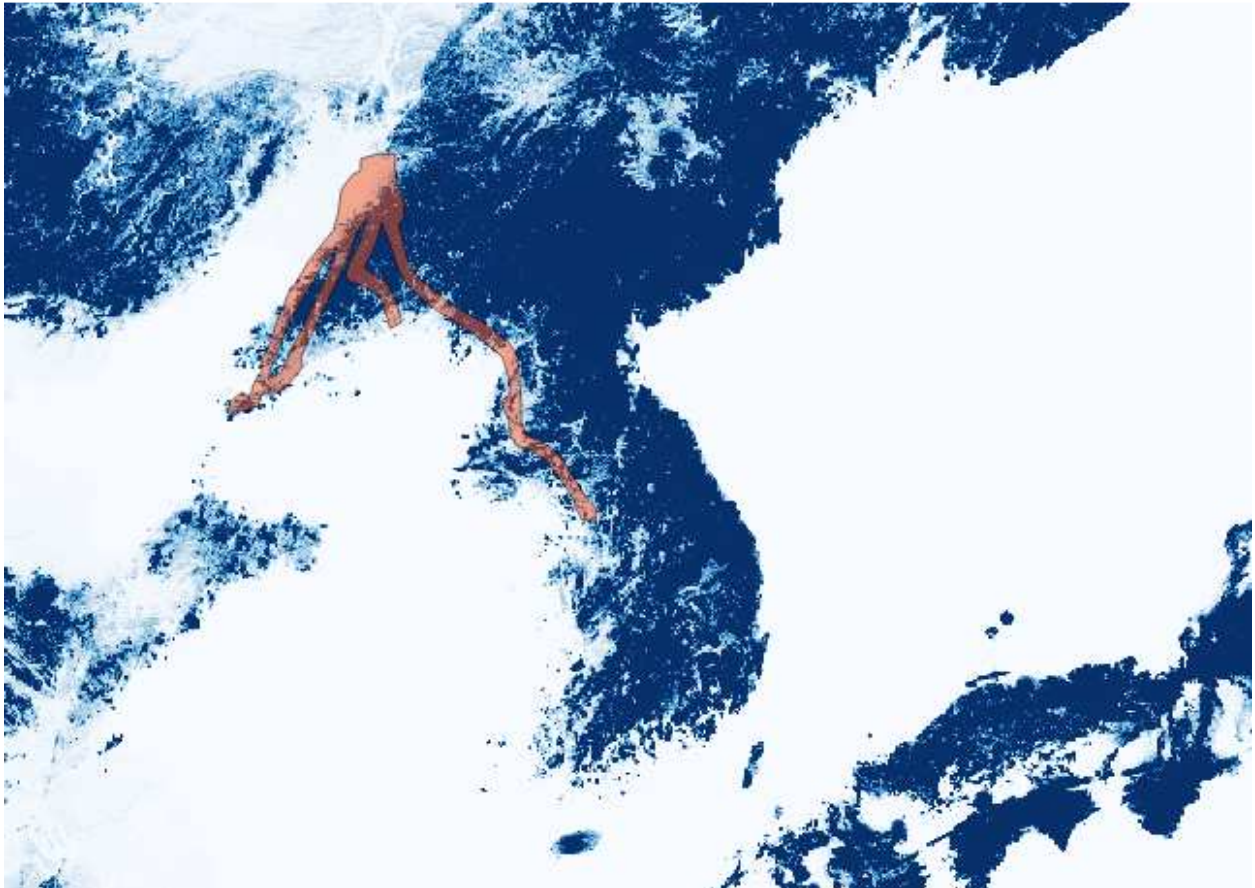
War began on February 8th, 1904 with a tactical surprise attack by the Japanese on Port

Arthur (present day China). The fight would ultimately determine dominance over Korea and

Manchuria. Clodfelter (1992) notes that this was largely a contest between Russia's Army and

Japan's Navy. Russia consistently faced the challenge of projecting power, both ground and naval

forces, across a massive distance. There are two major incidents of note relating to the role of

terrain in this consequential fight: The Siege of Port Arthur and the Battle of Mukden. The Siege

of Port Arthur ranks among the most memorable of sieges in military history – costing the lives

of thousands of Russians and Japanese soldiers. There is a general note to be made about sieges

and terrain – urban settings are often the focus of competition in war because of their political,

strategic, and geopolitical importance. The port had served, and would serve to whomever held

it, as a source of power projection capabilities in the region. Port Arthur, like any urban area, is

largely non-trafficable – but in the case of a fortified and walled site, this is especially true. The

cost of moving against the port in blood would add up to some 11,000 Japanese lives, not to

mention thousands of Russians. Clodfelter (1992) writes, "About 22 percent of the Japanese

wounded died, compared to a usual 12 to 15 percent in other wars of that era. The reason for

this high fatality rate was not due to poorer hygiene or medical care in the Japanese army, but

because of the phenomenal bravery of the Japanese infantry in direct assaults, particularly at

Port Arthur – where head wounds were more likely because of the angle of fire discharged from

Russian rifles downhill at the massed ranks of the attacking infantry" (650).

The real test of terrain lies across Liaodong Bay into Southern Manchuria proper. The

region is nominally nearly-level (though the means of war at the time, horses, were less apt to

scale rugged terrains than later machines equipped with rubber wheels and driven by internal

combustion) but challenging by landscape class. In places which were not wooded (much of the

area surrounding Mukden was open cropland), the cropland was only conditionally trafficable.

Winter conditions set in by the time of the battle (February 21-March 10, 1905) along the 40-

mile front. The numerous streams in the region were intermittently frozen and croplands challenging to traffic due to the frozen furrows (Sisemore 2015). As one Russian cavalryman wrote on Mukden:

> "In General, Our Cavalry Has Had To Operate Over Terrain Which Were Unfavorable To It. In The Mountains It Encountered Rocks And Torrents That Often Could Not Be Crossed By Fording. On The Plains There Were Other Difficulties: The Fields Were Quagmires And The Roads Were Abominable. Finally, We Lacked Good Maps. Such Were The Difficult Conditions Under Which Our Cavalry Had To Act, Conditions Which Have A Very Great Influence On The Operations Of The Army. Our Cavalry Could Only March Very Slowly; In A Single March Of About 20 Versts (A Verst Is 1066 Meters) One Troop Had To Ford Thirteen Streams" (capitalizations in original, Quoted in Nidoine 1907,685).

Taken broadly, the Russo-Japanese war may be the weakest link to the hypothesis but the great power disparity (even when mitigated by the challenges of massive projection) was partially equalized by terrain. The joint strategy of attrition found the Russians and the Japanese in major pitched battles. These fights, whether at Port Arthur or Mukden, would foreshadow the coming brutal fights of the twentieth century. Attrition strategies broadly seek to destroy enemies through pitched conflict and terrain aided Japan by limiting major elements of the Russian war machine (cavalry) at major moments of the conflict. Following Mukden, the remainder of the war would be relatively quiet with sporadic action, Japanese victory at Sakhalin, and final Russian defeat on the seas. The war would end with the Treaty of Portsmouth, brokered by President Roosevelt, the evacuation of Russia from Manchuria, and Japan cementing itself as the dominant power in the region – a position from which barbarous acts would be committed across Manchuria and Korea under Japanese occupation.

Map 8: Russo-Finnish War, 1939-40
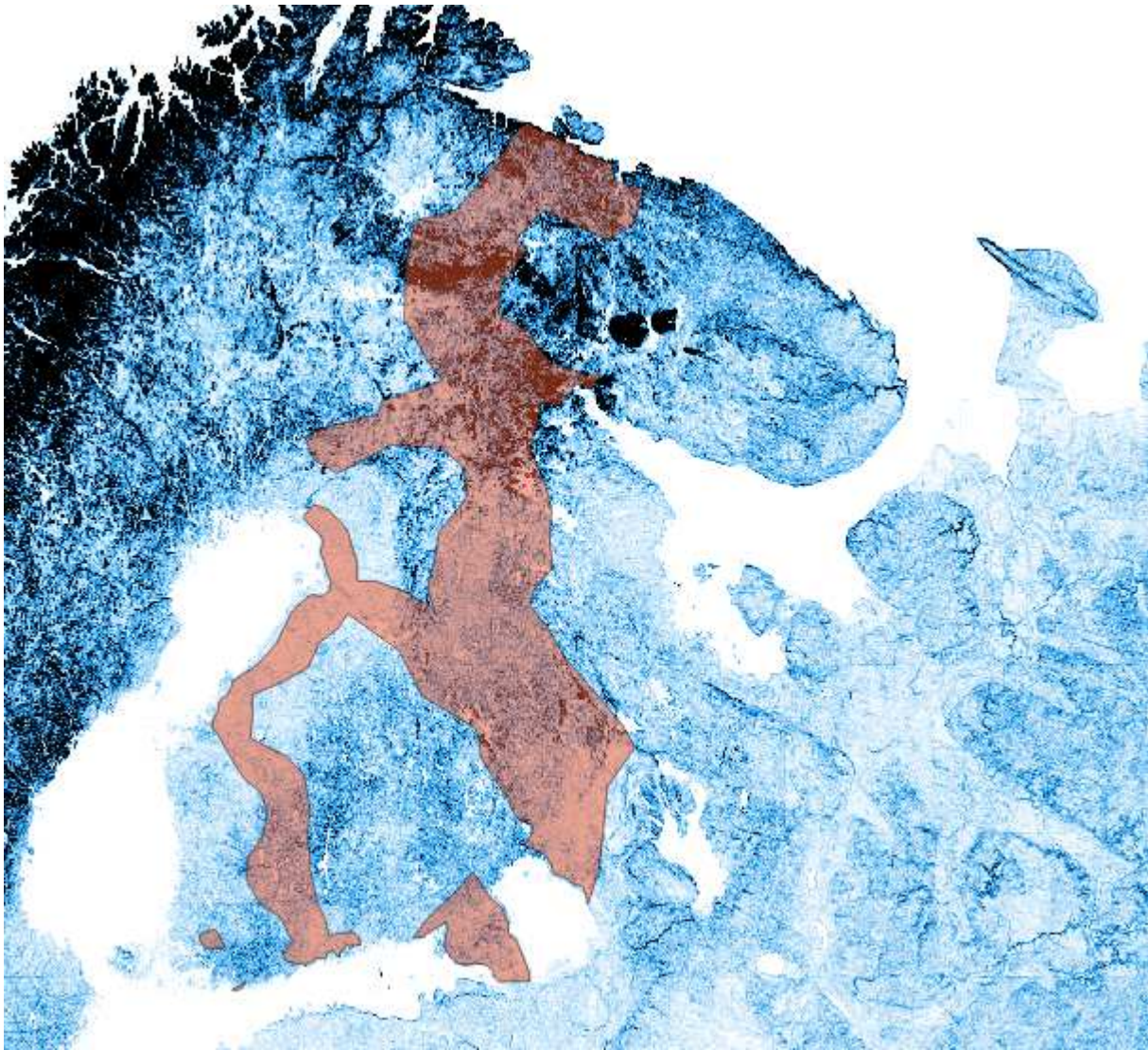
The Russo-Finnish War, perhaps better known as the Winter War, was a brutal prelude to

Soviet involvement in World War II. The war is most famous for the tremendous cost of Soviet

pyrrhic victory. A range of factors led to Soviet ineffectuality. Famously, the war occurred in the

wake of the massive purges of the Red Army's officer class under Stalin in the 1930s. When

combined with the brutal terrain, the Soviets found themselves mired in quagmire. Recognizing

the Nazi threat to the west, the USSR sought a territorial cushion near Leningrad. To this end, the

Soviets invaded on November 30th, 1939. The war was a mismatch of the highest proportions:

the Finnish population counted only 3.5 million to the Soviet Union's 180 million and the Finns were outgunned in every sense. Yet the Soviets immediately faced fierce resistance along the famed Mannerheim Line – named for brilliant Finnish tactician Carl Gustaf Emil Mannerheim[56] – along the Karelian Isthmus separating Finland and Leningrad (St. Petersburg).

Terrain would neutralize the dramatic Soviet superiority, at tremendous cost to the Russians in blood and materiel. While much of Northern Finland is extremely rugged, the theaters of action were relatively flat. However, they were sparsely populated and heavily forested. Where there were not trees, there was water.[57] Mixed with heavy snowfall and bitter temperatures,[58] the Soviet advance was slow and faced a Fabian styled Finnish defense. Soviet forces were stymied at every turn and when they were not being frustrated by hit-and-run attacks[59] out of the vast forests, Soviet forces froze to death where they stood and tanks refused to run in the cold. The Soviets also enjoyed massive air superiority and dropped 150,000 bombs (7,500 tons) to no avail. The dense forests provided ample cover for camouflaged Finnish troops. In the end, Soviet forces would break the Mannerheim line. Armed with 54 divisions, Soviet forces launched a renewed attack, firing over 300,000 artillery shells in one 24-hour period before the attack. These forces finally broke the Finns near Summa. The Soviets gained the small territorial

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[56] Mannerheim would first demonstrate his tactical prowess during the Finnish Civil War against the Finnish Red Guard.

[5757] I code water as trafficable for this war because the water remained frozen for the duration of the war. Deeply frozen ice in the, at times, -40 F weather supported men and armor alike. However, the ice was susceptible to breaking under mortar fire as occurred in the later days of the conflict as the Finns fired upon colored tanks on a white backdrop. Even then, breaks in ice are relatively localized, meaning a sizeable hole in the ice in one place has no impact on the structural integrity of ice even a few feet away (Sprague 2010, 169).

[58] Between December 11th and January 8th, ~27,500 Russians were killed, wounded, or froze to death on the Eastern border.

[59] Simo Häyhä, a Finnish sniper, would gain the nickname "White Death" during the Winter War. He achieved an unmatched 542 confirmed kills during the 105 day war – all with iron sights. See Saarelainen (2016).

cushion they sought at tremendous cost: 1,600 of 3,200 tanks, 725 planes, and between 175,000

to 200,000 thousand KIA (to Finland's 23,157).[60] The brutal winter weather and non-trafficable

terrain turned a gross mismatch into a killing field. In every sense, Soviet victory was pyrrhic. The

conflict set the stage for Finnish participation in the Nazi invasion of Russia.

Map 9: Vietnam War, 1965-1975
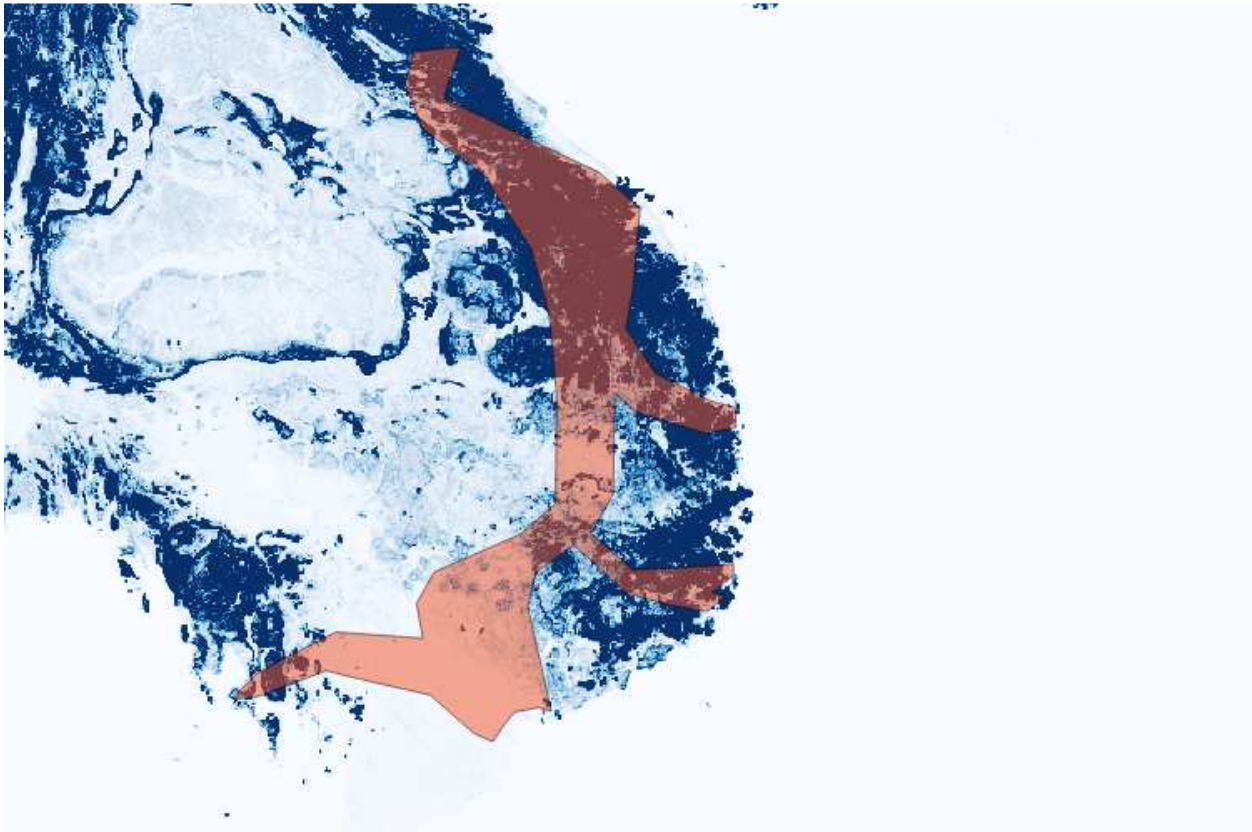
The Vietnam War is perhaps the greatest example of the role of difficult landscape

equalizing asymmetrical power. Nominally, the Vietnam War, per this dissertation, occurred

between February 7th, 1965 to April 30th, 1975 with the fall of Saigon to NVA forces. However,

the complexity of the war is as great as the loss of life in the several decade-long conflict. The

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[60] According to Clodfelter (1992, 791). The more conservative COW places the Soviet death toll at 126,875 (Sarkees and Wayman 2010a, 143). Using Clodfelter's toll, the loss exchange rate jumps to an astounding ~8:1 as opposed to the already gross ~5:1 calculated in the LERD dataset (Cochran and Long 2017).

war traces its roots to the Sino-French War of 1884-1885, when France established dominion over Indochina – perhaps even earlier with centuries of Chinese incursions into the region. As Clodfelter (1992) notes, there are unique challenges in determining a start date of the war given the conflict is nearly continuous, at least beginning with the First Indochina War between Vietnam and France (1222).[61] Regardless, the question at hand reads: how did terrain (low ruggedness – low trafficability) influence the outcome of the war? This question, and its implications, suggest that the primary consideration should be the war between North Vietnam and the United States – as well as her allies, South Vietnam, Cambodia, South Korea, the Philippines, Thailand, and Australia. North Vietnam fought the war at an immense disadvantage in capabilities. On average, between 1965 and 1975, North Vietnam held a mere 2.3% of the total conflict capabilities while the United States enjoyed an amazing 34.60:1 advantage in CINC scores. The common narrative is that the United States did not lose the war but abandoned it. Surely the United States enjoyed enough of an advantage in capabilities that they could have continued their participation in perpetuity. Yet the brutal combination of the NVA's punishment strategy and terrain allowed North Vietnam to raise the cost of the war beyond a point bearable by the United States. In this sense, one cannot discount the persistence of Vietnam in achieving victory, nor the NLF through 1968.

American involvement began in earnest with their support of the Diem Government in October 1961 as Saigon fought a brutal conflict against North Vietnamese trained and supported Viet Cong (VC) guerillas. The initial American role was advisory, expanding in 1964 with the arrival

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[61] Clodfelter suggests that one could conceive of the war as the "Asian Thirty Years War."

of General William Westmoreland. The stage was set when the ambiguous Gulf of Tonkin incident occurred in August. America, under President Johnson, committed to bringing the war to the North – while the North determined a direct engagement with the South and her allies. Following a VC attack at Camp Holloway on February 7th, 1965, the sustained hostilities between the two states began. The U.S. initially engaged the North primarily through the air, beginning on March 2nd. Operation Rolling Thunder continued for three years and was the largest bombing campaign in human history, unrivaled in sheer tonnage of explosives dropped across North Vietnam. On the ground, the American doctrine was largely defensive – with the goal of preserving South Vietnam and halting NVA and VC advances. The initial landing of 3,000 Marines at Da Nang on March 8th, 1965 would escalate continuously over the course of the conflict. The NVA and VC engaged in terror and punishment attacks against American and South Vietnamese targets – pouring men and materiel along the Ho Chi Min Trail.

When conventional confrontations did occur, American superiority was evident.[62] The first of these fights, the Battle of Van Thuong, demonstrates the duality of the fight. 5,000 Marines devastated 2,000 VC defenders between August 18-21 1965, killing 638 at a cost of 51 KIA Marines (Clodfelter 1992, 1232). Simultaneously, Communist forces infiltrated and destroyed a special forces camp at Dak Sut in guerilla fashion. This would be the tale of the conflict, while American forces managed tactical victories with superior firepower, mobility, and materiel, Communist forces secured punishing strategic victories – at great cost. The United States lost a fraction of the men but lost the war. Here, the interaction of terrain and strategy came to the aid

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[62] This point should not discount the capabilities that did exist among Communist Forces. Aided by the Soviet Union, the NVA enjoyed the use of incredibly reliable Kalashnikov rifles, T-Series tanks, and MIG jets.

of Communist forces. Vietnam is notoriously difficult to traverse. The landscape is nearly 70% non-trafficable and conditionally more so. The dominant landscape classes – 52% tropical evergreen broadleaf forest (*trpebf*) 12% tropical deciduous broadleaf forest (*trpdbf*), and 15% cropland following C3 photosynthetic pathways[63] (*c3crop*) – are challenging enough, but when weather and seasonality is considered, movement across the spatial extent was arduous. While the terrain challenged all who fought in Vietnam, Laos, and Cambodia the impact of terrain was unequal.

American defensive-attrition was hindered while NVA and Viet Cong offensive-punishment was bolstered. Elements of American supremacy were rendered null. Despite the historically unprecedented bombing campaign, neither the resolve nor the manpower of the NVA and VC were broken. Even horrific innovations in the art of war in response to landscape, such as the defoliant Agent Orange, could not penetrate nature's shield. Thousands may have died in the process – and millions more would live with its vestiges in cancers, birth defects, and elevated dioxin levels – but the structural impact of terrain could not be overcome. Armor was limited to trafficable areas, meaning the might of American industry could not be brought to bear on the primarily foot-based VC in their jungle refuges. The Maoist guerilla tactics employed by the NVA and VC across dense forests limited direct confrontation, except in places of their choosing.

The massive American troop presence is also relatively misleading to in terms of real strength, as some 88 percent of forces served in a support or administrative role - meaning there were roughly eight times as many "clerks, cooks, truck drivers, and telephone operators as

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[63] C3 plants of note include rice, cultivated in flooded paddy fields. Vietnam also produces deepwater rice, especially near the Mekong Delta, where water is substantially deeper.

grunts, cannon-cockers, tankers, and other combat personnel – something never before attempted in military history" (Clodfelter 1992, 1297). When American infantry were used, they were largely used as bait to draw out the VC and NVA so air and artillery could be used against the Communists. Terrain along with inherent 'home-field' advantages and the difficulty of "winning the hearts and minds" of the population, minimized gross American preponderance. The benefit of victory – nominally containing the spread of communism – simply would not justify continued American participation at such costs. In this sense, as much as the war's outcome was dependent on American withdrawal, it is more so North Vietnamese expert (but costly) use of terrain to benefit strategy that raised the cost of American participation.

High Ruggedness – High Trafficability (3)

The third terrain class, high-ruggedness – high trafficability, is largely the setting for mountainous warfare. Rugged settings, especially those at high elevations, limits the presence of non-trafficable fauna (dense forests) and large bodies of water (wide rivers). Given this, particularly rugged settings limit available landscape classes to those which are traditionally easy to traverse. Limited trees growing on rocky cliff faces, grasses and sparse shrubbery dominate these spaces. However, ruggedness – and often, but not exclusively, high elevation – eliminates ease of movement. Antiquity's most famous example of such warfare is the Punic Wars. In the Second Punic War, Hannibal famously traversed the Alpines through Gaul into Italy with a compliment of war elephants. The Carthaginians and their tribal allies would face little fighting in the process, yet would lose some 18,000 men to cold, crevasses, and avalanches.[64] In some

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[64] Supposedly, Hannibal himself prodded the ground during his descent into Italy – causing a massive avalanche which would kill thousands of his soldiers.

two thousand years since the Carthaginian invasion, warfare in rugged terrain has hardly become easier. Peruvian soldiers faced defeat in 1883 in the high peaks of the Andes Mountains at the hands of Chilean forces during the War of the Pacific. ANZAC soldiers between 1915-16 in Gallipoli faced horror on the shores of the Dardanelles. Indian and Pakistani soldiers prepared for the new Millennium with hand-to-hand fighting on Tiger Hill deep in the Himalayas during the 1999 Kargil War. Cliff faces, bluffs, snow, and the like give alternative meaning to William Tecumseh Sherman's adage, "war is hell" by forcing movement to be reliant on foot traffic, and emphasizing close quarter combat with limited communication, often with unique high-altitude weather and conditions. More than any other terrain class, forces not only have to fight each other, but the land itself. Armies always respond to settings-borne challenges like disease, but rarely does the terrain itself present such challenges as avalanches, landslides, cold, and others concomitant to ruggedness and elevation.

I present three of the nineteen wars in this class for case study. These three wars, the Assam War (1962), Badme Border War (1998-2000), and Kargil War (1999), demonstrate relatively extreme variations in rugged warfare. The first war, the Assam War, pits the much stronger PRC against India. Chinese forces, prepared and trained for mountain warfare, soundly defeated their Indian enemy. This war occurred between two other wars in the same terrain class: the 1948 First Kashmir War and 1965 Second Kashmir War. The second, the Badme Border War, sees a more common role of mountainous terrain as a boundary of war – serving to divide the conflict between highly rugged areas. Opposing forces avoided the most rugged setting, choosing instead to fight on the periphery of the most rugged space. Such is the case in the majority of wars in this class, where forces engage in the bulk of the fighting at the base of

mountains, only fighting in and traversing mountains when necessary to reorganize opposition[65].

Despite the fact that most violence occurs outside of these extremes, they are defined relative

to rugged space. This war is unique also for its recent use of trench warfare. The third war, the

Kargil War, returns to the Himalayas in the only interstate war between nuclear armed states in

history. The highly localized and relatively limited (in terms of loss of life) but brutal close quarters

combat of the war complete with modern equipment and tactics demonstrate the continuity of

mountain warfare.

Strategy is also limited by the terrain. In all but four cases, attrition strategy is selected by

both sides. The discrepant cases – First Russo-Turkish War, Italian-Greek War (WWII), German-

Greek War (WWII), and German-Yugoslav War (WWII) – are proverbially exceptions which prove

the rule. In the Italian-Greek war, as previously discussed, the Greeks used rugged terrain to halt

Italian advances before using a mobility strategy in their counteroffensive into Albania. The

German blitz into Yugoslavia was aided by a Yugoslav coup and their inability to organize any

semblance of resistance. Against the Ottomans, Russia demonstrated a rare moment of effective

mobility through the Haemus Mountains in the Balkans. The daring move by General Hans K.F.A.

von Diebitsch-Zabalkansky outmaneuvered the Turks, taking Adrianople and forcing the

Ottomans to sue for peace (Dupuy and Dupuy 1993, 847). Regardless, the defining strategy of

rugged terrain is attrition. This is only true for interstate-wars though, as general punishment or

guerilla strategies are often employed by weaker opponents in civil wars. The Afghani insurgency

has used the extremely rugged terrain of Afghanistan and Pakistan to evade the massive strength

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[65] This point is broadly applicable to larger wars in class I, low ruggedness – high trafficability, as well. In WWII, American forces certainly engaged in numerous fights in the mountains of Italy but the bulk of the fighting occurred at the bases of mountains in Italy or sought to avoid them all together when possible.

of NATO forces since 2001 – limiting the efficacy of American air strikes. The nature of rugged

warfare decreases mobility and allows for persistent opposition – via shelter in remote and rocky

places.

**Table 15: Assam War, Badme Border War, and Kargil War**

Terrain Class 3 Wars	State	Initiator	Concap	Trafficability	TRI	Count	Doctrine-Strategy	Outcome
Assam War (1962	China	Initiator	67.84%	80.08%	503.28 m	~119,571 km²	Offensive Attrition	*Japan Wins*
	India	Target	32.16%				Defensive Attrition	
Badme Border War (1998-2000)	Ethiopia	Target	24.85%	93.77%	190.11 m	~5,504 km²	Defensive Attrition	*Draw*
	Eretria	Initiator	75.15%				Offensive attrition	
Kargil War (1999)	India	Target	83.64%	98.21%	669.77 m	~829 km²	Defensive Attrition	*India Wins*
	Pakistan	Initiator	16.36%				Offensive Attrition	

Map 10: Assam War, 1962
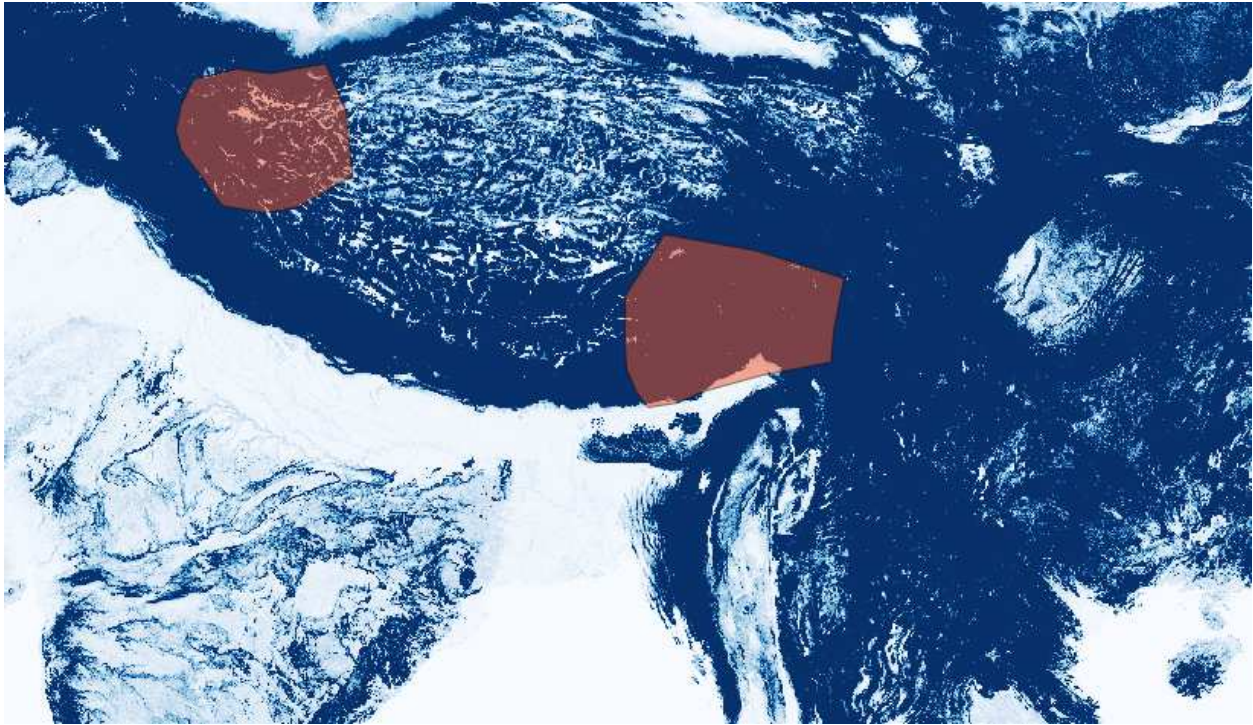
The Assam war pitted the PRC against India in one of the most inhospitable places war has ever been fought. The rugged Himalayas form the border between China and India. Neither state engaged air or naval forces in the conflict, which was focused on the border between the two massive states. Chinese forces advanced on October 20th in two locations: Ladakh (east of Kashmir) and in the Northeast Frontier Agency (NEFA), north of the Assam. Between October 20-25, Chinese forces – trained and equipped for mountain warfare – defeated Indian forces at Thag La Ridge. Chinese forces, despite being divided by the Crisis in the Taiwan Straits and facing materiel constraints given the growing Sino-Soviet split, were better prepared for the challenges of rugged terrain. The PRC had gained valuable experience in Korea against United Nations forces and in Tibet. Chinese forces enjoyed other non-violent advantages necessary for the high-altitude fight, namely warm and padded uniforms. Indian forces suffered insufficient knowledge of the topography of the region, while wearing cotton, summer uniforms (Calvin 1984). The Chinese

repeated their successes between November 17-21 at Se La and Bombi La on the western edge

of the NEFA. Both sides engaged in attrition strategies. The PRC handedly defeated their Indian

foes and tensions in the region continue to the present. Pakistani victory in the subsequent

Second Kashmir War would be aided by continued Chinese threat, with Indian forces on guard in

the Assam region to the persistent Chinese threat.

Map 11: Badme Border War, 1998-2000
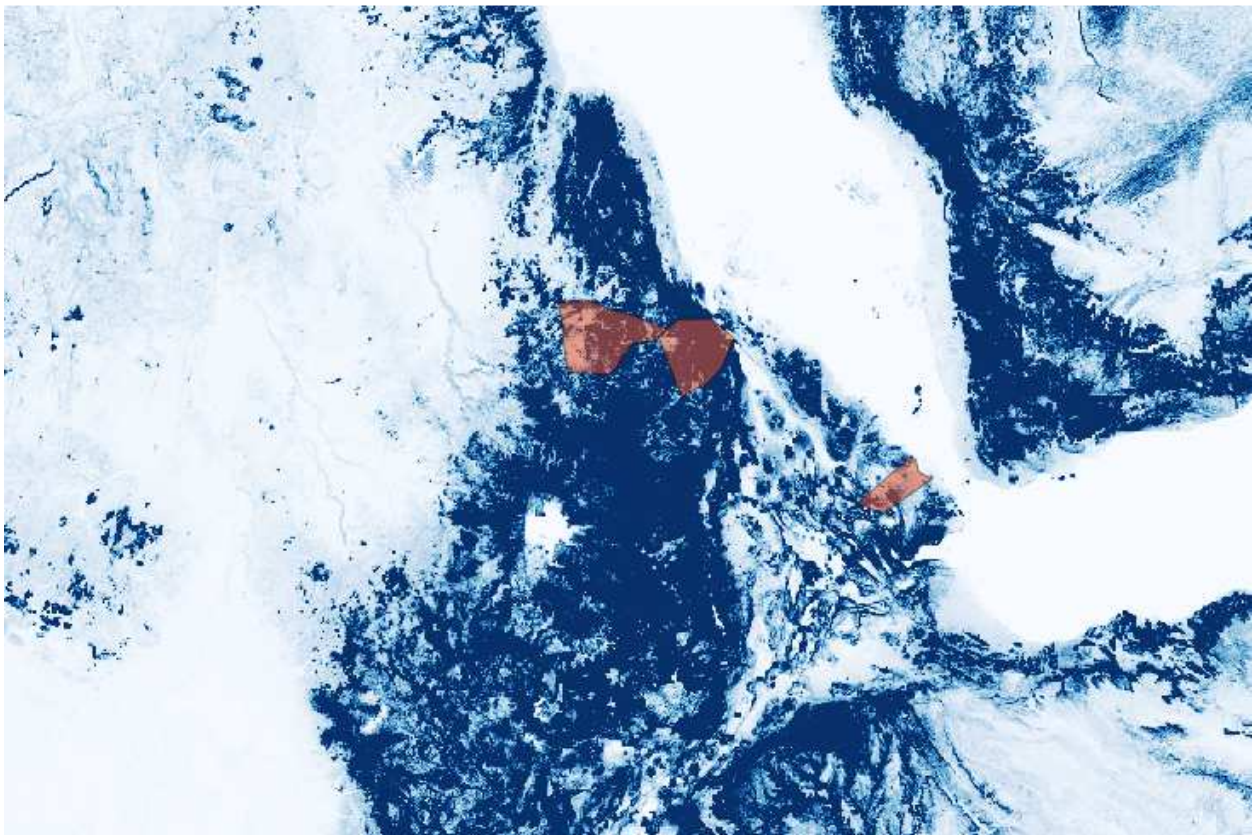
The 1998-2000 Badme Border War, fought between Ethiopia and Eritrea, demonstrates

the peculiar influence of rugged terrain by spatially framing the contest. The war was fought on

two fronts, each centered around a border town. In the East, the town of Badme and, in the west,

the town of Tserona. The mountainous Ethiopian highlands extend across the spatial extent of

the war, with particularly rugged areas between the two fronts. The border was loosely defined

across the Tekeze River (Setit) flowing though the highlands.[66] After a decades long march towards independence (1975-1991), Eretria peacefully seceded in 1993. However, the border remained ambiguous and a source of contention. On May 6th, 1998 Eritrean forces entered Ethiopian controlled territory and engaged forces there. The war would change course and severity in the early months of the conflict[67], before nominally ceasing in late 1998. However, hostilities would quickly reignite in February 1999 and thousands of forces were killed in brutal fighting.

The war, like many is this terrain class, had boundaries defined by terrain. The most extreme areas of the local highlands separated the two major fronts of the contest.[68] During a general lull in fighting following a joint Organization for African Unity, U.S., and Rwandan peace proposal, both sides dug extensive trenches. What followed was akin to the trench warfare of WWI, complete with human wave attacks. Ethiopian General Samora Yunis ominously stated, "the Eritreans are good at digging trenches and we are good at converting trenches into graves" (quoted in Gebru 2009, 345). The war would cost the lives of some 80,000 people including civilians (Clodfelter 2017, 559). Eritrean forces were only broken when, using donkeys to traverse the highlands, Ethiopian forces captured Barentu – forcing an Eritrean retreat on the Western front. The Eritreans, backed into a mountain, had little room for reorganization and were forced to accept tactical defeat. This contest would ultimately end in strategic stalemate, with borders essentially mirroring the status quo antebellum. The two states, among the world's poorest, were

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[66] The site is also famous for the use of chemical weapons in the 1930s by Facist Italian forces in their Invasion of Abyssinia.
[67] Both sides of the conflict employed Ukrainian mercenary pilots in an initial but relatively limited air contest.
[68] Nominally, a third front existed in the southeast near Assab.

mismatched in capability, with Ethiopia enjoying a 3:1 advantage in CINC scores. Yet the rugged

nature of the fight again limited the mismatch, forcing soldiers into a seemingly antiquated mode

of war. Meanwhile, peoples in the two states faced chronic hunger and disease.

Map 12: Kargil War, 1999

The 1999 Kargil War is far and away the most rugged war between 1816 and 2003, with

a TRI of 669m – nearly 170m more rugged on average than the next most rugged war (Assam

War). The average change in elevation per km^2 is roughly 1.5 Empire State Buildings. The Kargil

War also holds the distinction of being the only war in history between two nuclear armed states.

The small spatial extent is likely due to the deterrent effect of these nuclear weapons, but is also

likely due to the extreme conditions of the war.[69] The Kargil War occurred entirely on the Siachen

Glacier, the second longest glacier in the non-polar world. The landscape was defined by brutal

changes in elevation, glacial crevasses, and narrow passes between Himalayan peaks. The

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[69] This war is not entirely anomalous to the proposition that nuclear weapons have abolished war amongst their possessors. The war was extremely limited compared to previous fights between India and Pakistan and failed to expand beyond the region.

disputed Kashmir region precipitated nearly constant violence between the two states, with violence reaching war-level intensity in 1948 and 1965. The violence again came to a head when around 700 Pakistani and 500 Kashmiri guerillas infiltrated the border, seeking to occupy five peaks in the region, and Pakistani artillery opened on Indian positions. Indian forces would retake the mountain peaks one by one over the course of the some 70 day conflict.

The most famous locality of the war was Tiger Hill. The peak is the highest of the five points captured by Pakistani forces, allowing for line of sight for the region, improved communications, and direction for artillery. During the night, a small contingent of Indian forces scaled a local cliff face (some 300m) in a commando raid, while 200 of their comrades attempted an equally daring but more conventional approach up the peak. In limited but brutal combat, Indian forces overcame their Pakistani foes. The additional peaks would fall to the Indians in similarly unconventional and extremely dangerous ways. While limited aerial assaults occurred during the war and artillery would hammer the remote peaks, the war was defined by small groups of forces fighting in close quarters. The death toll would be low, with approximately 700 Pakistanis and 475 Indian battle-related deaths (Sarkees and Wayman 2010a, 184).

High Ruggedness – Low Trafficability (4)

The most challenging terrain class, high ruggedness-low trafficability, is the setting for fourteen wars. Every war in this class is coded as engaging joint attrition strategies. Again, this is a diverse set of wars but they share a general distinction: potential for brutality. Namely, this recognition comes from two examples of modern blood-letting. The 1941-5 American-Japanese War and the 1950-3 Korean War. There are examples of limited wars in the category, to the point

that they are the modal type. The First, Third, and Fourth Central American Wars pitted regional rivals against each other but the combination of terrain and limited state capacity limited the number of battle deaths.[70] Similarly, wars in the process of Italian Unification – Italian-Roman and Neapolitan – wars also occur in this class but are again relatively limited engagements when compared to the comparatively greater death tolls in the Austro-Sardinian War and the War of Italian Unification. Several wars also occur in Greater China but are again relatively limited, including the Sino-French War (12,000 deaths), Changkufeng War (~1,700 deaths), Second Laotian War (~14,000 deaths), Sino-Vietnamese Punitive War (~21,000 deaths). While the death toll is larger in these fights, especially in the conflict between China and Vietnam, these are all relatively limited conflicts. Finally, the remaining fights, First Spanish-Moroccan War (~10,000 deaths), the Ecuadorian-Colombian War (~1,000 deaths), and Cenepa Valley War (~1,500 deaths), are all limited. Each, however, are testaments to human commitment to war even in the gravest of conditions. The extreme examples across the Pacific and on the Korean Peninsula demonstrate the depths we are willing to go to realize political objectives. I present narratives of these cases, not only because of their paramount importance in the history of recent world politics, but because they are something of outliers in both scale and place. The American-Japanese and Korean Wars would cost millions of lives on the battlefield and even more in civilian lives and those laid low by disease and wounds.

[70] The Second, Third, and Fourth Central American Wars did not exceed 1,100 battle deaths. The First Central American War claimed roughly 4,000 lives. There were some 20 "mini-wars" across Central America in the later half of the nineteenth century and intro the early twentieth century. Only these four exceed the threshold of war. Presumably, many of these smaller conflicts also occurred in this terrain class.

Table 16: American-Japanese War and Korean War

Terrain Class 4 Wars	State	Initiator	Concap	Trafficability	TRI	Count	Doctrine-Strategy	Outcome
American-Japanese (1941-45)	United States	Target	16.07%	21.24%	264.92m	~21,899 km^2	Offensive Attrition	*United States Wins*
	Japan	Initiator	83.93%				Defensive Attrition	
Korean War (1950-1953)	North Korea, China	Initiator	18.68%	20.67%	224.04m	~30,961 km^2	Offensive Attrition	*Draw*
	South Korea, United States, Belgium, Canada, Colombia, United Kingdom, Netherlands, Greece, France, Turkey, Philippines, Thailand, Ethiopia, Australia	Initiator	81.32%				Defensive attrition	

Map 13: American-Japanese War, 1941-45
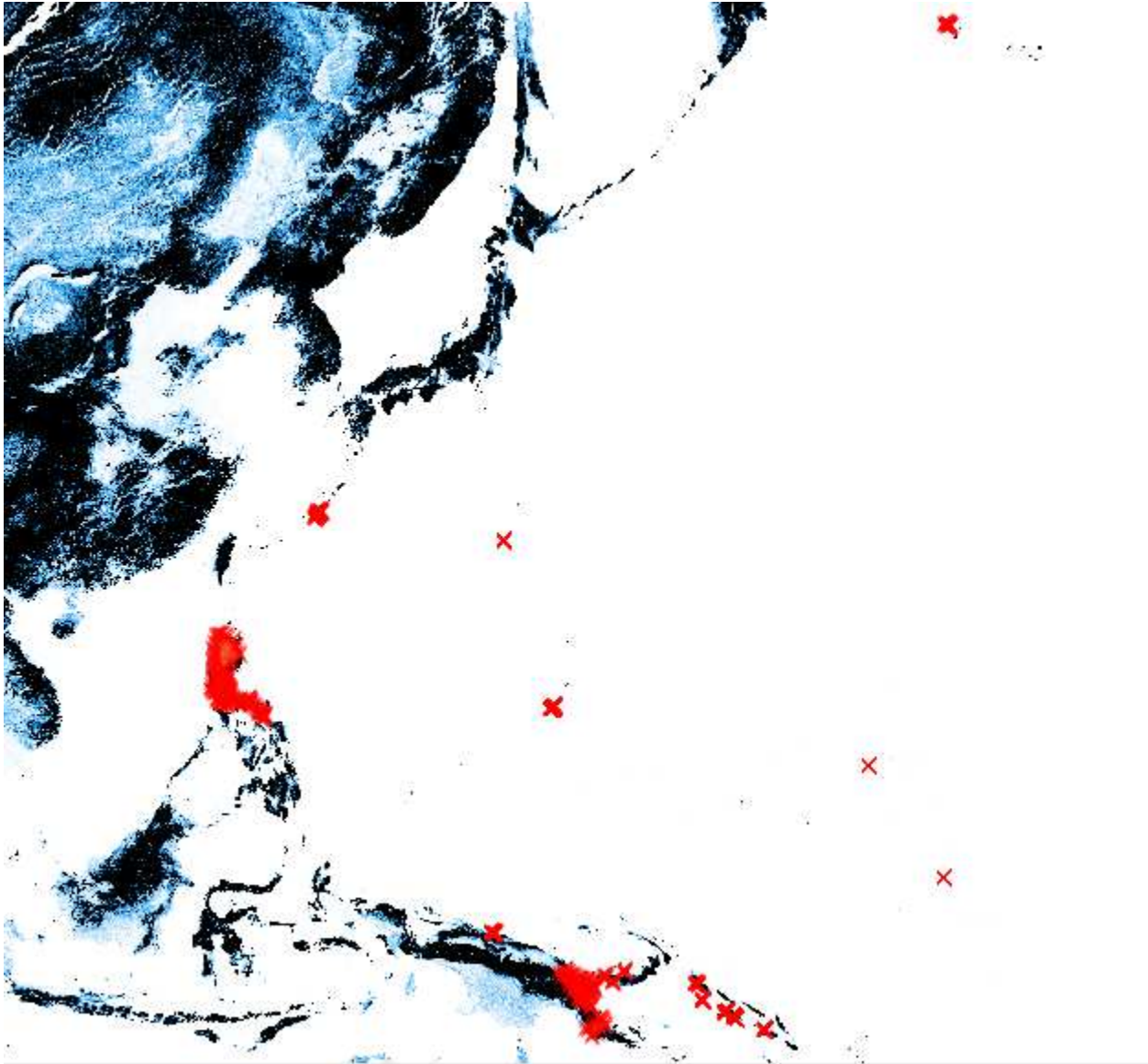
The American-Japanese War is not only part of a much greater conflagration that was the Second World War, but is also part of a locally complex fight across China, Burma, and into India. Still, Imperial Japan's fall would primarily come at the hands of the United States' incipient power. The war would be defined by a series of individual campaigns, often centered on very local areas separated by sizeable distances contiguous only by water. The war then is defined by projecting power, already a difficult feat across water, to fight in rugged and non-trafficable terrain. This

combination made for a war unprecedented in human history. Adding to this, the use of new weapons in new ways – massive incendiary bombing campaigns on wooden cities like Tokyo and the dropping of atomic bombs on Hiroshima and Nagasaki – would bring an astounding death toll to the war. While the war famously began on December 7th, 1941 with the Japanese attack on Pearl Harbor, America entered a war years, if not decades, in progress. Japan made its fateful first step into empire with its victory over Russia in 1905, and would continue its rise throughout the region through 1941 when, simultaneous with Pearl Harbor, Japanese forces attacked Hong Kong, Wake Island, Malaya, Singapore, and Burma (a few days later on December 23).

American forces enjoyed a sizeable CINC advantage in the conflict (5:1) against their Japanese foes. However, American forces would be divided between Europe and the Pacific, and Japanese forces enjoyed the benefit of surprise in their opening actions. Clodfelter (1992) reports rough parity in military personnel, with 2,169,000 American and 2,391,000 Japanese forces.[71] Coupled with the brutal terrain, the American power advantage was limited at the beginning of the war and would only be assured when American forces gained control of the seas after the devastation of the Pacific Fleet at Pearl Harbor – beginning with American victories at the Battle of the Coral Sea (May 7-8, 1942) and Midway (June 4-7, 1942). American naval superiority would be an essential element of the war, more so than likely any other great power war in modern history, as each campaign was only contiguous by water. American control of the seas, and thus American power projection capability, was realized with victories at Guadalcanal, fought between the islands of Guadalcanal and Tulagi (August 1942-February 1943), the Solomon Islands

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[71] Japanese forces were divided among several fronts as well, with a large portion stationed within Japan proper.

(March-October 1943), the Central Pacific Campaign (February 1943-June 1944), Leyte Gulf (October 1944), and finally, in the Philippines Campaign (December 1944-January 1945). Given the island-hopping nature of the American offensive, these victories, as well as America's eventual air superiority, proved essential to the American campaign – providing projection, logistical support, and bombardments.

The first American offensive of the war came in August 1942 in the Solomon Islands. By this time, Japanese forces had spread across the pacific – an even briefly into North America in the Aleutian Islands.[72] The campaign demonstrated the extreme consequences of modern war in extreme terrain. The Battle of Bloody Ridge (Edson's Ridge) showed the challenge of terrain as heavy forest covered Japanese positions from aerial and naval attacks and rugged hills confronted American foot traffic. This challenge would be repeated in across Guadalcanal and in major campaigns in the Solomon Islands, New Guinea, the Bismarck, Gilbert, Marshall, Mariana, Palau Islands before the reconquest of the Philippines. Fighting for the Philippines raged from Leyte to Luzon and cost thousands of lives. American forces made final assaults into Borneo before the most vicious fighting of the war occurred on the small islands of Iwo Jima and Okinawa.

Iwo Jima is a mere 4.5 long and 2.5 miles wide. On this small rocky island, covered in trees and dense shrubland, some 27,000 soldiers would die. The rugged island was the site of the third most costly battle by lives for the Americans in WWII, with only Okinawa and the Battle of the

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[72] The undefended Aleutian Islands of Attu and Kiska were taken in June of 1942. The battle to retake Attu would cost the Japanese forces all but 29 forces after a final Banzai charge in May of 1943. Japanese forces would slip away unchallenged under dense fog from Kiska. This would be the only fight of the war in the Western Hemisphere.

Bulge costing more American lives. The battle was won "inch by bloody inch" (Clodfelter 1992, 928). By the time the famous photograph of the American flag being raised on Mount Suribachi was snapped, the terrain had taken its toll. The ferocity of the fighting was surpassed on Okinawa. Only the fight at the Meuse-Argonne in WWI spilled more American blood than the taking of Okinawa (Clodfelter 1992, 929). The jointly rugged and non-trafficable terrain took its toll on the mass of American forces. With incredible sacrifice by both sides – let alone the native Okinawans – the battle marked the end of major ground battles in the Pacific. The fight was capped with the mass suicide of civilians on the island's cliffs – a fitting testimony to the futility of war. The Soviet Union joined the fight in the Pacific in Manchuria on August 8th, 1945 and Japan's fate was sealed. With the dropping of the atomic bombs at Hiroshima and Nagasaki, Japan accepted America's demand of unconditional surrender on August 15th, 1945 – V.J. Day. The war would be characterized by the terrible combination of terrain, power, and will. Thousands and thousands of Japanese soldiers chose to end their lives in massive Banzai charges rather than surrender, all after fearless and intractable defenses of extreme locations.

Map 14: Korean War, 1950-53
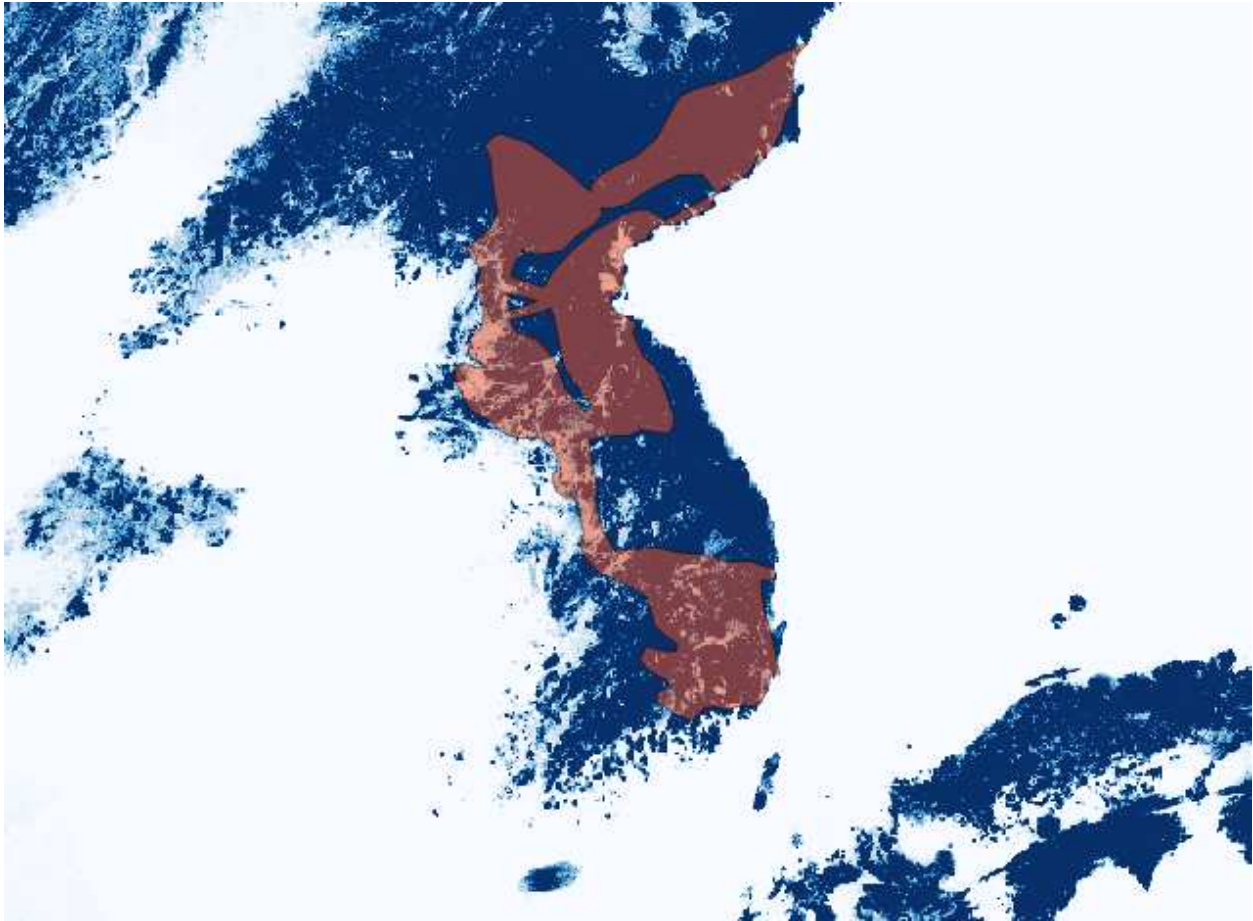
Less than five years later, America again joined a massive war in Asia. The Korean War is perhaps the mostly costly stalemate in the history of war. The war brought unprecedented international participation. Still, the primary fight was primarily between the Koreas, then between the United States and South Korea against China and North Korea. The bloodletting essentially was for naught, as the war would conclude with little change – only death. Like the American-Japanese War, the terrain contributed to the brutality. The war was a direct result of the settlement of WWII and the Cold War. Imperial Japan first occupied Korea in 1910 and upon defeat in 1945, the Peninsula was partitioned by the Soviets in the North and Americans in the South. The Chinese Civil War – easily among the costliest conflicts in human history – supplied

the Immun Gun with veteran forces. After a series of minor prodding attacks, North Korea launched a full-scale invasion of the South on June 25th, 1950. From the first days of the war, the South Koreans were outgunned, outmanned, and outmatched. Three days later, Seoul fell and a mere one-quarter of ROK forces remained active. Shortly thereafter, the young United Nations – after some skirting of the Soviet Union and the exclusion of the PRC – authorized action in the defense of the fledgling South. Limited American forces arrived on June 30th and were quickly pressed by advancing North Korean forces. A single and brief naval engagement on July 2nd would be the only fight on the sea. American air superiority quickly devastated the entirety of the North Korean Air Force by mid-July. Still, these limited victories could not stop the drive south. The American ground forces, a shell of their previous WWII strength, fought constant rearguard action down the Peninsula toward Pusan.

The Naktung Bulge Campaign at the Pusan Perimeter turned the tide of the North's advance. At Masan, the American counteroffensive across rugged terrain, with fights atop places – aptly named for the "Forgotten War" – like "No-Name Ridge," blunted the North's drive. Allied forces would hold, at high cost, the perimeter. Then, in dramatic fashion, MacArthur began the famous amphibious landing up the Peninsula at Inchon on September 15th, 1950. Success here and new successes at Pusan would change the nature of the war. Allied forces began the process of ridding the South of the North – aided by the American made division of North Korean forces at Inchon and disorganization and demoralization stemming from difficult terrain. Allied forces began the drive North, completely clearing the enemy forces from South Korea and, fatefully advancing into the north. The routed North retreated with Allied forces in pursuit towards the Yalu river. In a moment of cognitive dissonance – with no allied relations with the PRC and PRC

being forced to play an international game of telephone through India, to Britain, to America – the Chinese entered the war in late October 1950.

With the entrance of the Chinese, the war entered its third and most brutal period. The war, now into North Korean territory and even more rugged terrain than the South, would be characterized by massive human wave attacks.[73] In November, American forces would suffer their worst defeat of the war at the Battle of Ch'ongch'on. Retreating American and Turkish Forces were ambushed along a narrow pass adjacent to the Ch'ongch'on River. Chinese forces had significant experience with 'off-road' combat, meaning they were better prepared to traverse the rugged terrain. With the new year, Chinese forces crossed the 38th parallel. In a stalwart terrain-aided defense, allied forces – such as American and French forces at Chipyong-ni – repulsed human wave attacks. Allied forces then struck back, pushing Chinese forces northward. Famously, MacArthur was relieved of command by President Truman in April 1951. In this phase of the war, terrain would deeply cost the numerically superior Chinese. At the Ch'ongpyong Reservoir, allied forces would kill some 70,000 Chinese at a cost of 7,000 men in defensive position along the rugged hills. Now overextended, depleted, and disorganized, the Chinese were driven north and suffered massive losses. 200,000 Chinese were slain in the first half of 1951 alone. Facing stalemate, the two sides began the peace process and began the "outpost war." This final phase, into 1953, involved heavy artillery strikes against fortified targets. Peace was realized but never codified and little changed in three years of war.

Predicting Strategy Selection

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[73] Though the first human wave attack would not occur until early the next year in February 1951.

These classifications and narratives are only once piece of the war puzzle among many. Another central piece is strategy selection. As previously detailed, strategy is the application of the means. If there is validity to the democratic victory, then democracies must more effectively wield capabilities through the effective selection of strategy given terrain. That is, for victory to be truly promoted by democracy, there must be an endogenous cause. This suggests that we must explore the correlates of strategy selection as well. The following is a preliminary test of strategy selection.

In the below model, I use multinomial logistic regression to predict advantage, disadvantage, or neutral advantage as the dependent variable. I include state capabilities, alliance capability contribution, initiation, regime scores, terrain ruggedness, trafficability, and spatial extent. The reference category is the modal category of neutral advantage. While this is a preliminary test of predicting strategy selection, it is telling that neither capabilities nor regime type predicts either advantage or disadvantage. This suggests that traditional measures of power and regime type (including binary measures, not shown) are not factors in choosing appropriate strategies. In this sense, states with higher levels of capabilities are not inherently better at wielding them. Similarly, democracies do not inherently choose superior strategies. Terrain, with the exception of spatial extent, does however predict advantage. This implies that states do consider terrain in selecting strategies. An intuitive point, but a necessary first step in establishing how states choose to exercise power.

Strategy Model		B	Sig.	Exp(B)
Advantage	*State Capabilities*	-------	-------	-------
	Alliance Capabilities	-------	-------	-------
	Initiator	-------	-------	-------
	PolityIV	-------	-------	-------
	Count1000	-------	-------	-------
	TRImean	-.071	.004	.931
	NTraff	-.029	.001	.971
Disadvantage	*State Capabilities*	-------	--------	----------
	Alliance Capabilities	-------	-------	-------
	Initiator	-------	-------	-------
	PolityIV	-------	-------	-------
	Count1000	-------	-------	-------
	TRImean	-------	-------	-------
	NTraff	-.019	.004	.981
N=322	**Nagelkerke R^2: .200**			

This readily available data does little to demonstrate a causal relationship, but rather suggests that there is promising room for future research on the topic. Regardless of the paradigm and by definition, the topic of strategy inherently explores agency. It raises three simple questions: who makes decisions, why they make these decisions, and do these answers cleave along predictable lines? From a structural position, there can be a basic assumption that the strategy is partially selected by terrain. The above demonstrates that state actors do this. The answers necessarily become more complex and divisive as we move into the first and second image. I suggest that future research should contend with domestic political structures – i.e. civilian control of the military or the military industrial complex – as well as particularly challenging topics like experience (lessons from temporally recent wars), domestic organizations (parochial priorities and perceptions), and individuals. The challenge is then producing

generalizable assumptions in a low-N and high variable environment. For instance, in 1979 during the Sino-Vietnamese Punitive War, Vietnamese forces were equipped with the experience of decades of fighting against stronger French and American enemies – not to mention armed with Soviet and captured American arms and munitions. The Peoples Liberation Army, on the other hand, had not innovated their tactics during the Cultural Revolution. They choose to engage in human wave attacks reminiscent of the Korean War. The PRC also had the wisdom to withdraw after inflicting their punishment rather. How can this experience suggest a generalizable pattern of strategy selection? Innovative data, methods, and operationalization will all be necessary to examine this critical question, paying particularly consideration to the structural question of capabilities and terrain.

Conclusions

The above demonstrates a deeply complicated relationship between terrain and war outcomes. Terrain at times facilitates the powerful and at others humbles them. Terrain at times exposes the weak and at others shelters them. While war is a general phenomenon that defines international politics with relatively predictable patterns of behavior, the local nature of war in place is what makes individual wars unique affairs. While an imperfect classification, the sorting of conflicts by ruggedness and trafficability provides a broad set of lessons on the role of terrain in war. If strategy is the application of power and terrain changes the efficacy of strategy, then terrain is an important predictor of outcomes. The easiest class, low ruggedness – high trafficability, is the setting for most wars between 1816-2003. The modal strategy is attrition, but this terrain class is uniquely suited for mobility strategies. Even still, the local and peculiar are always conditional and variations in weather, season, and human action can change the

conditions of war. In low ruggedness – low trafficability, terrain may shelter the weak and abase the strong – even superpowers like the Soviet Union and the United States. Fabian defenses and punishing guerilla strategies serve the weak – though often at great cost. In high ruggedness-high trafficability, mountain warfare reigns. The terrain sets boundaries for action and forces troops into difficult and labored movement. The final and most difficult class, high ruggedness-low trafficability, is the setting for several small and limited wars and the some of the most brutal conflicts in human history. The indefinite combination of elevation changes and challenging landscape forces states in major wars to incur great losses.

Here there is room for questions about the selection of strategy. Future research should address this fundamental question: why and how do states select their strategy? This may require a deeper coding of strategy beyond a tripartite coding. The selection effects hypothesis, which is already dependent on Israel in 1948, (target), 1967 (initiator), and 1973 (target) and has little to do with Israeli democracy, implies states with democratic features would better apply the means of war. There is good reason to doubt this as the selection of strategy is rarely the function of either a mass public or an elected legislature. The reality likely lies in a combination of factors. Past experience, such as previous wars – as in the case of Mannerheim in Finland or Ho Chi Min in Vietnam – give decision makers and soldiers practice in the art of war. Other factors may limit success in selection and battlefield effectiveness, just as Stalin's purges decimated the Soviet officer class. This may even suggest problems within democracies in selection. That is, democracies may select wars on the basis of idealistic goals, such as the spread of democracy to ensure security on the basis of valence democracy or stopping the spread of competing ideologies as in American interventions in Vietnam, Afghanistan, and Iraq. This may be better

explained by the impetuousness concomitant to power. Unchecked power internationally, like unchecked power domestically, is dangerous and prone to missteps. Given this, future work should consider strategy as a dependent variable.

In conclusion, there are broad lessons for states in war. The only sure way to prevent loss in war is to avoid war. Yet, it is is a general inevitability in an anarchic world that states must prepare for war or pay the cost of weakness. Still, the costs of war can be mitigated by appropriately applying forces against an enemy. When possible, states should only fight wars when they enjoy at least a 3:1 advantage in power. This rule is only appropriate when the objectives are predicated on the defeat of enemy forces – not realizing an abstract political objective like winning hearts and minds. With these goals, mobility strategies – which use maneuver to disrupt enemy organization – facilitate strength more than any other strategy. Strong state power advantages are only realizable in appropriate environments. Weak states, if willing to engage in Fabian or punishment strategies in difficult terrain, can overcome gross mismatches and inflict considerable damage against dramatically stronger opponents – even if victory escapes them. Difficult terrain makes for difficult application of power. While not explicit in this study, this point is relevant for powerful states which might expect quick victory in contests against always-weaker non-state actors. Post-Cold War America, arguably the strongest state in terms of capabilities in human history, experienced this lesson – though seemingly has not learned it – through nearly twenty years of war in Afghanistan and Iraq. The defeat of their state opponents in Afghanistan and Iraq came swiftly based on the might and mobility of the American military but extremely weak insurgencies have survived in difficult terrains, killing thousands of Americans and hundreds of thousands more civilians – certainly an unacceptable cost in pursuit

of abstract ideals. Still the first point holds for the world's strongest state, facing no existential threat, the United States should engage in a grand strategy of forbearance, abandoning the general bellicosity and belligerence it has demonstrated in unipolarity. However, to quote Kenneth Waltz's prophetic words in 1993, "I would not bet on it" (Waltz 1995, 79). We, may, hope that there is still time before it is too late in a nuclear and multipolar world. In a world in crisis, stranger things have happened.

Chapter 5: Learning from Interstate War Outcomes

"Our modern liberal culture, of which American civilization is such an unalloyed exemplar, is involved in many ironic refutations of its original pretensions of virtue, wisdom, and power." – Reinhold Niebuhr, *the Irony of American History*

The outcomes puzzle is complex. No explanation will ever fully explain why states win, lose, or draw in war. At best, we are left with understanding the correlates of war outcomes, as informed by paradigmatic theory. This, the realm of normal science, is the arena for this dissertation. The essential findings of my work suggest that capabilities conditionally predict outcomes, with their application via strategy and the terrain factors which impact their application. Democracy is correlated with victory – i.e. democracies are more likely to win wars – but this does not imply causation. If victory is an output endogenous to democratic regime type, democracies must be superior in applying capabilities and interacting with terrain. The weight of the evidence presented here suggests that democracies are not superior in these endeavors. We are thus at a crossroads. The democratic victory is compelling but incomplete. It has placed the proverbial cart before the horse by failing to adequately explore a more fundamental causal relationship between capabilities, strategy, and terrain. The implication is that further research is necessary to explore the relationship between democracy and these factors.

However, proponents of the democratic victory, like the democratic peace, have treated these flaws with contempt. Supporting the democratic peace in light of its flaws, Russett (1993) writes, "understanding the sources of democratic peace can have the effect of a self-fulfilling prophecy. Social scientists sometimes create reality as well as analyze it… repeating the norms as descriptive principles can help make them true" (136). In similar vein, proponents of the

victory have reiterated the norms of selection effects and military effectiveness. Rather

constructing a reality of invincible democracies, these claims have only supported policies that

erode American power and have cost trillions of dollars and hundreds of thousands of lives since

the end of the Cold War in democratic foreign adventures. America and the world are not safer

in some self-fulfilled prophecy. The victory has been our hubris and decay our nemesis.

Learning from the Democratic Victory Debate

Chief proponents of the democratic victory, Reiter and Stam, conclude their 2002 book

Democracies at War by presenting American foreign policy implications of the democratic

victory. Broadly, they call for a general optimism for American unipolarity in the twenty-first

century, one which need not be afraid of war because victory is the bulwark of democracy. They

express great faith in the notion that democracies do not engage in wars of folly and when they

are confronted with war, they do so with superior effectiveness. The authors write,

> "Contrary to the fears of some naysayers, democracies have consistently been
> able to fight off attacks from autocratic predators and will continue to endure. They wisely
> avoid foolish war, and when they are forced to fight, their soldiers typically perform better
> than do their autocratic counterparts. This gives us confidence in the sustainability of the
> international trend to democracy. Several factors are pushing an increasing number of
> nations to democratize. Among these, rising global levels of material prosperity, the
> appearance of other democracies themselves, and the decreased ability of autocrats to
> manage and manipulate news information make the further spread of democracy more
> likely. In addition to these factors, we can say confidently that democracies can safely
> defend themselves from the threat of outside predators" (203).

These conclusions continue with broad policy prescriptions. The authors express that

America is made more secure by the spread of democracy globally on the basis that democracies

both do not go to war with one another and may stem any returning tide of advancing

authoritarianism should conflict arise through the victory. To better realize security, the United

States should not fear interventionism, so long as it is "a more enlightened interventionist policy." The implication being, where there is fertile soil for democracy, "military force can promote social stability and the advance of democracy." The authors "urge policy makers to be willing to use force for this end if the conditions for success, especially a society that enjoys the proper institutional, cultural, and economic conditions, seem to be present" (204). They conclude their text with continued optimism, writing "the installation of democracy presents no Faustian bargain, no dangerous tradeoff in the face of global anarchy. Counter to the fears of many scholars and politicians, national leaders need not subvert liberty in order to preserve it. (205)"

Reflecting on an additional 16 years of American unipolarity, these conclusions seem largely misplaced. To begin, we are in the midst of a problematic period for democracy, globally and in the United States. Diamond (2015) opines, the past decade has been "a period of at least incipient decline in democracy" (142). Alternatively conceptualized, Schmitter (2015) suggests the period has been one of "crisis and transition but not recession," with previous overly optimistic assessments of democratic gains and consolidation. The quality of American democracy has certainly suffered as well, as has liberalism. Seventeen years of continuous war and an additional eleven years of intermittent war, ironically in the name of democracy promotion with little to no fruit to bear, has contributed directly and indirectly to this erosion. Beyond this, the assumed inefficacy of authoritarianism in light of a supposedly changing world has proven false. Not only did Russian democracy give way to oligarchy, giving rise to persistent electoral authoritarianism, but the Russian state seemingly used the tools of a democratic society (one it was not meant to understand) to sow discontent in the 2016 American Presidential Election. Similar patterns emerged amongst equally persistent authoritarian regimes, while many

pseudo-democratic states were ultimately illiberal in nature. My suggestion here is not that democracy itself is somehow flawed or that there is some inherent or unavoidable defect in American democracy unknown to previous authors. This is hardly the case. Rather, that America has ironically has been the author of its own misfortune, as well as the misfortune of millions of souls abroad, in the name of democracy promotion. The best laid plans of the democratic victory – like the best laid plans of previous utopian thought – went awry. Rather than promote security, it has only cost blood and treasure, while strategically overextending the United States in light of looming multipolarity.

The work of this dissertation suggests an additional key element to this problematic prescription: incomplete information. The prescriptions of the democratic victory advise that democracies, especially powerful democracies, do not need to be afraid of war. They are bound by institution to avoid folly. Yet this prescription was made with entirely incomplete information, akin to traveling to a destination without quality directions. The war outcomes puzzle is simply incomplete at present. While this dissertation strives to make additions to the problem, it is hardly a finished product. As a general truism, informed by the massive bloodletting of the twentieth century and the continued potential for it in the twenty-first century, states should always be fearful of war, responding with a general cautiousness at each turn. To suggest otherwise or to suggest a monocausal route to future security, is self-evidently dangerous. I believe that my work demonstrates that we have a great deal yet to uncover as it relates to war outcomes. In the following, I present six lessons to guide the formulation of policy as it relates to war. Rather than novel propositions, these are cautious and historically rooted proposals with

the explicit aim of avoiding the mistakes of recent American foreign policy (and international politics more broadly) that have defined my lifetime.

Lesson One: Democracies should not tie security to regime type

Foreign policy is crafted with the goal of realizing tangible objectives. In an anarchic world populated by sovereign states with war-making capability, security is always the chief objective. Security is also fleeting and, in a nuclear world, always imperfect. This tension drives the course of international politics. Proponents of the democratic peace and victory suggest that democracy is the most stable ground to build security policy upon. Amongst democracies, war is no longer a tool of foreign policy and the security dilemma is largely mitigated, at least in the arenas of democratic dyads. A world with a higher volume of democracies is more secure. Democracies also enjoy inherent advantages in war, meaning they can be assured that in the arenas where insecure power politics and the specter of war remains, they will likely win the day should they be tested. In this conception, democracies are secure in both proverbial "zones of peace" and in "zones of turmoil."

Realist thought and the work of this dissertation, suggests that as democratic states increasingly craft policies on these pillars, the problem of insecurity may in fact be exacerbated. There are significant problems with the democratic peace. While regime type predicts peace, it does not cause peace. American history itself raises concerns with the peace, both in 1812, when the only two states globally which could be conceived of as democracies went to war, then in 1861 the two American democracies fought one another. Realism suggests the peace a product of a larger trend in the distribution of capabilities. Democracies, especially among Western

Europe, Japan, and South Korea, enjoyed the security umbrella of the United States, meaning American military might vis-à-vis the Soviets and then into unipolarity explains a lack of security competition and war amongst these states. As power defuses away from the United States in the twenty-first century, tying the hopes of security to democracy is ill founded. In the case of the victory and further detailed below, democratic successes and failures are best explained not by regime type but by capabilities. If democracy has played a role, it has been in the ironic pursuit of democracy as security, embroiling American and other western democracies in quagmire globally against state and non-state actors alike, shielded from the might of the American military by terrain. To actively pursue democracy as a cure for insecurity is to make democracies less secure. If the democratic peace and victory are valid propositions, war will not occur in zones of peace and democracies will be success in zones of turmoil. If it is not, and we act as if it is, democracies will be ill suited for multipolarity. This folly may destroy nations.

Lesson Two: Capabilities advantages provide for security, but only conditionally. Thus, states should only initiate wars to achieve concrete and explicit objectives, not abstractions.

The chief predictor of victory is capabilities. If insecurity is concomitant to both the possibility of war and the general difficulty in predicting war outcomes, security can then be measured by the extent of capabilities a state possesses. States should craft foreign policies on the basis of capabilities following the old proposition that a state with a 3:1 advantage is secure. However, as these advantages only conditionally hold, states must consider the application of capabilities and the factors which impact their application when seeking to realize capabilities as power. The lesson is then that states should craft policy on the 3:1 advantage but recognize its limitations. Capabilities advantages are not carte blanche invitations to achieve all objectives.

The odds of victory in the conventional sense of defeating enemy forces are favorable but will become decreasingly so as secondary and tertiary objectives are added. In this sense, the strong should only select wars if capabilities can effectively be brought to bear on the enemy toward the primary objective of military victory. Either fighting to supplant an abstraction (like winning hearts and minds to liberalism and democracy) or fighting in terrain which limits the full exercise of capabilities are recipes for quagmire. Even states with extreme advantages, or perhaps especially these states given temptations towards hubris, should explicitly consider the degree to which power can be realized through capability. The only sure way to avoid defeat in war is to avoid war itself. Security is best realized through capabilities advantages and forbearance – while recognizing that advantages can promote insecurity in other states. The ultimate goal, especially for the world's most powerful state, should then be preponderance without threat.

Lesson Three: States should select strategies in war jointly on the basis of capabilities and terrain

States apply capabilities in war through strategy. Here, we see the bulk of state agency in the process of war - deciding where soldiers, arms, and materiel are placed, how they pursue objectives, and how they interact with the ground. When choosing war, states must consider how they may strategically apply capabilities. That is, if war is predominantly chosen for political reasons (i.e. grievance) and evaluated on perceived probability of success, states should heavily consider strategy in this process. More specifically, the potential efficacy of strategy in light of objectives. This is simple enough from the perspective of relative capabilities but becomes increasingly complex when considering terrain. History is riddled with examples of states seeking war in terrain in which they are ill prepared, even in home-field contests. Be it the Nazi invasion of Russia in summer dress or American reliance on unmanned aerial vehicles in the mountains of

Afghanistan, strategic advantage is only as effective as terrain allows it to be. The most effective states in war are those that recognize their own strategic limitations and do not pursue objectives beyond what strategy can reasonably produce. Selecting war on the basis of informed strategy can prevent the trap of pursing abstract objectives beyond which traditional strategies and capabilities can obtain. For instance, American "shock and awe" and mobile invasion (a maneuver strategy) made quick work of the Iraqi state in 2003 but this rapid victory was only the first step in a long quagmire. Reasonable assessment of strategic advantage would readily suggest that advantage is lost once the state is defeated. Without a clear exit plan per the Powell Doctrine, the war is among the greatest blunders in American history (second only to Vietnam, arrived at in similar fashion).

Lesson Four: States should select wars on the basis of place

Whereas space is an abstraction, place is a reality. Without a full understanding of place as including terrain, increasingly abstract objectives are likely to be pursued beyond victory – if victory can only be achieved through an understanding of terrain. Intuitively, states already do this to a degree. The motivation for war is always purposeful and informed by place. If place is the combination of the peoples and institutions which give space meaning, the additional crucial element of place is terrain. Again, states presumably engage terrain in force planning, but the central thesis of this work suggests that states should select war itself while considering terrain. States must not only know their enemy but the place where an enemy occupies. History is again riddled with states with imperfect knowledge of where fighting will occur and a subsequent misapplication of means. Perhaps this is an unavoidable defect in the nature of state decision making but one with tremendous potential cost. Beyond this, the best laid plans are subject to

change given the complexity of war as conflicts evolve. The United States likely never intended to engage the NVA and VC in Cambodia and Laos but the war evolved as such to make these arenas central as the hinterlands became metropoles of violence.

When states select war on only one element of place, place is made an abstraction. Fighting to win hearts and minds of the Vietnamese misses the question of how best to defeat an enemy shielded by terrain. If we can assume that states enter war with rank ordered objects, chief among them disruption of an enemy's ability to maintain resistance (i.e. victory), the failure to consider place as the "nature of the ground" allows states to too quickly seek objectives secondary or tertiary to victory. Doing so is a sure path to quagmire. The American objective of victory in Afghanistan, quickly realized against its state opponent, was decided without ample consideration of its ability to bring the might of American capability to bear on non-traditional actors post-transformation (i.e. those without uniforms, with unconventional objectives, using "illegal" tactics) in terrain that limits full exercise of capability. States wisely limiting objectives on the basis on a full understanding of place, such as the PRC's decision to limit its 1979 engagement with Vietnam to a relatively limited punitive action in the hinterland, may avoid these pitfalls. Take the American experiences in Iraq in 1990-1 and 2003. Following Iraq's invasion of Kuwait, American led UN forces made quick work the world's fourth largest army, concluding the war with the restoration of Kuwaiti sovereignty. The 2003 experience, albeit with less international consensus, would be equally swift, instead ending with the collapse of the Iraqi state. However, the nature of occupation and failure to realize the implications of pursing abstract objectives in an abstract place (ill prepared for urban pacification against, again, nontraditional adversaries) costs trillions and well over 200,000 lives (including civilians).

Realization of these abstract objectives are not nearer today than in 2003, nor in neighboring states in which the U.S. has intervened, including Syria, Libya, and Yemen – each now embroiled in its own civil war.

Clear historical precedence suggests that those who are willing to wager everything, can overcome great disadvantages, albeit at great costs. These cases, and in all cases of asymmetrical warfare where a grossly mismatched state overcomes overwhelming capabilities, demonstrate this primarily as a strategy of the weak. The Finns mastered a Fabian styled defense against overwhelming Soviet advantage, to the point that their contiguous foe accepted an entirely pyrrhic victory. Vietnamese forces, be it against the French, Americans, [74] fellow Vietnamese, or Chinese enemies, sacrificed generations of souls in the name of independence – all while acting antithetically to basic rules of war. The Mujahedeen in Afghanistan, gifted advanced weaponry by their then American allies, withstood Communist invasion for a decade, only for their heirs to withstand American invasion for nearly two more decades. In all these cases, and nearly every case where a grossly mismatched state wins out, the winner fought for survival. In this sense, the alternative to victory was death of the state or equivalent organization. If we are to assume that states are mortal actors in some sense – they rise, they fall, and history provides no example of a permanent political organization immune to the ravages of political and international entropy, then we should also assume that those facing death are dangerous. These actors are willing to sacrifice everything to assure their survival.

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[74] The Americans "fell victim to one of the classic blunders, the most famous of which is 'Never get involved in a land war in Asia,' but only slightly less well known is this: 'Never go in against a Sicilian, when death is on the line!'"(Vizzini 1987).

Merely fighting for survival does not ensure success. Rather, this drive must be bulwarked by terrain. Weak states with the will to wage total war in challenging terrain enjoy inherent advantages. Their stronger adversary may seek to use of their advantage but are hamstrung in their application of force. Polish, Belgian, Danish, Dutch, and French leadership and soldiers certainly knew that failing to halt the Nazi advance meant death but were utterly incapable of stemming the blitzing tide of German mobility. Even if we see acts of bravery made possible by the threat of total political domination, such as Polish lancers[75] on horseback charging German armor among history's final and futile cavalry charges, they were no match for the onslaught of German capability. Facing even greater capability differentials, Finnish forces, under constant Soviet bombardment, utterly rendered Soviet numerical and materiel advantages null. Similarly, NVA and VC forces were shielded from the unprecedented application of force in Operational Rolling Thunder by dense tropical canopies, as well as the ground itself through tunnels and underground bunkers. The only forces capable of engaging these terrain-aided soldiers had to do on their level: on the ground and in close quarters. Once capabilities are increasingly equalized by terrain, these contests become questions of will and effectiveness – at once driven by strategy and at once driven by the political situation. States must do their homework before war to know place or face folly.

Lesson Five: Unchecked power is dangerous (to the powerful)

The weak are willing to bear the cost of total war in the name of survival but the strong are not. Facing no existential threat, the strong shoulder a general hubris concomitant to military

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[75] While the Uhlans were armed with sabers, their use against Nazi infantry and armor is myth. The wielding of sabers was entirely ceremonious.

might. Indeed, we might say that the deaths of empires are sowed in this hubris. The modern international system[76] began with such hubris, and was constantly redefined by it. With victories from Margeno to Austerlitz, Napoleon's forces carved away the *ancien regime* throughout Central Europe. Only Britain, insulated by water, and Russia, shielded by terrain, stood to French forces. Only then, spurred on by strength and victory, would Napoleon face Waterloo in 1815 as a result of grave overextension and general folly in light of strategy and terrain. One hundred years later, having conquered all of Western Europe save for Britain, the Nazi's turned their gaze toward the Soviets. While slowed by missteps of their Italian allies in the Balkans, their folly was again overextension and an underappreciation of terrain. The ferocity and skill of the German military machine, as well as all the brutality born of National-Socialism, could not overcome mud, let alone a Soviet state facing death. The American experience of the past twenty years demonstrates this against non-state actors. The strong do not need to fear defeat, though history suggests this confidence is hubris. As Reiter and Stam (2002) posit, "Democracies win wars in large part because they attack only when they are very confident they will win" (2002). After some 17 years of war in Afghanistan and nine years in Iraq (and an additional six of limited engagement), as well as numerous other interventions in Libya, Yemen, and Syria, what was dubbed "confidence" is clearly hubris. The vast cost in blood and treasure, let alone the utter destruction of the social conditions we may expect democracy to be born of, has not brought democracy to any of these states. Death and quagmire is Nemesis' retribution.

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[76] Generally, the modern international political system is given a start date of 1648, with the Peace of Westphalia. I prescribe this date (The Napoleonic Era) in line with the modern alignment of power across the major state actors per Small and Singer's (1982) *Correlates of War* conceptualization. Further, the date of January 1, 1816, begins the temporal scope of this study.

Here we can apply an update to Madison's assertion that unchecked political power is dangerous. This general proposition is self-evidently true in international politics given the modern history of imperialism and aggression. Indeed, major elements of paradigmatic thought and prescriptions including balance of power theory and collective security are responses to the problem of unchecked aggression and power. The caveat here is that unchecked power may also be dangerous to the powerful. If unchecked powers are unafraid of defeat and increasingly willing to wage war for abstract reasons beyond victory, they are susceptible to engage in unwise wars – in the sense that their power may be limited by place. Power humbled by terrain is nothing new: the Alps are the graveyard for thousands of Carthaginians, Indochina the graveyard for French, Japanese, Americans, and Chinese, and Afghanistan the graveyard for the Macedonians, British, Soviets, and Americans. In the American case, promoting democracy is simply the excuse for digging the grave.

Lesson Six: The democratic victory is ironic

Even if there is not a causal relationship between democracy and war outcomes, there is reason to believe that war impacts the quality of democracy. Even more so, war impacts the quality of liberalism. From an American perspective, few things should be more troubling after nearly three decades of war – from the Gulf War, Somalia, Kosovo, Afghanistan, Iraq, Libya, and dozens more actions globally. It may be fair to say that American political culture engages multiple political traditions (Smith 1993), but the liberal tradition is it's defining thought (Hartz 1955/1983; Abbott 2001; Desch 2007a). If liberalism is predicated on the protection of rights – that is to say, restrictions on government – and "war is the health of the state," then there is cause for concern (Bourne 1918/1998). Be it Upton Sinclair's arrest for publicly reading the Bill

of Rights on Liberty Hill in San Francisco in 1923 or warrantless wire taps and unchecked NSA data collection today, the consequences of war continually degrade the quality of American liberalism at home. Beyond this, there is an inherent tension between liberalism and efficacy in war. The impetus for brutality, often a necessary strategy in pursuit of victory, is generally at odds with liberalism but often wins out at liberty's sake and is ironically engaged in her name. Indeed, America's first genuine step onto the world stage as a major power in 1898 was immediately followed by entirely illiberal action in the Philippines against one-time allies, nominally in pursuit of promoting a civilizing mission of liberalization. Here the American's inherited the Spanish Water Cure as a tool of interrogation, akin to modern waterboarding. As Andrew Carnegie quipped in opposition to the war, "you seem to have about finished your work of civilizing the Filipinos. About 8,000 of them have been civilized and sent to heaven. I hope you like it." Dozens of other illiberal actions, ranging from the massacre at My Lai to torture at Abu Ghraib, did little to promote victory (though wholesale brutality may have) while generally setting illiberal precedent in pursuit of victory.

In this tension we see a certain irony, reminiscent of Niebuhr's (1952) famous critique of Cold War American foreign policy. In pursuing victory, states must kill. Indeed, one cannot conceive of war without killing and violence. In the name of democracy, liberalism, or against some evil, we may consider war to be a tragic adventure. Niebuhr writes, "If men or nations do evil in a good cause; if they cover themselves with guilt in order to fulfill some high responsibility; or if they sacrifice some high value for the sake of a higher or equal one they make a tragic choice" (xxiii). However, if in this pursuit, liberalism or democracy is permanently damaged, we may consider this to be an ironic pursuit. Niebhur adds, "if virtue becomes vice through some hidden

defect in the virtue; if strength becomes weakness because of the vanity to which strength may prompt the mighty man or nation; if security is transmuted into insecurity because too much reliance is placed upon it; if wisdom becomes folly because it does not know its own limits – in all such cases the situation is ironic" (xxiv). As America has traded conventional state enemies for either non-state actors (and therefore more easily shielded by terrain or hospitable populations) or abstractions, the irony has only deepened. The irony lies in the reality that war against these targets are largely unwinnable, meaning that victory as an abstraction is always escaping, while degrading the very thing it seeks to protect. Perhaps we could find success in great brutality (slaughter of populations supporting insurgents, chemical weapons, etc.) but to do so would be the wholesale trade of liberal values. History suggests we prefer its piecemeal erosion. This is directly at odds with conclusions some have taken from the democracy and war literatures (both peace and victory): that democracies should tie security to the spread of democracy because democracies do not fight wars against one another and that democracies are likely to win the wars they fight. The greatest temptation for irony stems from this point by inherently justifying war as a tool of spreading democracy, all with the presumption of a high odds of success.

As the war outcomes puzzle becomes clearer, in part I hope through the additions of this dissertation, the irony should also be less opaque. This is not to say that these lessons imply that America, or Western liberal democracies more broadly, should altogether abandon war as a tool of foreign policy. As Clausewitz writes, "the fact that slaughter is a horrifying spectacle must make us take war more seriously, but not provide an excuse for gradually blunting our swords in the name of humanity. Sooner or later someone will come along with a sharp sword and hack off our arms" (260). The specter of war haunts the modern world as it did the past. Rather, we should

heed a call to the modal realist American foreign policy prescription: preponderance without threat. More simply, preponderance without war. This is also not to outright dismiss the democratic peace or victory. Indeed, evidence does suggest that democracies have been reliably more peaceful in their affairs with one another and democracies win the majority of their wars (even if we charge that democracy does not cause peace or victory). But in a world with increasingly high stakes in terms of population growth, rising urbanization, and rapid technological change – meaning even more lives are in the crosshairs than ever before – and that is still governed by the international politics of uncertainty, to cast our lot with democracy is a dangerous gamble. Worse yet would be to aggressively pursue democratization through force, armed with the quasi-teleological notion that democracy will win the day.

Concluding this lesson, we may turn to Abraham Lincoln's *Lyceum Address,* presented in 1838. Lincoln stated,

"Shall we expect some transatlantic military giant to step the ocean and crush us at a blow? Never! All the armies of Europe, Asia, and Africa combined, with all the treasure of the earth (our own excepted) in their military chest, with a Bonaparte for a commander, could not by force take a drink from the Ohio or make a track on the Blue Ridge in a trial of a thousand years. At what point then is the approach of danger to be expected? I answer. If it ever reach us, it must spring up amongst us; it cannot come from abroad. If destruction be our lot we must ourselves be its author and finisher. As a nation of freemen, we must live through all time or die by suicide."

A century and a half later, America still faces no existential threat. Even more so, in unipolarity, America faces no state or non-state threat that is not of its own making. Guarded by terrain – taken here to include the insulation of oceans and distance – and armed with the strongest military capability in human history, the United States is secure. Our suicide will not be the dramatic bloodletting of 1861-65, but the weeping wound of decades of foreign adventures,

infected by illiberalism and superbia. As we approach multipolarity, time is running out. We may yet stem the tide of irony but such a change would require a 'Cincinnatus-like' relinquishing over position and role – a feat unprecedented in the modern era.

Future Research

The additions made in this dissertation are small pieces in a very complex mosaic. I believe that more than anything else, the introduction of novel methods to the political question of war outcomes highlights the need for the field to seriously consider the role of terrain in war – while taking lessons from other fields. More specifically, it highlights that the concept of place is underappreciated, if not partially ignored, when we fail to get quality data. The three additions in this work – TRI, trafficability indices, and spatial extent – improve the state of the art. Even so, they lack key elements that should be expanded in further studies. The first is further operationalization of the concepts themselves. My work demonstrates that terrain impacts outcomes but this is only conditional. Future research should seek to identify identifying the elements which bring terrain to the forefront of consideration and include them in analysis. This is increasingly complex given the temporal and geographically diverse nature of war, but generally we can suggest that several factors interact with terrain. First is climate and weather. Climate allows us to make relatively broad predictions about certain landscape classes in specific places in time. A lake may become trafficable if frozen just as a temporal broadleaf forest loses its leaves. Weather is less predictable but often has a more immediate impact on terrain. A heavy rain, mixed with the weight of men and machine, may turn gentle undulating plains into a hellish mud.

Second is time or temporal setting. Wars happen in time and over time. In this sense, the period in which a war occurs should have an impact on its outcome. Humans have constantly changed the way we interact with the world around us and the nineteenth and twentieth centuries have increased the rate at which change has occurred. We went from horse traffic to space travel in less than two centuries. The rate at which one can move between spatially separate points increased dramatically. However, this rate has always been unequal, with some enjoying the fruits of innovation and others stagnating. While this is inherently measured in some fashion within CINC data, greater operationalization is necessary. Further, wars occur over time. Other's work, namely Bennett and Stam (1996; 1998), address this problem by disaggregating individual wars by year. Still a year is perhaps too long a time period – though given the diversity of war, no single unit of time is universally appropriate. An army may win in the summer only to freeze in the winter or win on one battlefield only to lose on another. Further work should address this problem, partially through disaggregation, and partially through novel conceptions of time – perhaps thematically by campaign, but this too requires exceedingly high amounts of data to be generalizable. Doing so may also allow for increasingly precise terrain metrics apart from the whole of the war.

Third, and perhaps most importantly, is the question of strategy selection or how states select their strategy. Likely there is no monocausal explanation, but an answer (or best approximation) will address the lasting paradigmatic problem of agency. In other words, do democracies select strategies differently that nondemocracies? While I suspect the answer is no, it is an intriguing question. As Clemenceau stated, "war is too serious a matter to entrust to the military" (quoted in Suarez 1932). In a nuclear world this may be the case, but is less clear in

conventional war; the modal type. Indeed, democratic politicians may push for non-military objectives, such as the promotion of democracy or seeking media-friendly but strategically and tactically ill-advised endeavors. Akin to Allison's (1969) seminal work, future work should address questions beyond the assumption of the state as a monolith. Strategy selection as organizational output is likely conditioned by past experience (incremental learning lacking creative spontaneity), parochial priorities and perceptions, and standard operating procedures. Similarly, strategy selection as bureaucratic politics must consider players in positions, as well as the influence of domestic institutions such as the military industrial complex. As Desch (2007b) notes, tensions between political and military leadership in the Bush administration pushed strategy and tactical decisions towards politicians – to the detriment of American military effectiveness in Iraq. The future validity of the democratic victory rests in these questions on strategy.

Finally, expansion of the scientific study of terrain also allows us to explore the relationship in the other direction. How does war impact terrain? While numerous works have explored the question of the impact of war on ecology, advances in various ecological and geographic technologies and methods, such as remote sensing, are fertile soil for new study. This topic is a natural dovetail. The use of terrain in war is the exploration of how humans interact with the world around them. Never in human history have humans been capable of such dramatic effect on their environment. Beyond this, trends in climate and human settlement patterns are changing the essential nature of terrain- be it in deforestation, sea level rises, or urbanization. Presumably, this will change the nature of war in the future as place changes. The study of ecology provides a holistic approach to the study of war.

There are a great many questions which remain either partially answered or entirely unaddressed in the war outcomes puzzle. It is the duty of responsible scientists both to pursue these answers and to be cautious in generating prescriptions from partial understandings. In an anarchic world where war is an ever-present possibility, the stakes are high. Coupled with looming multipolarity and the prospect of a changing power landscape, states and scholars alike should practice forbearance, lest we inaugurate the folly of our predecessors. We must ask, do we want a twenty-first century like the twentieth? If the answer is no, we must be vigilant in formulating responsible prescriptions and policy rooted in both science and history – all while recognizing inherent limitations in our own work. When the stakes include the destruction of entire societies, we must tread lightly into the future and remember the past. If not, we will destroy nations.

Appendix A: Terrain Variables Codebook

Spatial Extent:

Spatial extent is derived from polygons determined by georeferenced maps. Spatial extent is an approximation of the total area of a given war, presented in km^2.

Terrain Ruggedness Index (TRI):

- TRI for each pixel is calculated by measuring the difference in elevation between it and its eight adjacent neighbor pixels. These differences are then squared and averaged, with the square root of this value producing a TRI (Riley, DeGloria, and Elliot 1999, 25). TRI variables include:
- *TRI Mean:* Average of TRI values in meters of given war.
- *TRI Median:* Median value of TRI values in meters of given war.
- *TRI Standard Deviation:* Standard Deviation of TRI values in meters of given war.
- *TRI Minimum:* Lowest recorded TRI value in meters of given war.
- *TRI Maximum:* Highest recorded TRI value in meters of a given war.
- *TRI Categorical:* Categorical values of TRI Mean from Riley, Degloria, and Elliot's (1999) coding:
  - 1: level (0-80 m); 2: nearly level (81-116 m); 3: slightly rugged (117-161 m); 4: intermediately rugged (162-239 m); 5: moderately rugged (240-497 m); 6: highly rugged (498-958 m); and 7: extremely rugged (959-4367 m). No wars occur in the extremely rugged TRI category.

Landcover Classes:

Data presents percent of each class present for each war. These classes include:

1. Tundra (*tun*)
2. Water (*wat*)
3. Urban (*urb*)
4. Desert (*desert)*
5. Tropical Evergreen Broadleaf Forest (*trpebf*)
6. Tropical Deciduous Broadleaf Forest (*trpdbf*)
7. Temperate Evergreen Broadleaf Forest (*tmpebf*)
8. Temperate Evergreen Needleleaf Forest (*tmpenf*)
9. Temperate Deciduous Broafleaf Forest (*tmpdbf*)
10. Boreal Evergreen Needleleaf Forest (*borenf*)
11. Boreal Deciduous Needleleaf Forest (*bordnf*)
12. Savanna (*sava*)
13. Grasslands/Steppe following C3 photosynthetic pathway (*c3grass*)
14. Grasslands/Steppe following C4 photosynthetic pathway (*c4grass*)
15. Dense Shrubland (*dshrub*)
16. Open Shrubland (*oshrub*)

17. Polar Desert/Rock/Ice (*pdri*)
18. Secondary Tropical Evergreen Broadleaf Forest (*strpebf*)
19. Secondary Tropical Deciduous Broadleaf Forest (*strpdbf*)
20. Secondary Temperate Evergreen Broadleaf Forest (*stmpebf*)
21. Secondary Temperate Evergreen Needleleaf Forest (stmpenf)
22. Secondary Temperate Deciduous Broadleaf Forest (*stmpdbf*)
23. Secondary Boreal Evergreen Needleleaf Forest (*borenf*)
24. Secondary Boreal Deciduous Needleleaf Forest (*sbordnf*)
25. Cropland following C3 photosynthetic pathway (*c3crop*)
26. Cropland following C4 photosynthetic pathway (*c4crop*)
27. Pastureland following C3 photosynthetic pathway (*c3past*)
28. Pastureland following C4 photosynthetic pathway (*c4past*)

Trafficability:
Landcover classes are aggregated by percentage as either trafficable or non-trafficable, following
Dupuy (1983). War landscapes are presented by percent trafficable or non-trafficable

Cover types are coded by trafficability:

Land Cover Type	*Trafficable*	*Non-Trafficable*
Tropical Evergreen Broadleaf Forest	0	1
Tropical Deciduous Broadleaf Forest	0	1
Temperate Evergreen Broadleaf Forest	0	1
Temperate needleleaf Forest	0	1
Temperate Deciduous Broadleaf Forest	0	1
Boreal Evergreen Needleleaf Forest	0	1
Boreal Deciduous Needleleaf Forest	0	1
Savanna	1	0
C3 Grassland/Steppe	1	0
C4 Grassland/Steppe	1	0
Dense Shrubland	0	1
Open Shrubland	1	0
Tundra	1	0
Desert	1	0
Polar Desert/Rock/Ice	0	1
Secondary Tropical Evergreen Broadleaf Forest	0	1
Secondary Tropical Deciduous Broadleaf Forest	0	1
Secondary Temperate Evergreen Broadleaf Forest	0	1
Secondary Temperate Evergreen Needleleaf Forest	0	1

Secondary Temperate Deciduous Broadleaf Forest	0	1
Secondary Boreal Evergreen Needleleaf Forest	0	1
Secondary Boreal Deciduous Needleleaf Forest	0	1
Water/Rivers	0*	1
C3 Cropland	1	0
C4 Cropland	1	0
C3 Pastureland	1	0
C4 Pastureland	1	0
Urban land	0	1
*coded as trafficable during Russo-Finnish War given winter conditions	11	17

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ABSTRACT

PLACE OVER POLITICS: POWER, STRATEGY, TERRAIN, AND REGIME TYPE IN INTERSTATE WAR OUTCOMES, 1816-2003

by

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While the study of war occurrence is among the primary considerations of the field of international relations, only recently has attention turned towards the study of war outcomes. This attention is best represented by the democratic victory proposition, which suggests that democracies win the majority of their wars by virtue of being democratic. However, elements of this study are currently incipient. In turn, this dissertation generates a novel set of variables to measure the impact of terrain on war outcomes, including measures of spatial extent, topographic heterogeneity, and land cover heterogeneity. These metrics are generated for all 94 interstate wars in the correlates of war population between 1816-2003, as well as disaggregated forms of WWI, WWII, and Vietnam – bringing the total to 105 wars. These data are then used to analyze war outcomes using multinomial logistic regression. The results suggest that, at present, the democratic victory proposition is incomplete. Further research is needed to explore the complex relationship between state capabilities, strategy, regime type, and terrain.

AUTOBIOGRAPHICAL STATEMENT

Connor Joseph Sprayberry Sutton is a Ph.D. Candidate in political science at Wayne State University, majoring in world politics, with minors in comparative politics and American politics. Connor graduated from Aquinas College (Grand Rapids, MI) in 2013. Entering the Ph.D. program in Fall 2013, he served as a Graduate Teaching Assistant from 2013-2016 before becoming a Guest Lecturer at Eastern Michigan University from 2016-2018. His research interests include the cause and course of interstate war, geopolitics, political geography, and gender and politics. He is also engaged in research on gender norms and adolescent political simulations. He currently lives in Kalamazoo, Michigan with his wife, Dr. Joanna Sutton, and his dog, Lenny, and cat, Prim. He enjoys fly-fishing and spending time outdoors.