SUPERFORECASTING OR SNAFU: THE FORECASTING ABILITY OF THE US MILITARY OFFICER

by

DAVID L. RAUGH
B.S. United States Military Academy, 1993
M.S. Kansas State University, 2004
M.M.A.S. School of Advanced Military Studies, 2005

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Political Science
in the College of Science
at the University of Central Florida
Orlando, Florida

Spring Term

2019

Major Professor: Thomas Dolan

ABSTRACT

What is the impact of military institutional tendencies and habits on U.S. Army senior officer forecasting accuracy and how does this forecasting ability shape success in battle? Military leaders plan operations based on the forecasted strengths and vulnerabilities of their adversary. Negative habits, such as limited option development, confirmation bias, doctrinal overreliance, and over-consideration of sunk costs, inhibit effective forecasting. The tempo of the modern battlefield, hierarchical culture, and institutional tendencies of the US Army may promote and reinforce these habits. I surveyed Colonels in US Army War College programs to measure their individual tendencies, levels of education, and accuracy in forecasting events during a three to twelve-month future. Quantitative analysis of the resulting data shows that these habits are present and negatively affect forecasting ability; additionally, higher levels of education positively affect forecast accuracy, possibly counteracting the effects of negative institutional tendencies and habits. Extending the research using historical and contemporary case studies of senior US Army Generals, including interviews of General David Petraeus and other high-ranking officials, I find that rejection of these institutional habits and tendencies enabled superior forecasting, leading to battlefield success. I conclude by examining how educational levels of commanding generals in the Iraq War affected military success. Exploratory quantitative analysis of data collected from the US Army historical archives shows that higher levels of education positively affected significant activities within the general's assigned areas.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE: INTRODUCTION

What is the impact of military institutional tendencies and habits on US military officer forecasting accuracy and how does this forecasting ability shape success in battle? Individuals and organizations use forecasts to make "an estimation of future situation…[and] an objective assessment of a future course of action" (Bhatia 2019:1); thus they assess what the future environment will be, as well as how a course(s) of action, if pursued, will unfold in that environment. Effective forecasting is important in all aspects of defense matters. Forecasting is part of the bureaucratic defense procurement processes, in which a state seeks to research, develop, and field equipment that to allow it to fight effectively in a future environment. It is a key component in campaign and battle plan development at the tactical, operational, and strategic levels. As a battle unfolds, military leaders should continue to refine forecasts of enemy and friendly actions and adjust their actions accordingly to be successful.

Unfortunately, most individual, including military leaders, are not effective forecasters. Effective forecasters acknowledge gaps in knowledge, conduct personal research to enables them to make educated predictions, and use logical processes to arrive at reasonable conclusions (Tetlock 2005, Tetlock and Gardner 2015). Contrarily, negative habits, such as limited option development, confirmation bias, doctrinal overreliance, and over-consideration of sunk costs, inhibit effective forecasting. The tempo of the modern battlefield, hierarchical culture, and institutional tendencies of the US military may promote and reinforce these negative habits. Military leaders, such as senior commissioned officers with 20 or more years of service, are especially prone to these institutional habits and tendencies and thus negatively affected by them.

This dissertation examines the effect of military institutional tendencies and habits on military officer forecasting abilities, how attendant success/failure in forecasting affects combat outcomes, and if increased education counteracts these institutional tendencies and habits, thus improving success in war. This dissertation is organized in five chapters, with the bulk of research organized into chapters two through four. The three primary research chapters are stand-alone articles that each contain their own literature review, theory, research design, analysis, findings and conclusions. To ensure academic rigor, this dissertation uses a mixture of research methods, involving both quantitative analysis of survey and dataset material as well as qualitative case study analysis, based upon archival and interview materials.

Chapter two, titled the *Impact of Military Institutional Tendencies and Habits on Forecasting* examines the US Army as an institution, what tendencies and habits are promoted within this institution, and what effect do these habits have on forecasting. I surveyed Colonels in US Army War College programs to measure their individual tendencies, levels of education, and accuracy in forecasting events during a three to twelve-month future. Quantitative analysis of the resulting data shows that these tendencies and habits are present and negatively affect forecasting ability; additionally, higher levels of education positively affect forecast accuracy, possibly counteracting the effects of negative institutional tendencies and habits.

Chapter three, titled *Senior General Officer Case Study*, extends this research through historical and contemporary case studies of senior US Army Generals, including General McClellan in the American Civil War, General Omar Bradley in World War Two and General David Petraeus during Operation Iraqi Freedom. Through these case studies, I confirm that

rejection of these institutional habits and tendencies enabled superior forecasting, leading to battlefield success.

Chapter four, titled *Education and Success in Battle*, examines if higher levels of education positively affect forecast accuracy, possibly counteracting the effects of negative institutional tendencies and habits. Using quantitative analysis of data collected from the US Army historical archives I find that higher levels of education positively affected significant activities within the general's assigned areas.

CHAPTER TWO:
THE IMPACT OF MILITARY INSTITUTIONAL TENDENCIES AND HABITS ON FORECASTING

> *When things go wrong it is natural to blame leaders, reasoning that things would have gone better if they had made better decisions. This is especially true when senior leader decisions are controversial, as was the case with Iraq. As commentators often note, Iraq was a war of choice that should not have been initiated without being prepared for all likely developments, especially postwar lawlessness. It also is understandable that poor outcomes are often linked to common decision-making errors such as erroneous assumptions, improper analogies, tunnel vision, and cognitive dissonance. Almost by definition when things go badly, these types of limitations are in play to some extent.*
>
> (Hooker and Collins 2015)

Most military decisions are based upon forecasts. In the military, individuals and organizations use forecasts to make "an estimation of future situation…[and] an objective assessment of a future course of action" (Bhatia 2019:1). Military planners forecast potential adversaries and adversarial capabilities to allow friendly forces to develop equipment, tactics, and overall capabilities, which can counter the advantages of a challenger. Thus, successful forecasting can allow a military force to operate from a position of relative advantage to its competitor. Historically, the United States' military has had mixed success in correctly forecasting the identity of its next adversary, organizing itself for warfare, and fighting in the most appropriate way. At the outbreak of the Korean War, 1-21 Infantry, (Task Force Smith), a poorly trained and equipped infantry battalion hastily deployed from constabulary duty in Japan, failed to stop North Korea attacks from the north. Only through retraining and the deployment of significant ground, air, and sea forces was the US able to stop, and then push back the North

Korean invasion (Millett 2010). Prior to the Vietnam War, US policymakers and military planners focused primarily on forecasting and organizing to fight against conventional Soviet and Warsaw Pact forces in Europe (DeBiase 2017). This failure to effectively forecast Vietnamese insurgent capabilities and US counterinsurgency requirements ultimately led to US failure in the Vietnam War (Krepinevich Jr 2009). US forecasting for conventional conflict in Europe later proved serendipitous when US and coalition forces routed Iraqi forces in the 1991 conflict of Operations Desert Shield and Desert Storm. Iraqi forces predominately employed obsolete Soviet equipment and tactics, making them easy targets for the high tech US military (Atkinson 1993). Following 9-11, the US achieved stunning victories in the opening phases of operations in Iraq and Afghanistan, but failed to forecast the changing nature of the conflict toward insurgencies once conventional operations ceased (Perliger and Sweeney 2018). This most recent failure resulted in sustained conflicts that cost trillions of dollars and thousands of American lives (Shane 2018).

Forecasting is difficult; accurate ex-ante predictions stand in "stark contrast" to easier ex-post analysis (Frühling 2006:21). Clausewitz (1976:25) addressed the challenges of forecasting when he wrote

> This uncertainty of all intelligence and suppositions, this continual interposition of chance, the actor in war constantly finds things different from his expectations; and this cannot fail to have an influence on his plans.

A commander must continually reassess his actions against the ever-changing situation in which he and his army are involved. Reinforcing Clausewitz's theory, researchers of complexity theory describe history simply as "a succession of chaotic shocks reverberating through incomprehensibly intricate networks" and thus non-predictable (Bak and Chen 1991:46-53).

Counterintuitively, expertise in the area being predicted generally does not improve predictive ability in it. More often than not expertise evokes hubris, misplaced confidence and decisiveness, that limits the self-critical and reflective judgement required for better-than-average forecasting (Tetlock and Lebow 2001:23). Although we must admit it is never possible to predict events with absolute certainty, this should not be used as justification for not forecasting, nor for excusing consistently bad forecasts. Forecasts allow us to evaluate potential futures; identifying and remedying causes of inaccuracy allows more-informed decisions with higher chances of success.

Knowing the challenges of forecasting and the cost of getting them wrong, this research examines the forecasting ability of military decision-makers. Military officers can be negatively and positively influenced in their forecasts and subsequent decisions not only by individual tendencies, but also by military institutional tendencies and habits. In undertaking this research, I use quantitative research methods to answer my substantive research question: *what is the impact of military institutional tendencies and habits on US Army senior officer forecasting accuracy?*

Examination of Relevant Research

Although forecasting is generally defined as methods to infer future action (Tetlock 2005), the disciplinary approaches to thinking about forecasting differ significantly, including both individual and institutional differences as well as economic, political and mixed method perspectives. Forecasting is relevant to both natural and human sciences (Mazlish 2017), though in this research I focus exclusively upon the latter. Even in these sciences that focus solely on

human behavior, the attendant scientists and researchers all view forecasting through divergent academic lenses.

Disciplinary Perspectives

Economists pioneered forecasting efforts to predict future market fluctuations and enable informed investment and budgeting procedures (Diebold 1997, Hawkins 2005, Friedman 2013). Most economists use macroeconomic models to represent the complex interaction of consumers, producers, investors, and others in state and international economies (Amisano, Geweke et al. 2017). Individual actor attributes are generally not considered since the focus is on the economic system. Economists have focused significant effort on political risk forecasting- a discipline that attempts to foresee hazards of political actions by host government and foreign opposition groups on international businesses' foreign ventures (Bunn and Mustafaoglu 1978, De La Torre and Neckar 1988, Goldstone, Bates et al. 2010). This disciplinary perspective is generally limited in its application to my research due to its focus on economic facets of society. To consider those societal factors as part of a forecasting effort, one must consider other disciplines.

Political scientists and international relations theorists also attempt to develop forecasts. Political scientists strive to forecast government and politics events at the local through international levels (Almond and Politics 1988). Scientists focused on international relations attempt to forecast conflict or other human disasters (Schneider, Gleditsch et al. 2011).

Most social scientists acknowledge the difficulty of developing completely accurate models, a prime example being the failure of Robert S. McNamara's system-analysis and cost-benefit predictions of North Vietnamese failure during the Vietnam War (DeLeon 1987). This

model predicted that aggressive actions by US and South Vietnamese forces would incur mounting losses on Viet Cong (VC) and North Vietnamese army (NVA) forces, eventually exhausting North Vietnam by 1968. As a result, the US pursued a strategy of attrition and massive firepower, with progress measured by enemy body counts. Unfortunately, the model incorrectly misjudged North Vietnamese will; VC and NVA forces continued fighting past 1968, through the US withdrawal in 1973, until they captured Saigon in 1975 (Rejeski and Olson 2006:17). McNamara admitted the complete failure of this forecast, and the devastation it caused to American lives and civil society (McNamara and VanDeMark 1996, McNamara 2003). Challenges such as strategic interactions, moral hazards, self-fulfilling and self-denying prophecies, selection effects, and other phenomena create complex systems that cannot be understood simply by examining each of its separate parts (Jervis 1998, George, Bennett et al. 2005: 130). Out of this complexity emerged theories such as balance of power, which forecasts alliances in responses to an aspiring world dictator (Jervis 1998). Since the discipline is diverse, social scientists use a wide variety of methods to test their theories. Both qualitative and quantitative methods to determine tendencies of causality are generally accepted.

Psychologists attempt to forecast individual human and group decisions by several means including laboratory, field experiments, and case study methods to determine correlation between variables (McLeod 2003). Cognitive psychologists have shown that individuals "rely heavily upon our prior beliefs to help [them] interpret new information and make sense of our ambiguous world" (Welch 2005: 37). Cognitive psychology scholars generally agree that humans think irrationally, relying upon "inaccurate problem-solving procedures learned through experience, trial and error, peers or parents, deliberate instruction" heuristics instead of rational

choice decision-making processes (Hastie and Dawes 2010:17, 88). Motivational psychologists theorize people forecast and make decisions based on basic needs (Hull 1943). These disciplinary perspectives, while useful in showing the human tendency toward irrational forecast and decision-making methodologies, are limited to the individual level, and do little to explain phenomena such as state and international organizational forecast-based decisions.

Other research uses multidisciplinary approaches to make up for the individual-disciplinary weaknesses when explaining forecasting and decisions, especially for complex scenarios, such as war. The remainder of this literature review first examines multidisciplinary forecasting research, next considers forecasting as part of the decision-making process, and then examines how institutional tendencies and habits affect forecasting and decision-making.

Multidisciplinary Application to State Policy

Forecasting is important to policymakers at the strategic level. At the state and international level, Frühling (2006) examined the importance of forecasting in the development of strategy linking a state's military actions and political objectives. Often, state leaders forecast the cause-effect relationship between potential military action and political success based upon previous experience in war. Unfortunately, history never exactly repeats. (Frühling 2006). Adding to research which examines the challenges of forecasting, Taleb (2010) examines the impact of "black swans," events that are outliers, and often considered ex ante as missed signals. Examples of contemporary black swan events include the dissolution of the Soviet Union and the attacks of 9-11.

Another cause of missed signals is the Fischoff tendency, or hindsight bias, in which one assumes that an action will unfold similar to how actions have unfolded in the past (Fischhoff 1975, Hastie and Dawes 2010:33). An example of this was Israel's failure to forecast the Arab surprise attacks of the 1973 Yom Kippur War (Rabinovich 2007). This failure was due to hindsight bias toward the results of the 1967 Six-Day War, and faulty assumptions subsequently developed during the War of Attrition (1967-1970) (Klein, Hegarty et al. 2017).

Obviously, state organizations are interested in finding ways to improve the forecasting ability of its military, security, and political apparatus. Improving forecasts can provide security by allowing the state to develop equipment, tactics, and overall capabilities to counter the advantages of a challenger. I follow now with research that examines detriments or benefits to forecasting.

At the individual level, Reiber (2004), examines intelligence analyst forecasts and finds "outcome feedback," or rapid feedback of a predictor's accuracy, does not ensure increased judgment about probabilities. Instead "calibration feedback," which depicts a combined overall trend comparing predictions to outcomes is more likely to improve accuracy in the analyst's forecasting. Other research suggests that a personality trait of "openness" prevents biased judgments in intelligence analysis (Bar- Joseph and McDermott 2008). This research, while valuable from a micro-perspective of intelligence analysis, does little to explain effective forecasting techniques for a greater public audience.

Tetlock (2005) attempts to remedy this when he combines economic, historical, psychological, and political science techniques over a multi-year (1992-2003) research program to identify the personal attributes of superior forecasters. He finds that "foxes," those with wide

ranging experience and multidisciplinary education tend to forecast more effectively than "hedgehogs," those with specialized experiences and single-disciplinary education (Tetlock and Lebow 2001). More specifically, superior forecasters tend to be more self-critical, appreciative of complexity, willing to revise estimates, and willing to admit when they are wrong. Poor forecasters are doctrinal in their approach, seeking simplistic patterns. They also tend to be vain, overconfident and willing to make bold prediction and suffer from both self-attribution bias and hindsight bias (Tetlock 2005). He later finds (2015) some individuals are innately "superforecasters" when compared to others. These individuals, though smart, are not geniuses. Superforecasting results from gathering evidence from multiple sources, working in teams, using probabilistic methodologies, and changing predictions based upon emerging evidence. He further found these traits could be enhanced with focused training. Tetlock's research methodology consisted of surveys in which respondents provided demographic information and answered questions to establish their personal psychological tendencies (such as need for closure, tolerance for ambiguity, and willingness to consider alternate views). Respondents then made multiple short and long-term forecasts, indicating not only whether an event was likely to occur or not, but also the confidence they had in the forecast (Tetlock 2005:243-245). Tetlock analyzed the resulting data to ascertain traits of those who forecasted more accurately than others.

The US Military and Forecasting

Forecasting is an integral part of US strategy process. Colin Gray (1999:17) defines strategy as the "bridge that relates military power to political purpose." US military services, the

Combatant Commands and the Chairman of the Joint Chiefs of Staff (CJCS) use the Joint Strategic Planning System (JSPS) to accomplish unified strategic direction in the armed forces in support of the elected civilian administration. They do so by understanding the civilian leadership's policy objectives, as articulated in the National Security Strategy (NSS), and determining the *ends, ways, means, and associated risk* required to accomplish these ends (Staff 2013:A3).

This *ends, ways, means* strategy development process utilizes forecasting as a major portion of its development process. The military begins the process knowing its *means*, the assets and capabilities available to conduct military operations, and *ends*- the military policy objectives desired by the civilian administrators. Forecasting allows military strategists to visualize potential combinations of military operations and capabilities to create courses of actions, or *ways*, to connect the *means* and *ends*. As discussed in my introduction, forecasters must also consider the actions and abilities of adversaries and potential enemies. These adversaries and potential enemies seek to deny the friendly military force from accomplishing its selected *ends*. The greater strategic, operational, and tactical environment can also limit or deny *means* by effects other than adversarial actions. It can include both physical limitations (distances, rugged topography, austere environments) and political considerations (alliances, international and state law, ethnic differences, cultural norms) which can significantly affect the feasibility of potential *ways*. Doing this successfully is difficult; oftentimes military leaders rely upon previous wartime experience rather than logical examination of future perspectives when undertaking it (Fischhoff 1975).

In some circumstances, it may be impossible to pursue any feasible *ways* due to existing limitations in *means*. An example of this is the cancelled Operation Sea Lion, in which Germany could not invade Great Britain in World War Two due to limitations in German naval combat and landing craft (Schenk 1990:22-25, Millett and Murray 2000:66). Forecasting allows strategists to identify a necessary change in *means*, for example, increasing the end strength of the US Army by 50,000 soldiers during the 2007 Iraq surge, in order to make the *ways* course of action a viable method to accomplish the desired ends (Knowlton Jr 2010, Gates 2014). The ends, ways, means methodology, and its embedded forecasting requirements in each, not only applies at the strategic level, but also at the operational and tactical levels of conflict.

Population of Interest

This research focuses on the forecasting abilities of a very specific population who operate at the strategic, operational, and tactical level of war; Senior Field-grade US Army officers with at least 20 years of service. At the lower end of this spectrum these officers perform key functions within the Army. They serve as the primary plans and policy action-officer for combatant command headquarters, advisors and military liaisons for senior governmental policy makers, and assistants to military four-star flag officers. This proximity grants some level of influence on strategic policy. During military deployments, they lead large numbers of soldiers (500-3500) in important and complex missions, which can include conventional combat, counterinsurgency, peacekeeping, peace-enforcement, and foreign internal defense[1]. Despite operating at the tactical

[1] See US Army Doctrine Reference Publication (ARDP) 3-90, (ARDP) 3-07, and US Army Field Manual (FM) 3-28 for the full list of US Army missions tasks.

level of war, their decisions may have worldwide strategic effect due to the impact of instantaneous media and the personal nature of contemporary population-based conflict (Storr 2003:123). This officer population also provides the human capital from which future general officers are selected. In 5-10 years, approximately 5% of these officers will be selected for advancement to general officer, and directly in charge of strategic-level military policy decisions (Eitelberg, Laurence et al. 1992). This population is rarely examined from an academic perspective, due to the relatively insular nature of the military (Thornhill and Whitlark 2015). Additionally, because these individuals have operated within the confines of the US Army institution for two decades of their professional career, it is possible, despite personal predilections, for them to internalize and subsequently utilize the habits and tendencies examined in this research. Given their significant influence within the US Army, their success or failure at forecasting has a strategic impact on US international policy and military effectiveness.

Theory- The Impact of US Army Institutional Tendencies and Habits

The US military exudes strong institutional tendencies and habits, often significantly different than those of the general society in the US (Huntington 1957, Janowitz 1964, Dunivin 1994, Feaver 1996, Feaver and Kohn 2001). My population of interest is professional US Army officers, with at least 18 years of service, allowing significant time for norm inculcation. Because organizational norms, tendencies and habits affect forecasting as part of the decision-making process (Rosen 1994, Allison and Zelikow 1999, Gartner 1999, Mintz, Redd et al. 2006, Haerem, Kuvaas et al. 2011), it is likely that US military institutional tendencies and habits do have some effect on US Army senior field-grade officer forecasting, especially due to the results

of specialization, violations of rational decision-making, bias and sunk costs (Kruglanski and Webster 1996, Tetlock 2005, Hastie and Dawes 2010). I now examine some institutional tendencies and habits and hypothesize potential impacts.

Specialization

I begin with consideration of specialization, an organizational norm. Tetlock, in a 20-year research study of political observers, found significant differences between "hedgehogs" and "foxes." Specialist "hedgehogs" are thinkers who often

> Know one big thing, aggressively extend the explanatory reach of that one big thing into new domains, display bristly impatience with those who do not 'get it,' and express considerable confidence that they are already pretty proficient forecasters. (2005: 73)

Inversely, generalist "foxes" tend to

> Know many small things (tricks of their trade), are skeptical of grand schemes, see explanation and prediction not as deductive exercises but rather as exercises in flexible 'ad hocery' that requires stitching together diverse sources of information, and are rather indifferent about their own forecasting prowess, and [are]…rather dubious that the cloudlike subject of politics can be the object of a clocklike science. (2005:73, 75)

His research found generalists forecasted more accurately than specialists (Tetlock and Lebow 2001). Specialists made more extreme forecasts, discounted incorrect forecasting results, and did not revisit assumptions upon which the predictions were made. Generalists were more conservative in their predictions, revisited previous forecasts, and revised their estimates and assumptions before forecasting again (Tetlock 2005).

The US Army contains both specialist and generalist-oriented officers. In 1996, the US Army officer personnel management system (OPMS) XXI task force completed a yearlong study

based on the assumption that “officers do too many things today for them to excel at any one of them” (Urben 2017:1). Results of the study recommended that US Army officers, instead of alternating between “specialized” jobs such as comptroller, strategist, and operations research, and “generalist” combat arms jobs including infantry, armor, field artillery and special forces, would instead be permanently divided. At approximately 10 years of service, officer self-selected into specialized areas or remained in the operations field. Once this division was finalized, the officers would remain in these separate career tracts for the duration of their military career, with no opportunity for assignments in the tract opposite. Officers designated into a functional area (FA) are specialists. FA-aligned officers are grouped into a technical specialty which usually requires unique education, training and experience (Army 2014:11-12). Figure one below identifies current US Army functional areas.

FA 39 (PSYOP)
FA 90 (Logistician Program)
FA 24 (Telecommunications Systems Engineer)
FA 30 (Information Operations)
FA 34 (Strategic Intelligence)
FA 40 (Space Operations)
FA 46 (Public Affairs)
FA 53 (Information Systems Management)
FA 57 (Simulation Operations)
FA 43 (Human Resource Management)
FA 45 (Comptroller)
FA 47 (US Military Academy Permanent Associate Professor)
FA 49 (Operations Research/Systems Analysis (ORSA))
FA 50 (Force Management)
FA 52 (Nuclear and Counterproliferation)
FA 59 (Strategic Plans and Policy)
FA 51 (Army Acquisition Corps)
FA 48 (Foreign Area Officer)

Figure 1: US Army Functional Area Designations (Army 2014)

With the exception of FA 39, 51, and 90, no other specialists are afforded opportunities to command US Army formations. Upon selection, FA-identified officers subsequently receive detailed training and education focused on their new specialty. From this point until the end of their military career, they perform jobs limited to their specialization, though their responsibilities increase as they rise in seniority. As an example, officers who select Strategic Planner (FA 59) are expected to lead multidisciplinary planning groups and facilitate senior leader decision-making by assessing, developing, and articulating policy, strategy, and plans at the national and theater level. Upon entry to this functional area, they receive specialized strategy training, education, and complete a master's degree from a university in a strategy-related field if they do not already possess one (Army 2014:285-289). They subsequently assume staff planning positions throughout the US Department of Defense. As FA 59 officers

progress in seniority, they assume additional responsibility, moving from assistant to lead planning responsibilities at different echelons in Army and joint military headquarters. This specialization in training and education, as well as similarity in successive jobs, may lead them to forecast using the well-established theories developed through their specialized education, experience, and socialization. An additional group of US Army officers who qualify as specialists are those that compose the "special branches." These include members of the Judge Advocate Generals (JAG or military lawyers), Chaplain Corps, Medical Corps (doctors), Dental Corps, Veterinary Corps, and the Army Nurse Corps. These specialists generally complete their advanced specialized schooling (medical, law, seminary, etc.) prior to commissioning. Upon entry into the US Army, they are directly commissioned as US Army Captains, a rank that normally requires four years for regular officers.

Those not functionally aligned or designated as a member of the special branches remain in their original "branch" from when they first entered the Army and are termed "operations" officers. These officers perform the traditional combat and combat support functions of the US Army. Operations officers can perform a wide variety of staff and leadership jobs throughout their military career, including senior command positions at the Lieutenant Colonel, Colonel, and General Officer ranks. Examples of these are as wide-ranging as liaison officer to the US State Department, aide to a commanding general, commander of an airborne infantry brigade at Fort Bragg, North Carolina, instructor at the United States Military Academy (USMA), and military doctrine writer at the US Army Combined Arms Center (CAC). These jobs contain widely varying responsibilities and requirements, including direct leadership of servicemen in various operational environments. Operations officers, after approximately 12-15 years of service, are

also given opportunities to attend graduate-level civilian schooling and serve in outside-of-Army "broadening" assignments at joint service, interagency, intergovernmental, and multinational (JIIM) organizational headquarters (Army 2014:5).

One could argue that this US Army specialist/operations branch is prescribed by military assignment, and thus the individuals may not be psychologically predisposed to act as described by Tetlock's theory (Tetlock 2005); I disagree. Officers are not forced into these career choices; they must self-select to become an FA-aligned or special branch officer. Research has shown that psychological disposition effects career choice (DeLeon 1987, Lau and Shaffer 1999, Bozionelos and Psychology 2004), thus military officers will choose a career paths in tune with their personality traits. Admittedly, some may make a poor career choice and choose a branch diametrically opposed to their psychological disposition. These officers likely would have left military service well before reaching the senior ranks of officers evaluated in this research; research supports this assumption (Boswell, Boudreau et al. 2005). Therefore, the senior officers considered in this research are psychologically predisposed to their branch of choice and act in accordance with Tetlock's (2005, 2015) research.

Based upon the methodological deviations between Functional Area/Special branch and operations branch officer training, education, jobs, and "broadening" opportunities, the differences are apparent. In total, Functional Area/Special branch officers can be accurately described as specialists; operations branch officers as generalists. Operations branch officers are exposed to more diverse experiences, challenges, education, and opportunities to work outside of their known area of expertise. This diversity makes operations branch officers more likely to pursue generalist "fox" forecasting techniques. Inversely, Functional Area/Special branch

officers, trained and experienced in a specific area of expertise, are more likely to pursue specialist "hedgehog" forecasting techniques. With these considerations in mind and following Tetlock's finding, I hypothesize the following:

*H1: Officers in Functional Areas/Special branches are less likely to accurately forecast future events; those in the operations branches are more likely to accurately forecast future event*s

Limited Option Development

In the traditional military planning process, US Army commanders direct their staffs to develop multiple options, or courses of action (COA), for potential employment. Each separate COA is evaluated against forecasted enemy actions, scored and then assessed against each other for final commander selection. Interestingly, this military decision-making process, officially titled the operations process, closely resembles Hastie and Dawes' (2010:3) rational decision-making process. They theorize that a rational decision is typically composed of several parts including: a consideration of more than one possible course of action, a formulation of the probabilities of outcomes of each course of action, a prediction of the anticipated outcomes, and how they are assessed in consideration of current goals (Hastie and Dawes 2010:24). Failing to use these techniques will likely result in a less than optimal forecasts and subsequent solutions

The US Army also has an abbreviated planning process known as the rapid decision-making and synchronization process (RDSP) (Army 2012:4-6). RDSP differs from the operations process by developing and synchronizing only a single course of action. Due to the high operational tempo of US Army forces since 2001, many commanders in Iraq and Afghanistan chose to utilize the single-COA RDSP technique for military planning. Its continued use for more than a decade has changed habits within the US Army. This single-COA

option is generally accepted within the force. While Army doctrine justifies the single-COA RDSP process as a situational timesaving measure when quick actions are needed, many officers apply it all situations; even when enough time is available for a more thorough analysis. Unfortunately, this skewed subset of possibilities is detrimental toward identifying the optimal solution (Kruglanski and Webster 1996: 264, Hastie and Dawes 2010: 159).

Admittedly, RDSP saves time; it allows quick execution in a time-constrained environment. However, it incurs a greater risk of mission failure. Hastie and Dawes (2010) and Fischoff (1981) would consider RDSP a risky decision-making framework because it limits the imagination of a full range of possibilities. Directing a single option makes a commander and his/her staff susceptible to hindsight bias. As a result, the projected forecast of how events could unfold are unrealized or incomplete. The commander and staff will focus only on the most salient possibilities and consequences, likely at the cost of other details which, if forecasted correctly, could lead to a more optimal decision. It also limits considerations of enemy actions and reactions. Lacking this evaluated forecasting denies the development of most effective tactics and countermeasures.

H2: Officers who consistently eschew multiple hypothesis development in decision-making are less likely to accurately forecast future events

Neglect of Inconsistent Information

Ignoring information that is inconsistent with existing beliefs can also affect forecasting. US Army commanders and staff can show a cultural-norm tendency to suppress or ignore any information contrary to a developed plan. This situation, known in the US Army as "fighting the plan," can occur if a commander keeps his/her plan focused on initial anchors despite

emerging evidence which indicates a necessity to change (Kruglanski and Webster 1996:265). This especially occurs if officers invest significant energy into planning and preparation of a complex plan prior to execution.

In cases of *confirmation bias*, or imperviousness to subsequent data phenomena, an individual may feel a need for cognitive closure. Kruglanski and Webster define cognitive closure as "an individuals' desire for a firm answer to a question and an aversion toward ambiguity" (1996:264). A consequence of this need for closure is a tendency for urgency and permanence. Urgency is an inclination to make decisions quickly. Permanence is a desire to perpetuate closure by discounting information which may discount the decision's logical foundation (1996:265). This discounting tendency is characterized by actions that seek confirmatory evidence and discount contrary information. Moreover, the desire for cognitive closure and permanence is heightened by external stimuli such as dullness of task, time pressure, fatigue, value of a decision by others, or simply if a decision on the topic is required (Kruglanski 1975, Kruglanski and Webster 1996:264, Webster, Richter et al. 1996).

The US Army plans operations using the complex problem-solving processes of the previously mentioned MDMP or the more abbreviated (but still complex) RDSP. These actions require significant labor from members of the staff, often in a compressed timeframe. Members of the staff are likely fatigued from nonstop operations, and under pressure to develop a product quickly in order to allow subordinates enough time to prepare for their mission. These plans include a complex support and logistics plan which ensures limited assets such as artillery and aircraft support, communications, transportation, medical evacuation, reserve forces, and the like

are synchronized into the overall plan. Preparing these complex missions are arduous undertakings.

Additionally, a military leader may suppress inconsistent information out of a desire for efficiency. Military leaders consider their military missions and objectives through the ends/ways/means paradigm and prefer "formulaic solutions that reduce problems to manageable terms, clarify responsibilities and calculations of capabilities I objectives, and maximize certainty and efficiency" (Betts 1991:157). Contrary information "messes up" the synchronized and well-resourced plan put in place at the beginning of the operation.

Because these conditions promote a tendency to "fight the plan," it results in biased perceptions of subsequent unfolding events. Service members are less likely to forecast enemy, friendly, or environmental deviational actions which would throw the plan awry. Thus, rather than attempting to refine the military operation through updated forecasts, they anchor on the initial cues established at the beginning of the planning process, potentially leading to disastrous results.

H3: US Army Officers who discount inconsistent information are less likely to accurately forecast future events

Neglect of Deviational Views

Similar to confirmation bias, individuals desiring cognitive closure may also desire *consensus bias*. Consensus bias is "a preference for consensual opinions that are unlikely to be challenged and potentially undermined by significant others" (Kruglanski and Webster 1996:256). Those who suffer from closure:

> Prefer to associate with similar-minded others, feel positively disposed toward group members who facilitate consensus, and feel negatively disposed toward dissenters or opinion deviates who jeopardize consensus. (1996:265)

Consensus bias from an institutional tendencies and habits perspective is also possible in the US Army, enabled by its hierarchical command structure. A commander, responsible for all personnel within a unit, and the actions of it, almost always demands consensus on a course of action once it is decided upon. Army regulations specify that a "chain of command facilitates the transmittal of orders from the highest to the lowest levels in a minimum of time and with the least chance of misinterpretation" (Army 2008:2-1). Although this regulation also states "Soldiers are responsible to ensure that the commander is made aware of problems that affect…mission effectiveness," (2008:2-2) commanders, exercising individual perspectives, and members of the staff, under the pressure of Army rigid hierarchical cultural habits, could feel negatively disposed toward dissenters or opinion deviators who jeopardize consensus (Kruglanski and Webster 1996:265). Although a commander could appoint an individual or team to critically appraise the plans and decisions of a headquarters in an effort to revise and improve them, this does not happen on a consistent basis, nor does military doctrine specify this as a mandatory part of the military planning process. Admittedly, a commander could simply not want others to disagree with him/her, rather than be suffering from consensus bias, however, since the outcome of both scenarios are identical (another is unwilling to voice a discordant opinion), I treat both scenarios identically.

This negatively affects forecasting ability because focusing only on the most salient possibilities and consequences while ignoring legitimate deviational information is indicative of incomplete thinking (Hastie and Dawes 2010:33). Tetlock (2005:85) has clearly shown that

superior forecasters are more likely to consider and integrate conflicting ideas; poorer forecasters discount them.

H4: US Army officers who discourage dissenting opinions are less likely to accurately forecast future events

Doctrinal Reliance

Military doctrine can be applied at the tactical, operational, and strategic levels of war. An example of US military operational/strategic doctrine includes US Air-Land Battle doctrine of the 1980s and 1990s, which combined land force defense with air and indirect fire deep attacks to attrit the rear echelon of attacking enemy forces (Richardson 1997). An example of US military tactical doctrine is Army Tactics, Techniques, and Procedures (ATTP) No. 3-06.11, Combined Arms Operations in Urban Terrain, which provides techniques to establish a foothold and subsequently exploit attacks into cities using combined-arms tactics. (Army 2011). The US Department of Defense defines military doctrine as the "fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives" (Staff 2001:71). Unfortunately, some US Army officers fail to apply the next sentence, which states, "It is authoritative but requires judgment in application" (Staff 2001:71). Those who fail to apply judgment in application exercise individual perspectives and instead create a bias toward consistency, thus resulting in a misapplication in theory (Welch 2005:12). They subsequently develop courses of action generally unchanged from their previous situation and wholly unfit for the situation in which it is meant to be applied (Kruglanski and Webster 1996:265). A historical example of improper doctrinal reliance is General William Westmoreland's use of conventional methods to fight an insurgency during the American war in Vietnam (Krepinevich Jr 2009).

Hastie (2010:17-19) describes the three heuristics of irrational decision-making; when one chooses by habit (what we have chosen before), when one chooses by conformity (making the same decision as what most other people would do), or when one chooses by cultural mandates. By using these tendencies, decision-makers make poor choices because they neglect to consider all possible consequences of a choice. Relying on rote military doctrinal solutions mirrors some of these tendencies. Admittedly, military doctrine is a critical component of a state's national security policy which defines how it can best secure itself (Posen 1993:13-33), however it is also a heuristic- an "efficient, but [sometimes] inaccurate problem-solving procedure learned through experience...and deliberate instruction" (Hastie and Dawes 2010:88).

Hastie has shown overreliance on heuristic problem-solving procedures results in inaccuracy in predictions and forecasting (2010:89-90). Similarly, Tetlock (2005:214) has found that theory-driven thinking, similar in application to doctrinal solutions, "desensitizes us to nuance, complexity, [and] contingency" necessary for superior forecasting. In simple terms, an overreliance on doctrinal heuristic results in poor overall analysis of the problem. The forecaster assumes that a doctrinal action would accomplish an outcome at a much higher probability of success than should be warranted given the unique friendly, enemy, and environmental conditions present in the situation. Only by fully examining all aspects of the scenario can this occur. As a result, the intended strength of military doctrine, bringing order and coherence to the battlefield, could potentially be a detriment to effective forecasting.

Fortunately, most US Army Officers, after multiple deployments to complex environments in Afghanistan and Iraq, acknowledge some military doctrinal solutions and processes are "ill-suited for the analysis of problems exhibiting high volatility, uncertainty,

complexity, and ambiguity" (Williams 2010:41). Despite this, others undoubtedly rely on rote doctrine, blandly applied, as the primary solution for all problem sets.

H5: US Army officers consistently reliant on rote doctrinal solutions are less likely to accurately forecast future events

Sunk Costs

Lastly, significant consideration of previous efforts and investments in time and personnel can promote bad predictions. Known in academia as sunk costs, they are defined as a cost which has already been incurred and cannot be recovered (Sherman 2008). Considering sunk costs in decisions and predictions violate Hastie and Dawes' first law criterion of rational decision-making, which is that decisions should only be based on future consequences (2010:36).

Unlike confirmation bias, which discounts deviational information that could threaten the logical support of a completed forecast and decision, sunk costs are considered at the beginning of the forecasting development process, irreparably skewing the results. As described in cognitive-dissonance theory, military leaders may exaggerate the forecasted benefits of "staying the course" in an effort to make sense of or justify costly losses (Festinger 1957). This could be especially prevalent among military leaders who feel guilt for subordinate casualties. Although military leaders may avoid initial commitment to conflict because they "don't want to risk lives and limbs if there isn't a high probability of a payoff" (Jaffe 2015), many officers feel the only acceptable outcome for previous significant investments such as these is continued military action, eventually leading to victory. A prime example of this is the 2001-2019 war in Afghanistan; despite the limited return from pursuing continued conflict in this war, many

civilians and military leaders see value in continuing operations there (Ricks 2015). As a result, individual and cultural-norm considerations of sunk-costs are often involved in US Army forecasting and decision-making as justifications for action.

H6: US Army Officers who significantly consider sunk costs are less likely to accurately forecast future events

Research Design

This paper seeks to answer *what is the impact of military institutional tendencies and habits on US Army senior officer forecasting accuracy* via a quantitative analysis of all six hypotheses using survey-based data. My unit of analysis for this research are individual US Army Lieutenant Colonels and Colonels at the US Army War College. This demographic serves as the primary plans and policy action-officer for combatant command headquarters, advisors and military liaisons for senior governmental policy makers, and assistants to military four-star flag officers. This proximity grants some level of influence on strategic policy. During military deployments, they lead large numbers of soldiers (500-3500). This officer population also provides the human capital from which future general officers are selected. My methodology attempts to closely match Tetlock's sampling, instrument, and data collection processes (Tetlock 2005:241-246).

Dependent Variable

The dependent variable (DV) is accuracy in forecasting (*forecast accuracy*), operationalized as a 0 to 100-percentage average accuracy in predicting, via survey response, 20 events that could occur during the three to twelve months after the survey was administered. This time frame,

shorter than Tetlock's (2005) 2-5 year forecast horizon, allowed me to collect, code, and analyze the survey data within the research timeline mandated by my supporting agency. Respondents forecasted by selecting from a 0 to 100-percentage chance of the event occurring. This response methodology mirrored Tetlock's (2005) methods, and assessed both their prediction accuracy as well as how strongly they believed this prediction (Figure 2). Forecast questions were potential national and international political, security, economic, and business events **(see appendix A).** Although some questions addressed operational and strategic military events; well within the purview of senior US military officers; many were not, though they speak to dynamics in the world that will influence strategic conditions in coming years. Forecasts questions outside of the subjects' area of expertise assesses if the respondents, like superior forecasters in Tetlock's (2015) research, conduct additional research to make an informed guess on the assessment. The respondents had access to external information sources, such as online news and information websites during the online survey, and thus could make informed forecasts if they chose to do so.

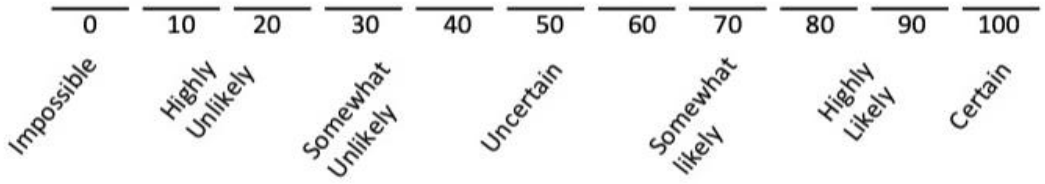


Figure 2: Forecast Response Scaling (Tetlock 2005:245)

Upon closure of the three to twelve-month period, I assessed which events occurred. If the forecasted event did occur, the respondent score (1-100) remained untouched. If the event did not occur, responses were subtracted from 100. All results were averaged into a consolidated forecast accuracy score per respondent (*forecast accuracy*). Acknowledging that some events

are much easier to predict than others, I also generated a trimmed value (*forecast accuracy trimmed*) that excluded questions in which the combined sample overwhelmingly predicted the event occurring or not occurring (80% of the entire survey sample forecasted the event correctly). For the trimmed value variable, the average number of excluded questions for all three surveys was six. [1]

Explanatory variables

This research includes six explanatory variables determined from survey response. To test hypothesis #1 (officers in specialized branches are less likely to accurately forecast future events in their field of expertise; those in the operational branches are more likely to accurately forecast future events), I consider the variable of s*pecialization*, defined as US Army officers who are one of the 17 functionally-aligned branches specified in figure one plus specialized branches of Judge Advocate Generals (JAG), Chaplain Corps, Medical Corps, Dental Corps, Veterinary Corps, and the Army Nurse Corps. Since specialists are less likely to forecast accurately, I used dichotomous methods to code specialists as 0, operations officers as 1. I expect generalists to achieve higher accuracy on forecasting ability. The majority of respondents in all three survey samples were operations officers, with mean values of .83, .78, .78 respectively.

The remaining explanatory variables are each determined by using a composite sum of responses to three or four survey questions for each variable of interest. To test hypothesis #2 (officers who consistently eschew multiple hypothesis development in decision-making are less

[1] A trimmed value removes a small designated percentage of the largest and smallest values, thus excluding those forecasts in which a majority forecasted correctly or incorrectly, allowing the researcher to focus on the area of greatest variability.

likely to accurately forecast future events), I examine the variable *COA.* It is an ordinal variable scaled 0 (always direct a single COA) through 4 (always direct multiple COA). I expect a higher score to correlate with higher forecast accuracy. The majority of respondents in all three survey samples tended toward multiple COA, with mean values of 3.4, 3.4, 3.5 respectively.

To test my third hypothesis (officers who discount inconsistent information are less likely to accurately forecast future events), I measure the variable *Inconsistent.* It is an interval variable scaled 0 (always discount inconsistent information) through 3 (always consider inconsistent information). I expect a higher score to correlate with higher forecast accuracy. The majority of respondents in all three survey samples generally considered inconsistent information, with mean values of 2.28, 2.18, 2.27 respectively.

I measure my fourth hypothesis (Officers who discourage dissenting opinions are less likely to accurately forecast future events), by considering the variable *Dissent,* is an ordinal variable scaled 0 (always discourage/ignore dissenting opinions), 1 (ignore dissenting opinions), 2 (generally ignore dissenting opinions), 3 (generally solicit dissenting opinions), and 4 (always solicit dissenting opinions). I expect a higher score to correlate with higher forecast accuracy. The majority of respondents in all three survey samples generally considered valued dissent, with mean values of 9.1, 9.1, 9.3 (of a possible 12) respectively.

I measure my fifth hypothesis (US Army officers consistently reliant on rote doctrinal solutions are less likely to accurately forecast future events) using the variable *Doctrine.* It is an ordinal variable scaled 1 (completely reliant on doctrine for solutions), 2 (generally relay on doctrine for solutions), 3 (rarely rely on doctrine for solutions), 4 (never rely on doctrine for solutions). I expect a higher score to correlate with higher forecast accuracy. The majority of

respondents in all three survey samples generally did not rely on doctrine, with mean values of 8.8, 8.3, 7.9 (of a possible 12) respectively.

I test my last hypothesis (US Army Officers who significantly consider sunk costs are less likely to accurately forecast future events) using the variable *Sunk Cost*. It is an ordinal variable scaled 1 (always consider sunk costs), 2 (sometime consider sunk costs), 3 (rarely consider sunk costs), 4 (never consider sunk costs). I expect a higher score to correlate with higher forecast accuracy. The majority of respondents in all three survey samples generally somewhat considered sunk costs, with mean values of 7.8, 7.2, 7.5 (of a possible 12) respectively.

My primary control is *Education*. Research has shown higher levels of education can mitigate the pitfalls of logical fallacies (L Ross 1980:191). I thus expect officers with higher levels of education to be less subject to the normative fallacies that negatively affect forecasting. I expect an increase in education to be correlated with increased forecast accuracy. This control variable will be an ordinal variable scaled 1 (bachelor's degree only), 2 (at least one master's degree), and 3 (PhD or MD).

My second control is combat experience (*combat tours*). Although high-tempo peacetime training activities may promote the institutional tendencies and habits discussed in my theory, combat operations directly feed them. Military officers deployed to combat are subject to accelerated timelines, stress, casualties, high uncertainty, and exhaustion; all of which negatively affect forecasting and decision-making (Kruglanski 1975, Kruglanski and Webster 1996:264, Webster, Richter et al. 1996). I therefore posit that an increase in combat tours is inversely

related to forecast accuracy. This control is an interval variable that equal the number of combat deployments (7 months or more) that the officer participated in.

My third control is *Active Duty,* which indicates whether the surveyed officer is an active component officer or reserve component (US Army National Guard or US Army Reserve). Since reserve component officers most often serve in a "part-time" capacity, they are less likely to have developed the shared institutional tendencies and habits that full-time serving active duty officers are likely to show. This control variable will be a dichotomous variable, with 1 indicating if the surveyed officer is active component, 0 indicating reserve component (US Army National Guard or US Army Reserve). I expect active duty officers to more fully embrace the negative military institutional tendencies and habits when compared to non-active duty counterparts; therefore, active duty officers are more likely to forecast poorly. Source of data is a response to the survey question "what is your duty status?"

I also include two demographic measurement indicators including: did the officer *command* a military formation at the Lieutenant Colonel level, and how *confident* are they at forecasting accurately.

Survey Sample

To collect data for this research, I conducted three online surveys of US Army Lieutenant Colonels and Colonels attending the US Army War College (USAWC) or participating in the US Army War College Fellows program. I generated the surveys formats using Qualtrics survey software. Samples were students from the 2015-2016, 2016-2017, and 2018-2019 academic year. One survey (survey 1- 2016) was conducted in the latter part of the 2015-2016 academic

year (Jan-Feb). Two surveys (survey 2-Fall 2016, survey 3- Fall 2018) were collected early in each respective Army War College/Fellowship academic year (September-October). US Army War College faculty distributed anonymous survey links via email for voluntary response; respondents could only respond once. Responders had approximately 30 days in which to respond. The population available for each survey included approximately 220-225 Army officers in the resident AWC class, and approximately 90 War College Fellows.[2] Each survey sample resulted in a response measuring at least the 10% threshold expected for legitimate research with 42, 32, and 67 respondents (of approximately 310-315) respectively.

Results

Using Stata, all models were estimated using OLS linear regression since both the explanatory and dependent variable were interval values. The results of my analysis are depicted below in tables one through five. Table one through three examine each representative survey sample, Table four examines combined samples, while Table five examines combined samples of survey two and three.

Since I was determined to measure the effect of institutional tendencies and habits on US Army officers, I combined surveys two and three because they are most similar; both surveys were collected early in the AWC academic year and thus "uncorrupted" by possible educational fallacy mitigation (L Ross 1980:191). Additionally these survey respondents were less likely to be influenced by the frequent survey response (FSR) bias (Whitsett 2013) or "survey fatigue" resultant of multiple surveys taken in the academic year.

[2] Data provided by the US Army War College.

All table regressions contain four combinations: all explanatory and demographic variables against an unmodified dependent variable, explanatory variables minus demographic variables against an unmodified dependent variable, all explanatory and demographic variables against a trimmed dependent variable, and explanatory variables minus demographic variables against a trimmed dependent variable.

For my first hypothesis, *Officers in Functional Areas/Special branches are less likely to accurately forecast future events; those in the operations branches are more likely to accurately forecast future even*ts, I find some statistically significant relationships between operations officers and forecasting accuracy. Tables 1, and 3-5 relationship results are not significant, however the majority of the resulting coefficients trend positively. Table two contains three of four regressions that show some statistically significant relationships between the relevant independent variable and forecasting accuracy and coefficients supporting my hypothesis. Table 2 can possibly be explained by an examination of summary statistics; a smaller number in the survey two mean value indicates a higher number of "specialists" in the sample ("Specialists" are coded as 0 while "generalists" are coded as 1). This increased variance allowed a more accurate measure of the interaction. Given the consistent coefficient trend and significance in several regressions, I find some support to my hypothesis.

Examining the results of my second hypothesis, *Officers who consistently eschew multiple hypothesis development in decision-making are less likely to accurately forecast future events,* I find no statistically significant relationships between the relevant independent variable and forecasting accuracy in support of my theory. The resultant coefficients are mixed in trend.

Some are positive, however the majority of them are negative, running opposite to my hypothesis.

For my third hypothesis, *US Army Officers who discount inconsistent information are less likely to accurately forecast future events,* I similarly find non-conclusive results, though the resultant coefficients trend more positive than negative.

My fourth hypothesis, *H4: US Army officers who discourage dissenting opinions are less likely to accurately forecast future events,* also generally has non-conclusive results. One result that showed statistically significant relationships between the relevant independent variable and forecasting accuracy, the trimmed regression that did not include demographic variables, has a coefficient trending opposite to my hypothesis, but in no way allows me to make an overall judgement on the variable at play.

My fifth hypothesis, *US Army officers consistently reliant on rote doctrinal solutions are less likely to accurately forecast future events,* has some supporting results. All 20 coefficients trend in my expected direction and all table 4 (combined surveys) and half of table 5 (trimmed results of survey 2-3) showed statistically significant relationships between the relevant independent variable and forecasting accuracy.

In my last hypothesis, *US Army Officers who significantly consider sunk costs are less likely to accurately forecast future events,* I find the results overwhelmingly support results inverse to my hypothesis; there is statistically significant relationships between the relevant independent variable and forecasting accuracy, but in the opposite direction of what I hypothesized. Almost all coefficients trended opposite of my theory; all regression coefficients

in table two and three quarters of coefficients in table five showed statistically significant relationships between the relevant independent variable and forecasting accuracy.

In control variables, *Education*, trended toward relevance. In addition to the great prevalence of coefficients trending positively, several of them showed statistically significant relationships between this control variable and forecasting accuracy, indicating that more highly educated US Army officers are more likely to forecast accurately. Officers with more *Combat Tours* tended to forecast less effectively. 5 of 6 tables show statistically significant relationships between the relevant independent variable and forecasting accuracy. There was no apparent difference between an *Active* versus reserve component officers' ability to forecast. No results showed statistically significant relationships between the being active duty and forecasting accuracy and the trends were equally mixed. Lastly, the demographic variables *Command* and *Confidence* were showed no significant relationships, nor were they overwhelmingly trending in one direction or another.

Further examining raw data to determine if certain "mental models" existed and were correlated to particular effectiveness or ineffectiveness in forecasting, I could not find consistent patterns of a certain psychological profile. No respondent scored consistently low in all variables including multiple COA, tolerance of ambiguity, tolerance of dissent, and resistance to rote doctrine. In a few cases some respondents scored slightly higher in all variables, and their corresponding forecasting score was slightly above average, but not dramatically so. Instead, respondents tended to score low in some variables and alternatively high in others.

Table 1: Effect of Mil. Institutional Tendencies and Habits on Forecasting (S1- JAN-FEB 2016)

Variables	Regression 1	Regression 2	Regression 3 (trimmed)	Regression 4 (trimmed)
Specialization	-1.802	-.471	-3.071	-2.131
	(6.894)	(8.371)	(3.847)	(4.381)
COA	-1.813	-1.044	-2.117	-1.414
	(2.335)	(2.137)	(1.970)	(1.772)
Inconsistent	-1.205	.902	-1.576	.243
	(2.222)	(2.452)	(2.477)	(1.890)
Dissent	-.488	-.205	-.465	-.201
	(1.756)	(1.648)	(1.130)	(1.099)
Doctrine	3.362	2.750	-.886	-1.450
	(2.284)	(2.063)	(1.202)	(1.281)
Sunk cost	-.004	.334	1.173	1.471
	(1.782)	(1.689)	(.842)	(.971)
Education	.318	-.564	-.514	-1.437
	(4.706)	(5.648)	(2.553)	(2.798)
Combat Tour	.2.068	-1.720	.146	.619
	(3.172)	(2.849)	(2.036)	(2.880)
Active Duty	-7.584	-6.244	1.443	2.470
	(6.229)	(5.176)	(3.573)	(3.148)
Command	5.858		4.554	
	(4.714)		(4.872)	
Confidence	6.213		6.055	
	(4.312)		(4.537)	
N	42	42	42	162
R2	.224	.133	.227	.112

Data in parenthesis = standard error
*- Significant at .05 **-Significant at .01 ***-Significant at .00 All tests are two-tailed

Table 2: Effect of Mil. Institutional Tendencies and Habits on Forecasting (S2 SEP-OCT 2016)

Variables	Regression 1	Regression 2	Regression 3 (trimmed)	Regression 4 (trimmed)
Specialization	7.308	8.018*	6.618	7.619*
	(4.827)	(3.255)	(3.657)	(2.502)
COA	.031	.327	-.274	-.046
	(1.470)	(1.372)	(1.584)	(1.474)
Inconsistent	-.190	.016	1.032	1.188
	(1.893)	(1.806)	(1.724)	(1.700)
Dissent	-1.643	-1.535	-1.920	-1.696*
	(1.210)	(.959)	(1.097)	(.803)
Doctrine	.910	.716	.545	.341
	(.841)	(.838)	(.789)	(.770)
Sunk cost	-2.861*	-2.790**	-2.473**	-2.404**
	(.829)	(.734)	(.669)	(.596)
Education	5.648	6.279*	7.127*	7.688**
	(3.195)	(2.850)	(2.311)	(2.081)
Combat Tour	-4.282*	-3.752*	-4.314*	-3.834*
	(1.779)	(1.526)	(1.575)	(1.390)
Active Duty	3.795	3.951	3.800	3.824
	(4.068)	(3.807)	(2.671)	(2.410)
Command	2.547		3.119	
	(5.863)		(5.067)	
Confidence	-1.479		-1.170	
	(2.974)		(2.560)	
N	32	32	32	32
R2	.609	.598	.625	.614

Data in parenthesis = standard error

*- Significant at .05 **-Significant at .01 ***-Significant at .00 All tests are two-tailed

Table 3: Effect of Mil. Institutional Tendencies and Habits on Forecasting (S3 SEP-OCT 2018)

Variables	Regression 1	Regression 2	Regression 3 (trimmed)	Regression 4 (trimmed)
Specialization	-.442	1.039	.129	.626
	(3.080)	(2.957)	(3.330)	(2.879)
COA	-1.573	-1.689	-1.792	-1.926
	(1.192)	(1.129)	(1.439)	(1.358)
Deviation	2.444	1.813	.638	.055
	(1.613)	(1.627)	(1.554)	(1.625)
Inconsistent	-.075	.369	-.215	-.145
	(1.062)	(1.099)	(1.227)	(1.279)
Doctrine	1.151	1.114	1.042	.944
	(.709)	(.655)	(.724)	(.679)
Sunk cost	-.291	-.240	-1.154	-1.072
	(.839)	(.831)	(.685)	(.691)
Education	.753	1.709	.876	1.712
	(2.629)	(2.535)	(2.770)	(2.713)
Combat Tour	-1.932	-1.553	--1.142	-.940
	(1.126)	(1.043)	(1.146)	(1.106)
Active Duty	-.937	-.979	.830	.838
	(2.442)	(2.475)	(2.505)	(2.511)
Command	2.066		.294	
	(2.765)		(2.803)	
Confidence	-2.787		-2.511	
	(1.918)		(1.993)	
N	66	66	66	66
R2	.183	.156	.128	.110

Data in parenthesis = standard error

*- Significant at .05 **-Significant at .01 ***-Significant at .00 All tests are two-tailed

Table 4: Effect of Mil. Institutional Tendencies and Habits on Forecasting (Combined S1-3)

Variables	Regression 1	Regression 2	Regression 3 (trimmed)	Regression 4 (trimmed)
Specialization	1.949	.715	-.386	1.572
	(2.932)	(2.619)	(2.461)	(2.210)
COA	-.976	-.976	-1.506	-1.541
	(.988)	(.994)	(1.075)	(1.072)
Inconsistent	1.567	1.635	.123	-.089
	(1.223)	(1.212)	(1.279)	(1.262)
Dissent	.312	.151	-.872	-.610
	(.709)	(.709)	(.785)	(.774)
Doctrine	1.033*	1.003*	1.196*	1.206*
	(.527)	(.514)	(.608)	(.615)
Sunk cost	-.539	-.554	-.481	-.417
	(.724)	(.722)	(.587)	(.592)
Education	.499	.166	1.723	2.485
	(2.191)	(2.145)	(1.751)	(1.723)
Combat Tour	-.962	-1.175	-1.586	-1.184
	(.799)	(.770)	(.895)	(1.106)
Active Duty	-3.605	-3.794	2.511	2.908
	(2.018)	(2.033)	(1.965)	(2.003)
Command	-3.273		5.151*	
	(2.479)		(2.268)	
Confidence	.640		-1.908	
	(1.446)		(1.780)	
N	140	140	140	140
R2	.095	.084	.128	.092

Data in parenthesis = standard error
*- Significant at .05 **-Significant at .01 ***-Significant at .00 All tests are two-tailed

Table 5: Effect of Mil. Institutional Tendencies and Habits on Forecasting (Combined S2-3*)*

Variables	Regression 1	Regression 2	Regression 3 (trimmed)	Regression 4 (trimmed)
Specialization	3.137	2.196	2.283	2.561
	(3.046)	(2.487)	(2.305)	(2.061)
COA	-.824	-.899	-1.198	-1.217
	(1.186)	(1.190)	(1.007)	(.970)
Inconsistent	2.339	2.187	.735	.424
	(1.276)	(1.256)	(1.154)	(1.191)
Dissent	-.106	-.191	-.446	.333
	(.801)	(.809)	(.758)	(.751)
Doctrine	1.021	.869	1.188*	1.052*
	(.586)	(.550)	(.526)	(.503)
Sunk cost	-1.181*	-1.085	-1.684**	-1.584*
	(.606)	(.611)	(.501)	(.500)
Education	1.629	1.921	2.055	2.735
	(2.012)	(1.847)	(2.097)	(2.060)
Combat Tour	-.810	-.789	-2.027*	1.786*
	(.863)	(.804)	(.825)	(.795)
Active Duty	-3.027	-2.916	1.583	1.924
	(2.092)	(2.127)	(1.978)	(1.976)
Command	-1.851		.674	
	(2.802)		(2.348)	
Confidence	-1.384		-2.377	
	(1.515)		(1.383)	
N	98	98	98	98
R2	.123	.112	.227	.205

Data in parenthesis = standard error
*- Significant at .05 **-Significant at .01 ***-Significant at .00 All tests are two-tailed

Survey 1 (JAN-FEB 2016)						
	Variable Type	Observations	Mean	Std. Dev.	Min.	Max.
Specialization	Dummy	42	0.833	0.377	0	1
COA	Ordinal	42	3.405	0.798	1	4
Inconsistent	Ordinal	42	2.286	0.835	1	3
Dissent	Ordinal	42	9.119	1.173	6	11
Doctrine	Ordinal	42	8.81	1.596	5	12
Sunk Cost	Ordinal	42	7.786	1.842	3	12
Education	Ordinal	42	2.071	0.463	1	3
Combat Tour	Interval	42	3.381	1.081	1	5
Active Duty	Dummy	42	0.81	0.397	0	1
Command	Dummy	42	0.643	0.485	0	1
Confidence	Ordinal	42	2.214	0.47	1	3
Forecasting Ability	Interval	42	57.61	11.688	16.92	73.538
Forecasting Ability (T)	Interval	42	62.401	9.341	25.857	74.429
Survey 2 (SEP-OCT 2016)						
	Variable Type	Observations	Mean	Std. Dev.	Min.	Max.
Specialization	Dummy	32	0.781	0.42	0	1
COA	Ordinal	32	3.437	0.84	1	4
Inconsistent	Ordinal	32	2.188	0.693	1	3
Dissent	Ordinal	32	9.125	1.385	6	11
Doctrine	Ordinal	32	8.25	1.32	6	12
Sunk Cost	Ordinal	32	7.281	1.8	4	11
Education	Ordinal	32	2.093	0.39	1	3
Combat Tour	Interval	32	2.219	1.008	1	4
Active Duty	Dummy	32	0.906	0.296	0	1
Command	Dummy	32	0.875	0.336	0	1
Confidence	Ordinal	32	2.406	0.665	1	3
Forecasting Ability	Interval	32	59.014	8.519	33.158	71.053
Forecasting Ability (T)	Interval	32	54.091	8.181	33.333	67.333
Survey 3 (SEP-OCT 2018)						
	Variable Type	Observations	Mean	Std. Dev.	Min.	Max.
Specialization	Dummy	67	0.788	0.412	0	1
COA	Ordinal	67	3.492	0.859	1	5
Inconsistent	Ordinal	67	2.269	0.845	0	3
Dissent	Ordinal	67	9.343	1.262	7	12
Doctrine	Ordinal	67	7.851	1.752	4	12
Sunk Cost	Ordinal	67	7.507	1.608	3	11
Education	Ordinal	67	1.925	0.502	1	3
Combat Tour	Interval	67	3.045	1.272	1	5
Active Duty	Dummy	67	0.537	0.502	0	1
Command	Dummy	67	0.731	0.447	0	1
Confidence	Ordinal	67	2.537	0.586	1	4
Forecasting Ability	Interval	67	64.307	9.281	41.778	83.5
Forecasting Ability (T)	Interval	67	49.581	9.259	22.333	68.833

Figure 3: Summary Statistics

Conclusion and Future Research

The somewhat inconclusive results for much of this research clearly demonstrates the challenges of small n research. Although each of the surveys met the 10% threshold for legitimate sampling standards, the overall small population of the AWC and Fellowship programs, tied with AWC administrative requirements to limit surveys to voluntary response, resulted in a small sample per class. Voluntary response also results in bias that makes it somewhat less representative of the implied population (Wilson, Journell et al. 2011:172). Additionally, the forecasting window was abbreviated, with respondents asked to forecast events only for a single time period. This runs counter to Tetlock's research methodologies that examine a number of respondents over a several year period (Tetlock 2005, Tetlock and Gardner 2015). To achieve truly conclusive results, this research must survey a representative sample of the almost 13,000 Lieutenant Colonels and Colonels in the US Army over a multiple year period. This is highly challenging given the US military's tendency toward insularity and protection of its servicemembers' time.

Despite this, some conclusions can be drawn from the research results. The demonstrated effect of specialization on forecasting ability supports Tetlock's (2005, 2015) findings that individuals with more diverse experiences and education are more effective at forecasting. It also provides justification for the US Army to expand opportunities for its officers to pursue broadening opportunities, such as civilian graduate school. These broadening opportunities are assignments

> outside [a military officers] comfort zone, where they cannot solely leverage their own past experiences in the Army in order to excel and where they are exposed to different organizational cultures and dynamics. (Babcock-Lumish 2016:34)

Additionally, it provides some justification for reexamining the current US Army officer personnel management system (OPMS XXI). In OPMS XXI, officers are separated into functional areas (i.e. specialized branches) and operational branches at approximately eight years of service. From that point forward, they cannot alternate between operational and specialized jobs. Justification for this change, instituted in 1996, was because the previous system required "officers to do too many things…for them to excel at any one of them" (Urben 2017:1). In the opinion of some researchers, OPMS XXI is a failed stove-piped system[3]. The lack of alternating learning has resulted in senior general officer decision-makers who are unprepared to operate effectively at the strategic level. This is in stark contrast to pre-OPMS XXI generals who were savvier at the strategic level due to various assignments in both specialized and generalized jobs (Colarusso and Lyle 2014, Urben 2017). This research provides some quantitative justification for arguments to remove the barrier of impermeability between functional area and general branch assignments.

This research demonstrates that officers less reliant on doctrinal solutions are more effective at forecasting. While good for this research, I suspect it is also the result of a dynamic change within the US Army. For 18+ years the officer population experienced combat, mostly in a fluid counterinsurgent environment. Officers developed and implemented tactics, techniques, and procedures initially on their own and later under the broad directives of the 2006-

[3] See Colarusso, M. J. and D. S. Lyle (2014). Senior officer talent management: Fostering institutional adaptability, ARMY WAR COLLEGE CARLISLE BARRACKS PA STRATEGIC STUDIES INSTITUTE.

, Urben, H. A. (2017). Reconnecting Athens and Sparta: A Review of OPMS XXI at 20 Years. Institute of Land Warfare. Arlington, VA, Association of the US Army.

counterinsurgency doctrine. This COIN doctrine was much less prescriptive than the previously-developed doctrine, designed for synchronized high-intensity conflict. As a result, the US Army officer corps as a whole is less likely to be overly reliant on rote doctrinal solutions. An examination of the summary statistics shows means values in all three datasets leaning heavily against reliance on doctrine.

The results indicating that (contrary to my hypothesis) US Army Officers who significantly consider sunk costs are more likely to accurately forecast future events is an interesting phenomenon. It is likely the result of the unique demographics of the survey sample. Almost 75% of the survey respondents commanded a unit as a Lieutenant Colonel, and all of them deployed on at least one combat tour. It can be deduced that a significant portion of them lost soldiers under their command while in combat. This, as well as the pride these leaders take in accomplishing missions in an arduous combat environment, make the survey sample participants more prone to consider sunk cost tendencies. Hence almost all of the survey officers, including those who are the most effective forecasters, have a higher than usual proclivity to considering sunk costs. I expect that senior leaders in the military as a whole tend to fall into this same phenomenon. The only potential solution for curing this tendency is educating military leaders and strategists on Hastie and Dawes' first law criterion of rational decision-making, which is that decisions should only be based on future consequences (2010:36). I expect, however, for this to be a hard sell for combat leaders psychologically scarred by previous subordinate casualties.

The results associated with the controls adds to existing research and inform military policy. A greater amount of education is positively associated with forecasting ability. This

supports previous research (L Ross 1980, Tetlock and Gardner 2015). It also provides justification to expand opportunities for US Army officers to attend civilian graduate school (Spain, Mohundro et al. 2015, Urben 2017). Higher numbers of combat tours are negatively associated with forecasting ability. Over the last two decades, the US has committed to multiple sustained conflicts with a modestly-sized military force, leading to a high operational tempo for its servicemembers. As a result, high-deploying officers are stuck in a vicious cycle; time in combat precludes them from participating in broadening opportunities which provide the knowledge that would make them more successful in combat. The only solution is to limit military commitments to a level that allows consistent breaks for broadening of the force, or increasing military end-strength to allow the depth for it.

Lastly, examination of the raw data makes it clear that no clear psychological profile exists that shows some US Army officers have completely absorbed or resisted all negative institutional habits and tendencies. Instead it is quite apparent that all absorb some, yet resist others. This is not surprising, given two considerations. First, although the US Army is a highly institutionalized organization, it remains a derivative of the highly individualistic nation in which it resides. Personal opinions and initiative are tolerated to a much higher degree than would be in a military of a more totalitarian or class-based state, such as the Cold War Soviet Union or 19th century British Army. Secondly, US Army officers live a somewhat mobile life. They generally change jobs and geographic assignments every two to three years. Each assignment brings contact with different superiors, peers and subordinates who likely influence personal attitudes, outlooks and decision-making methods.

In conclusion, this research provides initial support to the theory that military institutional tendencies and habits somewhat affect US Army senior officer forecasting accuracy. Although more research is needed to conclusively support this theory, it provides logical justification for the US Army to take action to enable effective forecasting and logical decision-making, especially given the complexity of contemporary political-strategic affairs. Foremost in these efforts should be increasing opportunities for broadening experiences, especially attendance at civilian graduate schooling. These experiences will be an investment in the future.

CHAPTER THREE:
SENIOR GENERAL CASE STUDY

Introduction

Most military decisions are based upon forecasts. Forecasts "help decision makers anticipate future events, avoid strategic surprises, and make informed decisions" (Mandel and Barnes 2014:1). Military and security intelligence is closely tied to forecasting, and "although not all intelligence is predictive, forecasts are an important part of intelligence, serving to reduce uncertainty about future events for decision makers" (Kaplan, Fischhoff et al. 2011:3-27). Military planners forecast potential adversaries and adversarial capabilities to allow friendly forces to develop equipment, tactics, and overall capabilities, which can counter the advantages of a challenger. Thus, successful forecasting can allow a military force to operate from a position of relative advantage to its competitor.

Historically, the United States' military has had mixed success in correctly forecasting its adversary's capabilities, organizing itself for warfare, and fighting in the most appropriate way. This was readily apparent in the opening stages of the Korean War. In late June, 1950, the US military failed to accurately forecast the capabilities of the invading Democratic People's Republic of Korea (DPRK) forces, which rapidly drove south from the 38th parallel after shattering US-backed Republic of Korea (ROK) forces. In response, in early July 1950, the US hastily deployed Task Force 1-21 Infantry, (Task Force Smith), a poorly trained and equipped US infantry battalion assigned to constabulary duty in Japan, to stem the tide of the DPRK attack. The failure in US forecasting was apparent; "badly outnumbered and without armor,

effective antitank weapons, or air support, the [TF Smith] was overrun. The next day, Colonel Smith could assemble only 250 men, half his original force" (History 2006).

Prior to the Vietnam War, U.S. policymakers and military planners focused primarily on forecasting and organizing to fight against conventional Soviet and Warsaw Pact forces in Europe. This failure to effectively forecast Vietnamese insurgent capabilities and U.S. counterinsurgency requirements ultimately led to U.S. failure in the Vietnam War (Krepinevich Jr 2009). U.S. forecasting for conventional conflict in Europe later proved serendipitously successful against, Iraqi forces, in the 1991 conflict of Operations Desert Shield and Desert Storm (Atkinson 1993). Following the September 11th, 2001 attacks, the U.S. achieved stunning victories in the opening phases of operations in Iraq and Afghanistan, but failed to forecast the changing nature of the conflict toward insurgencies once conventional operations ceased (Gordon and Trainor 2012). This most recent failure resulted in sustained conflicts that cost trillions of dollars and thousands of American lives (Shane 2018).

Forecasting is difficult; accurate ex-ante predictions stand in "stark contrast" to easier ex-post analysis (Frühling 2006:21). Clausewitz (1976:25) addressed the challenges of forecasting when he wrote

> This uncertainty of all intelligence and suppositions, this continual interposition of chance, the actor in war constantly finds things different from his expectations; and this cannot fail to have an influence on his plans.

Although we must admit it is never possible to predict events with absolute certainty, this should not be used as justification for not forecasting, nor for excusing consistently bad forecasts. Forecasts allow us to evaluate potential futures; identifying and remedying causes of inaccuracy allows more-informed decisions with higher chances of success.

Knowing the challenges of forecasting and the cost of getting them wrong, this research examines the forecasting ability of military decision-makers. Military officers can be negatively and positively influenced in their forecasts and subsequent decisions not only by individual tendencies, but also by military institutional tendencies and habits. In undertaking this research, I use qualitative research methods to answer my substantive research question: *what is the impact of military institutional tendencies and habits on US Army senior officer forecasting accuracy?*

Examination of Relevant Research

Before examining existing research, it is prudent to understand related definitions and methodologies in this subject. Although forecasting is generally defined as "an estimation of future situation…[and] an objective assessment of future course of action" (Bhatia 2019:1), the disciplinary approaches to thinking about forecasting differ significantly.

Disciplinary Perspectives

Economists pioneered forecasting efforts to predict future market fluctuations and enable informed investment and budgeting procedures (Diebold 1997, Hawkins 2005, Friedman 2013). Most economists use macroeconomic models to represent the complex interaction of consumers, producers, investors, and others in state and international economies. Individual actor attributes are generally not considered since the focus is on the economic system. Economists have focused significant effort on political risk forecasting- a discipline that attempts to foresee hazards of political actions by host government and foreign opposition groups on international businesses' foreign ventures (Bunn and Mustafaoglu 1978, De La Torre and Neckar 1988,

Goldstone, Bates et al. 2010). This research is somewhat limited by its focus predominately on economic facets of society. To consider those societal factors as part of a forecasting effort, one must consider other disciplines.

Political scientists and international relations theorists also attempt to develop forecasts or predictive theories. Most social scientists acknowledge the difficulty of developing completely accurate models, a prime example being the failure of Robert S. McNamara's system-analysis and cost-benefit predictions of North Vietnamese failure during the Vietnam War. This model predicted that aggressive actions by U.S. and South Vietnamese forces would incur mounting losses on Viet Cong (VC) and North Vietnamese army (NVA) forces, eventually exhausting North Vietnam by 1968. As a result, the U.S. pursued a strategy of attrition and massive firepower, with progress measured by enemy body counts. Unfortunately, the model incorrectly misjudged North Vietnamese will; VC and NVA forces continued fighting past 1968, through the U.S. withdrawal in 1973, until they captured Saigon in 1975 (Rejeski and Olson 2006:17). McNamara admitted the complete failure of this forecast, and the devastation it caused to American lives and civil society (McNamara and VanDeMark 1996, McNamara 2003). Challenges such as strategic interactions, moral hazards, self-fulfilling and self-denying prophecies, selection effects, and other phenomena create complex systems that cannot be understood simply by examining each of its separate parts (Jervis 1998, George, Bennett et al. 2005: 130). Out of this complexity emerged theories such as balance of power, which forecasts alliances in responses to an aspiring world dictator (Jervis 1998). Since the discipline is diverse, social scientists use a wide variety of methods to test their theories. Both qualitative and quantitative methods to determine tendencies of causality are generally accepted. Unfortunately,

much social science forecasting simplifies human actions, improperly assuming aspects such as rational decision-making and perfect information (Fearon 1995).

Psychologists attempt to forecast individual and group behavior and decisions by several means. Cognitive psychologists have shown individuals "rely heavily upon our prior beliefs to help [them] interpret new information and make sense of our ambiguous world" (Welch 2005: 37). Cognitive psychology scholars generally agree that humans think irrationally, relying upon "inaccurate problem-solving procedures learned through experience, trial and error, peers or parents, deliberate instruction" heuristics instead of rational choice decision-making processes (Hastie and Dawes 2010:17, 88). Motivational psychologists theorize people forecast and make decisions based on basic needs (Hull 1943). Most psychologist scholars use laboratory, field experiments, and some case study methods to determine correlation between variables (McLeod 2003). These disciplinary perspectives, while useful in showing the human tendency toward irrational forecast and decision-making methodologies, are limited to the individual level, and do little to explain phenomena such as state and international organizational forecast-based decisions.

Other research uses multidisciplinary approaches to make up for the individual-disciplinary weaknesses when explaining forecasting and decisions. The remainder of this literature review first examines multidisciplinary forecasting research, next considers forecasting as part of the decision-making process, and then examines how norms affect forecasting and decision-making.

Forecasting

Forecasting is important to policymakers at the strategic level. At the state and international level, Frühling (2006) examined the importance of forecasting in the development of strategy linking a state's military actions and political objectives. State leaders forecast the cause-effect relationship between potential military action and political success based upon previous experience in war. Unfortunately, four sources of uncertainty often stymie successful forecasting: aleatory uncertainty (randomness), nonlinearity and complexity, limited human cognitive ability, and uncertainity in enemy actions (Frühling 2006). Adding to research which examines the challenges of forecasting, Taleb (2010) examines the impact of "black swans," events that are extreme outliers and generally unpredictable. Examples of contemporary black swan events include the dissolution of the Soviet Union and the attacks of 9-11. Although these events are rare, the magnitude of their impact is enormous, making most strategic state-level predictive models based on statistical probabilities ineffective.

At the individual level, Reiber (2004), examines intelligence analyst forecasts and finds "outcome feedback," or rapid feedback of whether an individual outcome occurs does not ensure increased judgment about probabilities. Instead "calibration feedback," which depicts a combined overall trend comparing predictions to outcomes is more likely to improve accuracy in forecasting. Other research suggests that a personality trait of "openness" prevents biased judgments in intelligence analysis (Bar- Joseph and McDermott 2008). This research, while valuable from a micro-perspective of intelligence analysis, does little to explain effective forecasting techniques for a greater public audience.

Tetlock (2005) attempts to remedy this when he combines economic, historical, psychological, and political science techniques over a multi-year research program to identify the personal attributes of superior forecasters. Extending from the zoomorphism originally described by Greek poet Archilochus, he finds that "foxes," those with wide ranging experience and multidisciplinary education tend to forecast more effectively than "hedgehogs," those with specialized experiences and single-disciplinary education. More specifically, superior forecasters tend to be more self-critical, appreciative of complexity, willing to revise estimates, and willing to admit when they are wrong. Poor forecasters are doctrinal in their approach, seeking simplistic patterns. They also tend to be vain, overconfident and willing to make bold prediction and suffer from both self-attribution bias and hindsight bias. He later finds (2015) some individuals are innately "superforecasters" when compared to others. These individuals, though smart, are not geniuses. Superforecasting results from gathering evidence from multiple sources, working in teams, using probabilistic methodologies, and changing predictions based upon emerging evidence. He further found these traits could be enhanced with focused training.

Decision-making

As mentioned before, forecasting is part of the decision-making process. In Tversky and Kahneman's (1979, 1981) prospect theory, individuals are affected differently by risky choice framing, in which individuals will choose options differently, based upon how they view risk for each choice. Although framing per-se is not synonymous with forecasting, risky choice framing experiments clearly show that individuals evaluate risk and benefit prior to making a decision. Framing which promotes optimistic forecasting induces a choice different than those choices

associated with more pessimistic forecasts. Carnevale, Inbar, and Lerner (2011) find executive leaders in U.S. state, local and federal government who engage in and enjoy effortful cognitive activities, such as abstract thinking, without external motivation are less affected by risky choice framing/forecasting and sunk costs, but still are affected by confidence calibration and risk perception. Their research generally considers only internal perspectives, and neglects the impact of external influences.

Military Decision-making

Research has demonstrated that military professionals and non-military personnel make decisions differently. Mintz, Redd, and Vedlitz (2006) compared decision scenario results between mid-level military officers and college students. While college students were often willing to choose a "do-nothing" scenario, the military leaders resoundingly chose action. Haerem, Kuvaas, Bakken, and Karlsen (2011) examined junior to mid-level NATO military officers to see if they follow Tversky and Kahneman's general population prospect theory trends when faced with choices framed by risk. They found these officers consistently made riskier choices than general population trends. They also indicate initial findings that suggest that this risk-taking decreases with level of education. Officers with more education appear to make less risky choices.

The Effect of Military Institutional Tendencies and Habits

The U.S. military promotes strong institutional tendencies and habits, often significantly different than those of the general society in the U.S. (Huntington 1957, Janowitz 1964, Dunivin 1994, Feaver 1996, Feaver and Kohn 2001). Due to their extended time within the military,

senior leaders are more likely to exhibit these institutional tendencies and habits. Because institutional tendencies and habits affect forecasting as part of the decision-making process (Rosen 1994, Allison and Zelikow 1999, Gartner 1999, Mintz, Redd et al. 2006, Haerem, Kuvaas et al. 2011), it is likely that U.S. military institutional tendencies and habits do have some effect on U.S. Army senior field-grade officer forecasting, decision-making, and success in combat. Some of these institutional tendencies and habits, such as the requirement for discipline, and importance of teamwork, could positively affect the forecasting, decision-making, and success in combat. However other tendencies, as discussed further in this research, could negatively affect this cycle.

Discounting Inconsistent Information

In cases of *confirmation bias*, or imperviousness to subsequent data phenomena, an individual or group may feel a need for cognitive closure. Kruglanski and Webster define cognitive closure as a "desire for a firm answer to a question and an aversion toward ambiguity" (1996:264). A consequence of this need for closure is a tendency for urgency and permanence. Urgency is an inclination to make decisions quickly. Permanence is a desire to maintain closure by discounting information which may invalidate the decision's logical foundation (1996:265). This discounting tendency is characterized by actions that seek confirmatory evidence and discount inconsistent information. Moreover, the desire for cognitive closure and permanence is heightened by external stimuli such as dullness of task, time pressure, fatigue, value of a decision by others, or simply if a decision on the topic is required (Kruglanski 1975, Kruglanski and Webster 1996:264)

Strategic-level military leaders are especially subject to urgency. State political leaders, desiring the support of its general population, weighing the budgetary burden of sustained war, and intent on ensuring political goals are achieved; will justifiably apply pressure on military leaders to achieve rapid success on the battlefield (Feaver 1996, Cohen 2000, Feaver and Kohn 2001, Cohen 2012). Since the mid 19th century, advanced communications and press reports rapidly disclosing battle events have provided up to the minute details and promoted this hands-on approach by state leaders.

U.S. Army commanders and staff are likely to show an institutional tendency to suppress or ignore any information inconsistent with a developed plan. This situation, known in the U.S. Army as "fighting the plan," can occur if a commander and staff keeps his/her plan focused on initial anchors despite emerging evidence which indicates a necessity to change (Kruglanski and Webster 1996:265).

Additionally, a military leader may suppress inconsistent information out of a desire for efficiency. Military leaders often prefer "formulaic solutions that reduce problems to manageable terms, clarify responsibilities and calculations of capabilities I objectives, and maximize certainty and efficiency" (Betts 1991:157). Deviational information "messes up" the synchronized and well-resourced plan put in place at the beginning of the operation.

Because these conditions could promote some senior military officers to cling to the developed plan, it could result in biased perceptions of subsequent unfolding events. Service members are less likely to forecast enemy, friendly, or environmental deviational actions that would throw the plan awry. Thus, rather than attempting to refine the military operation through

updated forecasts, they anchor on the initial cues established at the beginning of the planning process, potentially leading to disastrous results.

H1: U.S. Army leaders who discount inconsistent information are less likely to accurately forecast future events

Neglect of Deviational Views

Similar to confirmation bias, individuals desiring cognitive closure may also display *consensus bias*. Consensus bias is "a preference for consensual opinions that are unlikely to be challenged and potentially undermined by significant others" (Kruglanski and Webster 1996:256). Those who suffer from closure:

> Prefer to associate with similar-minded others, feel positively disposed toward group members who facilitate consensus, and feel negatively disposed toward dissenters or opinion deviates who jeopardize consensus. (1996:265)

Consensus bias is also likely in the U.S. Army, enabled by its hierarchical command structure. A commander, responsible for all personnel within a unit, and the actions of it, almost always demands support for a course of action once it is decided upon. Despite US Army regulations which state "Soldiers are responsible to ensure that the commander is made aware of problems that affect…mission effectiveness" (2008:2-2), commanders are often negatively disposed toward dissenters or opinion deviators who jeopardize consensus (Kruglanski and Webster 1996:265). Although a commander could appoint an individual or team to critically appraise developed plans, in an effort to revise and improve them, this does not happen on a consistent basis, and military doctrine does not direct this as part of the military planning process.

This negatively affects forecasting ability because focusing only on the most salient possibilities and consequences while ignoring legitimate deviational information is indicative of incomplete thinking (Hastie and Dawes 2010:33). Added to this, Tetlock (2005:85) has clearly shown that superior forecasters are more likely to consider and integrate conflicting ideas; poorer forecasters discount them.

H2: U.S. Army leaders who discourage dissenting opinions are less likely to accurately forecast future events

Research Design

This article employs qualitative case study methodology to examine the impact of military cultural norms on forecasting accuracy and decision-making effectiveness. To test these hypotheses, I examine three senior U.S. Army commanders in three conflicts. First, I examine General McClellan's actions during the American Civil War's Peninsula Campaign in 1862. I next examine the actions of General Bradley during Operations Cobra to achieve breakout of the Normandy region of France in 1944. I finish by examining General Petraeus during the Iraq Surge in 2006-2008.

I chose these cases for several reasons. First, the rich archival resources, or interview opportunities available for these cases make it possible to examine and draw from a trove of both official and private correspondence. Unlike many general officers with only written biographies, wide-ranging correspondence or interviews allow me to make a more balanced examination of their actions. Second, there is significant variation in the independent variable; the decision-making and command personalities of the generals in each case differ strongly. Third, all three have similar breadths of responsibility, each commanding at the army echelon of command, with

subordinate corps and divisions. Lastly, in each conflict the commanders had strong influence over operations, influencing them strongly in a positive or negative direction.

The unique circumstances leading up to each of these case study conflicts add strength to my argument. However, these circumstances were not used as a selection criterion, since that would select on the dependent variable, are. The failure and victory in all cases were unexpected and the direct result of forecasting. Despite strong expectations that McClellan would win in the Peninsula and capture Richmond (Sears 2015: 298), it did not occur because he consistently over-forecasted Confederate strength. Similarly, most Allied leaders, including British General Montgomery, believed that United Kingdom Commonwealth soldiers, not the Americans under Bradley, would achieve the initial breakthrough at Normandy (Pogue 1954:188, Hastings 1999:231). Finally, many believed the situation in 2006 Iraq "grave and deteriorating" with US forces having limited ability to influence events within Iraq (Baker III, Hamilton et al. 2006:6-7, Sky 2016). The analysis in this paper will show instead that leaders were successful due to their willingness to break confirmation bias paradigms by considering deviational information or dissenting views. This willingness allowed superior forecasting that ultimately led to the success of the underdog.

Tracking the Variables of Interest

In an effort to ensure I do not rely upon anecdotal data, I follow Talmadge's (2015:34) technique of using qualitative indicator questions to "provide context and to probe for the performance of specific tasks." As a result, when examining each case study, I ask the following:

- Did the commander exhibit obvious bias going into the campaign?

- Did the commander develop a complex plan for the campaign? If so, was the commander overly resistant to change of this plan?
- Did the commander seize on confirmatory information or suppress contrary information during the campaign?
- Did the commander ignore dissenting opinions during the campaign?

Although the above qualitative indicators do not specifically measure the generals' forecasting ability, their presence are indicators of institutional tendencies that negatively affect his forecasting.

General McClellan in the Peninsula Campaign (1862)

McClellan's forecasting ability was poor. He began the campaign with an overinflated estimate of enemy strength on the Virginia peninsula and failed to refine it effectively over the subsequent months of the campaign. Ironically, his extreme caution and slow methodical maneuver provided both time and space for Confederate forces to reposition forces from other campaigns, eventually allowing them to amass forces almost equal to McClellan's initial force estimates. McClellan's forecasting failure was due to several factors, including overconfidence, bias toward slow and methodical operations, ignorance of emerging intelligence contrary to his starting estimate, and unwillingness to consider dissenting opinions

Background

McClellan's received an engineering degree, as did all graduates at that time, from the United States Military Academy at West Point in 1846. Although he dabbled in politics, his

military and civilian careers generally remained specialized toward engineering, strategy and tactics until his death in 1885.

McClellan began the war with several biases, including a resistance to emancipation of slaves (Sears 2014), resistance to Lieutenant General Winfield Scott's Anaconda Plan (Sears 1989), and professional disdain for President Lincoln (Waugh 2010) . Unfortunately, most of them ran counter to that of the Federal administration, and particularly, that of President Abraham Lincoln. To understand his resistance to deviational information and dissenting views, we must first understand McClellan's tendencies and preferred strategies for war.

First, McClellan was a detail-oriented planner. He was deeply interested the strategic principles of Jominian military art, and received detailed instruction on it at the United States Military Academy, from which he graduated, second in his class, in 1846. McClellan most appreciated the military principles of mass and concentration, which he discussed in his memorandum to Lincoln on August 4th, 1861. It articulated his interest in using "such an overwhelming strength as will convince all our antagonists, especially those of the governing, aristocratic class, of the utter impossibility of resistance" (Scott, Lazelle et al. 1901: Volume 1, Ch 14, pg 7). This prescription of mass as a requirement for success influenced much of his subsequent career. He felt it imperative because only massed forces could achieve the lopsided coefficients of combat power necessary to "crush the rebellion at one blow [and] terminate the war in one campaign," (Scott, Lazelle et al. 1901: Volume 1, Ch 14, pg 8).

Second, McClellan was confident to the point of over-confidence (McPherson and Davis 1988:360). He felt himself exquisitely capable of leading Union forces to victory. He had served very capably in the Mexican-American War, served as an American military observer in

the Crimean war, and upon initiation of hostilities with the South, was called upon by the three most important states of the North to command their forces (Sears 1989:1). In the late summer, 1861, following his assumption of command of the Union Army of the Potomac in August of 1861 (Beatie 2009:372), he reorganized its forces and took steps to significantly improve its morale following the Union defeat at first Bull Run in July 1861. McClellan's efforts earned him the trust and adulation of the men of the Army and significantly strengthen the defense of Washington DC from nearby Confederate forces south of the Potomac River (Sears and McClellan 1988:111, 116). Positive press reports and adulations from his men led him to claim in October 1861, that the Union Army will "fight under no one no one but [me]…I believe they love me from the bottom of their hearts." (Sears 1989: 112). Unfortunately, this vainness resulted in the tendency to believe only he had true ability to achieve victory. He and members of his staff often quickly dismissed derivations of his plans and alternatives to his opinions.

McClellan's Overestimates

McClellan's plan for the Peninsula campaign was built upon a faulty forecast that, when combined with his desire for overwhelming odds, resulted in unnecessary caution. He predicted the presence of a large Confederate force, numbering approximately 100,000, on the Virginian peninsula that stretched from the Chesapeake Bay in the east to Richmond in the west. McClellan based this assumption on the recent withdrawal of Confederate forces that had previously threatened Washington DC from the south. He suspected that these forces were positioned in and around Richmond, the Confederate capital. Unfortunately, his enemy estimate

was reinforced by Allen Pinkerton, the Lincoln-appointed Union spy chief. Both had a tendency to inflate their enemy estimates, although McClellan more so than Pinkerton (Fishel 1988: 126).

Shortly before and immediately after the landing on the peninsula, his subordinate commanders provided their estimations of Confederate troops, which were accurate, numbering at 15,000 to 18,000 (Rawson, Long et al. :Volume 1, Ch 7, pg 99, Scott, Lazelle et al. 1901Volume 1, Ch 63, pg 564). Unfortunately, McClellan ignored this contrary information. McClellan's Federal army, in reality, initially outnumbered his Confederate adversary's force by almost 100,000. A rapid drive from his initial landing spot to Richmond would have certainly overwhelmed his adversary. Instead, McClellan forecasted that he had the "whole force of the enemy on my hands, probably not less than (100,000) one hundred thousand men, and possibly more…[resulting in a Federal force] possibly less than that of the enemy" (Scott, Lazelle et al. 1901: Volume 1, Ch 23, pg 11). Even after receiving federal reinforcements, he continued this trend, on May 14th reporting, "I must attack…a much larger force, perhaps double my numbers" and asked "for every man the that the Department [of War] can send me" (Scott, Lazelle et al. 1901: Volume 1, Ch 23, 26).

Not only did McClellan discount information contrary to his plan, but he also seized on fallacious reports that supported it. At multiple times during the campaign, McClellan would inflate his enemy estimate and actions based upon the inflated testimony of captured or turncoat Confederate soldiers while discounting accurate escaped slave testimony. As an example, in early April, four prisoners of the Confederate 14th Alabama reported that Confederate strength in the peninsula was 40,000 but would grow in a few days to 100,000. These soldiers were likely enemy moles, planted to seed disinformation (Sears 2014:43). Alternatively, an escaped slave,

servant to an officer within the Confederate Army, reported the withdrawal of Confederate forces from the eastern portions of the peninsula. Elements of McClellan's personal staff discounted this latter intelligence false; instead claiming they "had positive intelligence …that [the enemy] were going to make a desperate fight there" (Congress 1863: 284) .

McClellan exercised extreme caution for the remainder of the campaign, and into subsequent actions. During the May 31st Battle of Seven Pines, confederate forces initiated an unsynchronized attack on federal forces that were separated by the Chickahominy River. Although southern forces initially achieved success, federal reinforcements repositioned across the river to stabilize union lines. Confederate General Johnson was wounded in the battle, and McClellan could have decisively defeated southern forces in a counterattack, but chose not to. Instead, as he wrote to Lincoln in a June 4th telegram "I have to be very cautious now" (Scott, Lazelle et al. 1901: Volumme 1, Ch 23, pg 45).

McClellan Ignored Dissent, Leading to Lost Opportunities

In addition to discounting contrary information, McClellan consistently ignored or suppressed dissenting views of his operations. McClellan's attitude as he assumed command was summed up in a letter to his wife on July 30th 1861.

> All tell me that I am held responsible for the fate of the Nation & that all its resources shall be placed at my disposal. It is an immense task that I have on my hands, but I believe that I can accomplish it. (Sears 1989: 71)

He set about reinforcing his concept for the peninsular campaign using two methods, discounting superior objections and suppressing those of subordinates.

In a private meeting between McClellan and Lincoln on March 8th, 1862, the President expressed concern that McClellan's initial plans for an amphibious turning movement up the peninsula would leave Washington DC uncovered from Union defenses. McClellan strongly refuted the President's concerns, declaring those concerns unnecessary (McClellan and Prime 1887:196). Unfortunately, McClellan's plan of action in the peninsula ignored defense of the Union capital. He (incorrectly) assumed that Federal forces, then engaged in the Shenandoah Valley, could be recalled as defensive forces while others under his control conduct the Peninsula campaign (Sears 2014:33). This discounted Lincoln's clear directive to secure Washington with strong and uncommitted forces. Based upon confederate threats that would later evolve, Lincoln would later recall some of McClellan's forces from the peninsula to ensure the capital's safety.

McClellan similarly suppressed his subordinates' dissenting opinions both in planning and action as the campaign unfolded. On March 8th, 1862, McClellan's Chief of staff, General Samuel Peter Heintzelman, quietly informed each general before the council of war that "there was a strong effort to have [McClellan] superseded & that he would be unless we approved his plan" (Sears 2014:5). Although several officers present disagreed with McClellan's plan of action, the majority supported it, and thus it carried the vote. His plan was subsequently briefed to and approved by President Lincoln on March 9th. From this point forward, there was no backing out of McClellan's plan.

Upon landing on the Virginia peninsula at Fort Monroe, federal scouts identified outnumbered Confederate forces. Despite this, McClellan twice restrained action that likely would have ruptured the Confederate's thin defenses, citing concerns with the size of his forces

versus those of the Confederates. On the morning of April 6th, Heintzelman requested McClellan's permission to conduct a reconnaissance in force at an identified weak point in the Confederate defensive line. He was denied by McClellan, citing overwhelming enemy odds, and instead told to entrench his forces where they were (Sears 2014:42). That same day, General William F. Smith, commanding a division on the east side of the peninsula, directed reconnaissance of the weak Confederate line in preparation for subsequent offensive actions. He recalled it upon receiving direction from McClellan to cease all reconnaissance pending engineering evaluations of enemy defenses (Sears 2014:42).

Outcome of the Peninsula Campaign

McClellan's actions remained timid for the duration of the campaign. Despite having a three to one advantage over Confederate forces, he was quick to overestimate enemy strength and result to logistics-heavy siege warfare, resulting in plodding advances versus lightning maneuver. The result was a slow creep up the Virginia peninsula, allowing more than enough time for Confederate leaders to reinforce defensive forces around Richmond (Sears and McClellan 1988:211-212). The Confederate army consolidated and reinforced its lines around Richmond then threatened McClellan's flank with forces repositioned from the valley campaign in the north. This eventually led McClellan to initiate Federal withdrawal procedures along the peninsula and prevented any chance of an early termination of the American Civil War and emboldened General Lee to later undertake bold strategies in support of the Confederacy.

In the planning for and execution of the Peninsula campaign, McClellan suffered from both confirmation bias and a tendency to discount contrary information, resulting in egregious

starting forecasts. These tendencies prevented him from updating his forecasts as the campaign progressed and led him to discount information that ran counter to his expectation, most importantly the small size of the defending Confederate force. As a result, he maintained forecast of enemy forces at a number equal to or greater than his own, leading to a lockstep and cautious series of operations that permitted ample time for the Confederate army to reposition and consolidate forces, resulting in a Union defeat. Similarly, McClellan discouraged dissent. All of these actions led him to forecast enemy actions based upon what he initially conceived when he formulated the Peninsula campaign plan. This forecast was woefully mistaken, and subsequently led to his defeat.

General Bradley in Operation Cobra (1944)

Unlike McClellan, General Omar Bradley was an effective forecaster. He began the campaign at Normandy with a limited forecast, preferring to build, refine and extend it based upon Allied and enemy progress on the battlefield. Prior to the Normandy invasion, Bradley strongly objected to his higher headquarters' phase line objectives designating long-term progress expectations, likely due to beliefs (no doubt forged in North Africa) that accurate long-term forecasts of friendly progress versus enemy resistance were unrealistic given the tempo and lethality of modern mechanized warfare (Hastings 1999:38). Although both US and British commonwealth breakout operations were initially unsuccessful, Bradley was able use lessons learned from them to build an accurate forecast of a viable course of action, that ultimately led to the Allied breakout and follow on success. He did not suffer from confirmation bias, as indicated by several instances in which he considered contrary information and alternative views,

as well as promoted subordinate autonomy and initiative during the lead up to and execution of Operation Cobra, the U.S. 21st Army's breakout of the Normandy bocage in 1944.

Background

Before World War II Bradley spent much of his career, when not in command, either teaching or pursuing education. He served twice as a professor at the United States Military Academy at West Point and attended the Command and General Staff College and the Army War College. More importantly, he served as an infantry tactics instructor under (then Lieutenant Colonel) George C Marshall at the Infantry School at Fort Benning, Georgia. Of note, many contemporary theorists consider the quality of instruction at the inter-war Infantry school the zenith of American professional military education at the time and superior to that of the Command and General Staff College or War College (Muth 2011:138). Marshall best sums up Bradley's persona as "quiet, unassuming, capable, with sound common sense. Absolute dependability" (Chambers 1999). General Dwight D. Eisenhower further describes him as having "brains, a fine capacity for leadership and a thorough understanding of the requirements of modern battle" (1943:3,11). As a result of this well-rounded perspective, Bradley tended to consider all emerging events with objectivity; none were disregarded as unnecessary and needing no response (Hansen 1944:4,6).

It also appears that Bradley, unlike McClellan, was not hamstrung in his forecasting due to confirmation bias. In fact, the allied invasion of Normandy did not include a specific breakout plan (Pogue 1946). Prior to the Normandy invasion, Bradley strongly objected to his higher headquarters' phase line objectives designating long-term progress expectations, likely due to

beliefs (no doubt forged in North Africa) that accurate long-term forecasts of friendly progress versus enemy resistance were unrealistic given the tempo and lethality of modern mechanized warfare (Hastings 1999:38). Thus, the plans and execution of any breakout were to be based on forecasts that Bradley, and his trusted subordinates, would develop in France as the battle unfolded.

Bradley's plan for the Normandy breakout, Operation Cobra, envisioned a narrow-front attack by five American Army divisions southwest toward the western side of the Cherbourg Peninsula (Hastings 1999:250, Zaloga and Bryan 2013:44). Bradley predicted that this type of operation would crack the German defensive line, allowing Allied entry into the less constrained interior of France, and allow a more rapid maneuver toward Paris and Germany. He based this forecast on previous Allied broad-front attack failures Forecasting the array of enemy forces and the type of American army operations that could successfully shatter its line required Bradley's full consideration of contrary information as well as consideration of alternative views.

Bradley's Consideration of Contrary Information Enables the Breakout

Bradley fully embraced contrary information before, during, and after Operation Cobra. On June 3rd 1944, three days before the D-day landings, he acknowledged that his projected timelines to seize immediate objectives in vicinity of the landing sites were "a little too bright [optimistic]" (Hansen 1944:4,7). Following the June 6th landings and subsequent German actions to contain the Allied beachhead, the American and British commonwealth forces rapidly stacked up, requiring an expansion of the beachhead. Bradley knew that contrary to General George S. Patton's claim that a consolidated tank attack could "be in Paris in five days," achieving this

breakthrough would require infantry forces to "stand up…and slug it out" with the Germans defenders (Hansen 1944:4,11).

Operation Cobra was the second breakout attempt by American forces. The first, a broad front push, was launched July 3rd, 1944. Due to a combination of rushed planning, bad weather, difficult terrain, and lack of aggressiveness by the American commanders, it failed (Bradley and Blair 1983:269-271). Bradley would learn from this failure and correct these deficiencies in Cobra on July 25th, by attacking on a narrower front using units and using commanders with whom he developed trust during previous operations in north Africa (Hastings 1999:250). He forecasted that this consolidated attack, along with concentrated aerial bombing, could disrupt the disciplined German defenses and allow U.S. forces to exploit the rupture out of bocage country.

On July 25th, following saturation bombing of a narrow area by Allied bombers, the US First Army attacked. Although initially the German defending forces fought obstinately, by the morning of the 27th German forces had withdrawn to hasty positions several miles to the southeast (Williams 2011:180-183). Bradley was correct in forecasting that narrow penetration of the German defensive front, followed by rapid exploitation, would set conditions for further mobile war, so suited to the US mechanized forces. After the breakthrough was achieved, most Allied leaders, including Bradly and Montgomery, forecasted that German forces would gradually withdraw east to the Seine River, a natural defensive barrier (Bradley and Blair 1983:288). This did not occur, due to direct orders from Hitler. Fortuitously, it created the opportunity, first identified by Bradley, to trap significant numbers of German defenders in the Falaise pocket, leading Bradley to remark "this is an opportunity that comes to a commander not

more than once in a century. We're about to destroy an entire hostile army and go all the way from here to the German border" (Williams 2011:197). Unfortunately slow allied movement by the encircling Canadian forces allowed many retreating German soldiers to escape (Hastings 1999:300-306).

Bradley's Promotion of Alternative Views and Subordinate Suggestions

Bradley not only accepted, but expected subordinate dissenting suggestions to enable his forecasting and decision-making. Bradley empowered his staff, who were "not afraid to make decisions in his name…he backs them up" (Hansen 1944:4,7). While commanding II Corps in Tunisia in 1943, staff officers suggested a reorientation of forces to achieve a breakthrough to Bizerte, one of the final objectives of the Allied Tunisia campaign. Bradley fully considered this recommendation, mulling the idea for several hours before finally admitting the suggestion as "entirely possible...[despite] high risks" (Hansen 1943:4,7). The subsequent reorientation of forces resulted in American success and seizure of Bizerte on May 7th, 1943.

During the planning for and execution of Cobra, Bradley always considered, and in many cases implemented alternative suggestions. Following a 24 July suggestion by Major General Collins, the US Seventh Corps commander, to add another American division to the attack, he directed it immediately, despite the likely logistical challenges that would accompany it (Hansen 1944:4,11). Bradley ignored inter-service rivalries and followed the advice of the US Army Air Corps aviator General Quesada, commander of the Ixth Tactical Air Command, to add US Army Air Corps forward air controllers to armored tanks crews. From this vantage point they could control close support aviation in support of frontline troops (Hastings 1999:271). In one of the

most obvious examples of accepting subordinates' alternatives, Bradley observed the demonstration of a hedgerow-busting rhino modification to a Sherman tank, devised by an army private and sergeant, and forecasted it a game-changer in Normandy; immediately directing it applied to all tanks within his command prior to Cobra (Blumenson 2014 :206).

Outcome of Operation Cobra

As a result of Bradley's superior forecasting of American and German actions and capabilities during Operation Cobra, the Allied armies achieved breakthrough out of the restrictive bocage terrain of coastal Normandy. The American Army, more mechanized than any other force in World War II, could now exercise operations in a manner which favored its strength; mobile warfare.

As a counter-factual to Bradley's forecasting acumen was General Sir Bernard Montgomery, the British commander of the Allied 21st Army Group and overall commander of all Allied forces during the Normandy campaign. Montgomery predicted British forces would capture Caen shortly after the Normandy landings, seeing it as a spot from which Anglo-Canadian forces could absorb German counterattacks as American forces captured Cherbourg and then flanked German forces to south (Powers 1992:471). This did not occur; and rather than refining his forecast, Montgomery clung to it. As a result, he felt he must capture it, rather than refine his forecasts to acknowledge he could accomplish the same effect by maintaining fixing operations north of Caen. Later during the US Operation Cobra, Montgomery directed a simultaneous Anglo-Canadian operation titled Operation Goodwood, during which his British forces would capture Caen. This operation proved both costly and unnecessary, resulting in

numerous British tanks and lives destroyed by German forces (Urban 2005). The results are best described by Bradley, who in a LIFE magazine interview in 1951, stated "had [Montgomery] limited himself simply to the containment without making Caen a symbol of it, he would have been credited with success instead of being charged, as he was, with failure" (Bradley 1951:99).

Part of the success of Cobra was Bradley's resistance to the military institutional tendency of confirmation bias; specifically, the failure to adequately consider contrary information or subordinate alternative views when updating his operational forecasts. As demonstrated by this case study, Bradley exemplified this resistance before, during, and after Operation Cobra. His non-confirming tendencies were fortuitous; his actions soon led to rapid Allied advances across France and into Germany.

General Petraeus during the Iraq Surge (2006-2008)

Unlike the other case studies presented, this research of General David Petraeus is contemporary, which creates unique opportunities. Since the Iraq surge remains a relatively recent phenomenon, memories and personal perspectives of it remain fresh in the minds of those interviewed. Only one of the key participants interviewed for this project have authored personal memoirs of the Iraq war or the surge period. In order to ensure a balanced appraisal of the situation, I took care to not only interview Petraeus and members of his "inner circle" trusted aides and advisors, but also those with more nuanced views of General Petraeus' leadership and actions in Iraq (Figure 4). This allowed a critical examination, somewhat controlling for personal affections or bias.

Title	Name	Relation to GEN Petraeus
Colonel	William Rapp	Principal advisor
General	Pete Chiarelli	Multi-National Corps-Iraq Commander, Mil. Advisor to SECDEF
Ms.	Emma Sky	Political Advisor to Multi-National Corps-Iraq
Major General	David Fastabend	Multi-National Corps-Iraq Operation Officer
Admiral	William Fallon	Commander, US Central Command

Figure 4: General Petraeus Case Study Interviews

Petraeus' Forecasting Ability

Petraeus was an effective forecaster, though this was not readily apparent in early 2007. In early 2007 he "was unable to forecast whether or not the surge would be successful, but [he] was fully committed to giving it a try" (Petraeus 2016). He began his command of the Iraq surge without a well-developed forecast, instead choosing to build it based upon personal observations and subordinate recommendations in theater. Similar to Omar Bradley, he was able use lessons learned from them and opportunities that became apparent in 2007, including the Sunni awakening, to initiate and then repeatedly refine an accurate forecast of a viable counterinsurgency campaign that led to significant reductions in violence within Iraq by late 2008. Going further, Petraeus reinforced his demonstrated forecasting prowess, when he correctly foresaw challenges with long-term maintenance of this peace. Since the drop in violence was not matched by Iraqi ethnosectarian and political reconciliation, he acknowledged that long term peace in Iraq "depended on how and when the Iraqis resolved the ongoing struggle for power and control of resources and the various factions decided to work together" (Petraeus 2008).

Background

General David Petraeus graduated in 1974 in the top 5% of his West Point class and subsequently embarked on a unique military career in the U.S. Army. Unlike the stereotypical single-track career path that most US Army Officers pursue, Petraeus mixed hard-nosed assignments in light infantry combat units including the 101st Airborne and 82nd Airborne with academia, earning an M.P.A and Ph.D. from Princeton and later serving as an assistant professor at West Point (Kaplan 2013). In addition to combat leadership assignments as captain, major, and colonel, Petraeus also held key aide and assistant positions, serving in close proximity with general officers far senior to his rank.

Prior to his time as the 2007-2008 Multi-National Forces- Iraq (MNF-I) commander, Petraeus commanded the 101st Airborne Division during the early stages of the Iraq war in 2003. During the initial occupation of Iraq following major hostilities, his division secured northern Iraq for most of 2003. During the post-invasion US-management challenges, Petraeus operated semi-autonomously from the often non-responsive Coalition Provisional Authority, "governing the northern province of Nineveh in the way he saw fit…even conducting his own foreign policy" (Sky 2015:72). There he practiced many of the counterinsurgency techniques he would later publish in the U.S. Counterinsurgency Manual and oversee during the Iraq surge 2007-2008 (Ricks 2006:228-232).

General Petraeus returned to command all coalition forces in Iraq in 2007 armed only with "the knowledge of the [US government-directed] surge, the knowledge that the US president was backing him, and a commitment to counterinsurgency that [his subordinate] warfighting commander, [Lieutenant General Raymond] Odierno had already embraced" (Rapp

2016). He held no bias to a specific course of action beyond the philosophic desire to transition coalition strategy toward counterinsurgency techniques(Rapp 2016:2).

In early 2007 he "was unable to forecast whether or not the surge would be successful, but [he] was fully committed to giving it a try" (Petraeus 2016). In public, Petraeus' initial forecasts of how the surge would unfold were conservative, but not overly skeptical. In his January 23rd confirmation hearing before the Senate Armed Services Committee he remarked,

> None of this will be rapid. In fact, the way ahead will be neither quick nor easy, and there undoubtedly will be tough days. We face a determined, adaptable, barbaric enemy. He will try to wait us out. In fact, any such endeavor is a test of wills, and there are no guarantees…the way ahead will be very hard…but hard is not hopeless. (Petraeus 2007)

The previous MNF-I strategy, overseen by General George Casey, was that of train and transition; specifically, to train Iraqi security forces and transition security oversight to those Iraqi forces as soon as possible. Unfortunately, this strategy was failing. Conditions in late 2006 Iraq were "grave and deteriorating", with U.S. forces "caught in a mission that has no foreseeable end" (Baker III, Hamilton et al. 2006). When Petraeus arrived in early 2007 to assume command, President George W. Bush had already approved five reinforcing surge brigades to arrive in Iraq in 2007-2008. Petraeus' primary subordinate, Lieutenant General Ray Odierno, the commander of Multi National Corps- Iraq, had arrived two months prior and developed a tactical plan for the placement of these brigades, pending Petraeus' approval. General Petraeus, seeing no need to change it, readily approved Odierno's tactical war-fighting plan, acknowledging their agreement on COIN tactical employment principles (Rapp 2016:2, Schlosser 2017:31).

Petraeus' philosophic desire for COIN in 2007 Iraq would prove appropriate, given the circumstances. Petraeus had spent the previous 15 months in partnership with Marine General (later Secretary of Defense) James Mattis developing the new U.S. Counterinsurgency doctrine and manual. Tasked by the U.S. Army Chief of Staff to "shake up the army," his analysis and development of counterinsurgency doctrine was wide-ranging (Petraeus 2016:1). Despite this, Petraeus did not see the application of counterinsurgency techniques as rote application of iron-clad doctrine, but instead a flexible application of existing military tactics to fit local conditions. According to him

> a counterinsurgency campaign is just merely a construct for a comprehensive effort that includes offensive, defensive, and stability operations… The predominant engagement is stability operations and [in] other places it might be completely offensive and others where it might be mostly defensive as a characterization (Petraeus 2016)

Upon arrival, he utilized a joint strategic assessment team (JSAT), composed of talented military and civilian individuals including (then) Colonel H.R. McMaster, future National Security Advisor and David Kilcullen, and Australian counterinsurgency expert, to conduct an in depth four month analysis of the situation in Iraq and draft recommendations for his joint campaign plan (Knowlton Jr 2010:6-7). His initial campaign focused only on the application of counterinsurgency techniques and the use of the approved US surge forces to secure the population; not discussed by this team was the opportunity provided by the budding Sunni awakening in Western Iraq. Fortunately, his later consideration of deviational information and alternative views allowed coalition forces to take advantage of opportunities soon afforded by the Sunni awakening in Al Anbar (Fastabend 2016:1).

Following the JSAT analysis, he developed a campaign plan in coordination with the US Ambassador to Iraq, Ryan C. Crocker. This plan focused less on tactical details and more on overall concepts and empowering subordinates to recognize and act on opportunities. He saw a responsibility in getting the COIN "big picture right…,was very, very good at getting the big [COIN] ideas right, and then repeating those messages, and getting those messages understood all the way down the chain of command" (Sky 2016). Simultaneously he understood the impact of American political support. He was acutely "aware of the need to win support for the war back in the US" (Sky 2016).

Lastly, he and Ambassador Crocker saw the use of US military forces to accomplish Iraq political ends. They agreed to "use the coalition's military operations and political advantage both to bring Sunnis to the negotiating table and to force the Shi'a parties in power to end their sectarian abuses" (Rayburn 2019:127)

Petraeus' Consideration of Contrary Information Enables Security Improvement in Iraq

Petraeus' initial conduct demonstrated his consideration of contrary information. Prior to his arrival, In late 2006, the violence in Iraq had increased to a point where the majority of the general public and most of Congress (including most Republicans) believed the situation in Iraq was beyond salvage (Schlosser 2017:1). Many of the military in Iraq though the same; according to the senior planner of the MNF-I staff

> Things weren't going well in Iraq. We had just lost the translator (US Army Specialist Ahmed K. Altaie) who had left the green zone and were going through search procedures to get him back. [Iraq Prime Minister] Maliki had raised hell on us blocking [sectarian members] of the Iraqi Army…[MNF-I commander General] Casey brought us in and asked what we thought of five more brigades in Iraq? I didn't want to think about it. At the time there was no justification to do it. (Fastabend 2016).

Only a few months later, Petraeus took command, determined to turn the tide in Iraq. Petraeus initially expected to focus primarily on providing population-based counterinsurgency security using only coalition and Iraqi security forces. However, in late 2006 and early 2007, an opportunity emerged. Several Sunni tribes in Al Anbar Province joined forces against Al Qaeda and began cooperating with coalition forces (Knowlton Jr 2010:18). Previous efforts to partner with Sunni tribes had failed (Biddle, Friedman et al. 2012:18), and Petraeus' JSAT team did not recommend investing in indigenous tribal security partnerships (Fastabend 2016:2). Fortunately, LTG McCrystal, the commander of joint special operations in Iraq (JSOC) acknowledged in a private meeting that targeting insurgent leadership by US and ISF special operations "cannot fish this pond dry," and recommended dialogue with Sunni tribal leaders to promote alliance with coalition in forces (Fastabend 2016). Heeding this advice, and disregarding his JSAT team's initial advice, Petraeus personally travelled to Ramadi, in Western Iraq, to investigate firsthand what these partnerships could provide. He subsequently fully supported programs to implement what would later be known as the Sons of Iraq (SOI). However, he also foresaw challenges to the partnership's legitimacy. In a June 9th update to Defense Secretary Robert Gates, he observed the need to "formalize the volunteers as quickly as possible by linking them with Iraqi and coalition forces," integrate them initially as SOI, and later as Iraqi security forces (Rayburn 2019:180). The subsequent SOI support program added over 100,00 tribal local security forces to the counterinsurgency forces in Iraq, greatly enabling the decrease or cessation of violence by 2008 (Biddle, Friedman et al. 2012:36).

Petraeus' Promotion of Alternative Views Supports Military Success in The Surge in Iraq

Petraeus welcomed alternative views during his tenure as the MNF-I commander. He surrounded himself with a highly educated and talented staff, fully acknowledging the capabilities that an educated staff could assist him with. He desired staff members with

> brains, a work ethic and the ability to get along with others. If [they] had the brains they must be able to both analyze as well as communicate in writing and verbally, to help me think through issues [and] to help me communicate my big ideas and messages. (Petraeus 2016)

He also gauged operations on the battlefield by personally observing actions on the ground. Based on this, he undertook a daily regimen of battlefield circulation tours, taking time to meet with subordinate forces and the indigenous population. He used these trips not only to determine what did/did not work in each battlespace, but also to ensure his strategic messages are passed to and understood at the lowest level. Petraeus "had ways of pulsing at all different levels. He wasn't one of those leaders who would believe everything that was given to them on a power point [slide]" (Sky 2016). As an avid consumer of information, he welcomed personal emails from and participated in daily physical fitness with US Army captains, who were seven ranks and at least four command echelons below his position as the MNF-I commander (Rapp 2016:4). Subordinate initiatives that appeared promising were disseminated across the entire MNF-I battlespace, thereby flattening tactic distribution.

Petraeus valued divergent perspectives and logical disagreement. When others expressed views counter to his own, he would

> try to persuade them to why I made my decision as I did...because if you can't persuade somebody, you have to acknowledge that you could be wrong or that your ideas aren't brilliant as you thought they were. This

> allows you to better refine. So, not only did I welcome, I actually encouraged disagreement (Petraeus 2016)

Petraeus, in response to media criticisms that he and Ambassador Crocker provided incorrect measures to depict the level of violence and progress in Iraq during his September 2007 congressional testimony, personally invited his critics to Iraq for review and feedback on MNF-I metrics used to measure of levels of violence, progress in security, and other actions in Iraq. Several key members of the media, authors, and theorists, including Thomas Friedman, Stephen Biddle, and Ben Shapiro participated in a November 2007 two-day conference at his headquarters. Based on their feedback, he validated some and adjusted other metrics (Rapp 2016). Although some critics saw this as a way to "co-opt them", this conference benefited Petraeus not only through its rigorous academic process, but also by improving his image in the eyes of a skeptical media and providing a method to evaluate feelings in Washington DC and academia (Sky 2016).

Outcome of the Iraq Surge

Petraeus presented subsequent forecasts of war progress in his September 2007 testimony to Congress, where he was guardedly optimistic. In it he predicted that

> based on [the decrease in ethnosectarian violence] and on the further progress we believe we can achieve over the next few months, I believe that we will be able to reduce our forces to the pre-surge level of brigade combat teams by next summer without jeopardizing the security gains that we have fought so hard to achieve. Beyond that, while noting that the situation in Iraq remains complex, difficult, and sometimes downright frustrating, I also believe that it is possible to achieve our objectives in Iraq over time, though doing so will be neither quick nor easy. (Petraeus 2007)

His last forecast was somewhat noncommittal. Petraeus knew that the increased security situation in Iraq was not matched by Iraqi ethnosectarian and political reconciliation. When asked when the war in Iraq would end, he replied "it depended on how and when the Iraqis resolved the ongoing struggle for power and control of resources and the various factions decided to work together" (Petraeus 2008).

As a result of Petraeus' superior evaluation of the operational environmental and recognition of opportunities, as well as his accurate assessment of their forecasted chances of success, coalition forces, along with partnered Iraqi security forces achieved a significant increase in local population security within Iraq. This security directly resulted in a dramatic temporary decrease of violence in Iraq: over an 80% decrease in U.S. military casualties, and a 70% decrease in Iraqi civilian casualties, just between May and December 2007 (Biddle, Friedman et al. 2012:7). These numbers continued to improve through the U.S. eventual withdrawal in 2011.

Part of the security success of the 2007-2008 surge in Iraq was Petraeus' resistance to military norm-induced tendencies of confirmation bias; specifically, the failure to adequately consider contrary information or subordinate alternative views when updating his operational forecasts. As demonstrated by this case study, Petraeus instead relished any contrary opportunities and alternative views and looked to capitalize on them by disseminating them quickly across the entire Iraq battlespace.

Unfortunately, these effects were temporary. Security continued to improve through 2011, but a combination of Iraqi ethnic distrust and political turbulence, Iranian intervention, and American war exhaustion combined to result in political discord, US withdrawal and the

eventual rise of ISIS in Iraq. Petraeus was aware of this danger. Despite his close planning efforts with the US Ambassador, the US was unsuccessful in achieving the overall strategic political end state desired of the surge. Although military efforts "[bought] the time and the space for the Iraqi governments to move forward with national reconciliation and the delivery of public services," the Iraqi government failed to deliver on these goals (Sky 2016). Some, close to Petraeus, foresaw this problem, and advised that

> It is not a military problem in Iraq…while the military certainly could help set the conditions, at the end of the day it was a political problem. And until we made progress in the political side, [the decrease in violence] numbers could look as good as possible. And yet we weren't getting anywhere…political accommodations were not working (Rapp 2016)

Petraeus agreed, but saw this dilemma as not his issue. He saw his missions as "the military problem; [the political issue was] up to the ambassador and the president [to solve]" (Rapp 2016). This reasoning, correct in US civil-military relations, proved ineffective in the complex environment of Iraq and American political environments.

Conclusion

This qualitative research examined case studies of US general officers in combat to determine if U.S. Army leaders who fall prey to military institutional tendencies and habits; specifically discounting contrary information and discouraging dissenting opinions, are less likely to accurately forecast future events. Case studies were selected using four criteria: availability of information, significant variance on the independent variable, similarity in breadth of responsibility, and the general's strong influence over operations. Using qualitative indicator questions, specifically examining if each general exhibited obvious bias, developed an overly

complex plan, suppressed contradictions or welcomed/considered dissenting opinions during the campaign, I have shown that generals with negative norm-induced attributes failed in their subsequent campaign, even in the face of overwhelming advantage. Similarly, I've demonstrated that general who resisted these attributes were successful, even in the face of disadvantage.

This research strongly supports Tetlock's (2015) theory that individuals who are more self-critical, appreciative of complexity, willing to revise estimates, and willing to admit when they are wrong, make more effective decisions. It also shows that leaders whom are more willing to consider deviational information were less susceptible to Kruglanski and Webster's phenomena of "seize and freezing," or an unwillingness to shift off a plan, regardless of any contradictory conditions. (1996). Lastly, it appears that in the case of complex and everchanging campaigns, it may be wiser to enter it with only a simple short range forecast to build upon rather than attempt to refine an overly complex or far ranging forecast. Additional case studies could strengthen this qualitative research and the population of study, US Army general officers, could be expanded to included echelons one or more level lower, as well as to include other military services in the US, or other international states.

CHAPTER FOUR:
EDUCATION AND SUCCESS IN BATTLE

Introduction

Since the end of the Cold War, the US has struggled in its role of implementing desired foreign policy using military means. Contrary to earlier visions of a "new world order" in which the US would peacefully supervise the expansion of opportunity and democracy throughout the world (Bush 1990), it instead expanded its commitment of military forces into lengthy and large-scale conflicts. The results of these conflicts were mixed. Since 1990, the US military was successful in some post-Cold War conflicts (the 1991 Gulf War, the Bosnian/Kosovo Wars, the intervention in Haiti). In others, US military actions culminated in stalemate and withdrawal (First Intervention in the Somali Civil War 1992-1995). In still others, civil war followed the withdrawal of forces (Iraq War, the American-led intervention in Libya)). The US military remains committed in several ongoing conflicts that have uncertain foreseeable outcomes (Afghanistan War, the American-led interventions in Iraq and Syria).

This wide disparity in intervention outcomes naturally raises question about what makes some military operations more successful than others. Setting aside political machinations which may influence these outcomes and focusing only on the military context, a place to start is by examining the traits of the military commander responsible for leading the operations. According to US military doctrine, the commander

> Leads the fight, deciding what is to be done and when. He or she is concerned with the larger goals of the organization, determining when new circumstances dictate change, in accordance with broad conceptual direction. (Thie 1994)

The largest component of the US military, the US Army, believes that its leaders must have the ability to "anticipate and recognize change and lead transitions" (Army 2015:5). Specifically, foresight (forecasting ability) and adaptability (ability to adjust to new conditions) are crucial attributes that commanders must possess to be successful in today's complex military interventions. These attributes allow leaders to identify circumstances, either opportunities or risks, that should drive a change in operations in order to ensure mission success. The US military attempts to develop these attributes through professional military education (PME) at military schools and broadening experiences. Broadening experiences are assignments to joint (other military services), interagency (other US governmental agencies), multinational (other allied partners or, international, or nongovernmental organizations), or other non-military related positions (Army 2015:5). These broadening experiences are assignments

> outside [a military officers] comfort zone, where they cannot solely leverage their own past experiences in the Army in order to excel and where they are exposed to different organizational cultures and dynamics. (Babcock-Lumish 2016:34)

A prime example of a non-military related broadening position is civilian graduate school. According to Corarusso and Lyle (2014:111)

> Adaptability stems from developmental programs that place people in unfamiliar situations and require them to figure things out. Civilian graduate education is a proven way to develop mental agility and adaptability.

Institutionally, the US military readily acknowledges the value of education. The US Chairman of the Joint Chiefs of Staff (2009) policy on professional military education acknowledges that education

> fosters breadth of view, diverse perspectives, critical analysis, abstract reasoning, comfort with ambiguity and uncertainty, and innovative thinking, particularly with respect to complex, non-linear problems.

Despite this institutional commitment, principle and practice have diverged. US Army civilian graduate school slots decreased dramatically at the end of the Cold War, from approximately 5,500-7,000 annual slots in the mid 1980s to fewer than 400 by 1995 (Colarusso and Lyle 2014:110). Contemporary numbers have not improved much beyond the 1995 level. Only 17 percent of US Army brigadier general basic-branch officer selectees from 2008 to 2016 attended full time graduate school at a civilian university (Urben 2017:7). These officers provide the US Army its high-level commanders.

This dearth of education was accompanied, or potentially caused, by a major reorganization of the US Army officer management system. In 1996, the US Army officer personnel management system (OPMS) XXI task force completed a yearlong study based on the assumption that "officers do too many things today for them to excel at any one of them" (Urben 2017:1). Results of the study recommended that US Army officers, instead of alternating between "specialized" jobs such as comptroller, strategist, and operations research, and "operations" combat arms jobs including infantry, armor, field artillery and special forces, would instead be permanently divided. "Specialized" or "operations" branch officers would remain in these separate career tracts for the duration of their military career, with no opportunity for assignments in the tract opposite. This reorganization created circumstance described by Betros

(2012) and amplified by Spain, Mohundro, and Banks Spain, Mohundro et al. (2015) as "Athens versus Sparta." In this construct

> Athens represents an institutional preference for intellectual ability, critical thinking, education, etc. Conversely, Sparta represents an institutional preference for motivation, tactical-ability, action-bias, diligence, intensity, physicality, etc. Many in the Army may generally associate the Spartan descriptions as more in line with the expectations of the combat-arms' culture(s), and the Athenian descriptions as more in line with the expectation of the other-than-combat arms culture(s) (Spain, Mohundro et al. 2015:86)

Combat command positions within the US Army are limited to combat-arms operations-branched officers (Spartans). Time pursuing broadening opportunities, such as civilian graduate education, is "time away from the troops" and often viewed as an other-than-combat-arms (Athenian) activity. This culture, has created what could be described as an anti-intellectual bias amongst those who serve as US Army commanders.

This bias could not have developed at a worst time. Since 1990, US military commitments have increased both in frequency and duration, while the percentage of commanders with full-time civilian graduate school has decreased dramatically. Could the lack of US military success be the result of a lack of critical thinking and adaptability due to mediocre intellectual acumen amongst combat commanders? This paper examines *how does commander education affect success in military operation?* It provides a quantitative examination of the effect of U.S. Army Division Commander education on counterinsurgency effectiveness during recent military operations in Iraq.

I research this question by first examining the relevant literature. Building on existing research, I present my theory and results of quantitative analysis, which show a significant relationship between the level of division commander education and the number of significant

activities (SIGACTs) within their assigned areas of responsibility. I subsequently identify additional research to fully support my theory and provide recommendations for the US Army

The Literature

The US military acknowledges (though does not necessarily promote) the value of education in conflict decision-making. Despite this, the institution has not articulated a causal mechanism tying education to success on the battlefield. Though examination of relevant research I will attempt to remedy this. I begin with an examination of theories on warfare, specifically focused on the role of the combat commander.

Sun Tzu prescribed a hierarchy of strategic objectives aimed at achieving political goals with the least amount of military cost. The military commander, using general political objectives provided by the state ruler, had the primary responsibility to recognize, attain and maintain a position of advantage from which he could take action to achieve victory (Tzu 2008:77-84). Commanders should first strive to psychologically overwhelm an enemy and thus capture his objective without damage to it or one's own army. Short of this, a commander should strive to capture an enemies' army. As a last resort, a commander should capture an adversaries' cities (Tzu 2008:77). .

Carl von Clausewitz (2004), a Prussian general influenced by the campaigns of the Napoleonic War, stressed the psychological and political aspects of war. To him, military force was an instrument used by a state to impose its policy (and will) upon another. In it, successful commanders must use the constant re-evaluation process of dialectic methodology to identify opportunities to mass against the enemies' center of gravity for a decisive battle, despite

incomplete and erroneous intelligence, unexpected developments, and the general fear imposed by the "fog of war."

Similar to Sun Tzu precepts in concept, both B.H. Liddell-Hart's *indirect approach* and John Boyd's *theory on maneuver warfare* reject Clausewitz's requirement to an army to mass on its adversaries' decisive point to annihilate the enemy. Instead, Liddell-Hart proposed the use of the "indirect approach" to strike at an enemies' weakness with one's own army's strength "to produce a decision without any serious fighting" by either dislocating, dissolving, or enabling follow on destruction of the enemy (Hart 2008:324-325). Boyd (2017) similarly fused mental and physical efforts in his strategy. Physical maneuver and attacks committed and overload an enemies' attention and strength while psychological warfare created an atmosphere of fear and uncertainty that paralyzed the adversary. In both theories command and control of the maneuvering force was decentralized, enabling the commander on the ground to recognize opportunities and take them quickly, allowing them to rapidly overwhelm the slower response of the more centralized adversary.

Examining counterinsurgency theory, Nagl (2002) finds that counterinsurgency success depends mainly on the organizational adaptability of the counterinsurgent force. Leaders of these forces must constantly learn and change their tactics based upon changes in the operational environment.

Theory

In all of these military theories, as well as the general doctrinal guidance of the US Army and military, much of battlefield success depends on two primary attributes of a combat commander:

1) an ability to recognize risk (to be mitigated) and opportunities (to act upon) and 2) a willingness to modify the direction of military actions to take advantage of these opportunities. Successful *recognition* of risk/opportunities requires effective forecasting, while a willingness to *modify* actions requires a resistance to confirmation bias. Research has shown that both abilities are affected positively by education.

When examining *recognition,* Tetlock (2005) finds that "foxes," those with wide ranging experience and multidisciplinary education tend to forecast more effectively than "hedgehogs," those with specialized experiences and single-disciplinary education. Additionally, the amount of education matters; those with greater levels of knowledge, gained through higher levels of education, are also better forecasters (Tetlock and Gardner 2015:109) Superior forecasters tend to be more self-critical, appreciative of complexity, willing to revise estimates, and willing to admit when they are wrong. Poor forecasters are doctrinal in their approach, seeking simplistic patterns. They also tend to be vain, overconfident and willing to make bold predictions, and suffer from both self-attribution bias and hindsight bias (Tetlock 2005). Forecasting allows a commander to continually observe and assess the environment, discount incomplete and erroneous data (war fog), and mentally war game possible friendly and enemy scenarios. As a result, opportunities on the battlefield are more readily apparent to the superior-forecasting commander; he has most likely already "gamed" the outcome and can quickly decide whether to act upon or discard the opportunity.

To *modify* the direction of military actions, the leader must be willing to change. In cases of confirmation bias, or imperviousness to subsequent data phenomena, an individual may feel a need for cognitive closure and resistance to change. Kruglanski and Webster define cognitive

closure as "an individuals' desire for a firm answer to a question and an aversion toward ambiguity" (1996:264). A consequence of this need for closure is a tendency for urgency and permanence. Urgency is an inclination to make decisions quickly. Permanence is a desire to perpetuate closure by discounting information which may invalidate the decision's logical foundation (1996:265). This discounting tendency is characterized by actions that seek confirmatory evidence and discount contrary information. Commanders suffering from confirmation bias would likely suppress or ignore any information inconsistent with a developed or existing plan. This situation, often described as "fighting the plan," can occur if a commander keeps his/her plan focused on initial anchors despite emerging evidence which indicates a necessity to change (Kruglanski and Webster 1996:265). Research has shown that increased education, especially if it includes the awareness of the cognitive fallacies involved in confirmation bias, can mitigate against it (L Ross 1980:191). Since most, if not all, advanced civilian graduate degrees include education on the pitfalls of logical fallacies in academic research, it follows that individuals with these degrees are more insulated against this bias.

Going further, increased education positively effects the interaction of these two leader attributes. The causal mechanism that interacts *forecasting* (perspectives in which one identifies risks or opportunities) with a *modification of actions* (willingness to change direction) is a *decision*. Specifically, a leader mulls the former, decides and implements the latter. Research has shown that education improves general rationality in making decisions (Huffman 1974, Kim, Choi et al. 2018).

My theory is that battlefield success depends on the critical-thinking ability of the military combat commander. These forces must constantly learn and adapt based upon changes

in the operational environment (Nagl 2002, Nagl and Flournoy 2007). Battlefield success depends on: 1) an ability to *recognize* opportunity/risk and 2) a willingness to *modify* the direction of military actions to take advantage of these opportunities; acted upon through the causal mechanism of the *decision*. Since forecasting, resistance to confirmation bias, and effective decision-making are all positively influenced by increased education (Huffman 1974, L Ross 1980, Tetlock 2005, Tetlock and Gardner 2015, Kim, Choi et al. 2018), my primary theoretical insight is that *leaders with higher levels of civilian education are more likely to achieve success in military conflict*. My hypothesis to test this theoretical argument is:

H1: Military commanders with higher levels of civilian education are more likely to achieve a decrease in reported significant activities (SIGACTs).

Research Design

My research methodology regresses individual division commanding general's education levels against reported significant activities within each of their assigned battlespace in Iraq. My unit of analysis for this research is U.S. Army division commander/month from January 2004 (general initiation of insurgency) to December 2008 (termination of the "surge" in Iraq). Division-level commanders are senior U.S. Army officers (Major Generals) with approximately 30-35 years of Army service, who command one of ten U.S. Army combat divisions. I chose this echelon of officer because all began their service prior to the end of the Cold War and the implementation of OPMS XXI. They thus had the equitable option of pursuing generalized and/or specialized jobs within the US Army, as well as advanced civilian education, unconstrained by the perception issues induced by the "Athens versus Sparta" dilemma, or the significant decrease in

advanced civilian education slots. This allows a much greater level of diversity in my explanatory variable.

Major Generals are selected for command of US Army divisions in a manner specified by United States code (U.S.C.). Initial selections are made by a board of US Army four-star Generals. Those recommendations are then reviewed by the Chief of Staff of the Army (CSA), who then gains concurrence from the Secretary of the Army, Secretary of the Department of Defense, and US President. They are ultimately confirmed by the US Senate. Almost always, Division commanders will have previously served as an assistant division commander (two assigned to each division), prior to their selection to division commander. Division commanders are overwhelmingly chosen from the combat arms branches of the US Army.

Structurally, a US Army division is composed of a headquarters and 5-7 subordinate combat maneuver, aviation, artillery, and support brigades that roughly total 15,000-20,000 soldiers. During Operation Iraqi Freedom, division level-headquarters and subordinate brigades often deployed separately to Iraq. In the Iraq theater of operations, division headquarters were termed multi-national divisions (MNDs), to account for the small, and often token, foreign coalition forces that were often assigned under the divisional command's command and control structure. Division Headquarters were assigned to specific MND locations not as a result of the personality or education of the MND commanding general, but instead by the amount of time between deployments, as most division headquarters organizationally deployed from home station to Iraq two to three times between 2004-2008 (each time with different commanding

generals).[4] MNDs were task organized within the timespan examined in this research, with the in-theater division commander leading 3-8 subordinate armored, Stryker, or infantry combat brigades from either their own or another division.

MND Commanders were especially important in Iraq due to their impact and influence on the battlefield. Unlike the next higher level of headquarters (Multi National Corps-Iraq (MNC-I) or Multi National Force-Iraq (MNF-I)), These commanders focused downward to the tactical fight. Their day to day interactions with subordinate commanders at the brigade (one level down) and battalion (two levels down) allowed them to focus exclusively on the unique environment of their assigned MND battlespace, generally free from the distraction of interaction with civilian policymakers. These commanders typically issued guidance and directives several times a week, directly impacting the actions of 15-25 subordinate battalions. MND commanders owned and allocated enablers including intelligence, surveillance, and reconnaissance (ISR) assets such as unmanned aerial vehicles (UAV), rotary assets (helicopters), and other scarce battlefield enablers. Division commanders also hold general courts-martial convening authority, meaning they have the authority to convene a military trial that could ultimately result in the death penalty, life imprisonment, or a dishonorable discharge for all enlisted, non-commissioned and commissioned officers within the MND.

Since this research focuses exclusively on the education and performance of US Army general officers, I did not include data for the US Marine Corps divisional equivalent unit in Iraq (Multi-National Force West) nor that of British (multi-national division southeast) or Polish led

[4] Information based on 3 April 2019 personal discussion with US Army Lieutenant General Jeffrey Buchanan

organizations (multi-national division central-south). The USMC, British, and Polish officer development, promotion, and education process are significantly diverse and would thus likely invoke skewed results in my final analysis.

The US Army general-led MNDs considered for this research included MND-Baghdad (Jan 2004-Dec 2008), MND-north central/north (Jan 2004-Dec 2008), MND-northwest (Jan 2004-Dec 2005), and MND-central (Apr 2007-Dec 2008). The varying periods of time considered were due to changes in MND-assigned battlespace. In January 2006, MND-northwest (at times also named Task Force Olympia and Task Force Freedom) was absorbed into MND-north central battlespace. The resulting expanded MND battlespace was from then on known as MND-north. Similarly, as part of the 2007 troop surge, an additional MND headquarters was added to the OIF theater; its assigned battlespace, previously part of MND-center south, was designated MND- center. During the span of January 2004-December 2008, a total of 18 US Army generals commanded these MNDs in Iraq. The source of MND boundaries, as well as the generals who commanded them, is the Operation Iraqi Freedom digital archives maintained at the US Army Center of Military History at Fort Lesley J. McNair, Washington D.C.

Dependent Variable(s)

Measuring military success in a counterinsurgency conflict is difficult. Some research has suggested use of state regime stability (Goldstone, Bates et al. 2010), but that measure examines overall state political soundness, going well beyond a military counterinsurgent's responsibilities. Comparisons of US to enemy combatants killed was heavily criticized as a

measure of the Vietnam War progress (Krepinevich Jr 2009). Similarly, simply measuring the number of enemy insurgents killed or captured is not appropriate, since estimates of insurgent populations are often inaccurate (McChrystal 2014). According to US counterinsurgency doctrine (Army and Corps 2010:122-123) to be successful, counterinsurgent forces must

> Protect the population…[by] continuously conduct[ing] patrols and [using] measured force against insurgent targets of opportunity. Contact with the people is critical to the local COIN effort's success. Actions to eliminate the remaining covert insurgent political infrastructure must be continued; an insurgent presence will continue to threaten and influence people

From this requirement, an accurate and effective dependent variable must measure both *protection of the population* and *elimination of insurgent forces*. The number of casualty-producing attacks on coalition forces, Iraqi security forces and the civilian population meet these requirements by measuring: 1) how successful US and Iraq security forces are at protecting the local population from insurgent attacks, and 2) if insurgents can conduct effective attacks against counterinsurgents and the civilian population. Therefore, successful counterinsurgents will see a decrease in casualty-producing attacks on coalition forces, Iraqi security forces and the civilian population. Trends from these type of events were used by General Petraeus to measure progress in Iraq during 2007 Congressional testimony ((GAO) 2007). A robust dataset exists that provides this; the still-classified MNF-I dataset released to Wikileaks in 2010. Although some academic research has made use of this dataset (Donnay and Filimonov 2014), US government policy prohibits and general academic consensus limits its general use (Defense 2011, O'Loughlin 2016). This dataset contains coalition, ISF and civilian casualty statistics. Pending

declassification, which has been requested to US Central Command by several individuals, I must use other data sources for my dependent variable.

Due to an inability to use the above-described variable, I instead used coalition-recorded reported incidents that occurred in Iraq. The primary dependent variable (*Iraq SIGACTs*) is the total number of monthly incidents recorded in the Multi-National Forces Iraq (MNF-I) SIGACT III database for the Iraqi governorates corresponding to the of-interest MND boundaries. Source of this data is the Empirical Study of Conflict (ESOC)- Iraq Civil War Dataset version 3.0, coded by Berman, Shapiro and Felter (2013). These SIGACT reports contain events which affected "coalition, Iraqi Security Forces (ISF), civilians, Iraqi infrastructure and government organizations " ((DOD) 2008). As an alternate DV, in accordance with Gartner's (2008) research methodologies, I also considered a change-value of this variable (*Change in SIGACT*). This variable was used in peer-reviewed academic research (Berman, Shapiro et al. 2011, Shapiro and Weidmann 2015) to measure success in the Iraq counterinsurgency.

Admittedly, this data has some limitations and potential effects. Coded as they are in the ESOC dataset, SIGACTs are an imperfect measure of success in a counterinsurgency conflict. The ESOC SIGACTs cover a wide swath of events. They include both negative events (IED detonations, rocket attacks, gunfire attacks, etc.), as well as what could be judged positive events from a counterinsurgent perspective (an IED discovery resulting from a local resident identifying it to patrolling US soldier). Additionally, Berman, Shapiro and Felter (2011) readily admit the limitations in the data, including inconsistencies in data coding and probable measurement error. Most importantly, since it only captures events that occur when US forces are present, it approximates US presence amongst the population. As a result, an in increase in SIGACT may

be due to a higher US and Iraqi security force presence amongst the population, rather than higher insurgent activity or effectiveness. As a result, I predict that an increase in SIGACT reporting indicates more successful application of COIN principles and thus more success.

Explanatory Variable

Since a greater level of higher education promotes effective forecasting and reduces the tendencies to rely upon heuristics (Tetlock 2005)(L Ross 1980), my primary explanatory variable of interest is US Army MND commander level of education (*Commander Education*). For this measure, I consider the level of education completed and number of degrees awarded, as well as three other factors (figure 1). First, I consider the quality of school. Tier I civilian schools, specifically those that rank in the top 20 nationwide (Colleges 2010), score higher on my scale. Additionally, since a wider-ranging education (different versus same discipline) improve forecasting and subsequent decision-making, those officers with degrees of varying disciplines score higher (Tetlock 2005). Lastly, civilian fellowships, though perhaps not degree-awarding, generally provide a rigorous academic experience, hence I include them.

Scale	Education Level
1	BS/BA - single major
2	BS/BA- double major, different disciplines
3	Single MS/MA- Tier II school, same discipline
4	Single MS/MA- Tier II school, different disciplines
5	Single MS/MA/civilian fellowship- Tier I school, same discipline
6	Single MS/MA/civilian fellowship- Tier I school, different disciplines
7	2 or more MS/MA/civilian fellowship- Tier II schools, same disciplines
8	2 or more MS/MA/civilian fellowship- Tier II schools, different disciplines
9	2 or more MS/MA/civilian fellowship- Tier I schools, same disciplines
10	2 or more MS/MA/civilian fellowship- Tier I schools, different disciplines
11	Ph.D. same discipline
12	Ph.D. different discipline

Figure 5: Education Level Scale of MND and Subordinate Brigade Commanders

Since a key objective of counterinsurgency operations are to reduce violence (Defense 2018:xiii), I expect a higher level of education to improve a commander's ability to forecast effectively, identify risks/opportunities, and modify the direction of the MND's actions to meet counterinsurgency success criteria. Thus, I expect higher education to correlate with decreases in violence. Counterinsurgency flow of units and commander names were determined via archival research of Operation Iraqi Freedom digital archives maintained at the US Army Center of Military History at Fort Lesley J. McNair, Washington D.C. Division commander levels of education were determined through data queries of open-source military and biographies available on the worldwide web.

Controls

Although division commanders entered the US Army before the end of the Cold War, many subordinate combat brigade-level commanders did not, and thus were fully affected by the "Athens versus Sparta" phenomenon. Combat brigade commanders hold the rank of US Army Colonel, have approximately 20-24 years of service in the military, are combat arms, and are selected using processes similar to division commanders. Brigade commanders typically commanded 2-5 subordinate battalions, and their impact and influence were significantly smaller than that of the MND commander. Despite this, these subordinate commanders were responsible for carrying out the guidance of the MND commander, as well as identifying opportunities and recommending actions to their MND superior. Fort these reasons, I also consider the collective MND-subordinate brigade commanders' education (*Subordinate Education)*. I did not include aviation, artillery, and support brigade commanders since these types of brigades did not execute the daily face-to-face interaction with the population, Iraq security forces, or insurgents that maneuver brigades did. I expect, like my primary hypothesis that an increase in education will result in decreased SIGACTs. I do this for each combat brigade commander using the same scaled methodology as used in my primary explanatory variable. However, since each of the 3-8 subordinate combat brigades per division could be different each month, each generally conducting a 12-15-month deployment offset from other brigades, I average the combined subordinate brigade commander education levels to a single monthly value per MND. Like my IV, the flow of units and commander names were determined via archival research of Operation Iraqi Freedom digital archives maintained at the US Army Center of Military History at Fort Lesley J. McNair, Washington D.C.. Brigade commander levels of education were determined

through data queries of open-source military and civilian biographies available on the worldwide web.

The second control *(US COIN*) is the number of US service members per MND battlespace conducting counterinsurgency tactics. Previous research considers ratios of counterinsurgents to insurgents (Thompson 1966, Galula 2006, Joes 2006) or to the indigenous population (Quinlivan 1995, Quinlivan 2003, Budiansky 2004, McGrath 2006, Biddle, Friedman et al. 2012). Only a portion of the soldiers deployed to Iraq actually left the protection of military bases to conduct counterinsurgent activities. The rest provided indirect support such as logistical, aviation, indirect fire, or administrative services and should not be considered counterinsurgent forces. From detailed orders of battle gleaned from the Operation Iraqi Freedom digital archives maintained at the US Army Center of Military History at Fort Lesley J. McNair, Washington D.C., I determined the battalion composition of each brigade and used the values depicted in figure 2, rounded values from US Army battalion tables of organization and equipment (TOE), to estimate the number of COIN-executing soldiers per brigade and MND conducting operations in Iraq per month. Like the theorists cited above, I expect that an increase in COIN-executing soldiers will result in decreased SIGACTs.

COIN Soldiers	Type of Unit
700	Airborne, Light, Stryker Infantry Battalion
500	Airborne, Light, Stryker, Armored Recon Squadron
450	Armored/Light Cavalry Regiment, Division Cavalry Squadron
600	Mechanized Infantry Battalion
500	Combined Arms Battalion
400	Armored Battalion

Figure 6: Counterinsurgency Soldiers Within a US Army Brigade

Source: US Army modified table of organization and equipment (MTOE)

A third control, *(ISF*) is the logged total number of trained Iraqi security forces, composed of Iraqi Army and Iraqi Police, throughout Iraq per month. Source of this data is Operation Iraqi Freedom digital archives maintained at the US Army Center of Military History at Fort Lesley J. McNair, Washington D.C.. Similar to my second control, this controls for theories that equate counterinsurgency success primarily to a higher ratio of counterinsurgents to insurgents (Thompson 1966, Galula 2006, Joes 2006) or to the indigenous population (Quinlivan 1995, Quinlivan 2003, Budiansky 2004, McGrath 2006, Biddle, Friedman et al. 2012). inconsistencies in reporting by MND units prevents accurate MND-level values. For this research, Iraqi Forces are gross values per month, Iraq wide. Similar to my previous control, I expect increased Iraq security forces to correlate with decreased SIGACTs.

Critical events, such as elections, large-scale (brigade-size or greater) military actions by counterinsurgent forces, insurgent attacks (or perceptions of attack) which either generated more than 100 casualties or ignited significant ethno-sectarian strife, and other strategic political events often resulted in spikes in SIGACTS. Some events resulted in SIGACTS limited to the region or MND in which the event occurred, while others triggered nation-wide violence. To acknowledge these critical events, detailed below in figure 3, I add a fourth control (*Critical*). An interval value listing the number of these types of operations in a reporting cycle. Those events with limited resultant violence are annotated with the effected MND in parenthesis. Values are lagged one month since the resultant violence is not instantaneous. Source for these events are multiple historical examinations of Operation Iraqi Freedom (Wright and Reese 2008, Knowlton Jr 2010, Gordon and Trainor 2012, Mansoor 2013). I expect an increase in critical events to be correlated with increased SIGACTs.

2004	2005	2006
MAR- Shi'a festival of Aashurah	JAN- Iraqi legislative elections	FEB- Al Askari mosque bombing
MAR- 1st battle of Fallujah	APR- battle of Abu Ghraib (B)	JUN- Operation Together Forward (B)
AUG- battle of Najaf	AUG- Baghdad bridge stampede (B)	JUL- Op River Falcon (B)
OCT- battle of Samarrah (N)	SEP- battle of Tal Afar (NW)	DEC- Diyala campaign (N)
NOV- second battle of Fallujah	DEC- Iraqi elections	DEC- Saddam Hussein executed
NOV- battle of Mosul (NW)		

2007	2008
JAN- battle of Najaf II	JAN- OP Phantom Phoenix
MAR- battle of Baqubah (N)	JAN- Ninewah campaign (N)
JUN- Al Askari mosque bombing II	MAR- battle of Basrah
JUN- OP Phantom Thunder	JUL- OP Iron Pursuit (N)
AUG- OP Phantom Strike	

Figure 7: Critical Iraqi Events Resulting in Violence

Results

Since both explanatory and dependent variables were interval values, all models were estimated using OLS linear regression with the MND held as the panel variable, the month as the time variable. The results of my analysis are depicted below in table six and seven. Table six regressions were run with the DV "change in SIGACTs" per month, table seven with "total SIGACTs" per month.

	Variable Type	Observations	Mean	Std. Dev.	Min.	Max.
Commander Ed.	Ordinal	162	6.074	2.599	1	11
Subordinate Ed.	Interval	162	7.461	1.294	4	10
US COIN Soldiers	Interval	162	7681.42	3296.705	2100	16800
Iraqi Sec. Forces (log)	Interval	162	276855.6	126815	100000	454000
Critical Event	Ordinal	162	0.309	0.571	0	2

	MND CDR	Ed. Level	SIGACT Avg.
2004	Dempsey	10	257
	Odierno	8	106
	Petraeus	11	85
	Chiarelli	8	721
	Batiste	4	447
	Ham	4	210
2005	Webster	3	796
	Taluto	1	586
	Rodriguez	7	296
2006	Thurman	4	1730
	Turner	8	1010
2007	Fil	8	1591
	Mixon	8	1796
	Lynch	9	63
2008	Hammond	3	512
	Huertling	8	1051
	Oates	4	25

Ed. Level	SIGACT Avg.
1-4	615
5-8	938
9-11	101

Figure 8: Summary Statistics

Multiple OLS regression iterations resulted in mixed results for my primary explanatory variable, commander education. Although all table six (change in SIGACTs) coefficient results trend in accordance with my hypothesis, none were significant, despite multiple combinations of control variables. Additionally, the extremely low adjusted R2 scores in all regressions indicate that little of my input variables explain the variation of my output.

Table seven (total SIGACTs) commander education coefficients show strong relationships between higher education and increased SIGACTs. Additionally, adjusted R2 scores are much higher. Interestingly, all three of the four regression coefficients are significant at the .00 level. This research supports an the hypothesis that "Military commanders with higher levels of civilian education are more likely to achieve higher levels of recorded significant activities in their areas of responsibility."

A more nuanced examination of COIN doctrine explains this alternative hypothesis. From the perspective of commander attributes, more-educated commanders are more aggressive than less educated counterparts, understanding that a prime tenet of counterinsurgency is to actively live amongst and secure the civilian population. A commander's directive for more presence by his subordinates will create a greater opportunity for US Army soldiers to observe, and hence report and document significant activities in sector.

In potential issues with the data, we must consider this research's primary dependent variable and the dataset from which it is sourced. Coded as they are in the ESOC dataset, SIGACTs are an imperfect measure of success or failure in a counterinsurgency conflict. The ESOC SIGACTs cover a wide swath of events. They include both negative events (IED detonations, rocket attacks, gunfire attacks, etc.), as well as what could be judged positive events from a counterinsurgent perspective (an IED discovery resulting from a local resident identifying it to patrolling US soldier). Unfortunately, SIGACTs fail to accurately measure how successful US and Iraq security forces are at protecting the local population from insurgent attacks, and if insurgents can conduct effective attacks against counterinsurgents and the civilian population.

Other control variables similarly trend opposite of my expected direction. Although some variable coefficients in table six (Change in SIGACTs) trend in my predicted position, I discount this entire model because none of the adjusted R2 results are large enough for serious consideration. In table seven, subordinate education coefficients are significant, but like my primary explanatory variable, trend opposite of what I predicted, most likely for the same reasons I outline above.

The *number of US soldiers conducting counterinsurgency actions* are also significant in two of the four considered regressions, but all four results trend opposite from what I predicted. The likely reason is fairly intuitive: a larger number of troops will likely result in a larger number of significant activities reported.

The number of Iraq security forces control variable is considered in two of the four regression and one of its results are significant, but both trend opposite of what I expect. This trend likely similar to the others already mentioned. ISF soldiers and police often accompanied US forces on patrol, and later developed their own reporting process that allowed them to provide input to SIGACTs. Therefore, more of them resulted in more SIGACT generation.

Lastly, *critical events* were insignificant, but trended as I expected.

Table 6: Effect of Division Commander Level of Education on Iraq Change in SIGACTs 2004-2008

Variables	Regression 1	Regression 2	Regression 3	Regression 4
Commander education	-1.0680 (6.66346)	-3.6518 (6.64542)	-1.4173 (6.58619)	-4.6756 (6.61842)
Subordinate Education	16.0211 (16.25985)	18.0375 (16.44326)		15.99561 (16.41271)
US COIN Soldiers	-.00433 (.00942)	-0.0129 (.00870)	-0.0046 (.00953)	-0.01208 (.00871)
Iraqi Security Forces	-.00038* (.00017)		-85.6491* (43.05349)	
Critical Events	-42.19118 (28.90271)	-38.97102 (29.23746)		
N	162	162	162	162
Adjusted R2	.0149	-.011	.004	-.016

Data in parenthesis = standard error
*- Significant at .05 **-Significant at .01 ***-Significant at .00 All tests are two-tailed

Table 7: Effect of Division Commander Level of Education on Iraq SIGACTs 2004-2008

Variables	Regression 1	Regression 2	Regression 3	Regression 4
Commander education	36.14529* (15.76178)	42.5209** (15.74333)	40.7745** (15.4497)	44.1783** (15.62927)
Subordinate Education	111.5822** (38.46107)	106.6066** (38.94897)		109.9123** (38.75830)
US COIN Soldiers	.041525 (.022283)	.062751** (.02062)	.0209 (.02236)	.0614** (.02055)
Iraqi Security Forces	.00094* (.000403)	369.9593 (100.9939)		
Critical Events	71.0308 (68.36652)	63.0922 (69.25446)		
N	162	162	162	162
Adjusted R2	.450	.434	.453	.435

Data in parenthesis = standard error
*- Significant at .05 **-Significant at .01 ***-Significant at .00 All tests are two-tailed

Conclusion and future research

This research highlights the challenges with measuring success in war. Although it shows the strong relationship between education and SIGACT reporting, it fails to completely answer my primary research question *how does commander education affect success in military operations*?

More research is needed to fully answer this question. The first step of this should be to use a dependent variable that more accurately measures conflict success or failure, specifically measuring how successful US and Iraq security forces are at protecting the local population from insurgent attacks, and if insurgents can conduct effective attacks against counterinsurgents and the civilian population. A robust dataset exists that may provide this; the still-classified MNF-I dataset released to Wikileaks in 2010 that contains casualty-producing attacks on coalition forces, Iraqi security forces and the civilian population. Although some academic research has made use of this dataset (Donnay and Filimonov 2014), US government policy prohibits and general academic consensus limits its general use (Defense 2011, O'Loughlin 2016). Pending declassification, which has been requested to US Central Command by several individuals, this research must wait. Despite these limitations, research using partial components of this dataset shows promising results, with statistically significant relationships between increased levels MND commanders' levels of education correlating with a decrease in casualty-producing attacks on coalition forces, Iraqi security forces and the civilian population.

Other leader attributes, such as command experience and number and type of deployments are other officer traits that should be examined as explanatory variables to determined relationships with effectiveness in combat. This data, easily accessible through US

Army Human Resources Command (HRC) could be assessed both against both ESOC and a declassified SIGACT data.

In conclusion, this work provides some initial quantitative research that examines the effect of advanced US Army education on conflict. Much more must be done. Previous historical research attributes US success in World War II to the US Army's interwar (1919-1941) focus on education. During this period "officers routinely spent one-half to two-thirds of their careers as students or instructors" at military and civilian schools (Colarusso and Lyle 2014:3). This, along with a revamped promotion system based upon performance, not time in service, allowed the US Army "to find the leaders…not only [capable] of creating mighty armies…but of leading and guiding those armies upon a scale incomparably greater than anything that was prepared for (Larrabee 1987:120).

Today things are much different. Combat experience and assignment to operational units are the most desired military attributes, with continuing education coming in last in priority (Colarusso and Lyle 2014:4). The US Army itself acknowledged this in its *Review of Education, Training and Assignments for Leaders* (RETAL) study (2006:6) which stated:

> …a culture exists in the Army in which officers aspire to the highest positions of responsibility by selecting narrow career paths at the expense of development in the skills needed in the non-kinetic spectrum…Often times the current culture discourages experiences outside of the traditional career track.

Current military leadership has of late promoted the necessity of education, but has addressed half of the problem; demanding only an increase in quantity, not quality. From 2016-2018, the Chief of Staff of the Army has directed US Army assignment board members to ensure officers were given enough time for completion of military Senior Service College (SSC). SSCs are

military universities, including the Army War College, Air War College, and Naval War College, that are established specifically to train senior military officers. Unfortunately the education provided there is woefully inadequate for the modern complex era of conflict and discusses little beyond military-centric subjects (Hodges Jr 2012, Cyrulik 2015).

Ultimately what is needed is the continued focus on quantity, but increased vigor toward quality. At a minimum, military war college curriculum must be revitalized to be more challenging, in-depth, and diversified. They should be expanding from a one to a two-year program with enforced requirements for graduation, thus making them comparable to other civilian programs. More effectively, the US military must crack the Athens versus Sparta paradigm and reverse the downward spiral of advanced civilian school slot availability, making it more commensurate with 1980 Cold War levels. US Army promotion and selection boards should give more weight to education when selecting those for higher responsibility and combat command.

CHAPTER FIVE: CONCLUSION

This research provides initial support to the theory that some military institutional tendencies and habits negatively affect US military officer forecasting accuracy. Furthermore, poor forecasting inhibits success on the battlefield. Lastly, that increased education does have some effect on the modern battlefield.

In chapter two, *The Impact of Military Institutional Tendencies and Habits on Forecasting*, I examined the US Army as an institution, what tendencies and habits are promoted within this institution, and what effect do these habits have on forecasting. Using survey data collected from Colonels in US Army War College programs which measured their individual tendencies, levels of education, and accuracy in forecasting events during a three to twelve-month future, I found that some habits are present and negatively affect forecasting ability; additionally, higher levels of education positively affect forecast accuracy, possibly counteracting the effects of negative institutional tendencies and habits.

In chapter three, *Senior General Officer Case Study*, I extended chapter two's research through historical and contemporary case studies of senior US Army Generals, including General McClellan in the American Civil War, General Omar Bradley in World War Two and General David Petraeus during Operation Iraqi Freedom. Through these case studies, I confirmed that rejection of these institutional habits and tendencies enabled superior forecasting, leading to battlefield success.

Lastly, in *Education and Success in Battle*, I examined if higher levels of education positively affect forecast accuracy, possibly counteracting the effects of negative institutional tendencies and habits. Using quantitative analysis of data collected from the US Army historical

archives I found that higher levels of education positively affected significant activities within the general's assigned areas, but did not definitively answer if education promotes success on the battlefield; more research is needed.

In conclusion, this research serves as an impetus for additional research. Forecasting is an important aspect of military and defense responsibilities, but programs specifically designed to improve forecast accuracy improvement are not an acknowledged part of the US military's professional military education process. Additionally, since the 1996 implementation of the US Army Officer Professional Management System XXI, the US military has significantly devalued the importance of rigorous education, as identified in the Athens vs. Sparta crisis (Urben 2017), for those officers destined for senior and strategic levels of command. Despite this, a likely solution could be made available. Education opportunities, available both through civilian graduate schooling and a more rigorous war college curriculum could lessen the effects of negative military institutional tendencies and habits.

APPENDIX A: FORECAST SURVEY QUESTIONS

What is your US Army Rank?

What is your sex?

What is your duty status?

Did you a service transfer into the U.S. Army from another U.S. military branch of service (U.S. Air force, Navy, Marine Corps) or the U.S. Coast Guard within the last 10 years?

Did you command at the O5 level?

How many total combat deployments have you completed (each longer than 7 months)?

Describe your level of education (4= Bachelors, 2= Masters, 3= PHD, MD other Doctoral)

Is your master's degree (if more than one, one of your master's degrees) in the same discipline as your undergraduate degree?

How confident do you feel in correctly predicting international and national political-military events 12 to 18 months in the future?

What is your branch/functional area? (Select 1)

when in charge of a group developing a plan, you tend to: (1= directed COA, 2= consider several COAs)

When faced with a problem, you tend to: (1= directed COA based on own experience, 2= solicit others)

How do subordinates help you in a planning effort? (1= directed COA, 2= non-directed COA)

"A single directed course of action (COA) during the military decision-making process (MDMP)...." (1= directed COA can always be used, 2= directed COA should only be used when necessary)

A fellow officer would describe you as: (1= dislike ambiguity, 2= can operate in ambiguity)

Which statement makes more sense to you? (1= confirm a plan, 2= invalidate a plan)

You have greater respect for a leader who is: (1= firm, sticks with plan, 2= scraps plan if conditions change)

How do you feel about the following statement: "When considering most disagreements, I can usually see how both sides could be right."

Do you agree or disagree with the following statement?
"It is important to consider dissenting opinions on a plan, especially from those who are not close colleagues."

When faced with a complex and ambiguous situation, what is the likelihood that you will seek an answer using published military doctrine?

Do you agree or disagree with the following statement?
"A benefit of military doctrine is a consistency or general uniformity in solutions."

Do you agree or disagree with the following statement?
"Published military doctrine is nothing more than a general guide; it can be ignored if the situation calls for it."

Do you agree or disagree with the following statement?
"We have spent too much time, money, and blood in Afghanistan to let it collapse."

Do you agree or disagree with the following statement?
"Soldier deaths and money spent in war are unimportant. They should have zero impact on our future options."

Does the loss of 3 Soldiers increase your determination to complete the mission now?

What is the likelihood of the following event occurring during fiscal year 20__?:

U.S. and Chinese military forces will clash in the South China Sea, resulting in US and/or Chinese serviceman casualties

Great Britain will exit from the European Union

The U.S. will withdraw its military forces from Syria

North Korea will agree to an externally verified denuclearization plan

ISIS will perpetrate a large-scale (50 or greater) casualty-producing terrorist attack in the US

Iran will violate the denuclearization Joint Comprehensive Plan of Action (JCPOA) still in place between Iran and the European Union (EU)

Oil prices will rise by 10%

Macedonia meets conditions for future inclusion to NATO

Bashar al-Assad will step down or be overthrown as the president of Syria

Democrats will achieve a majority in the US Senate

A far-right candidate will secure the most votes in the first round of the Brazilian presidential elections

US Gross Domestic Product (GDP) per capita will increase by 5 or more percent

A cyberattack will result in a significant shutdown of critical infrastructure (electrical, communication, water, transportation) shutdown for at least 24 hours

The US will remove the steel and aluminum tariffs currently imposed on Turkey

Draft legislation to create a US Space Command will be approved by the House or Senate Armed Services Committee

Two or more US executive branch cabinet members will resign

The US trade deficit with China will decrease by 10%

SpaceX, Virgin Galactic, Boeing or Blue Origin will successfully complete a scheduled civilian passenger spaceflight

US Army Security Force Assistance Brigade Two (SFAB-2) will deploy to Afghanistan

APPENDIX B: IRB HUMAN SUBJECTS PERMISSION LETTERS

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Dave Raugh**

Date: **January 08, 2016**

Dear Researcher:

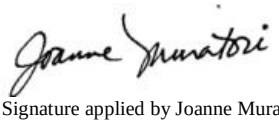
On 01/08/2016, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	The Effect of Norms on Military Forecasting
Investigator:	Dave Raugh
IRB Number:	SBE-16-11921
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:



Signature applied by Joanne Muratori on 01/08/2016 10:46:07 AM EST

IRB Manager

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Dave Raugh**

Date: **January 20, 2016**

Dear Researcher:

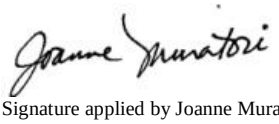
On 01/20/2016, the IRB approved the following activity as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Project Title:	Senior Leaders, Informing or Norming?
Investigator:	Dave Raugh
IRB Number:	SBE-16-11956
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:



Signature applied by Joanne Muratori on 01/20/2016 03:43:55 PM EST

IRB Manager

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Approval of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **Dave Raugh**

Date: **August 16, 2016**

Dear Researcher:

On 08/16/2016, the IRB approved the following activity as a minor change to human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Modification Type:	Survey was revised and uploaded.
Project Title:	The Effect of Norms on Military Forecasting
Investigator:	Dave Raugh
IRB Number:	SBE-16-11921
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

Signature applied by Kamille Chaparro on 08/16/2016 10:12:39 AM EDT

IRB Coordinator

University of Central Florida Institutional Review Board
Office of Research & Commercialization
12201 Research Parkway, Suite 501
Orlando, Florida 32826-3246
Telephone: 407-823-2901 or 407-882-2276
www.research.ucf.edu/compliance/irb.html

Determination of Exempt Human Research

From: **UCF Institutional Review Board #1**
FWA00000351, IRB00001138

To: **David Raugh**

Date: **August 24, 2018**

Dear Researcher:

On 08/24/2018, the IRB reviewed the following modification as human participant research that is exempt from regulation:

Type of Review:	Exempt Determination
Modification Type:	Updated survey instrument

Project Title:	The Effect of Norms on Military Forecasting
Investigator:	David Raugh
IRB Number:	SBE-16-11921
Funding Agency:	
Grant Title:	
Research ID:	N/A

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these changes affect the exempt status of the human research, please contact the IRB. When you have completed your research, please submit a Study Closure request in iRIS so that IRB records will be accurate.

In the conduct of this research, you are responsible to follow the requirements of the Investigator Manual.

This letter is signed by:

Signature applied by Racine Jacques on 08/24/2018 03:27:50 PM EDT

Designated Reviewer

REFERENCES

(DOD), U. D. o. D. (2008). Measuring Stability and Security in Iraq: March 2008 Report to Congress in Accordance with the Department of Defense Appropriations Act 2008. D. o. Defense. Washington, DC, Government Printing Office.

(GAO), U. G. A. O. (2007). The Department of Defense's Use of Solatia and Condolence Payments in Iraq and Afghanistan. Washington, DC, Government Printing Office.

Allison, G. T. and P. Zelikow (1999). Essence of Decision: Explaining the Cuban Missile Crisis, Longman New York.

Almond, G. A. J. P. P. S. and Politics (1988). "Separate tables: schools and sects in political science." **21**(4): 828-842.

Amisano, G., et al. (2017). "Prediction using several macroeconomic models." **99**(5): 912-925.

Army, D. o. t. (2006). Review of Education, Training and Assignments for Leaders (RETAL), Officer Team Report. C. o. S. o. t. Army. Washington DC, Headquarters, Department of the Army.

Army, D. o. t. (2014). DA PAM 600-3 Commissioned Officer Professional Development and Career Management. U. Army. Washington DC, Department of the Army.

Army, U. (2008). "Army Regulation 600-20." Army Command Policy (Revised 2012).

Army, U. (2011). Army Tactics, Techniques, and Procedures (ATTP) 3-06.11, Combined Arms Operations in Urban Terrain, Washington, DC: Department of the Army.

Army, U. (2012). "Army Doctrine Reference Publication (ADRP) 5-0." Unified Land Operations.

Army, U. (2015). Army Leader Development Strategy (ALDS) 2013 (Washington, DC: Department of the Army, 2013).

Army, U. and U. M. Corps (2010). Counterinsurgency field manual, Cosimo, Inc.

Atkinson, R. (1993). Crusade: the untold story of the Persian Gulf war, Houghton Mifflin Harcourt.

Babcock-Lumish, W. Z. a. U. (2016). The Value of Broadening Assignments. ARMY Magazine.

Bak, P. and K. Chen (1991). "Self-organized criticality." Scientific American **264**(1): 46-53.

Baker III, J. A., et al. (2006). The Iraq study group report, Vintage.

Bar‐Joseph, U. and R. McDermott (2008). "Change the Analyst and Not the System: A Different Approach to Intelligence Reform." Foreign Policy Analysis **4**(2): 127-145.

Beatie, R. (2009). Army of the Potomac: Birth of Command, November 1860-September 1861, Da Capo Press.

Berman, E., et al. (2013). "Modest, secure, and informed: Successful development in conflict zones." American Economic Review **103**(3): 512-517.

Berman, E., et al. (2011). "Can hearts and minds be bought? The economics of counterinsurgency in Iraq." Journal of Political Economy **119**(4): 766-819.

Betros, L. (2012). Carved from granite: West Point since 1902, Texas A&M University Press.

Betts, R. K. (1991). Soldiers, statesmen, and cold war crises, McGill-Queen's Press-MQUP.

Bhatia, A. (2019). DEMAND FORECASTING, Meaning, Types, Techniques and Methods . Academia. Academia.edu**:** 4.

Biddle, S., et al. (2012). "Testing the surge: Why did violence decline in Iraq in 2007?" International Security **37**(1): 7-40.

Blumenson, M. (2014). United States Army in WWII-Europe-Breakout and Pursuit:[Illustrated Edition], Pickle Partners Publishing.

Boswell, W. R., et al. (2005). "The relationship between employee job change and job satisfaction: the honeymoon-hangover effect." **90**(5): 882.

Boyd, J. (2017). A discourse on winning and losing, Air University Press.

Bozionelos, N. J. J. o. O. and O. Psychology (2004). "The relationship between disposition and career success: A British study." **77**(3): 403-420.

Bradley, O. (1951). An Interview with Omar Bradley, LIFE magazine.

Bradley, O. N. and C. Blair (1983). A general's life: an autobiography, Simon & Schuster.

Budiansky, S. (2004). "Formula for How Many Troops We Need." Washington Post **9**: B04.

Bunn, D. W. and M. Mustafaoglu (1978). "Forecasting Political Risk." Management Science **24**(15): 1557-1567.

Bush, G. (1990). Toward a new world order, US Department of State, Bureau of Public Affairs, Office of Public Communication.

Carnevale, J. J., et al. (2011). "Individual Differences in Need for Cognition and Decision-Making Competence Among Leaders." Personality and Individual Differences **51**(3): 274-278.

Chairman, J. C. o. S. C. (2009). Officer Professional Military Education Policy. D. o. Defense. Washington, DC, CJCS.

Chambers, J. W. (1999). The Oxford companion to American military history, Oxford University Press.

Clausewitz, C. v. (1976). "On War. Translated by Michael Howard and Peter Paret." Princeton, NJ.

Clausewitz, C. v., et al. (2004). On war. New York, Barnes & Noble.

Cohen, E. A. (2000). "Why the Gap Matters." The National Interest **61**(48): 61-62.

Cohen, E. A. (2012). Supreme Command: soldiers, statesmen and leadership in wartime. new York, NY, Simon and Schuster.

Colarusso, M. J. and D. S. Lyle (2014). Senior officer talent management: Fostering institutional adaptability, ARMY WAR COLLEGE CARLISLE BARRACKS PA STRATEGIC STUDIES INSTITUTE.

Colleges, B. (2010). "US News and World Report." May **1**: 2010.

Congress, U. (1863). Report of the Joint Committee on the Conduct of the War. Second Session Thirty-eighth Congress.

Cyrulik, J. M. (2015). The Fifth Army War College: Preparing Strategic Leaders to Win in a Complex World, AIR WAR COLL MAXWELL AFB AL.

De La Torre, J. and D. H. Neckar (1988). "Forecasting Political Risks for International Operations." International Journal of Forecasting **4**(2): 221-241.

DeBiase, B. (2017). The 1970s and Early 1980s: Enabling a Military Offset, Defense Acquisition University Aberdeen Proving Ground United States.

Defense, D. o. (2018). (JP 3-24) Counterinsurgency Operations. Washington DC, US Government Printing Office.

Defense, U. D. o. (2011). Notice to DoD Employees and Contractors on Protecting Classified Information
and the Integrity of Unclassified Government Information Technology (IT) Systems. D. o. Defense. Washington DC.

DeLeon, P. J. P. S. (1987). "The influence of analysis on US defense policys." **20**: 105-128.

Diebold, F. X. (1997). The Past, Present, and Future of Macroeconomic Forecasting, National Bureau of Economic Research.

Donnay, K. and V. J. E. D. S. Filimonov (2014). "Views to a war: systematic differences in media and military reporting of the war in Iraq." **3**(1): 25.

Dunivin, K. O. (1994). "Military Culture: Change and Continuity." Armed Forces & Society **20**(4): 531-547.

Eisenhower, D. (1943). Letter From Eisenhower to George Marshall, Chester B. Hansen Collection, U.S. Army Heritage and Education Center, Carlisle, PA.

Eitelberg, M. J., et al. (1992). Becoming brass: Issues in the testing, recruiting, and selection of American military officers. Test Policy in Defense, Springer**:** 79-219.

Fastabend, D. M. r. (2016). Personal Interview. D. Raugh.

Fearon, J. D. (1995). "Rationalist explanations for war." International Organization **49**(03): 379-414.

Feaver, P. and R. H. Kohn (2001). Soldiers and civilians: the civil-military gap and American national security, MIT Press.

Feaver, P. D. (1996). "The Civil-Military Problematique: Huntington, Janowitz, and the Question of Civilian Control." Armed Forces & Society **23**(2): 149-178.

Festinger, L. (1957). A theory of cognitive dissonance, Stanford university press.

Fischhoff, B. (1975). "Hindsight is not equal to foresight: The effect of outcome knowledge on judgment under uncertainty." Journal of Experimental Psychology: Human perception performance **1**(3): 288.

Fischoff, B. (1981). Debiasing, DECISION RESEARCH EUGENE OR.

Fishel, E. C. (1988). "Pinkerton and McClellan: who deceived whom?" Civil War History **34**: 115-142.

Friedman, W. (2013). Fortune Tellers: The Story of America's First Economic Forecasters, Princeton University Press.

Frühling, S. (2006). "Uncertainty, Forecasting and the Difficulty of Strategy." Comparative Strategy **25**(1): 19-31.

Galula, D. (2006). Counterinsurgency warfare: theory and practice, Greenwood Publishing Group.

Gartner, S. S. (1999). Strategic Assessment in War, Yale University Press.

Gartner, S. S. (2008). "The Multiple Effects of Casualties on Public Support for War: An Experimental Approach." American Political Science Review **102**(01): 95-106.

Gates, R. (2014). Duty, Random House.

George, A. L., et al. (2005). Case studies and theory development in the social sciences. Cambridge, Mass., MIT Press.

Goldstone, J. A., et al. (2010). "A Global Model for Forecasting Political Instability." American Journal of Political Science **54**(1): 190-208.

Gordon, M. R. and B. E. Trainor (2012). The endgame: The inside story of the struggle for Iraq, from George W. Bush to Barack Obama, Pantheon.

Gray, C. S. (1999). Modern Strategy, Oxford University Press Oxford.

Haerem, T., et al. (2011). "Do Military Decision Makers Behave as Predicted by Prospect Theory?" Journal of Behavioral Decision Making **24**(5): 482-497.

Hansen, C. B. (1943). Personal Diary, Chester B. Hansen Collection, U.S. Army Heritage and Education Center, Carlisle, PA.

Hansen, C. B. (1944). Personal Diary, Chester B. Hansen Collection, U.S. Army Heritage and Education Center.

Hart, B. L. (2008). Strategy: the indirect approach. Strategic Studies, Routledge**:** 92-95.

Hastie, R. and R. M. Dawes (2010). Rational Choice in an Uncertain World: The Psychology of Judgment and Decision Making, Sage.

Hastings, M. (1999). Overlord: D-day and the Battle for Normandy 1944, Pan Macmillan.

Hawkins, J. (2005). "Economic Forecasting: History and Procedures."

History, U. A. C. o. M. (2006). Th Korean War; The Outbreak. D. U. S. o. Defense. Fort McNair, Washington DC, US Government Printing Office.

Hodges Jr, H. C. (2012). The United States Army War College: Time for a Change, ARMY WAR COLL CARLISLE BARRACKS PA.

Hooker, R. and J. Collins, Eds. (2015). Lessons Encountered, Learning from the Long War. Washington DC, National Defense University Press.

Huffman, W. E. J. A. J. o. A. E. (1974). "Decision making: The role of education." **56**(1): 85-97.

Hull, C. (1943). "Principles of Behavior."

Huntington, S. P. (1957). The soldier and the state: The theory and politics of civil-military relations. Cambridge, MA, Harvard University Press.

Jaffe, G. R., Missy (2015). In Iraq Debate, Military Pushed Offer Less. Washington Post. Washington DC, Washington Post.

Janowitz, M. (1964). The Professional Soldier: A Social And Political Portrait. New York, NY, Free Press.

Jervis, R. (1998). System Effects: Complexity in Political and Social Life, Princeton University Press.

Joes, A. J. (2006). Resisting rebellion: the history and politics of counterinsurgency, University Press of Kentucky.

Kahneman, D. and A. Tversky (1979). "Prospect Theory: An Analysis of Decision Under Risk." Econometrica: Journal of the Econometric Society: 263-291.

Kaplan, E. H., et al. (2011). "Operations research and intelligence analysis." 31-56.

Kaplan, F. (2013). The insurgents: David Petraeus and the plot to change the American way of war, Simon and Schuster.

Kim, H. B., et al. (2018). "The role of education interventions in improving economic rationality." **362**(6410): 83-86.

Klein, O., et al. (2017). "Hindsight 40 years on: An interview with Baruch Fischhoff." **10**(3): 249-260.

Knowlton Jr, W. A. (2010). The surge: general petraeus and the turnaround in Iraq, NATIONAL DEFENSE UNIV FORT MCNAIR DC INDUSTRIAL COLLEGE OF THE ARMED FORCES.

Krepinevich Jr, A. F. (2009). The Army and Vietnam, JHU Press.

Kruglanski, A. W. (1975). "The Endogenous-Exogenous Partition in Attribution Theory." Psychological review **82**(6): 387.

Kruglanski, A. W. and D. M. Webster (1996). "Motivated Closing of the Mind: "Seizing" and "Freezing"." Psychological review **103**(2): 263.

L Ross, R. N. (1980). Human Inference: Strategies and Shortcomings of Social Judgements. New Jersey, Prentice-Hall.

Larrabee, E. (1987). "Commander in Chief: Franklin Delano Roosevelt."

Lau, V. P. and M. A. J. C. d. i. Shaffer (1999). "Career success: The effects of personality." **4**(4): 225-231.

Mandel, D. R. and A. Barnes (2014). "Accuracy of forecasts in strategic intelligence." **111**(30): 10984-10989.

Mansoor, P. R. (2013). Surge: my journey with General David Petraeus and the remaking of the Iraq War, Yale University Press.

Mazlish, B. (2017). The uncertain sciences, Routledge.

McChrystal, S. A. (2014). My share of the task: A memoir, Portfolio.

McClellan, G. B. and W. C. Prime (1887). McClellan's Own Story: The War for the Union, the Soldiers who Fought It, the Civilians who Directed it and His Relations to it and to Them, CL Webster.

McGrath, J. J. (2006). Boots on the ground: troop density in contingency operations, Government Printing Office.

McLeod, J. (2003). "Qualitative Research Methods in Counselling Psychology." Handbook of Counselling Psychology **2**: 74-92.

McNamara, R. (2003). The Fog of War: Eleven Lessons from the Life of Robert S, McNamara.

McNamara, R. S. and B. VanDeMark (1996). In retrospect: The tragedy and lessons of Vietnam, Vintage.

McPherson, J. M. and G. H. Davis (1988). Battle cry of freedom: The Civil War era, Oxford University Press.

Millett, A. and W. Murray (2000). A War to be Won: Fighting the Second World War, Cambridge, MA: The Belknap Press of Harvard University Press.

Millett, A. R. (2010). The War for Korea, 1950-1951: they came from the north, University Press of Kansas.

Mintz, A., et al. (2006). "Can We Generalize From Student Experiments to the Real World in Political Science, Military Affairs, and International Relations?" Journal of Conflict Resolution **50**(5): 757-776.

Muth, J. (2011). Command culture: Officer education in the US army and the German armed forces, 1901-1940, and the consequences for World War II, University of North Texas Press.

Nagl, J. A. (2002). Counterinsurgency lessons from Malaya and Vietnam : learning to eat soup with a knife. Westport, Conn., Praeger.

Nagl, J. A. and M. A. Flournoy (2007). Institutionalizing Adaptation: It's Time for a Permanent Army Advisor Corps, Center for a New American Security.

O'Loughlin, J. J. J. o. G. S. S. (2016). "The Perils of Self-Censorship in Academic Research in a WikiLeaks World." **1**(4): 337-345.

Perliger, A. and M. M. Sweeney (2018). United States–Taliban, al-Qaeda, and ISIS: the failure to defeat Jihadist terror. Deterring Terrorism, Routledge**:** 260-280.

Petraeus, D. (2007). Opening Statement- MNF-I Command Confirmation Hearings. Senate Arms Servcies Committee. Washington D.C., Government Printing Office.

Petraeus, D. (2007). Report to Congress on the situation in Iraq. US Congress. D. U. S. o. Defense. Washington DC, Government Printing Office.

Petraeus, D. (2008). Report to Congress on the Situation in Iraq. D. U. S. o. Defense. Washington DC, Government Printing Office.

Petraeus, D. (2016). Personal Interview. D. Raugh.

Pogue, F. C. (1946). Transcript- Interview of Bradley by Dr. Pogue, War Department Historian, Chester B. Hansen Collection, U.S. Army Heritage and Education Center, Carlisle, PA.

Pogue, F. C. (1954). The Supreme Command, Office of the Chief of Military History, Department of the Arm.

Posen, B. R. (1993). "The Security Dilemma and Ethnic Conflict." Survival **35**(1): 27-47.

Powers, S. T. J. T. J. o. M. H. (1992). "The Battle of Normandy: The Lingering Controversy." **56**(3): 455.

Quinlivan, J. T. (1995). "Force requirements in stability operations." Parameters **25**(4): 59.

Quinlivan, J. T. (2003). "Burden of Victory: The Painful Arithmetic of Stability Operations." Rand Review **27**(2): 28-29.

Rabinovich, A. (2007). The Yom Kippur War: the epic encounter that transformed the Middle East, Schocken.

Rapp, W. (2016). Personal Interview. D. Raugh.

Rawson, E. K., et al. Official Records of the Union and Confederate Navies in the War of the Rebellion: General Index, Government Press Office.

Rayburn, J. a. S., F (2019). The U.S.Army in the Iraq War Volume 2, Surge and Withdrawal. C. o. S. o. t. Army. Carlisle, Pennsylvania, US Army War College Press.

Rejeski, D. and R. L. Olson (2006). "Has futurism failed?" The Wilson Quarterly (1976-) **30**(1): 14-21.

Richardson, W. R. (1997). "FM 100-5: The AirLand Battle in 1986." Military Review **77**(1): 174.

Ricks, T. (2015). "Let's Not Reinforce Failure in Afghanistan- Al Qaeda moved on, so should we." Foreign Policy.

Ricks, T. E. (2006). Fiasco: the American military adventure in Iraq, Penguin.

Rieber, S. (2004). "Intelligence analysis and judgmental calibration." International Journal of Intelligence and CounterIntelliggence **17**(1): 97-112.

Rosen, S. P. (1994). Winning the Next War: Innovation and the Modern Military, Cornell University Press.

Schenk, P. (1990). Invasion of England 1940: the Planning of Operation Sealion, Conway Maritime Press Ltd.

Schlosser, N. (2017). The Surge, 2007–2008. Washington, DC, Center for Military History.

Schneider, G., et al. (2011). "Forecasting in international relations: One quest, three approaches." **28**(1): 5-14.

Scott, R. N., et al. (1901). The War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies, US Government Printing Office.

Sears, S. W. (1989). The Civil War Papers of George B. McClellan: Selected Correspondence, 1860-1865, HMH.

Sears, S. W. (1989). The Civil War Papers of George C. McClellan: Selected Correspondence, 1860-1865, Houghton Mifflin Harcourt.

Sears, S. W. (2014). George B. McClellan: The Young Napoleon, HMH.

Sears, S. W. (2014). To the Gates of Richmond: The Peninsula Campaign, Houghton Mifflin Harcourt.

Sears, S. W. (2015). Landscape Turned Red: The Battle of Antietam, Houghton Mifflin Harcourt.

Sears, S. W. and G. B. McClellan (1988). "The Young Napoleon." New York.

Shane, L. (2018). Price Tag of the 'war on terror' will top 6 trillion soon. Military Times. Vienna, VA, Sightline Media Group.

Shapiro, J. N. and N. B. Weidmann (2015). "Is the Phone Mightier Than the Sword? Cellphones and Insurgent Violence in Iraq." International Organization **69**(02): 247-274.

Sherman, R. (2008). Market Regulation, Pearson/Addison Wesley.

Sky, E. (2015). The unraveling: High hopes and missed opportunities in Iraq, Public Affairs.

Sky, E. (2016). Personal Interview. D. Raugh.

Spain, E. S., et al. (2015). "Intellectual capital: A case for cultural change." **45**(2): 77.

Staff, C. o. T. J. C. o. (2013). Chairman of the Joint Chiefs of Staff Instruction 3100.01B (Joint Strategic Planning System). D. o. Defense. Washington DC, Government Printing Office.

Staff, J. (2001). JOINT PUB 1-02 2001: Department of Defense Dictionary of Military and Associated Terms, Washington, DC: Joint Staff.

Storr, J. (2003). "A Command Philosophy for the Information Age: The Continuing Relevance of Mission Command." Defence Studies **3**(3): 119-129.

Taleb, N. N. (2010). The Black Swan:: The Impact of the Highly Improbable Fragility, Random House.

Talmadge, C. (2015). The Dictator's Army: Battlefield Effectiveness in Authoritarian Regimes, Cornell University Press.

Tetlock, P. (2005). Expert Political Judgment: How Good is It? How Can We Know?, Princeton University Press.

Tetlock, P. E. and D. Gardner (2015). Superforecasting: The Art and Science of Prediction, Signal.

Tetlock, P. E. and R. N. J. A. P. S. R. Lebow (2001). "Poking counterfactual holes in covering laws: Cognitive styles and historical reasoning." **95**(4): 829-843.

Thie, H. J. (1994). Future Career Management Systems for US Military Officers, Rand Corporation.

Thompson, R. G. K. (1966). Defeating communist insurgency: The lessons of Malaya and Vietnam, FA Praeger.

Thornhill, P. and R. Whitlark (2015) Political Scientists and the Military. War on the Rocks

Tversky, A. and D. Kahneman (1981). "The Framing of Decisions and the Psychology of Choice." Science **211**(4481): 453-458.

Tzu, S. (2008). The art of war. Strategic Studies, Routledge**:** 63-91.

Urban, M. (2005). Generals: ten British commanders who shaped the world, Faber.

Urben, H. A. (2017). Reconnecting Athens and Sparta: A Review of OPMS XXI at 20 Years. Institute of Land Warfare. Arlington, VA, Association of the US Army.

Waugh, J. C. (2010). Lincoln and McClellan: The Troubled Partnership Between a President and His General, St. Martin's Press.

Webster, D. M., et al. (1996). "On Leaping to Conclusions When Feeling Tired: Mental Fatigue Effects on Impressional Primacy." Journal of Experimental Social Psychology **32**(2): 181-195.

Welch, D. A. (2005). Painful Choices: A Theory of Foreign Policy Change, Princeton University Press.

Whitsett, H. J. N. E. C., Working Paper (2013). "Understanding frequent survey responders on online panels."

Williams, A. (2011). D-day to Berlin, Hachette UK.

Williams, B. S. (2010). Heuristics and Biases in Military Decision Making, DTIC Document.

Wilson, P. H., et al. (2011). "Lies, damn lies, and statistics: Uncovering the truth behind polling data." **6**(1): 169-180.

Wright, D. P. and T. R. Reese (2008). On Point II: Transition to the New Campaign: The United States Army in Operation Iraqi Freedom, May 2003-January 2005, Combat Studies Institute Press Fort Leavenworth, KS.

Zaloga, S. and T. Bryan (2013). Operation Cobra 1944: Breakout from Normandy, Osprey Publishing.