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This work explores the need and benefits of including social psychology in Red Teaming practices. The work also calls into question many of the current practices attributed to Red Teaming and critically analyses them for relevancy. Alternative Analysis has no common basis on which to build its processes. This has invariably crippled appropriate and productive Red Team application. By founding Red Teaming principals on a basis of threat replication, social psychology Adversarial Analysis techniques are identified as Red Teaming’s operational core. This study offers a comprehensive structure for Alternative Analysis and a common approach based definition for Red Teaming. The applied research of social psychology alongside Adversarial Analysis techniques reveals the understanding of an enemy’s mindset and perceptions is needed to effectively replicate a selected adversarial target. The study concludes with insight into Social Identity Theory and postulates an analytical structure for application to adversarial surrogacy for the purposes of Red Teaming.
DEDICATION

To my wife Rebecca who has endured countless days of research and boring conversations. And to whom I owe an untold amount of grammatical homage for the near infinite pages she has proofread throughout my graduate work. I could never complete any of what I do without her wholehearted support.
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I would like to acknowledge and thank all of the professors at American Military University that continually challenged me and encouraged me to never settle or accept something as ‘truth’ without critical analysis. I would also like to acknowledge all of my classmates who provided the many discussions and debates that made the program’s value unprecedented. Finally, I owe a big thanks to all of my Commanders and Bosses who encouraged and enabled me to earn a higher degree not because the Air Force said to, but because it would benefit me as a leader and person to do so.
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I. Introduction

The mighty and power projecting American homeland is not safe, nor are its citizens, both of whom are vulnerable to attack from innovative forward thinking enemies. The Black Tom explosions on July 30, 1916, in New Jersey were attributed to German saboteurs and killed an estimated 7 people, the damages amounted to $224 million in 2013 dollar value, which included repairs to the Statue of Liberty (Warner 2009). A day of infamy, December 7, 1941 Pearl Harbor, Hawaii, Japanese fighter aircraft attacked killing 2,402 Americans and causing an immeasurable amount of damage, destroying numerous naval vessels and aircraft (Stilwell 1981). On May 5, 1945, fire bombs released into a jet stream by Japan fell from the sky on Oregon and killed six people (Ancona 2006). September 11, 2001: New York and America were shaken when terrorists hijacked four airplanes in an attack that killed an estimated 3,000 people and cost roughly $3.385 billion in immediate damages (IAGS 2004).

Just in the past hundred years the US mainland has come under surprise attack numerous times from a foreign enemy. Depicting such attacks in a quantitative manner is relatively simple, offering a glimpse at the cost enemy innovation has inflicted on the American homeland. The toll amounts to 5,415 American lives, of which 2,694 were civilians, all struck down by an enemy who was able to out strategize its opponent. America is fortified by over 55 different security agencies that work hand in hand to protect the US from hostile forces around the world (ODNI 2009). The Department of Defense (DoD) is one of the largest collective organizations in the US government today. Many of the agencies that comprise the DoD pride themselves on the capability to take a fight to an enemy’s mainland; thus saving American lives, resources, infrastructure, and the homeland itself from the threat of harm.
One major tool used in preparation against an enemy is the Red Team. These Teams have given DoD operators a broad understanding of an enemy’s tactics and war fighting abilities, yet still offer very little predictive analysis. The modern use of Red Teams has almost exclusively operated around threat replication and security validation, and therefore offers very few insights into an enemy’s mental model or psychological mindset. Understanding an enemy on a psychological level is critical to effectively replicating decision matrices and offering a realistic surrogate, especially when combating an innovative enemy. How can Red Teams evolve into a capability that offers degrees of threatscapeing analysis and prediction modeling of both symmetric and asymmetric innovative threats?

The concept of Red Teaming through simulated war is not new or revolutionary. The inception of war gaming and use of surrogate enemies can be traced back as early as the 6th century to the invention of chess (Boot 2006). However it has been noted that in spite of many years of recommendations Red Teaming still stands as a luxury training apparatus, failing to become a default standard for risk assessment (DSB 2008). In this expansive lapse of time enemies have evolved from warring kingdoms of knights and trebuchets on linear battle fields into complex global systems, exploiting asymmetric interactions through covert action with weapons capable of destroying nearly all life on earth. Accordingly, the present state of the world is in a constant flux of complex and chaotic contexts (Snowden and Boone 2007). The flux of unknown and unknowable variables has dramatically hindered prediction in the threatscape. Even though Red Teams have given operators great understanding of an enemy’s tactics and war fighting capabilities they still offer very little in the way of predictive analysis.

Red Teams, the once relied on static surrogate enemy, have fallen victim to the increasing complexity of world events. Techniques such as mirror imaging and script based scenarios do
not provide the fidelity needed to effectively combat modern adaptive threats (Gilmour et al. 2006; Gilad 2010). The complex and chaotic contexts that modern threat has introduced to the threatscape can only be effectively combated by looking though some form of predictive lens (Snowden and Boone 2007). The lack of such a capability has exposed the limits of modern Red Teams. There have been many previous attempts to fix Red Teams, but none have looked at the core problem and ultimately leave behind a confused and cumbersome tool lacking in depth and predictive analysis. Both depth and predictability are vital components to combating threat in the modern threatscape (Kotta and Ownbyb 2005). Red Teams need a consistent foundation that will offer an evolutionary path towards achieving applicability as a modern predictive analytical option. Such an option will offer systematic insights into an enemy’s decision making matrix in addition to that same threat’s psychological mindset.
II. Literature Review

Red Teaming has received a considerable amount of attention in the last two decades. During this time specialists established their own narrow operating structure, offering no common structure to guide and define the field. As a result when Red Teams were established across the intelligence community their guiding principles were an equally impromptu assimilation of competing theories and ideas. Even the very basic definition of a Red Team is heavily conflicted from one source to another. Many of the incongruities will be indexed in detail throughout the accompanying research. In an effort to appropriately articulate how the above mentioned incongruities are affecting the Red Team concept this literature review will start with a look at the intentions behind Red Teaming. Centering on how Red Teams need to meet the basic intent of their purpose offers a value added product to any analytical processes.

Value Added

Red Teams offer a litany of benefits to any person opposed by an adversary. Red Teaming falls under the much larger concept of Alternative Analysis (Longbine 2008). Alternative Analysis is defined best as a review of known data to reveal assumptions, weak data, or bias in order to consider alternative hypothesis (George 2006). Alternative Analysis techniques force analysts to look at their own or a peer’s work from varying viewpoints. The goal is to scrutinize a plan or thought against previously unforeseen scenarios.

Intelligence agencies constantly work to understand the intentions of an enemy. This is accomplished throughout all of the different intelligence disciplines (INTS). Many times the ultimate conclusion is drawn from smaller, differing bits of intelligence all assimilated into one coherent and relevant fact (Richelson 2008). These facts, however, are based on interpretation and processing in a purely friendly mindset. In countries such as America or Britain this mindset
is often described as a ‘Western’ mindset. Likewise in Red Teaming any friendly team or mindset is referred to as ‘Blue’. Relying on data produced by Blue thinking analysts will only yield a Blue perception of the analyzed data (White 2012). The error of projecting a Blue mindset on data is referred to as Mirror Imaging. Mirror Imaging is an unintentional bias that occurs when a decision maker or analyst falsely assumes their own values, beliefs, or perceptions are the same as others (DSB 2008; Longbine 2008; MD 2010; UFMCS 2011). Alternative Analysis is a method that offers planners the ability to challenge basic assumptions associated with a Blue mindset (DSB 2003; Mateski 2009).

Mirror Imaging is not the only analytical pitfall that Alternative Analysis techniques address. Group Think is a much larger problem, especially amongst military subordinates who often try to construct a plan considering largely what a higher ranking officer believes to be correct instead of consulting available facts (UFMCS 2011). Group Think comes from the desire for solidarity or unanimity within a group and often leads to the explicit non-exploration of alternative ideas or concepts (MD 2010). This analytical impasse can be instilled in a group’s mind for a variety of different reasons. Commonly the desire to please a boss or higher ranking official will force a group to consider only courses of action believed to be preferential by the authority figure (UFMCS 2011). Other factors may include habit, complacency, failure of creativity, monochromatic mindsets of group members, or even complete apathy for the project at hand (Nettles 2010). Just as Mirror Imaging can be overcome by Alternative Analysis, Group Think can also be resolved through similar means.

Table 2.1 highlights the nine major prejudices that often affect decision makers (UFMCS 2011). Each of the biases shown in Table 2.1 is easily addressed and overcome, but only if the group recognizes and accepts the bias’s presence as a problem. Assertion that the group is
suffering from a bias can be positive or negative depending on group dynamics. In the case of Cultural Contempt bias, reasoning with the violator can lead to circular thinking and justification or even reveal an outright ignorance of the subject at hand. In the same way a group with Over Optimism might criticize whistle blowing members as attempting to sabotage the success of the group.

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Table 2.1 – Common Analytical Bias (UFMCS, 2011)

**Alternative Analysis Concepts**

Historically Red Teaming has been a subset of a larger group of analytical concepts known as Alternative Analysis (Longbine 2008). Recent trends in the Intelligence Community have blurred the distinction between Alternative Analysis and Red Teaming, consequently the term Red Teaming has been used in place of Alternative Analysis. This is most likely a result of two separate inquiries and requests to expand the dynamic use of Red Teams within the DoD by the Defense Science Board (DSB), first in 2003 and later in 2008. The Board attributed many of the techniques and skill sets associated with the broader Alternative Analysis to Red Teaming. This resulted in the term Red Team achieving almost buzzword status (MD 2013). Leaders, in attempt to implement the word of the DSB rather than the intent, ultimately confuse the two terms. The DSB did not necessarily get the information in their report wrong, it is just that the
working definitions for each of the terms are extremely similar. The DSB failed to offer a definitive hierarchy of Alternative Analysis and the corresponding concept of Red Teaming.

Red Teaming as defined by the Ministry of Defense reads:

**Red Teaming** is the independent application of a range of structured, creative and critical thinking techniques to assist the end user make a better informed decision or produce a more robust product. (MD 2013)

Compared to the North Atlantic Treaty Organization’s (NATO) definition of Alternative Analysis:

**Alternative Analysis** is the deliberate application of independent critical thought and alternative perspectives to improve decision making. (NATO 2012)

Reading both definitions highlights how similarly each term is defined and how easy it is to confuse both. This technique also demonstrates how difficult it is to pinpoint where both definitions differ. One can furthermore observe how it is impossible to ascertain whether or not Red Teaming is principally a subset of Alternative Analysis. This simple misunderstanding may be the origin of additional confusion and disputes within the field.

**Further Contradiction in the Field**

A limited number of manuals and doctrine have been promulgated by various government agencies on Red Team employment. In spite of the limited ‘how-to’ guidance the Defense Science Board (DSB) has appealed to the Secretary of Defense on two separate occasions to increase Department of Defense (DoD) implementation of Red Teaming (DSB 2003; DSB 2008). The DSB states in both assessments that a Red Team’s capabilities to combat known surprises is a critical and underutilized competency within the threatscape. Much of the research on Red Teams echoes the DSB’s plea to increase the number of Red Teams in
employment across not only military organizations, but throughout business, education, or any enterprise that desires to reduce risk (DSB 2003; Fontenot 2005).

Current literature guiding the employment of Red Teams offer varying contradictions surrounding the subject. Many authorities conflict on how to precisely define a Red Team and offer very little in the way of clarification or reasoning behind a selected definition. Terminology is mixed and addressed interchangeably amongst and within manuals without pause, i.e. red teaming, devil’s advocacy, threat emulation, intentional failure, vulnerability assessments, and so on (Culpepper 2004; MD 2010; Nettles 2010; UFMCS 2011). Just as terminology is employed without discern so are the implied tasks; avoiding groupthink, mirror imaging, surrogacy, opposing force, cultural lens, etc. (Culpepper 2004; MD 2010; Nettles 2010; UFMCS 2011). A casual observer would have considerable difficulty codifying the plethora of definitions and tasks in any attempt to construct a suitable analytical tool.

Many of the analytical tools offered in Red Team manuals ultimately paint Red Teams as a group of contrarians whose job is to question evaluated plans (Culpepper 2004; MD 2010; UFMCS 2011). Yet the same guiding documents all hail Red Teams as a critical implement in combating adaptive and forward thinking adversaries (Culpepper 2004; MD 2010; Nettles 2010; UFMCS 2011). By definition Red Teamers are assumed to be experts specializing in a particular threat (MD 2010; UFMCS 2011). However, there are not enough experts to go around - particularly when most Red Teams are operated in an ad hoc manner without formalized training (Fontenot 2005). The culminating result is often nothing more than a multifarious group of inexpert individuals tasked to bring down a system however possible.
Introducing Psychology to the Intelligence Community

Applying psychology to the intelligence field is not a new idea whatsoever. Analysts and operatives alike were briefed by well-credentialed psychologists during the Cold War (Richelson 1997). The briefings were intended to give analysts and agents an advantage over their adversary by enabling an operative to understand how a prospective target may think and act. This would empower an analyst’s ability to follow the actions of the target in near predictive fashion, assisting the agent with a clear advantage catch the objective in an unanticipated trap (Richelson 1997). Understanding the psychology of an enemy is extremely applicable today while combating asymmetrical warfare in the Global War on Terror. Agents of the Central Intelligence Agency work hard to learn critical information from detainees at Guantanamo Bay, Cuba. Much of the reliable intelligence gathered has come from tactics based on a thorough understanding of the detained prisoner’s mindsets (Saar and Novak 2005).

Red Teams, just as the agents and analysts mentioned above, rely on receiving psychological insight from someone who is a specialist in the field at hand (USG 2009; Nettles 2010; White 2012; MD 2013). There have been very little attempts to apply psychological theory in a broad consumable manner for an analyst to employ. The current method gives analysts processed and formed guidelines to work by; there is very little room for creativity or to think of operations outside of the opinion of the specialist.

Heuer took a large step in bridging the gap of intelligence work and psychological principals in 1999. The book *Psychology of Intelligence Analysis* offered one of the very first attempts to bring psychology into the intelligence world. The book concentrates on current analytical processes and offers tools that any analyst, regardless of educational specialty, could employ. The book was not focused on turning analysts into psychologists; rather it was on
exposing analysts to the psychological limitations of intelligence processing and how to overcome these limitations (Heuer 1999).

One very critical and noteworthy observation concentrated on how intelligence is formed. Most intelligence is compiled by the mosaic theory, the idea that by collecting numerous small pieces of information an analyst can fit them together to reveal the larger picture (Heuer 1999). This process can be thought of as putting together several different jigsaw puzzles of abstract art that all vary in size and shape, with no picture to guide the assembler, and all the pieces came from the same bucket. Cognitive psychology details that this approach is inherently flawed. Analysts will typically form a mental picture of what the raw data is supposed to represent before consulting any of the records (Heuer 1999). This bias is very common and can go overlooked through numerous levels of analysis before being identified, if ever. One such way to overcome this bias is through Alternative Analysis by utilizing Red Teams. However, current techniques only reinforce a specialist’s opinion on a matter. To fully break down unintentional bias and see the problem as the enemy would, free of Blue predisposition, the Red Team must see the problem as if they were the adversary. Psychology has been studying mindsets and individual perspectives since before the time of Freud; Blue Teams have only been actively trying to see the battle space through the Red lens of an enemy soldier since the Cold War.

**Social and Group Identity Theories**

During the most recent war in Iraq, Operation Iraqi Freedom and the subsequent Operation New Dawn, the Iraqi military was decidedly no match for the force wrought by the US military. As the fight turned to a nation building effort the US found itself fighting an insurgency that came to be a more formidable foe than the Iraqi military (Kilcullen 2010). The initial response to the insurgency was extremely overplaced by US forces (Kilcullen 2010). Overplacement is a common bias addressed by Social Identity Theory (SIT) where one group of
individuals believes that they are better than another (Bi, Du, and Li 2011).

SIT addresses various components that deal with group interaction and how those interactions influence individual behavior (Tajfel 1981). SIT is built on three distinct constructive pillars and two socio-cognitive processes. The three pillars state that: (1) individuals judge themselves and others based on social organization, (2) the subjective status of a particular group will influence the individuals’ self-worth, and (3) nongroup members set the context of measure for determining another group’s worth (Tajfel 1978). These three pillars are determined by establishment of both socio-cognitive processes - social categorization and self-enhancement. Social categorization describes the perceptions that define a group, including tastes, customs, and acceptable behavior (Tajfel and Turner 1985). Self-enhancement works alongside Social categorization by establishing models that exceedingly favor group members (Tajfel and Turner 1985).

Group membership directly influences the emotional ties of self-worth and how an individual views themselves as a representative of the group and will model their attitudes, emotions, and individual behaviors accordingly (Tajfel and Turner 1985). Social identity ties to groups are not always a product of actively seeking or demonstrating membership. Social identity is strong enough to produce predictable and measurable results in a person’s shopping behaviors based solely on nostalgia (Sierra and McQuitty 2007). The basis of which may offer insight into individuals sympathetic to a cause, such as the new generation of terrorists who may become radicalized in a matter of months via the internet (Schwartz, Dunkel, and Waterman 2009). An Alternative Analysis viewpoint may identify a lurking insider threat or enemy course of action previously unidentified due to Blue based bias.
Group membership has an extreme aptitude for dictating an individual’s behavior. Not only does social theory provide a predictive capability, it also provides direct insight into a person’s mindset. When appropriately applied to two interacting groups it can identify similarities, differences, customs, grievances, and goals, along with innumerable further information regarding the principal group in question.

**Conclusion**

Because group membership is based on common ideological constructs and ultimately will influence a members’ attitudes, emotions, and intentions about not only the group they claim membership of but competing groups as well, SIT offers valuable framework for understanding adversarial members’ responses in or to a conflict (Sierra and McQuitty 2007). No published study has examined SIT or any other social theory for applicability to a surrogate adversary construct.

While the current state of Red Team guidance is exceedingly fractured the field of psychology has made significant strides in individual and group theory. One such theory, Social Identity Theory, can provide reliable inquiry through rigorous critical thinking framework solidly based on psychological examination of divergent groups (Brannan and Strindberg. 2012). The application of Social Identity Theory and other similarly structured models will empower Red Team members to synthesize threat based dynamics in an evolutionary manner.

With limited available literature on the specific research question but an adequate quantity related to the general research topics, including Alternative Analysis, Red Teaming, and social psychology, the author will attempt to explain how socially oriented psychological theories can be applied to Red Teaming concepts. By contrasting the successes of Red Team case studies and peer reviewed social psychological theory, a foundation will be developed of psychological theory and applicability wherein Red Teaming can be further built upon.
III. Methodology

The very basis of Red Teaming inculcates the theory that by knowing an enemies’ course of action friendly forces can formulate a scheme of maneuver that will defeat said enemy. Bias is a perspective shaped by personal experiences and assumptions and not all bias is negative. The University of Foreign Military and Cultural Studies (UFMCS) offers various techniques for mitigating bias in an effort to see a battle space from the enemies’ point of view. Eliminating bias frees the user from various preconceived notions or assumptions that in turn can help fuel the innovation of new concepts. Yet eliminating one’s own biases does not offer a clearer picture or insight into the enemies’ mind, which has biases of its own. It is for this reason that enemy defectors are such highly sought after prizes (Cherkashin and Feifer 2005). Defectors not only have firsthand knowledge of operations already under way, or approved, they also are able to provide highly reliable and accurate assessments of future operations and courses of action (Richelson 1997). The defector’s predictive ability comes from an in-depth knowledge of the opposing group. The defector’s bias is a perspective that friendly forces can benefit from. An elimination of this positive bias from the defector would alter their perception and judgment as an adversary.

The biases and perceptions that formulate a person’s thinking define and guide their mindset. Biases are a baseline of thought that provides the background to reasoning. This background is surmised into the decisions that make up a course of action. The purpose of the following research is to seek out psychological theory that is capable of mapping an individual’s or a group’s mindset for the applied purpose of threat mitigation and predictive analysis. Specifically, this research will address the posed question: how can current psychological theory
aid Red Teams’ evolution into a capability that offers degrees of threatscapeing analysis and prediction modeling for both symmetric and asymmetric innovative threats?

**Theoretical Framework**

The following qualitative case study will investigate and identify the best strategy for combining Red Teams and psychological pretexts to improve prediction in an evolving threatscape. Utilizing disciplined configurative study techniques this research will analyze a variety of mixed medias including documents, articles, videos, charts and other items that offer relevancy and impact to the question at hand. The investigation will concentrate on various established Red Team doctrines and standards as well as other pedagogical research that identifies current trends in Red Team development to identify techniques, or a lack thereof, that lend to adversarial replication. The inquiry will then examine psychological theories concentrated on inter- and intra- group dynamics.

Manuals and doctrine promulgated by government agencies on Alternative Analysis and Red Team employment along with group and social identity theories will be utilized as the basis for the majority of the research conducted for this investigation. Marrying the aforementioned fields will give further support to the Defense Science Board’s (DSB) appeal to the Secretary of Defense to increase Department of Defense (DoD) implementation of Red Teaming for its capabilities to combat known surprises (DSB 2003; DSB 2008). Much of the research on Red Teams revolves around a plea to increase the number of Red Teams in employment across not only military organizations but throughout business, education, or any enterprise that needs to reduce risk. (DSB 2003; Fontenot 2005).

Evaluating the information listed above will be handled in a qualitative approach, analyzing the applicability of psychological theories to threat prediction through synthesization. The testing and application of the identified techniques by a professional surrogate in a closed or
large scale exercise are outside the scope of this paper. To mitigate potential bias or incongruities the identified techniques will be scrutinized against current analytical methods employed by Red Teams in order to identify which technique(s) will offer the best fit given the variety of Red Team applicability. To maintain structure and prevent irrelevancies research contained herein will follow in accordance with George and Bennett’s (2004) five steps for case studies in the manner described below.

A discussion on the importance of the research was framed throughout the literature review in the previous chapter. The Literature Review outlined not only the need for a psychological basis in Red Teaming, but it also identified areas of conflict within the Alternative Analysis field that impact the applicability of Red Teaming. Addressing the current state of disarray within Alternative Analysis is critical to defining a Red Team and identifying how psychological theory may help. The following research will construct a foundation on which the concepts of Red Teaming will be demarcated and then further studied. Results will be compiled throughout the research.

**Known Variables**

There are numerous variables within the research that must be codified and managed. The primary variable driving the entirety of the study is the initial hypothesis that Red Teaming is in need of a psychological process to further its capabilities. This mediating variable was first addressed through the literature review and will be further dissected as appropriate psychological theory is scrutinized against current analytical techniques. Later in the study the identified psychological theories will become independent variables as they are measured against the dependent variables of the proposed case study questions.

One of the aspects of this research is the bringing of two different fields together. The selection of theories and analytical techniques will cover different fields of study and have
selection criteria applicable to their respective fields. The information reviewed will either be peer reviewed or governmental in publication. Forming a composition of several independent variables will rely on selection of psychological material focused on establishing or explaining a selected theory. Dependent variables will be formulated through review of Alternative Analysis and Red Team centric research with defined methodologies. The use of such reference will allow the researcher to clearly identify the applicability of psychological theory in Red Team practice.

The variables identified for this study will be quantified for analysis as explained below. Variances are expected and will be sought out as each theory is tested against Red Teaming techniques. The variable with the highest degree of positive impact will be identified as the ideal theory for the given component of Red Teaming. Impact will be assessed by comparison of selected Red Teaming techniques with the psychological theory in question.

**Research Design**

Data will be generated via the comparison method listed above. Scrutiny of the selected Red Team methodologies will be qualified by a detailed set of questions. These same qualitative questions will be posed to the selected psychological theory for potential applicability. The resulting data will provide independent insight into both current Red Teaming processes and potential effectiveness of psychological theory. Alternative Analysis procedure and psychological theory will be assessed against the following questions and qualifiers:

**Q1:** Do members eliminate Blue based bias?
   - H: Methodology directly targets elimination of Blue bias
   - M: Methodology makes the user aware of potential bias, but does not target it
   - L: Methodology makes no attempt to identify Blue bias

**Q2:** Do members develop Red based bias?
   - H: Methodology directly forms Red bias
   - M: Methodology makes the user aware of Red bias, but does not target it
   - L: Methodology makes no attempt to identify Red bias
Q3: Does the technique explore Red perceptions, beliefs, or ideologies?
   H: Methodology directly targets Red perceptions, beliefs, or ideologies
   M: Methodology makes the user aware of potential Red perceptions, beliefs, or ideologies
   L: Methodology makes no attempt to identify Red perceptions, beliefs, or ideologies

Q4: Is a social hierarchy (self-esteem) based mindset formulated?
   H: Methodology directly works to establish social mindset
   M: Methodology makes the user aware of social mindset, but does not target it
   L: Methodology makes no attempt to identify social mindset

Q5: Could members formulate new methods of attack?
   H: Methodology establishes understanding of threat
   M: Methodology makes the user aware threat, but understanding is not required
   L: Methodology does not identify threat

Q6: Is the method replicable?
   H: Yes
   M: Best with training
   L: No

Q7: Can team members construct enemy decision matrices?
   H: Methodology directly targets synthesis of selected individual/group
   M: Methodology identifies a mindset but, no replication is intended
   L: Methodology makes no attempt to synthesize a mindset

To facilitate a qualitative comparison, each question will be satisfied by a graduating degree of applicability will be applied. Whereas the lower extreme ‘L’ (Low) signifies no applicability and the high extreme ‘H’ (High) denotes the question was satisfied in its entirety. A moderate category ‘M’ (Medium) will offer distinction to analysis that yields psychological theories or Alternative Analysis traits that only partly placate the specific case study questions. Identified processes will then be individually measured against the subsequent questions.

The results of this study will empower threat replication to evolve past mere surrogacy and offer reliable threatscapeing prediction capabilities. Entities that train to protect citizens domestically and abroad will be able to train against more than a modern snapshot of the enemy.
These entities will be able to train against a surrogate enemy that can adapt, evolve, and think in a manner very similar to that of the enemy. Ultimately the end state will allow friendly forces to take more proactive steps against a threat while denying the success of said enemies’ emerging tactics and processes.
IV. FINDINGS AND ANALYSIS

A. Investigation into Social Psychology

Social psychology offers a few theories designed around understanding and predicting behaviors of individuals. Most of these are based on the central theme of group dynamics or experience as it relates to an individual’s self-esteem or perception. Social theory is not a traditional hard science that can be proven or disproven with proofs or quantifiable variables, thus there are considerable dissimilarities in conceptual basis from researcher to researcher. As a result there are numerous hypotheses available to explain a social condition or action. Even with considerable ongoing debate within the field of psychology six theories were selected. Each theory was selected based on a high level of individual merit, established by repeated studies in the psychology field, as well as a strong relevance to social and individual identity construction. The selected theories offer testable insight into the motivation of an individual or group’s behavior.

Of the six selected social theories Social Identity Theory, or SIT for short, has received the most attention from researchers despite not being the first to propose the concept of socially based perception. Researchers have applied SIT to numerous inquiries and have dependably shown SIT’s applicability across a broad spectrum. Research has drawn correlation between purchasing trends and nostalgia of an individual as well as perception of wrongdoing in a conflict based on cultural background, while other applications have shown a person’s actions are a predication of a particular group they identify with (Lalonde and Silverman 1994; Sierra and McQuitty 2007). In the case of nostalgia purchasing the individual in question held a passive connection to a particular group, showcasing that the individual need not be a conscious or self-identified member of a particular group (Sierra and McQuitty 2007).
The following section will investigate social psychology for a theory that fits best with our outlined case study questions. Along with SIT the five other theories include Social development Theory, Socio-cultural Identity, Ego-Identity, Group Identity, and Identity Theory. A brief definition of each is presented in Table 4.1 followed by an individual discussion of each theory thereafter.

<table>
<thead>
<tr>
<th>Social Identity Theory</th>
<th>Self-concept derived from perceived membership to a particular group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social development Theory</td>
<td>Aims to explain qualitative changes in a society that impact the society’s structure and framework</td>
</tr>
<tr>
<td>Socio-cultural Identity</td>
<td>Identifies the methods a group or culture uses to identify themselves</td>
</tr>
<tr>
<td>Ego-Identity</td>
<td>A person’s perception of continuity and coherence in an individual’s social relations</td>
</tr>
<tr>
<td>Group Identity</td>
<td>Identifies the social characteristics associated with identified groups</td>
</tr>
<tr>
<td>Identity Theory</td>
<td>Explores an individual’s role fulfillment within a group</td>
</tr>
</tbody>
</table>

Table 4.1 – Social Theories (Feigl 1967; Jacobs and Asokan 1999; Lewis 1971; Tice 1999; Turner and Oaks 1986)

**Social Identity Theory**

SIT’s defining principals make it a near ideal fit to the questions at hand. This section will predominantly work with SIT as it was originally defined by Tajfel (1978). SIT has changed over time as an increasing amount of research has been devoted to refining the original theory. Tajfel himself even further refined the original thought with subsequent publications in 1981 and again in 1985 with Turner. SIT evaluates a person’s decisions and actions based on perceived group membership. The central theme and foundation of the theory describes how a person will deal with intergroup dynamics. The entirety of this foundation is grounded on the proclivity of
the individual to identify as a member of a definable group, commonly referred to the ‘in-group’ (Tajfel 1978). Membership of the group is important, but not as important as the relationship that emerges as the individual further defines themselves via comparison of a contrasting group known as the ‘out-group’ (Tajfel 1981). Despite striking similarities pointed out by Stets and Burke, SIT is different from Identity Theory in the fact that Identity Theory concentrates on how the individual fulfills the role they assume within the ‘in-group’ (Stets and Burke 2000). When applied appropriately SIT enables the researcher to identify catalysts for conflict amongst groups at odds with one another (Tajfel and Turner 1985). The potential to identify future skirmishes is an inherent capability of evaluating group evolution.

Social Development Theory
Social development Theory takes a different approach. This psychological model is predictive in nature. Social development Theory is a qualitative theory that strives to identify changes in the structure and framework within a society (Jacobs and Asokan 1999). This is done by undertaking the general assumption that all societies evolve in an increasingly complex and productive manner until they peak and decline (ICPF 1994). The theory applies broadly across many different areas that contribute to increased development. These include progressive social thinking, political change, economic shifts, as well as technological and infrastructure expansion and innovation (Jacobs and Asokan 1999). This theory is ideal for mapping causes of historical advancement and predicting potential future states of a studied social structure, especially when societal impact is considered as a catalyst on the individual (Vygotsky 1962).

Socio-cultural Identity
Socio-cultural Identity looks at a culture as a defined group and explains how that group influences the individuals within it and advances the society in which it exists. This is similar to Social development Theory only with a different slant. Social development Theory looks at a
society as a whole and is inclusive of all the different sub cultures within the designated society: Socio-cultural Identity is exclusive of all other cultures within a society less the one in question. Socio-cultural Identity measures the influence a culture has on how an individual involves themselves within the greater society given their cultural background (Bucholtz and Hall 2005).

**Ego-Identity**

Ego-Identity articulates a state of mind in which an individual finds his/her place within society. Persons achieve one of four varying levels of Identity throughout their lives. From the highest level of achievement downward they are: Identity Achievement, Moratorium, Foreclosure, and Identity Diffusion. Persons who have Identity Achievement are less likely to be phased by stressful conditions while persons with Identity Diffusion assume an ambiguous stance against stress (Marcia 1966). The theory of Ego-Identity is critically shaped and re-shaped during especially stressful moments of an individual’s life. Marcia (1964) identifies the period when an adolescent is subject to entry to the ‘real world’ as one of the most critical points in the development of a person’s Ego-Identity.

**Group Identity**

Group Identity articulates how social groups identify as a group. This encompasses a litany of identifiable physiognomies from commonalities of dress to similarities of recreational interests and even economic factors (Geisinger 2004). There has been some discussion if Group Identity is a trait or sub-component of SIT within the psychology community. A few authors actively utilize Group Identity to describe a condition that must be satisfied in order to apply SIT to a selection of individuals. The unifying factor being a trivial commonality brings individuals together to form a group (Ashforth and Mael 1989; Chen and Li 2009). This distinction is outside the scope of this study and Group Identity will be handled as a separate theory throughout this inquiry.
**Identity Theory**

Roles are critical to the survival of any group. Without a structure a formal group has minimal chance of survival. Informal groups have less defined roles dedicated to the continued survival of the group, but by simply being a member of a group a role is being filled (Lewis 1966). Unlike SIT, Identity Theory explores how an individual fulfills a role within a group that they identify themselves as being a member. The theory states that group members both fill and define roles within a group (Ashforth and Mael 1989).

**Evaluation of Social Theories**

Each of the different psychological theories is measured against the selected case study questions. When each theory is measured against a question the definition and discussion given above are considered in its evaluation. The questions were originally phrased to fit Alternative Analysis methodologies and the administrators of such tools. The overall intent and application of the questions remains unaltered when compared against a psychology based theory even though the selected theories utilized different terms. Despite the difference in vernacular the ultimate intent framing both the questions and theories are not lost. A rating of High – ‘H’, Medium – ‘M’, or Low – ‘L’ will still be assigned to each methodology for each question as previously outlined. Table 4.2 highlights the individual results of the analysis followed by a discussion of each of the seven questions. For ease of association the original questions are listed below, for specific qualifications of each question see section III. Methodology.

Q1: Do members eliminate Blue based bias?

Q2: Do members develop Red based bias?

Q3: Does the technique explore Red perceptions, beliefs, or ideologies?

Q4: Is a social hierarchy (self-esteem) based mindset formulated?

Q5: Could members formulate new methods of attack?
Q6: Is the method replicable?

Q7: Can team members construct enemy decision matrices?

<table>
<thead>
<tr>
<th>Theory</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
<th>Q7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Identity Theory</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Social development Theory</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Socio-cultural Identity</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Ego-Identity</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>H</td>
<td>H</td>
</tr>
<tr>
<td>Group Identity</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>H</td>
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<tr>
<td>Identity Theory</td>
<td>M</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

Table 4.2 – Social Theories Evaluated

Evaluation

**Q1: Do members eliminate Blue based bias?**

Blue based bias in Alternative Analysis represents the original point of view or that of the analyzers. In psychology a person’s individual bias is of concern, but many of the decisions made when utilizing social theory forces the user to actively investigate the target for social construct and perspective. The actual elimination of the researcher’s bias is inherent, but not directly targeted. Note that Social development Theory was marked as Low in comparison to the other theories’ score of Medium. Social development Theory centers itself on investigating the qualitative infrastructure of a given society (Macfarlane and Van Harten 1999). Any inquiry of perception is not within the scope of Social development Theory.

**Q2: Do members develop Red based bias?**

This question also asks of bias, however this time it is asking of the Red Team. In this case the Red Team is the target culture/group/person and the bias is their unique methodology of reasoning and justification. All the theories scored High on this question except for Social development Theory and Identity Theory. Social development Theory scored Low again for the same reason as before; cultural perception is not even a secondary goal, it is approached only
when needed (Macfarlane and Van Harten 1999). Identity Theory scored in the Middle range as it strives to identify the roles an individual fills more than why those roles are filled (Stets and Burke 2000).

**Q3: Does the technique explore Red perceptions, beliefs, or ideologies?**

For the third question all of the theories scored High, except for Social development Theory which scored Medium, its highest score thus far. All of the remaining theories explicitly search to identify and replicate the target group’s perceptions, beliefs, and ideologies. Each theory accomplishes this with different viewpoints. Social Identity Theory looks at how the ‘in-group’ compares itself to an ‘out-group’ (Cassidy 2004). Group Identity explores how a group identifies itself through clothing style, ideological beliefs, and even socio-economic status (Holiday 2010). Social development Theory misses the High mark again, but scores in the middle range. This time the theory satisfies the question as a byproduct of first order effects. The qualitative components of the theory satisfies the stated question, however it only achieves the desired results as a secondary effect of identifying potential motivations behind developmental evolution (Vygotsky 1978).

**Q4: Is a social hierarchy (self-esteem) based mindset formulated?**

Question four produced almost the same results as question three. All the processes except Social development Theory scored High. Their intent is to explore and identify the mindset of the group/individual in a given situation. The investigation into an individual’s mindset or a group’s mentality will identify social hierarchy and where the selected individual or group ranks within that hierarchy.

**Q5: Could members formulate new methods of attack?**

This was overall the lowest scoring question; none of the theories received a High. The theories were evenly split with three scoring in the Middle range; Social Identity Theory, Social development Theory, and Socio-cultural Theory, and the remaining three scoring Low; Ego-
Identity, Group Identity, and Identity Theory. Social development Theory scored with the higher scoring components in this round due to the secondary effects of identifying vulnerabilities and potentially high payoff targets that could stunt a society’s growth. Both SIT and Socio-cultural Theory scored Medium due to the simple fact that neither of the theories investigated here are adversarial in nature. They are based on identifying different social and psychological perspectives. Such perspectives can be applied in a manner that replicates an identified adversary; however this perspective is only a byproduct of the originating theory. The remaining theories scored low because their primary focus is on the individual’s interaction within the group. This internal interaction could pose as a catalyst for attack, such as an escalation of tactics, but this does not placate the question’s intent of predictive replication.

**Q6: Is the method replicable?**

This was the highest scoring question by far as all theories received a High. Red teams often rely on subject matter experts for insights into a selected adversary instead of performing analysis themselves. None of the theories presented in this study are exceedingly complex in nature, nor are they a one-time use solution to a defined problem. A lay person would be able to apply any of the theories presented here to an analytical problem with simple written direction. Aside from the Red Team’s own observations these theories could even help rid unwanted bias from a subject matter expert’s objective observations and even improve upon them.

**Q7: Can team members construct enemy decision matrices?**

In a similar manner to previous questions that investigated Red biases this question posed an inquiry on the ability to replicate an enemy’s perception. The subject at hand, an enemy, was assumed to be the ‘in-group’ or targeted individuals. All theories, less Social development Theory, scored highly in this category. The intent of all of the theories at hand is to understand the reasoning behind the motivations of a selected group or individual. With the help of the
selected theories a researcher is able to reliably articulate the perceptions and working mental models of a selected target.

Social Psychology Summary

As demonstrated by the results, group-based social psychology theories offer significant insight into a target audience or individual’s motivations, perceptions, mindset, and core values. All of these items can be surmised into a comprehensive cognitive mental model of the subject (Johnson-Laird 1980). This modeled system can provide Red Teams the needed insight of the target audience in order to formulate mindsets, perceptions, and bias that can be in turn quantified as a rule set that the team can then base further decisions. These decisions would bear striking resemblance to actual decisions the target audience would make given similar circumstances and problem sets.

The six theories detailed in this section each offer significant strengths and some weaknesses depending on their individual applications. Even though Social development theory scored consistently low compared to the other theories, it offers significant insights into potential pitfalls and societal weaknesses that could be exploited by an enemy to stunt the society’s further growth as a competitor. The overall goal of this research, however, is to identify psychological theory that has the ability to offer significant insights into a selected group or individual’s mindset. Both Social Identity Theory and Socio-cultural Theory scored the highest of all the tested theories. Each received two markdowns for analytical application. One markdown was on the first question, eliminating the operator’s own bias. Psychological theories work to investigate a subject and explain that person’s or group’s perceptions. Elimination of personal influence on the part of the researcher is a common problem that cannot be passively removed. There are enormous amounts of research devoted to the topic of eliminating bias. No one method or theory will eliminate all bias, but applying methodologies rooted in scientific research will
help to mitigate unwanted bias (Denmark et al. 1988). The second markdown occurred on
question number five. This question asked if the theory could formulate new methods of attack.
The two theories received a Medium marking because they would offer insight into the target
group’s resourcefulness, motivations, and goals. All of these factors are vital to understanding
how and when a threatening group would attack; thus fulfilling the posed question moderately.

The theories examined here were not formulated to replicate the capabilities of would be
attackers or adversaries. The processes do not ask the researcher to consider critical components
of logistical support such as a supply chain or physical resources at the disposal of a target group.
These environmental factors are unique to the specific environment in which the target group
finds themselves and requires specific analytical follow through outside the immediate scope of
the examined concepts.

Aside from the constant consideration of personal bias, psychological theories,
specifically Social identity Theory and Socio-cultural Identity, are extremely relevant for
understanding a contrasting perception and establishing a replicable working knowledge of a
group or individual’s psychological processes. As ultimately implied by the Heisenberg principal
of quantum mechanics no theory or process can offer clairvoyant results (Heisenberg 1930).
However, Social psychology offers significant insights into target groups that will give Red
Teams a level of analytical processes that approaches predictive capability without breaking the
governing laws of physics.
B. Investigation into Red Teaming

Red Teaming is intended to offer commanders significant insight into an adversary’s potential by means of threat replication (MD 2010; UFMCS 2011). This replicated potential has been based on various analytical steps, yet none of them offer a reliable, scientifically based ability to replicate an adversary’s mindset or thought process. As a result many of the applied Red Team events have offered only a limited glimpse into an enemy’s true capability. In accordance with the proposed methodology Alternative Analysis techniques and traits were evaluated for applicability and usefulness in an implied environment where unknown threats abound. This environment is similar to the complex and chaotic contexts as defined by Snowden and Boone (2007). Persons within these two contexts will face an increasing amount of uncertainty with little to no recognizable patterns or reasoning behind actions of the enemy (Snowden and Boone 2007). Such contexts also make it nearly impossible to determine what the right answer to a problem set would be (Snowden and Boone 2007). The group and individual psychological theories previously tested will be reintroduced alongside identified Red Team methodologies in the following section, V. Conclusions. This section will take note of theoretical processes that can further Red Teaming methodology by way of identifying a target group’s mindset, perceptions, and information that would remain unknown and unknowable by applying current methodologies.

As shown in the literature review the concept of Red Teaming covers a very broad area of threat analysis and is often intermingled with analytical areas that are not actually Red Teaming in nature or application. This broad interpretation extends to and encompasses most of the qualities found in Alternative Analysis. To define and later qualify the various subcomponents of Red Teaming the broader Alternative Analysis needs to be articulated and then evaluated. In order to demonstrate how a technique or methodology is not Red Teaming this study calls for a
clearer definition of Alternative Analysis and its subcomponents. This will aid in determining what techniques are in fact adversarial in context.

Adversarial based techniques comprise the basis of the Red Teaming construct. Even though the Red Team is the focus of this research there are other teams just as important as Red Teaming is to Alternative Analysis as a whole. It is necessary to define these additional teams to help identify how they interact with each other, specifically with the Red Team.

**Red, White, Blue, Brown, and Green**

There are five distinct teams to consider when investigating Alternative Analysis. The two most important teams have already been covered in some detail. These are the Blue and Red Teams, friendly and surrogate enemy players respectively. All five teams that make up Alternative Analysis are shown in Figure 5.1.

Green Teams are another integral team in the Alternative Analysis construct. The Green Team is a friendly team, but not the same as a Blue Team. Blue Teams are the indigenous friendly team from which an event centers itself (MD 2010). The Green Team is often a supporting team or partner with the Blue team. Examining the Global War on Terror from the point of view of American forces; the Australian and British forces would compose the Green Team. This concept can be disseminated even further within American forces to represent a different branch of the military, or another unit, that is not the focus of the exercise or event. Green Teams will normally fall under the same assumptions of Blue Teams even though there can be significant fallout of unconsidered cultural and legal differences.
A fourth team is the Brown Team. This team represents any player that has interests of its own outside the direct conflict of Blue and Red Teams (MD 2010). These interests may align with any of the other aforementioned teams, but not because any one particular team is friendly or adversarial. Most commonly Brown Teams are non-governmental organizations such as Doctors without Borders. Brown Teams generally work towards their objectives without consulting the Blue Team and can be viewed as adversarial when in fact they are not at odds with either the Blue or Green team (MD 2010). Brown Team analysis could benefit from many of the same analytical techniques that Red Teams utilize.

There is also the White Team, whose function is different than all of the others. The White Team observes and controls an exercise or event to keep all the other teams on a defined track or within defined boundaries. This team will inject data into a scenario that may pose a
problem for any of the other teams, such as a severe thunderstorm. The White Team is unique amongst all the teams in the fact that it is not acting in concert with or against any of the other teams. The White Team is much like a researcher who keeps an experiment on track with a control but does not alter the course of the experiment, except to keep it within scope of the research design. Such an omnipotent force, the White Team only exists in structured events and exercises.

Some non-adversarial based events or training exercises do not need an indoctrinated or structured adversarial force. This is true for many initial qualification training programs within the military. The inclusion of an advanced thinking adversarial team would potentially prove detrimental to a student Blue Team. Considering such cases that the Red Team is either not warranted or not wanted the White Team can offer operationalized inputs to the event. This is often done with instructors filling the role of a semi-traditional OPFOR, only in this case the OPFOR have a copy of the script from which the exercise is derived and is commonly referred to as a White Cell. The intent of this type of training is to reinforce instruction. A White Cell offers none of the threat replication aspects found in some of the Alternative Analysis techniques. Once students master a basic set of skills a more advanced adversarial based opponent would be appropriate. The White Cell is not one of the five core teams as it is a sub-component of the White Team. The White Cell was included in the White Team’s description to help remove the ostensible void left with regards to events with no Red Team.

Each of these teams interacts differently in the battle space. The format of that battle space is irrelevant and can vary from theoretical discussion or table top gaming, to full event replication with surrogate players. Figure 5.1 shows how each of these five teams interacts with one another in the battle space. It is important to note that the White Team serves as the
foundation of the event or exercise. This is indicated by the dashed line surrounding the White Team’s sphere of influence. The White Team’s sphere of influence is permeable and unobtrusive to the other teams, giving each team free access to participate in the exercise as they would in an actual conflict. The Green team appears partly under the Blue Team, signifying the Blue Team is the focus and supported by the Green Team’s actions and decisions. The Brown Team’s location isolates it from the other three teams as the Brown Team tends to its own objectives independent of the other teams objectives. The actions of the Brown Team, even though not directly opposing the Blue Team, can offer momentous impact to the overall accomplishment of a desired mission. The Brown Team’s position also indicates that its actions are not implicitly in support of or in conflict with another team. Finally, the Red Team is positioned directly across from the Blue and Green Teams. This positioning conveys that the Red Team is in direct conflict with both the Blue and Green Teams while remaining generally indifferent of the Brown Team.

Individual events may be unique and require repositioning of the teams from the positioning shown in Figure 5.1 in order to articulate varying conflicts. The positions shown in Figure 5.1 and described within this text are given as the baseline interactions of Alternative Analysis teams. It best highlights how each team will interact with one another and conveys the most likely conflict model. This depiction is utilized as an ideal situation and a baseline for analyzing Alternative Analysis as this study is structured.

**Analytics of Alternative Analysis**

The Ministry of Defense lists a total of twelve alternative techniques. The University of Foreign Military and Cultural Studies (UFMCS) echoes many of the same and offers an additional four methods (MD 2010; UFMCS 2011). Both guides provide a definition and suggested usage for each of the presented techniques. Consulting a further supplementary of nine articles yields a total of 29 different techniques, some of which are very similar and offer only a
few minor differences. Only one of the compositions offers any attempt to categorize the highly contrasting analytical processes and it does so by coarse functionality. Theories are assigned to one of three functionally oriented classifications; diagnostic, contrarian, and imaginative thinking (USG 2009). The Contrarian methods are broadly grouped by techniques that offer contrarian views requiring no adversarial mindset. A few are considered Diagnostic due to their functionality as progress checks that are not detracted by a particular mindset either way as long as they are employed appropriately. The final category, Imaginative based techniques, require the analyst to think in a creative manner for the technique to yield valid results (USG 2009).

Utilizing the analytical approaches referred to in the methodology section this study will first organize the available techniques and definitions into definitive archetypes. This paradigm will provide a comprehensive groundwork for the remainder of the study as well as Alternative Analysis as a whole. Techniques will be arranged based on the need of the user to understand and relate to the enemy’s perspective. A complete list of techniques is summarized in Table 5.2.

<table>
<thead>
<tr>
<th>Key Assumptions Check</th>
<th>Devil’s Advocate</th>
<th>Team-A Vs. Team-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Cell Exercises</td>
<td>Contingency ‘What if’ Analysis</td>
<td>High impact/ Low Probability</td>
</tr>
<tr>
<td>Scenario Development</td>
<td>Analysis of Competing Hypothesis</td>
<td>Alternative Analysis</td>
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<tr>
<td>OPFOR</td>
<td>Quality of Information Check</td>
<td>Indicators of Change</td>
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<td>‘What If’ Analysis</td>
<td>Brainstorming</td>
<td>Outside-In Thinking</td>
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<td>Red Team Analysis</td>
<td>Alternative Futures</td>
<td>Deception Detection</td>
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<td>Experimentation</td>
<td>Logic Mapping</td>
<td>Surrogate Adversary</td>
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<tr>
<td>Wargaming</td>
<td>Gap Analysis</td>
<td>Cultural Capability</td>
</tr>
<tr>
<td>Stakeholder Mapping</td>
<td>Argument Deconstruction</td>
<td>Problem Restatement</td>
</tr>
<tr>
<td>Threats Intentional Failure</td>
<td>Strength, Weaknesses, Opportunities, and Threats</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.2- Alternative Analysis Techniques (Mateski 2009; MOD 2013; UFMCS 2011; USG 2009)

Of the techniques listed above six are originally categorized as Diagnostic; an analytically based argument that addresses a problem (USG 2009). Eight of the techniques encourage insights through new or innovative thinking and are classified as Imaginative.
Thinking (USG 2009). Only six of the remaining techniques are considered Contrarian because they encourage challenge of current thought or facts (USG 2009). Not all authors categorized the techniques, thus nine currently are not considered in any of these categories.

Despite the categorization many of these techniques are intended to offer some form of adversarial based thinking. Many are placed in either Imaginative or Contrarian categories due to their inherent qualities that offer an opposing view or imaginative process. Considering the application of and methodology behind several of the listed techniques a fourth category can be developed; an adversarial based category. Several of the presented techniques rely on a combination of both the Imaginative and Contrarian traits, but still operate with defined constraint unlike the Brainstorming technique that is very unrestricted and open ended in nature. These few traits are potential candidates for the adversarial category.

As noted in the literature review many of the analytical processes that fall under the larger context of Alternative Analysis are inadvertently attributed specifically to Red Teaming, even when the technique offers viewpoints not based on an adversary. A prime example is the use of the term OPFOR (Opposing Force).

An opposing force is defined by the Headquarters Department of the US Army as (emphasis added):

“…a plausible, flexible military and/or paramilitary force representing a composite of carrying capabilities of actual worldwide forces used in lieu of a specific threat force for training and development…”

-Headquarters Department of the US Army 2004
OPFOR is often referred to as a Red Team but when the definition of a Red Team and OPFOR are compared glaring differences shine through. One of the most concise definitions of a Red Team is as follows (emphasis added):

“…seeking to get inside the heads of adversaries, not asking what we would do if we were them but creatively trying to ask what they might do given their own goals, culture, organization, and the like.”

-Treverton 2005

Both techniques are intended to offer some form of resistance to Blue Team members but only one is intended to offer a true replication of a selected threat. OPFOR may have trace amounts of realistic threat amongst its tactics; however these are a mishmash of worldwide forces where no one particular force is replicated in detail (HDA 2004). The goal of an OPFOR is to offer a faceless enemy that reinforces the training of the Blue Team (HDA 2004). The OPFOR technique is one of the nine previously uncategorized methodologies. It is important to note that the OPFOR methodology is not presented in all Alternative Analysis based literature. Due to the lack of indoctrination or specific threat replication OPFOR teams often offer only a mirror image of the Blue Team. This is very different from the Red Team Analysis technique that is categorized as an Imaginative technique due to the fact an understanding of a selected adversary’s perspective is required to provide a realistic replication capability.

**Finding the Red Team**

Among the three main categories of Alternative Analysis techniques, Diagnostic, Contrarian, and Imaginative, none are exclusively defined by the traits that comprise adversarial based techniques. These afore mentioned primary categories cover the basis of Alternative Analysis, yet none of the categories explicitly support methodologies that require an adversarial
based mindset. For the most part methodologies requiring a thought process similar to a selected threat have been categorized as either Imaginative or Contrarian. Such categories only qualify a portion of the entire Red Team capability that ultimately lead to ambiguity and misapplication of procedures. The end result comes to planners applying methodologies in expectation of a particular effect and the result falls short due to a misallocation of techniques that are narrowly fit in to the defined categories. Researchers and military planners alike are unable to fully replicate an adversary utilizing Alternative Analysis as it is currently formatted.

The inclusion of a fourth category, Adversarial, will remove much of the current ambiguity and assist planners with appropriate application of Alternative Analysis Techniques. Utilizing the seven case study questions from the described methodology, each definition will be adjudicated for the implied task and/or need of adversarial replication to purposefully realize the task’s requirements.

Comparison of all 29 analytical techniques’ definitions against the seven questions will identify what techniques are best designed to offer insights into an adversaries’ mind or thought process. Insight provided by this comparison is the unifying trait of all the techniques within the spectrum of Red Teaming. The case study will also identify which techniques do not require an adversarial insight, techniques that only offer a difference in opinion. All of the Alternative Analysis techniques are listed in Table 5.3 along with the original classifications and their corresponding definitions. Classifications are listed as ‘D’ for Diagnostic, ‘I’ for Imaginative, ‘C’ for Contrarian and ‘N’ for none.

<table>
<thead>
<tr>
<th>Alternative Futures</th>
<th>I</th>
<th>Explores numerous options for how a situation may develop into the future given unknown factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPFOR</td>
<td>N</td>
<td>A force that opposes the Blue team with a non-specific threat</td>
</tr>
<tr>
<td>Red Cell</td>
<td>N</td>
<td>A replicated environment and force that accurately represents a culture</td>
</tr>
<tr>
<td>Exercises</td>
<td>Level</td>
<td>Description</td>
</tr>
<tr>
<td>----------------------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Devil’s Advocate</td>
<td>C</td>
<td>Challenging a Blue consensus with the best plausible case from the adversaries’ abilities</td>
</tr>
<tr>
<td>High Impact/Low Probability</td>
<td>C</td>
<td>Assessing the impact of low probability events with potentially high impact</td>
</tr>
<tr>
<td>Intentional Failure</td>
<td>N</td>
<td>A cross check of a plan’s details for potential failure points</td>
</tr>
<tr>
<td>Key Assumptions Check</td>
<td>D</td>
<td>A critical review of explicit and implicit assumptions</td>
</tr>
<tr>
<td>Contingency ‘What if?’</td>
<td>N</td>
<td>Given a fictional future event what events would have to occur for it to be highly plausible</td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scenario Development</td>
<td>N</td>
<td>Construction of a series of events under a common theme</td>
</tr>
<tr>
<td>Team-A Vs. Team-B</td>
<td>C</td>
<td>The advocacy of competing hypothesis with separate teams</td>
</tr>
<tr>
<td>‘What if?’ Analysis</td>
<td>C</td>
<td>Challenge of an assumption if the opposite were true, generally an event occurring or not</td>
</tr>
<tr>
<td>Analysis of Competing</td>
<td>D</td>
<td>Identification of alternate explanations and an evaluation of information discrediting the</td>
</tr>
<tr>
<td>Hypothesis</td>
<td></td>
<td>commonly held hypothesis</td>
</tr>
<tr>
<td>Alternative Analysis</td>
<td>N</td>
<td>Exploration of how an uncertain or complex scenario may develop</td>
</tr>
<tr>
<td>Quality of Information</td>
<td>D</td>
<td>Evaluates completeness, soundness, and credibility of available information</td>
</tr>
<tr>
<td>Check</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indicators of Change</td>
<td>D</td>
<td>Re-evaluation of information and trends to identify new trends or unexpected change</td>
</tr>
<tr>
<td>Brainstorming</td>
<td>I</td>
<td>Unconstrained group process designed to generate new ideas</td>
</tr>
<tr>
<td>Outside-In</td>
<td>I</td>
<td>Identification of the full range of basic and secondary forces that shape</td>
</tr>
<tr>
<td>Thinking</td>
<td>Red Team Analysis</td>
<td>Models an individual/group by replicating how an adversary would think of an issue; and initiative based team</td>
</tr>
<tr>
<td>--------------------------</td>
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<td>----------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Deception Detection</td>
<td>D</td>
<td>A check of the veracity of information for deception</td>
</tr>
<tr>
<td>Experimentation</td>
<td>C</td>
<td>Use of scientific procedure to make a discovery or test a hypothesis</td>
</tr>
<tr>
<td>Logic Mapping</td>
<td>N</td>
<td>Ensure logic is complete and coherent by extracting and simplifying key elements of the argument</td>
</tr>
<tr>
<td>Surrogate Adversary</td>
<td>I</td>
<td>Models an individual or group on how an adversary would think of an issue</td>
</tr>
<tr>
<td>Wargaming</td>
<td>C</td>
<td>Employment of a scenario based gaming model</td>
</tr>
<tr>
<td>Gap Analysis</td>
<td>N</td>
<td>Identification of holes in evidence</td>
</tr>
<tr>
<td>Cultural Capability</td>
<td>N</td>
<td>Understanding and applying an alternate culture in a selected environment</td>
</tr>
<tr>
<td>Stakeholder Mapping</td>
<td>D</td>
<td>Maps an individual or groups stance in relation to the Blue Team</td>
</tr>
<tr>
<td>Argument Deconstruction</td>
<td>I</td>
<td>Breaks an argument down to the basic assumptions</td>
</tr>
<tr>
<td>Problem Restatement</td>
<td>I</td>
<td>Reframes a problem statement to consider different issues or causes</td>
</tr>
<tr>
<td>Strength, Weaknesses, Opportunities, and Threats</td>
<td>I</td>
<td>Breaks a situation out into the namesakes four elements</td>
</tr>
</tbody>
</table>

Table 5.3 – Alternative Analysis Techniques Defined (HAD 2004; Mateski 2009; MOD 2013; UFMCS 2011; USG 2009)

Red Team Analysis has the word ‘adversary’ outright in its definition and is identified as an Imaginative Alternative Analysis technique. The categorization of Imaginative implies that it requires a fanciful portrayal of the adversary. Under these circumstances the imaginative or
creative portrayal of an enemy would produce a product not unlike characters in a fictional novel. A definitive structure and categorization is needed to establish a sound foundation on which replication of a selected threat could reliably occur.

Evaluation of Alternative Analysis

All of the 29 different methodologies are weighted against the seven selected case study questions. A rating of High – ‘H’, Medium – ‘M’, or Low – ‘L’ is assigned to each methodology for each question established by the study’s foundation. As a redundant check against bias once all of the questions are considered against a technique the intended goal of the technique is then reconsidered against the case study results and reevaluated as needed. In some cases this means context clues in the procedure’s name or definition were utilized to identify the nature of analysis the methodology attempts to achieve. A detailed discussion of selected techniques follows the presentation of the findings. Table 5.4 highlights the conclusions of the individual results of the analysis. For ease of comparison the original questions are listed below, for specific qualifications see section III. Methodology.

Q1: Do members eliminate Blue based bias?

Q2: Do members develop Red based bias?

Q3: Does the technique explore Red perceptions, beliefs, or ideologies?

Q4: Is a social hierarchy (self-esteem) based mindset formulated?

Q5: Could members formulate new methods of attack?

Q6: Is the method replicable?

Q7: Can team members construct enemy decision matrices?

<table>
<thead>
<tr>
<th>Methodology</th>
<th>Category</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
<th>Q7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative Futures</td>
<td>I</td>
<td>L</td>
<td>M</td>
<td>L</td>
<td>M</td>
<td>M</td>
<td>H</td>
<td>M</td>
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<td>OPFOR</td>
<td>N</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>H</td>
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<td>Activity</td>
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</tr>
<tr>
<td>Red Cell Exercises</td>
<td>N</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>H</td>
</tr>
<tr>
<td>Devil’s Advocate</td>
<td>C</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>H</td>
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<tr>
<td>Devil’s Advocate</td>
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<td>H</td>
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<tr>
<td>Key Assumptions Check</td>
<td>N</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Key Assumptions Check</td>
<td>D</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Contingency ‘What if?’ Analysis</td>
<td>N</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>Scenario Development</td>
<td>N</td>
<td>M</td>
<td>M</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Team-A Vs. Team-B</td>
<td>C</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>‘What if?’ Analysis</td>
<td>C</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>M</td>
</tr>
<tr>
<td>Analysis of Competing Hypothesis</td>
<td>D</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>M</td>
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<tr>
<td>Alternative Analysis</td>
<td>N</td>
<td>L</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Quality of Information Check</td>
<td>D</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Indicators of Change</td>
<td>D</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Brainstorming</td>
<td>I</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Outside-In Thinking</td>
<td>I</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>Red Team Analysis</td>
<td>I</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Deception Detection</td>
<td>D</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Experimentation</td>
<td>C</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>L</td>
<td>M</td>
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<tr>
<td>Logic Mapping</td>
<td>N</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Surrogate Adversary</td>
<td>I</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
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</tr>
<tr>
<td>Wargaming</td>
<td>C</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>H</td>
<td>M</td>
<td>M</td>
</tr>
</tbody>
</table>
Defining the Red Team

The above analysis considered numerous facets and applications of components that comprise Alternative Analysis. As expected a few of the techniques cataloged were unremarkable when compared against the case study questions. This is because the case study questions were designed to identify methodologies founded in the Red Teaming principal of threat replication. Several techniques showed significant results. A detailed discussion of the results presented in Table 5.4 follows. This discussion highlights the significant findings of the case study into Alternative Analysis.

Alternative Futures, an Imaginative technique, scored on the lower end of the spectrum. Constructing an alternative future will require the inclusion of alternative, potentially adversarial, perspectives when considering the motivations fueling outside influence. The methodology, however, does not explicitly target the development of these perspectives. The technique also makes no explicit use of eliminating Blue based bias. The processes needed to develop reliable
exploratory futures relies more on imaginative techniques than adversarial replication. The user is made aware of potential adversarial goals or intentions, but specific mindsets and perspectives are not developed. Alternative Futures is a poor candidate for inclusion in adversarial based category.

As eluded to earlier in the research the OPFOR technique is not a component of Red Teaming. By definition OPFOR, is the antithesis of Red Teaming, offering very little, if any, analytically based adversarial capability. The technique scored moderately when presented with social hierarchy formulation. An OPFOR team would rely on the already established military hierarchy for execution within an event. The moderate rating came as a hierarchical mindset was not established explicitly for the employment of the technique. As stated above this methodology was not originally categorized nor does it neatly fit into any of the available categories. Due to its lack of adversarial replication it is not a candidate for inclusion in the Adversarial category. It does not offer a conflicting point of view to the Blue Team, just an opposing force towards an objective. The OPFOR technique best fits the criteria for Imaginative techniques only because team members must think of ways to oppose the Blue Team.

Red Cell Exercises scored extremely high in the study. Even though the technique was included in only a few of the publications and was uncategorized, it offers an extremely more divergent option than OPFOR. By definition this technique is an Adversarial based technique. The methodology calls for realistic replication of a selected environment. Red Cells are traditionally an office within the intelligence division of the military which offers the predominating source of cultural experts and would likewise supply the majority of the brain power when employing this technique. The only markdown came from question six due to
training. To properly replicate enemy forces Red Team members will have to undergo some form of indoctrination that allows them to replicate the environment.

The Devil’s Advocate procedure is similar and also scored considerably high. This method calls for a replication of the selected enemy’s mindset. It received the same markdown due to indoctrination, but also scored moderately in identifying Blue bias. The current definition of the technique does not call for or imply an explicit accountability of Blue bias when considering an adversarial perspective. It is intended to counter a Blue Team assumption with and adversarial mindset. Teams with an adversarial mindset will be uniquely qualified to present the best case possible for the potential failure of a Blue Team’s selected course of action. This mindset would unequivocally benefit the application of the Devil’s Advocate method.

Many of the following tested methods scored low on the applicability test. Scores for ease of replication remained consistently High, indicating a fairly unconstrained simplicity of use. Blue Biases were moderately targeted and Red Bias was generally neglected all together. A few methods were in need of categorization, including Intentional Failure, Contingency ‘What if?’ Analysis, and Scenario Development.

Intentional Failure asks the user to consider why a given plan could fail. It is identical to Devil’s Advocate methodology only without an indoctrinated team. The processes employed require the user to take the assumption that an aspect of a plan will fail and justify how such a failure would occur. The failure is then considered for realism and plausibility. By requiring the user to take an opposing stance the process is Contrarian in nature. This is the opposite of Contingency ‘What if?’ Analysis and Scenario Development. Both methods are inherently Imaginative. Contingency ‘What if?’ Analysis asks the user to imagine a fictional event and piece together the events that would lead to the fictional events occurrence. Scenario
Development was one of the highest scoring methods that was not considered an Adversarial process. Many of the steps Scenario Development utilizes are similar to Red Teaming, only the end result is a scenario that may or may not replicate an actual adversary.

Many more of the evaluated techniques scored considerably lower than Scenario Development on applicability. The next notable process was Red Team Analysis. This process was one of the highest scoring methods receiving the same mark down as Red Cell Exercises for incurring an indoctrination method. Red Team Analysis also contributed heavily to eliminating Blue bias and establishing a Red perspective and bias. Both are required traits for building a reliable understanding of the enemies’ mindset. A trend in scoring started to emerge at this point in the research. Most Adversarial Analysis methods seemed to score high across the majority of the case study questions, generally receiving a single markdown in the area of replication. Red Team Analysis is an initiative based function; meaning the team only comes together to consider a specific item during a larger process. The Red Team Analysis function is an Adversarial based function because of its indoctrinated properties, but of all of the Adversarial methods it leans closest to the Imaginative category.

A few techniques scored very low on the analysis but could potentially benefit from an application of an adversarial mindset. This was the case with Deception Detection. Initial review of the intent behind the method, identifying deception, commonly shows that an adversaries’ mindset would help to identify the problem set. However, when consulting the definition associated with the method it became clear that adversarial thinking would offer no benefits. The functioning cogs behind Deception Detection perform an evaluation of the collected intelligence’s legitimacy. This process only looks at the reliability of the source and the potential for misinformation to leak through as legitimate. Red based bias would offer little to no help in
this inward looking process. Even though currently not a part of the process, detecting Blue bias would offer much more useful results than considering an enemy’s perspective for internal diagnostic purposes.

Experimentation is listed as a Contrarian technique when it is in fact a Diagnostic technique. The technique works to solve a problem and is thus diagnostic in nature. This is significantly different from the process of a truly Contrarian technique such as Analysis of Competing Hypothesis. This method offers a different hypothesis and attempts to prove it true. Experimentation is based on the scientific process and therefore has very strict rules governing the values and variables at play. Even though the process scored highly in most categories associated with Red Teaming it is not an accurate method for establishing adversarial mindsets. Nevertheless, the Experimentation process could reliably be used to test both Blue and Red based bias for authenticity and completeness.

The Surrogate Adversary and Cultural Capability systems produced results that were identical to both Red Cell Exercises and Red Team Analysis. Both received high marks across all questions except for ease of replication. Surrogate Adversary by definition is extremely similar to Red Team Analysis. Even when the underlying intent of both methodologies is considered each offers nearly identical processes. The differentiating factor comes from the purpose filled by the group when it convenes to apply the technique in practice. A Surrogate Adversary is generally a group that provides a continual adversarial force during an event. The event can vary from table top analysis to comprising the enemy portion of a field implementation with a Red Cell Exercise component. This contrasts Red Team Analysis’ relatively short lived processes that occur as a part of a larger event.
Cultural Capability offers a noteworthy insight into a culture that contrasts the Blue Team. This method requires significant indoctrination and an elimination of bias to offer its full capabilities. This process is a complementary process to Red Cell Exercises that is generally employed to assist with the establishment of a Red Cell Exercise environment. The Cultural capability method also offers significant insight into supplanted persons and how they may react to a new environment. The adversarial component of this technique can be applied in a variety of combinations including, but not limited to; supplanted groups, individuals, and/or the environment itself.

Stakeholder Mapping is the remaining adversarial based analytical technique. The resulting scores this procedure received were atypical of the other identified Adversarial Analysis techniques. The method was the lowest scoring Adversarial technique, having a score similar to other techniques not considered Adversarial. Though not strictly adversarial centric like Red Cell Exercises, the core concept requiring synthesisization of a culture’s contending mindset and perceptions makes this method Adversarial. The technique identifies the motives and goals of teams other than the Blue Team. Doing so requires indoctrination and insight into a potentially confrontational group. The technique is often applied in an effort to understand the Brown Team, a team that has its own agenda outside that of both the Blue Team and Red Team.

The Red Team
Upon close inspection of the techniques that comprise Alternative Analysis’ very roots a void was found. This emptiness encompassed techniques surrounding the Red Teaming concept. Most of Alternative Analysis techniques were grouped into one of three distinct categories. Diagnostic techniques offered means for users to diagnose problems or systematically overcome bias. Imaginative processes encouraged members to think outside conventional means and exercise creativity. Contrarian methods take the opportunity to challenge known facts and
assumptions alike. Approaches that sought to capture an adversarial perspective were almost arbitrarily thrown into one of these three categories by previous publications. Techniques encouraging non-Blue based thinking were placed either in Contrarian or Imaginative categories.

Red Teaming as a whole has previously been encompassed within these three categories. There was little distinction between a scheme that offered an enemy’s perspective and that of a varying opinion. Thorough critical analysis of all the components comprising Alternative Analysis identified the need for a fourth category. Techniques that relied on establishing foreign mindsets and perspectives existed in a void between Contrarian
and Imaginative techniques. The fourth category, Adversarial, completed a transitional advancement in technique evolution from Diagnostic to Predictive.
The relationship between all four categories is illustrated in Figure 5.5. The figure also shows each methodology within Alternative Analysis placed in its appropriate category. A few techniques moved to new categories when analyzed and the figure is reflective of these changes. Each category borrows mechanisms of another as identified by the overlapping. Adversarial techniques utilize a considerable amount of imaginative qualities and offer contrarian viewpoints, whereas Diagnostic techniques work to challenge most conventional thinking through structured investigative processes.

There are six Alternative Analysis Adversarial techniques; Red Cell Exercises, Devil’s Advocate, Red Team Analysis, Surrogate Adversary, Cultural Capability, and Stake Holder Mapping. Each of these skills has the common trait that they all rely on the ability to replicate a mindset foreign to the user. This replication is the core of what makes a Red Team. The analytical techniques within the Adversarial category are the processes that a Red Team will employ.

Red Teaming is charged with understanding and replicating a foreign mindset. The first half of this section selected psychological theories with the capability to facilitate this replication. The following section, V. Conclusions, will consider aspects of the identified techniques of Red Teaming alongside the analyzed psychological theories. The section will draw parallels and identify practical employment concepts that will bring social psychology into the routine practice of Red Teamers.
V. Conclusions

What Was Discovered

Alternative Analysis was poorly defined and partly grouped into three different categories with very rough qualifiers for each. The original constructs of Alternative Analysis and Red Teaming had lost much of their definition and structure due to years of use without a solid foundation. The analysis conducted in the research offers a foundation for Red Teaming that has been lacking within Alternative Analysis.

The inquiry into Red Teaming components of Alternative Analysis led to the formation of a fourth analytical sub-category, Adversarial Analysis as shown in Figure 5.5. This category excludes analytical processes that do not require the formation of an indoctrinating mindset or understanding. Adversarial Analysis is the basis of all processes and applications that are Red Team centric. The unifying factor for analytical traits being the need to develop a mindset foreign to the Blue Team based on the perceptions and biases of an identified individual or group. This foreign thought process, for the purposes of Red Teaming, is the internal thinking and mindset of an adversary.

The literature review not only identified the need for the above inquiry, it also identified that the majority of the processes now identified as Adversarial Analysis had no methodology for establishing an understanding of the selected adversary. A system is needed to help Red Teamers construct the needed mindset without unwanted bias or false perceptions clouding their judgments. Social Psychology was a natural option as it offered many of the processes needed to fulfill Red Team objectives. These Red Teaming objectives are echoed in the unifying factors that underscore Adversarial Analysis principals.
Several social theories were considered for their group and individual properties. These theories are all based on scientific principles of investigation and constructed so that other resources can replicate and apply the theory with relative ease (Brown and Ghiselli 1955). Of the original six theories tested Social Identity Theory and Socio-cultural Theory produced the most desirable results when analyzed against the case study questions, as shown in Table 4.2. To eliminate potential bias in the case study social theories were examined first followed by the constructs and methodologies of Alternative Analysis. This technique eliminated the potential to select a social theory based on identified Adversarial Analysis techniques during the scrutiny of the study. The end result offered independently reviewed social theories and Alternative Analysis methodologies by way of a common rule. The research design proposed seven case study questions that offered a common rule of measure.

**Applicability to Adversarial Analysis and Red Teaming**

This study proposed the question: how can current psychological theory aid Red Teams’ evolution into a capability that offers degrees of threatscapeing analysis and prediction modeling for both symmetric and asymmetric innovative threats? Results of the case study have shown both Social Identity Theory and Socio-cultural Theory offer significant applicability towards this goal. Alternative Analysis has evolved within this research through the comprehensive organization of its processes based on their inherent applicability. Red Teaming specifically has become a defined capability supported by the Adversarial Analysis category of core capabilities.

The Adversarial Analysis core capabilities are all founded in the basic principal of threat replication. Replication is achieved through a unique understanding of the enemy by viewing scenarios through a lens of the enemies’ own perceptions and specific mindsets. Until now there has been no specific methodology or basis in which Red Teams could formulate critical socio-cognitive perceptions. Social Identity Theory and Socio-cultural Theory have both demonstrated
a high propensity for success based on the same examination process that identified the six Adversarial Analysis components.

With all of the components identified and examined for applicability a framework of application needs to be constructed. The framework will allow Red Team members to employ the identified social psychology techniques in order to achieve the desired effects of Adversarial Analysis methodologies.

** Proposed Analytical Structure  
Current Red Teaming indoctrination methods involve some form of exposure to the target culture. This can range from a briefing by a subject matter expert to something as simple as reading a few select articles (Culpepper 2004; MD 2010; UFMCS 2011). Meer exposure to the selected group only allows Red Team members to replicate the methods they have been shown or even worse make decisions with a Blue based mindset thinking it is a legitimate enemy course of action. Any analysis offered would be largely inspired from first impressions, not critically ascertained. Such a unique mix of perceptions and inspirations could offer significant insight and foreshadowing of unique enemy sets. This unique and extremely rare target set may include the homegrown lone wolf terrorist. This paper, however, is designed to lay the foundation on which exploration of such a specific target could later ensue.

Social Identity Theory at its core inculcates the search for the ‘self’ (Brown 2000). A person can have multiple ‘self’ s depending on the number of groups they identify with. The understanding of the ‘self’ comes from the constructs of SIT (Brannan and Strindberg, 2012). SIT is built on a common foundation of two socio-cognitive processes that in turn support three pillars of constants. Social Identity Theory founds itself on the concepts that people will identify as members of varying groups, establishing a social hierarchy of categorization, each group will offer some enhancing effect to the individual, self-enhancement. Once the foundation is
established the three constant pillars offer guidance to the individual’s perceptions and actions. The individual will judge themselves and others based on who is a member of both the in- and out- groups. The same persona will then gauge and base their own self-worth off of their perception of both the in- and out- groups. Finally, an individual’s selected group is measured against contextual traits of non-group members. Ultimately all of these factors surmise to define the end state of SIT as a search by the individual to fulfill two motivations; define the self and seek positive self-esteem (Hymans 2002). This entire process is outlined in Figure 6.1.

Figure 6.1 shows the socio-cognitive process of SIT from start to finish. Contrary to typical illustrations that depict SIT process from a top down approach Figure 6.1 is constructed in a manner that lends itself to Adversarial Analysis.

Figure 6.1 – Socio-cognitive process of SIT
The traditional top down representation of SIT can be seen in Appendix A. The proposed approach showing in Figure 6.1 offers a dual sided method that will enable Red Teamers to apply SIT in a specific step by step manner. The dual sided methodology allows team members to independently evaluate both of the founding processes of SIT and the corresponding pillars before building conclusions. This method identifies how an adversary will categorize itself while identifying in parallel how the same group offers self enhancement to the individual. The evaluation occurs by applying each Process to the Pillars individually before developing a perception. This development results in a synthesis of perceptions that the target group will possess, these perceptions are the basis for qualifying how the group defines itself and offers a positive self-esteem outlook to its members.

Processes and Pillars are gray to signify most of the analysis and evaluation of the target group occur within this processes. Perception and Motivation are shaded in red to signify the information at these stages is vital to Red Teamers. Both Perception and Motivation are by products of the applied SIT construct. Red Teamers are encouraged to focus on these outputs as central pieces of data for establishing indoctrinating principals. By moving continually between Analysis and Perception Red Teamers can fully identify and replicate a select target’s mindset. The replication of a target’s mindset is the common factor underpinning Adversarial Analysis.

**Future Applications**

The systems defined here only offer a start for evolutionary Red Teaming. This research has shown that the benefits social psychology brings to Red Teaming could dramatically improve its capabilities as a threatscapeing capability. Red teaming is only a supportive step in the entirety of the Alternative Analysis process. Alternative Analysis itself is only a portion of the much larger threatscapeing discipline of prediction and study. The larger construct of threat replication is demonstrated by Figure 6.2.
This study’s in-depth analysis established the foundation for the continued advancement and application of threat replication. This foundation is articulated in Figure 6.2, the Threat Replication Pyramid. The research exhibited the need for threat replication to be based on a psychological understanding of the target as well as qualifying Red Teaming as a sub-category of Alternative Analysis. Other researchers have shown that the top tiers also hold a severe deficiency in application and structure. Even though this research stops at the third tier, Red Teaming, all of a Red Team’s efforts are for naught if their findings are not heeded and applied to doctrinal pathways as called for by the top two tiers. Post exercise evaluations, or debriefings, offer the single most effective method to capture and quantify Red Team findings for the Blue Team’s edification and evolution (Matherly 2013). Future inquiry of the top tiered steps, Debriefing and Application, would complement this research and complete the fundamentals for application of Red Teaming from start to finish.

![Threat Replication Pyramid](image)

Figure 6.2 – Threat Replication Pyramid
Final Conclusions

This research set out to investigate if the application of psychological theory to Red Teaming could assist in the evolution of a threatscapeing function with a predictive ability. The case study presented an in-depth analysis of major psychological theory and Alternative Analysis. Significant findings resulted in each evaluation. The most notable of all was the formation of the Alternative Analysis sub-category; Adversarial Analysis.

A prospective methodology for the application of Social Identity Theory to Adversarial Analysis was proposed. The method allows Red Team members to identify key characteristics behind an adversary’s perception, thus enabling Team members to replicate the enemy with similar perceptions and to follow a similar decision matrix.

The result of the findings with Social Identity Theory only warrants further research. The preceding research demonstrated the need for inclusion of psychological analysis in Red Teaming. It also established SIT’s ability to increase the predicative nature of Red Teaming. This helped establish a foundation for Red Teaming comprised of Adversarial Analysis and the methodologies it contains. The next step in increasing Red Teaming capabilities would be the application of the foundations established in this research in full and small scale Red Teaming vignettes. Continued research will only benefit the threatscapeing discipline as a whole and further refine methodologies for precision application.
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APPENDIX A. Traditional SIT Construct

Figure A.1 - Traditional SIT Construct (Tajfel 1978)