

**Violent Systems:
Defeating Terrorists, Insurgents, and
Other Non-State Adversaries**

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TABLE OF CONTENTS

Foreword	vii
Executive Summary	ix
Adversary	3
Violent Systems	6
The Environment as a System	7
VNSA as a System	12
VNSA Subsystems	22
Support Subsystem	23
Maintenance Subsystem	31
Authority Subsystem	35
Conversion Subsystem	43
Life Cycle Vulnerabilities	47
Coerce	52
Narrow and Broad	54
Rational Choice	55
Exceptions	56
Deterrence Strategy	61
Conquer	69
Principles	70
Conclusions	88
Notes	91

FOREWORD

We are particularly pleased to publish this fifty-second volume in the *Occasional Paper* series of the United States Air Force Institute for National Security Studies (INSS). This important paper continues the work begun by Troy Thomas and Stephen Kiser in *Lords of the Silk Route: Violent Non-State Actors in Central Asia*, INSS Occasional Paper #43, May 2002. The Thomas/Casebeer team now adds a biological system overlay to the systems model of violent non-state actors (VNSA) that was presented in *Lords*. This more fully developed VNSA model then lends itself to analysis toward designing tailored strategies to coerce/deter particular VNSA depending upon their specific stage of development, characteristics, and leverage points. Further, their model demonstrates that should deterrence fail, this same biological/ systems framework can be used to design equally well-tailored strategies to fight and defeat specific VNSA.

This development is neither simple nor simplistic—it is based in sophisticated application of hard and social sciences to complex organizations and environments. However, the journey of discovery is worth the effort: the oft-voiced generalization that VNSA are undeterrable is directly challenged by this work; and the extremely difficult task of crafting warfighting strategies for new adversaries and situations is also directly advanced. INSS is proud to commend this second offering in an important research series by a team of incredibly talented young officers.

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JAMES M. SMITH
Director

EXECUTIVE SUMMARY

Inter-state war no longer dominates the landscape of modern conflict. Rather, collective violence and challenges to the international system come increasingly from violent non-state actors (VNSA). With few exceptions, VNSA play a prominent, often destabilizing role in nearly every humanitarian and political crisis faced by the international community. The broad spectrum of objectives and asymmetric methods of these contemporary Barbary Pirates fractures our traditional conceptions of deterrence and warfighting. We contend that deterrence remains a viable strategy for meeting their challenge if adapted to an understanding of VNSA as dynamic biological systems. The prolonged utility of deterrence hinges on insight into VNSA life cycles and a broader conception of the psychology inherent to organizational decision-making. Bundled as “broad biological deterrence” (BBD), we develop deterrent strategies that tackle the VNSA threat throughout its life cycle.

However, we also realize that deterrence may not work in every case. This sets up a counter-VNSA (C-VNSA) strategy that goes beyond coercion to the defeat of the enemy. At its core, our C-VNSA strategy defeats a VNSA by: 1) denying the negative entropy, or stores of energy, required to survive attack; and 2) disrupting congruence, or fit, among sub-systems to achieve system failure. By also understanding the indicators of organizational change during its developmental life-cycle, preemptory defeat before the VNSA reaches maturity becomes feasible. Importantly, our approach allows for measuring campaign progress by assessing changes in VNSA effectiveness. Thus armed, prospects improve

for inter- and intra-governmental collaboration, on-target intelligence collection and analysis, and successful execution of a multi-faceted, effects-based strategy.

Our work is not a panacea, but it should add multiple dimensions to a strategy that sometimes focuses too much on the product of the system and not enough on the system itself. Our inter-disciplinary application of open systems theory provides a powerful framework for diagnosing adversaries, shaping their development, and structuring an effects-based strategy for coercion and conquering. It is a global approach to a global challenge.

VIOLENT SYSTEMS: DEFEATING TERRORISTS, INSURGENTS, AND OTHER NON-STATE ADVERSARIES

Troy S. Thomas and William D. Casebeer

Interstate war no longer dominates the landscape of modern conflict. Rather, collective violence and challenges to the international system come increasingly from violent non-state actors (VNSA). With few exceptions, VNSA play a prominent, often destabilizing role in nearly every humanitarian and political crisis faced by the international community. From the *fedayeen* in Iraq to the warlords of Afghanistan to the drug lords of Colombia, the United States (US) and its allies are engaged in open conflict with highly adaptive, transnational organizations. As non-state armed groups gain greater access to resources and networks through global interconnectivity, they have also come to dominate the terrain of illegal trade in drugs, guns and humans. The broad spectrum of objectives and asymmetric methods of these contemporary Barbary Pirates fractures our traditional conceptions of coercion and warfighting. Successfully countering VNSA across the geopolitical landscape is complicated by a host of factors, including but certainly not limited to the dynamic, adaptive character of the threat and the difficulty of developing and implementing a coherent strategy that engenders measurable victories.

This paper establishes the interdisciplinary application of systems theory as a valuable framework and methodology for understanding the adversary in a manner that facilitates the coercion and defeat of the full range of VNSA: Hezbollah to Revolutionary Armed Forces of Colombia (FARC) to the Basque Fatherland and Liberty (ETA) group. In applying systems analysis to this

Thomas and Casebeer—Violent Systems

intensifying problem, we begin by defining the VNSA and providing general adversary characteristics. We follow with a robust discussion of systems theory, outlining its general principles and laying out the three levels of analysis framework: environment, VNSA systems, and subsystems. The environment, or supersystem of violence, is reviewed by drawing out the key points of a previous Institute for National Security Studies (INSS) Occasional Paper (#43), *Lords of the Silk Route: Violent Non-State Actors in Central Asia*, by Troy S. Thomas and Stephen D. Kiser. At the second-level analysis, we debut the general characteristics of the VNSA as a system and introduce the seminal concept of life cycle, which is essential to understanding the continued, although changed, value of coercion. Moreover, this section introduces key organizational properties, such as negative entropy, which is central to understanding how VNSA survive crises. By going inside the adversary to look at its four subsystems—support, maintenance, authority, conversions—we reveal how each contributes to negative entropy, system congruence, learning, and other key behaviors that inform the prosperity, adaptability, and survival of VNSA.

Based on this pioneering understanding of our adversary, we lay out a strategy for coercing and conquering the VNSA. The first of this paper's two strategy pillars is an examination of the continued utility of coercion, and more specifically, deterrence. We contend that deterrence remains a viable strategy for meeting the challenge if adapted to an understanding of VNSA as dynamic open systems. The prolonged utility of deterrence hinges on insight to VNSA characteristics and life cycles as well as a broader conception of the psychology inherent to organizational decision making. Termed "ecological deterrence," we introduce deterrent

strategies that tackle the VNSA threat throughout its life cycle. When coercion fails, disruption and defeat are often the goal, particularly in the context of a global war against terrorism. To this end, the examination of VNSA inner workings reveals the sources of strength and critical vulnerabilities important for the second strategy pillar. In turn, these vulnerabilities set the stage for a counter-VNSA (C-VNSA) strategy that goes beyond coercion to the defeat of the enemy. At its core, our C-VNSA strategy defeats a VNSA by (1) denying the negative entropy, or stores of energy, required for VNSA to survive attack, and (2) disrupting congruence, or fit, among subsystems to achieve system failure. Moreover, understanding indicators of subsystem change during a life cycle may enable a preemptory defeat before the VNSA reaches maturity. Rather than concentrating on countering the specific tactics of terrorism and guerilla operations, this strategy has universal application due to its innovative emphasis on disrupting congruence among organizational subsystems. Importantly, our approach also allows for measuring success by assessing changes in VNSA effectiveness. Thus armed, prospects improve for intergovernmental and intragovernmental collaboration, intelligence collection and analysis, and successful execution of a multifaceted, effects-based strategy.

ADVERSARY

Our purpose is complicated by the wide range of VNSA, as well by their unique properties, methods, and objectives. One can easily identify at least eleven discernable VNSA types (“species,” to use the ecological metaphor), although numerous variations are certain to exist: militant religious movements, transnational criminal organizations (TCOs), ethno-political groups, warlords

Thomas and Casebeer—Violent Systems

with private militias, tribes or clans, city states (regionalism), eco-warriors, ideological political parties, private security firms, and multinational corporations. Importantly, many of the most beguiling VNSA are hybrid organizations, embracing multiple, reinforcing identities. For example, the Islamic Movement of Uzbekistan (IMU) purports to be a militant Islamist movement; however, its involvement in the opium trade earns it the additional label of TCO. Although non-state actors are not new, globalization has contributed to a sea change in the character and reach of terrorist organizations. Networked organizations extend across borders, and rely on advanced information technology to move finances and information.

To bind the problem set, we define VNSA as a *non-state organization that uses collective violence*. As social entities, VNSA have an “enduring membership and specifiable authority relationships.”¹ Social movements, one-time demonstrations, and even some revolutions do not fit within the context of this non-state actor definition. A second criterion is the reliance on collective violence, which is coordinated violent action by group members in pursuit of common ends.² The VNSA approach to collective violence challenges Carl Philipp Gotlieb von Clausewitz’s concept of Trinitarian war: “organized mass violence” waged by the state for political ends.³ Trinitarian war is based on the Napoleonic model and remains the guiding construct for modern warfare. But VNSA do not engage in “modern” warfare. They are not strictly postmodern or premodern, but rather reflect characteristics that precede the birth of the nation state in 1648 while embracing elements of 20th century total wars. VNSA are certainly not states,

nor do they mobilize the populace to serve in organized, hierarchical armies.⁴

In terms of specific methods, VNSA most often engage in highly organized violence with limited participation on a small scale, also known as conspiracy violence.⁵ Tactics trend toward the asymmetric, including violent crime, guerrilla operations, terrorism, and in some rare cases, cyber warfare. VNSA excel in asymmetric collective violence on three levels: weapon, strategy, and actor.⁶ At the first level, the VNSA employs asymmetric weaponry. For example, the irregular forces of Somali warlord Mohammad Farrah Aideed were able to bring down highly advanced Blackhawk helicopters with relics of the Soviet arsenal, the rocket propelled grenade.

VNSA really shine at the second level of asymmetric war—strategy—which is important to understand given the relational nature of deterrence. VNSA rely on what military strategist B.H. Liddell Hart calls the indirect approach, attacking vulnerabilities while simultaneously avoiding direct engagements.⁷ We know, for example, that some VNSA such as the Aum Shinrikyo of Japan seek weapons of mass destruction (WMD) while others such as Hamas in the Palestinian Territories attack with human bombs. The third level of asymmetry focuses on war between dissimilar actors as in the state and non-state nature of our current war on terrorism. The Filipino army's fight against the Abu Sayyaf, or Spain's persistent contest with the ETA, are sound examples.

Most importantly, VNSA do not always employ force to achieve political ends as conventionally understood. While many VNSA do seek change in the political system, others employ violence for nontraditional reasons, or what some have called post-

Thomas and Casebeer—Violent Systems

heroic goals. Collective violence is often a means to destroy a feared or hated people (i.e., ethnic cleansing), perpetuate criminal activities, or protect turf. In the most extreme cases, violence is an end itself. Moreover, the strictest interpretation of Trinitarian war does not help us understand or deal with an adversary that is not just seeking to shift power in the system, but seeks to overthrow the entire system from outside that system. On 15 November 2001, Taliban ruler Mullah Mohammed Omar told the BBC “the current situation in Afghanistan is related to a bigger cause: the destruction of America.”⁸ This is what Michael Ignatieff, Director of the Carr Center for Human Rights Policy, calls “apocalyptic nihilism.” He argues, “the apocalyptic nature of their goals makes it absurd to believe they are making political demands at all. They are seeking the violent transformation of an irremediably sinful and unjust world.”⁹

VIOLENT SYSTEMS

Systems theory serves as the diagnostic model for VNSA threat analysis and strategy development. This approach, derived from the general systems theory of Ludwig von Bertalanffy, conceptualizes a system as an “organized cohesive complex of elements standing in interaction.”¹⁰ Interaction refers to two generalized patterns of behavior: 1) the relationships among the “complex elements,” or organizational subsystems; and 2) the relationship between the VNSA system and its environment, or supersystem. The former constitute the transformational processes of the VNSA, while the latter draws attention to the reality that organizations are open systems, continually exchanging information and energy with the environment.

As systems theory has matured, its benefits have been clarified. Thomas G. Cummings summarizes the positive “fallout” from systems thinking in his foundational book, *Systems Theory for Organizational Development*. Systems thinking

- 1) enables thinking about organizations at a higher level of abstraction; it requires thinking in terms of general characteristics rather than thinking about a particular organization or similarities between particular organizations;
- 2) transcends the branches of science;
- 3) provides a common language for understanding organizational phenomena;
- 4) enables thinking in relational terms rather than things, leading to a process oriented and contextual views of organizations;
- 5) stimulates holistic appreciation of whole properties of an organization;
- 6) leads to an appreciation for two kinds of meaning explanation, the first being traditional deductive analysis derived for logic and the second being pattern analysis from the “gestalt processes of the human mind;”
- 7) gives the potential for world defining by the organization itself.¹¹

In organizational theory, diagnosis is the process of employing conceptual models and methods to assess the target organization’s condition in order to solve problems and increase performance.¹² Our approach applies systems analysis to a different, but related purpose: solving threat assessment problems in order to decrease and deny VNSA performance. Diagnosis is not just about collecting and analyzing intelligence; it requires building actionable knowledge in order to anticipate threats, implement a C-VNSA strategy, and importantly, assess effects.

The Environment as a System

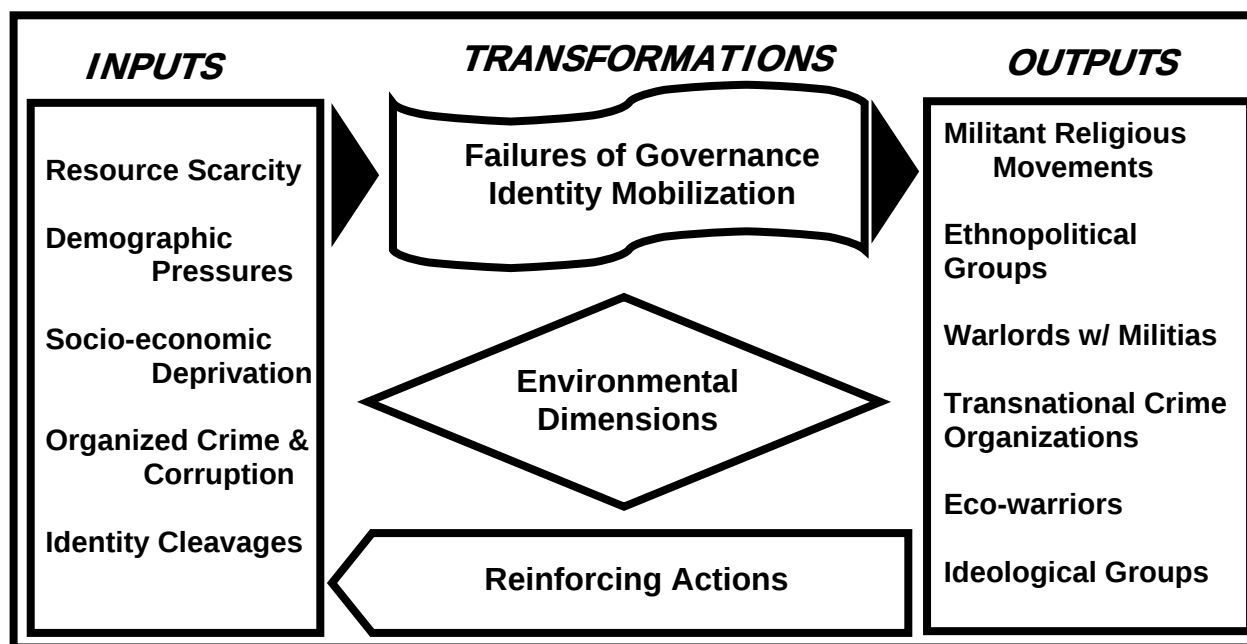
The first level of analysis is the environment. This approach has already been applied to an understanding of the system of

Thomas and Casebeer—Violent Systems

violence from which VNSA are most likely to emerge. In *Lords of the Silk Route: Violent Non-State Actors in Central Asia*, Troy Thomas and Stephen Kiser introduce a supersystem model that provides insight to the inputs, transformations, and outputs that produce non-state groups employing collective violence to achieve a broad range of goals.¹³ As shown in Figure 1, the key elements are the roots of violence as inputs, conversions, VNSA as outputs, and environmental dynamics. These system elements interact in a highly dynamic, causative manner to spawn VNSA and feed their growth. The framework captures divergent factors too often examined in isolation, drawing attention to the key relationships that amplify the cycle of violent collective action. It also clarifies the ever changing organizational character of VNSA; they are moving targets.

The roots of violence identified here have explanatory power regarding the formation of an at-risk population, ripe for mobilization along existing identity cleavages such as family, region, religion, or socioeconomic class. From among the varied sources of human insecurity, we contend that resource scarcity, demographic pressures, socioeconomic deprivation, organized crime and corruption, and identity cleavages are most likely to make individuals susceptible to mobilization. Each root places significant stress on the individual, civil society, and state. There is no absolute threshold for collective violence; however, severe stresses in any one area may be sufficient to engender a sense of individual desperation. Grave stresses across the board are a strong indicator that VNSA will enter the gestation phase of their life cycle.¹⁴

Figure 1: Violence as a System



Violent collective action on a widespread scale is rarely the spontaneous outgrowth of system inputs. The roots of violence create the conditions and shape individuals to be ripe for mobilization into a group. For mobilization to actually occur, there must be a transformational process. Current research focuses almost solely on state failure as the primary catalyst. We agree that a weakened state is a key intervening variable.¹⁵ Research by the Central Intelligence Agency's State Failure Task Force concluded that a combination of three variables could correctly predict state failure two thirds of the time: infant mortality, openness to trade, and level of democracy.¹⁶ States like Somalia that provide no basic health services, or Turkmenistan that embrace official corruption, or Nigeria that have not completed a democratic transition, are poorly positioned to sustain a loyal, docile citizenry. In these cases and many others, failures in governance begin when significant segments of the population perceive the state as incapable of managing these three, intercorrelated variables. If the state has the accommodative capacity to address the needs of the disaffected, however, then the system of violence will be interrupted while the VNSA is still in gestation.

The state may also do nothing, which is likely because it either lacks the capacity, or it chooses not to address the grievances. Both fertilize the soil of discontent; however, the latter is more likely to accelerate mobilization. For example, the Zapatista National Liberation Army (EZLN) of Chiapas, Mexico, emerged out of dire socioeconomic conditions as well as a popular perception that Zapatistas were politically ignored. According the EZLN leader, Subcomandante Marcos, "the modern state cannot be oligarchic in the sense of excluding the masses from politics; it is obliged to

work with them.”¹⁷ Referring to social conditions, he argues, “Education? The worst in the country. At the elementary school level, 72 out of every 100 children don't finish the first grade. More than half of the schools only offer up to a third grade education and half of the schools only have one teacher for all the courses offered.”¹⁸

The state may also respond with a heavy hand, which we contend also constitutes a form of failure. Here, the state employs the tools of coercion in an attempt to silence, stifle, or even destroy that sector of the populace that is expressing its discontent through nonviolent means.¹⁹ The reasons vary but center on the state concluding it can no longer count on the fabric of shared values to hold it together; the basis of state authority in such situations then shifts to the unstable solution of coercion.²⁰

A persistent failure to accommodate the population's expectations, or the resort to coercion, is a necessary but not sufficient condition for VNSA mobilization. We assert that identity mobilization, as part of an organizational life cycle, is an equally potent explanatory factor. The loss in regime legitimacy undermines attempts to constitute a “citizenry,” allowing existing identity cleavages to absorb the wandering loyalties of a disaffected people. These identity cleavages, which may be along biological, regional, socioeconomic, or religious lines (or a combination of these and others), are the embryonic “growth factors” for gestating VNSA. For mobilization to progress there must be additional ingredients, including an “identity entrepreneur” to create or reinforce the identity cleavage, resources to fuel the process, and some degree of organizational cohesion. The maturity of the VNSA

Thomas and Casebeer—Violent Systems

is directly related to the maturity and availability of these ingredients over the course of its life cycle.

The process is dynamic. The actions of VNSA can have reinforcing effects, perpetuating the cycle of violence. While it is true that some VNSA do act with the intent of improving their communities or for some perceived public good, the groups we are focused on generally pursue less noble objectives such as increasing profit margins or eradicating a rival group. To this end, they benefit by the deepening of the roots of violence, which in turn increases their recruiting pool. These VNSA also thrive on the margins of state authority and civil society's influence. By reinforcing the cycle of violence, they gain greater autonomy of action. State coercion may constrain their growth in the short term, but over the long run it serves to legitimize the violent response.

The output of our system is the VNSA, which can be distinguished by its unique life cycle and the previously discussed objectives and preferred forms of collective violence. The output is not a mature armed group capable of rational choice, but rather an embryonic group that must move through its life cycle before it is prepared to pursue prioritized goals.

VNSA as a System

We introduced VNSA as non-state organizations with specifiable members and authority relationships, employing conspiracy violence to achieve goals. This basic definition implies a formal organization, which can be analyzed through the lens of modern structural organization theory. As with other organizations, such as corporations or bureaucracies, the structural emphasis fails to capture the dynamic reality of a VNSA like the Provisional Irish Republican Army (PIRA) and others. Our analysis must go beyond

formal theory to appreciate the organic character of the VNSA. Effective C-VNSA strategies require analysis of a VNSA as an open, cooperative system that evolves over the course of an organizational life cycle.

Like the modern nation-state, VNSA are generally treated as formal institutions with no developmental history. In the language of structural organization theory, they are seen to “represent rationally ordered instruments for the achievement of stated goals.”²¹ Rationality is achieved through defined rules and highly institutionalized relationships, which allow the entire structure to become subject to manipulation, i.e., an instrument of rational action.²² To achieve this high degree of control and coordination, the formal organization is also treated as a closed system. It is seen as a self-contained unit, functioning independently of changes in its environment.

This approach fails to deliver an accurate picture of the VNSA (and most organizations for that matter) for three key, interrelated reasons. First, the formal structure never fully succeeds in “conquering the nonrational dimensions of organizational behavior.”²³ An informal structure exists as well, which deviates from the well-defined roles imposed by the rational structure. Philip Selznick wrote, in his seminal article, “Foundations of the Theory of Organizations,” that individuals have a “propensity to resist depersonalization, to spill over the boundaries of their segmentary roles, to participate as *wholes*.”²⁴ The formal structure cannot adequately accommodate the deviations from rationality introduced by individual action. Thus, it is better to view VNSA as cooperative systems, consisting of “individuals interacting as wholes in relation to a formal system of coordination.”²⁵

Thomas and Casebeer—Violent Systems

As cooperative systems, VNSA are also open systems. The rationality of the organization cannot be simplified by examining them independent of their environment and static in time. The closed system approach is appealing, particularly since it allows us to apply the laws of physics to organizational behavior and control for environmental change. While convenient, the approach denies the reality that organizations are also living, social entities, adapting to a dynamic environment and simultaneously impacting the environment by their actions. As argued by Daniel Katz and Robert Kahn in their important text, *The Social Psychology of Organizations*, the open systems approach frees us from the shackles of physics and leads us to the more apt science of biology.²⁶

The VNSA as open system can be understood in terms of several key characteristics, which directly relate to the system of violence examined earlier.²⁷ These groups share certain system characteristics:

- importation of energy;
- throughput (energy conversion);
- export of product to the environment;
- cyclic pattern of activities;
- negative entropy;
- feedback and coding; and
- dynamic homeostasis, or the preservation of system character.²⁸

These characteristics can be easily observed.

The FARC offers a worthwhile illustration of these features. The VNSA imports some form of energy from the environment. The FARC imports recruits as well as guns, training (PIRA urban tactic training since 1998), and drug monies. Second, the FARC

converts, or transforms the input into a trained guerrilla. Third, the reorganized input is exported to the environment; the FARC recruit joins a unit and conducts attacks on Colombian armed forces. Fourth, this pattern of activity is cyclic; the attacks generate new inputs—recruits, resources, governmental responses, etc. In a clear rejection of the closed system approach, the VNSA seeks negative entropy. That is, it seeks to arrest the entropic process of inevitable disorganization and death by importing more energy (recruits, guns, funds) than it expends.²⁹ Indeed, it is this adaptive characteristic that has enabled the FARC, and most likely, al Qaida, to survive periodic increases in counterinsurgency and counterterrorism efforts. Sixth, the energy inputs are also informative, providing the VNSA with intelligence about its environment. An increase in drug monies provides the FARC with intelligence on a changing drug market. Defeat in combat provides the negative feedback often required to drive a fundamental shift in tactics as seen with al Qaida after the pitched battle of Tora Bora.

At the systems-level, our analysis also explores three often over-looked, but critically important organizational properties: negative entropy, congruence, and life cycles. *Negative entropy* is essential for survival. Organizations must overcome “the universal law of nature in which all forms of organization move toward disorganization or death.”³⁰ Social organizations, because they are open systems, can import more energy from the environment than is immediately required and store it for use during periods of crisis, such as a concentrated counter-insurgency campaign. Smart VNSA will recognize their impressive ability to continuously arrest the entropic process and build their reserves to ensure a “comfortable margin of operation.”³¹ Until the negative entropy pond is drained,

Thomas and Casebeer—Violent Systems

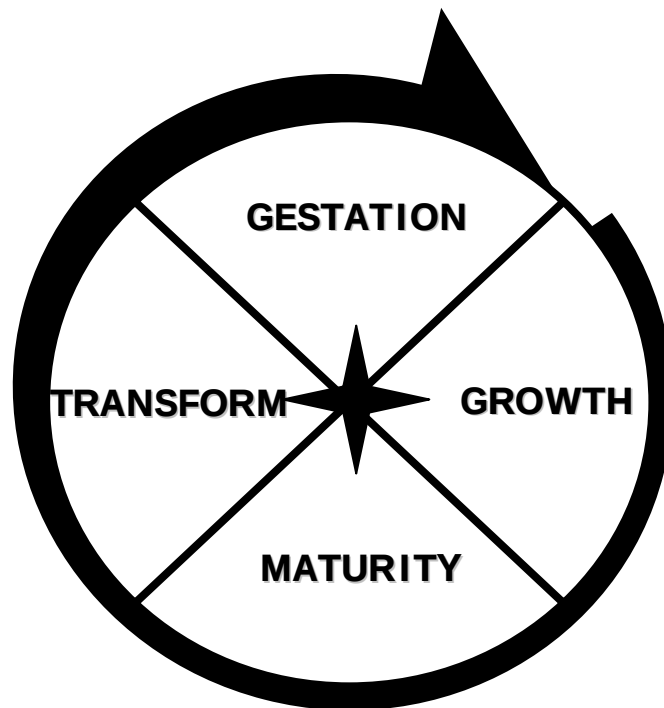
the VNSA will retain the energy required to survive even if it is just a few members clinging to a persuasive ideology.

Inducing positive entropy at the supersystem and system-level can also have a significant short-term impact on the congruence of the targeted VNSA. *Congruence*, sometimes referred to as fit or alignment, is an open systems term used to describe “relations among internal system components and between organizations and their environments.”³² A VNSA has good congruence when its internal elements, or subsystems, are functioning in a reinforcing manner and optimizing coordination and information exchanges so as to reduce inefficiency and uncertainty.³³ Good congruence is also evidenced by good matches between environmental opportunities/constraints and system functions. Al Qaida demonstrates good environmental-system congruence by shifting to soft-targets in Africa when the hardening of targets in the US and Europe make operational success less likely. Misfit, or bad congruence, can contribute to organizational failure. ETA shows poor congruence when it recruits undisciplined youth to carry out highly complex attacks that demand strict adherence to operational secrecy. VNSA that cannot adapt their organizations to the external environment, or achieve some degree of harmony among internal functions, are likely to not only expose themselves, but struggle to evolve beyond gestation.

The importance of viewing the VNSA as a cooperative system in an open system of violence leads to the final reason for rejecting formal organization theory: organisms have life cycles. They do not spontaneously appear on the international scene as mature beings with well-ordered structures and patterns of activities. Rather, they pass through a distinct series of stages in form and

function. The organizational life cycle shown in Figure 2 parallels that of an organism, transitioning from gestation through growth to maturity. Decline normally follows maturity; however, the ability of VNSA to acquire negative entropy suggests the need to think in terms of transformation rather than an inevitable death, although it may very well be that a subset of possible transformations includes elimination. Despite the chronological sequencing, each stage is highly interrelated. A mature VNSA like the IRA continues to experience aspects of gestation, growth, and transformation as it interacts with its environment.

Figure 2: VNSA Life Cycle



The life cycle begins with gestation, or the initial conception of an idea for collective violent action. At gestation, the idea is no

Thomas and Casebeer—Violent Systems

more than an embryo in the minds of one or several identity entrepreneurs who are part of an at-risk identity cleavage. Gestation occurs at the intersection of the roots of violence and failures in governance in our supersystem model. At this crossroads, the identity entrepreneurs are engaged in environmental scanning. These future VNSA leaders are evaluating the state's response to the salient roots of violence and drawing conclusions about the need and prospects for violent action as a means to achieve unspecified goals of survival, political power, profit, or even vengeance. The organization has yet to take form or differentiate its functions; there are no recruits, training programs, facilities, or sustainable resources. Although gestation may involve rational decision making by the identity entrepreneurs, there is a distinct lack of organizational rationality.

The Yomud tribe of Turkmenistan, for example, is a strong candidate for an embryonic VNSA. Already a non-state group with identifiable leaders, the deep roots of discontent and continued state failure by the enigmatic regime of Turkmenbashi (dominated by the Tekke tribe) are probably sufficient to lead tribal leaders to conceive of violent action as an option to continued socioeconomic decay and political marginalization. Because of its lack of form, the gestating VNSA is the most difficult to identify, but is also the most susceptible to a deterrence strategy of environmental shaping. At this stage, the VNSA may be articulating a foundational mythology justifying its existence, and may be actively creating exemplars that "fall out" of these myths and stories.

The VNSA moves from gestation to growth of subsystems at the point when goals are specified, an organization takes initial form, and basic functions ensue. Growth occurs at the intersection

of state failure and identity mobilization with gestation continuing as long as the roots of violence persist. The development of specific, prioritized goals by VNSA leadership as part of the authority subsystem opens the door to traditional deterrence; however, the adolescent nature of the organization limits the group's ability to differentiate alternatives, assess outcomes, and orchestrate functions that consistently reflect purpose.³⁴ The VNSA remains heavily focused on recruitment, developing resources and establishing an organizational model (hierarchical, network, cells, etc.) to eventually conduct a sustained campaign of violent action. While sporadic violent acts can be expected during the growth stage, these are more likely to establish legitimacy, enhance recruiting, collect intelligence, and test tactics.

By way of example, the Uighur militants of Xinjiang Province in China are a growing VNSA. Enver Can, President of the East Turkestan National Congress, leads a political front to a grassroots separatist movement, which is based largely in Kazakhstan and Kyrgyzstan. Uighur militants received training and resources from the Taliban and Al Qaida in Afghanistan and have conducted several small-scale bombings and assassinations against Chinese officials and facilities throughout Xinjiang.³⁵ The movement remains adolescent due to a diffuse and informal organization, limited resources, and pressure from the Chinese government. Indeed, US operations in Central and South Asia have also contributed to the Uighur's decline, forcing transformation before maturity is even reached.

It is in maturity that the VNSA achieves its closest approximation to the formal organization of structural theory, thus providing the greatest opportunity for the application of rationality

based deterrence strategies. A mature VNSA has completed its development, achieving the form and functions that are optimal, or nearly so, for it to achieve specified, prioritized objectives. The VNSA engages in environmental scanning, reorganizes inputs and exports a product back to the environment. Patterns of activity, authority relationships, and membership are all discernable, and preferred forms of conspiracy violence are actively employed as part of a sustained campaign.

Importantly, functions are differentiated in a process known as progressive mechanization; organizations shift toward greater elaboration and multiplication of increasingly specialized roles.³⁶ Progressive mechanization recognizes that the patterns of regulation in an embryonic organization involve dynamic interaction.³⁷ As the organization reaches maturity, “fixed arrangements and conditions of constraint are established which render the system and its parts more efficient, but also gradually diminish and eventually abolish its equipotentiality.”³⁸ Essentially, the mature organization may be more efficient, but it also loses its equifinality, or ability to achieve its optimal performance in relation to its environment.³⁹

Progressive mechanization and the increased rationality it engenders are to blame for making the VNSA more vulnerable to traditional deterrence or even conventional warfighting upon maturity. As an example, the Al Aqsa Martyr’s Brigade emerged as a mature organization on 12 October 2000 during a paramilitary parade in Nablus, Palestinian Territories.⁴⁰ According to David Eshel, reporting for *Jane’s Intelligence Review* in June 2002, the brigades were “a loose coalition of irregulars, hurriedly trained in basic individual combat and equipped with privately owned small arms. Operatives wore plainclothes and limited their activities to

roadside shootings....”⁴¹ This growth phase included efforts to create a formal military organization, establish infrastructure, acquire arms, develop tactical leadership, and attract recruits to their secular version of the Hamas suicide squads. Upon maturity, a cell-based structure emerged under the senior command of Marwan Barghouti. Progressive differentiation was evidenced in the formation of an intelligence division (environmental scanning), military logistics division, special combat teams, suicide bomber volunteer forces, and chapters in at least six West Bank towns.⁴² Additionally, the Brigades clarified their goals: 1) end Israeli occupation, and 2) create a sovereign Palestinian state. Although not deterred from its bombing campaign by the Israeli Defence Forces (IDF), the mature Brigades were sufficiently developed to make instrumentally rational choices and direct organizational behavior on this basis.

Ultimately, progressive differentiation left the Brigades vulnerable to direct military action, as evidenced by the temporary destruction of their infrastructure and capture of senior leaders during Israeli military operations in April 2002. The result is the transformation of the Brigades, which serves as just one example of how a VNSA may transform over time. The VNSA can survive transformation in two key ways. First, it can choose to end hostility due to a fundamental change in state capacity or policy. This outcome is often the purpose of efforts to build nation states through good governance programs while simultaneously negotiating a peaceful resolution to the conflict. This approach is currently underway in Burundi, the Democratic Republic of the Congo, Indonesia, and elsewhere. Second, the VNSA can suffer a devastating blow, which would normally result in its ultimate death

unless it has built sufficient negative entropy. In the case of the Brigades, the decentralized organizational structure, rich supplies of arms, and ready access to external resources from countries like Iraq and Iran suggest it has sufficient negative entropy to weather this storm. Indeed, Israeli defense and intelligence officials fully expect the Brigades to successfully rebuild their operational capabilities.⁴³ Like the Brigades, the longevity of al Qaida, the IMU, FARC, and others will depend on their ability to navigate the transformation stage. In rare cases, the VNSA can even be co-opted by the government and become a state agent, as in the attempted co-optation of militant Palestinian groups by the Palestinian National Authority.

VNSA Subsystems

Our diagnostic plan is rooted in the three levels of systems analysis.⁴⁴ Thus far, we have introduced tools for assessing the environment in terms of broad inputs, transformations, and outputs. We have also defined whole system properties and championed the value of life cycle analysis to more accurately characterize the threat. By now diagnosing VNSA subsystems, we complete our dissection of the organism, revealing vulnerable relationships and enabling an effects-based C-VNSA campaign of coercion, disruption, and ultimately defeat.

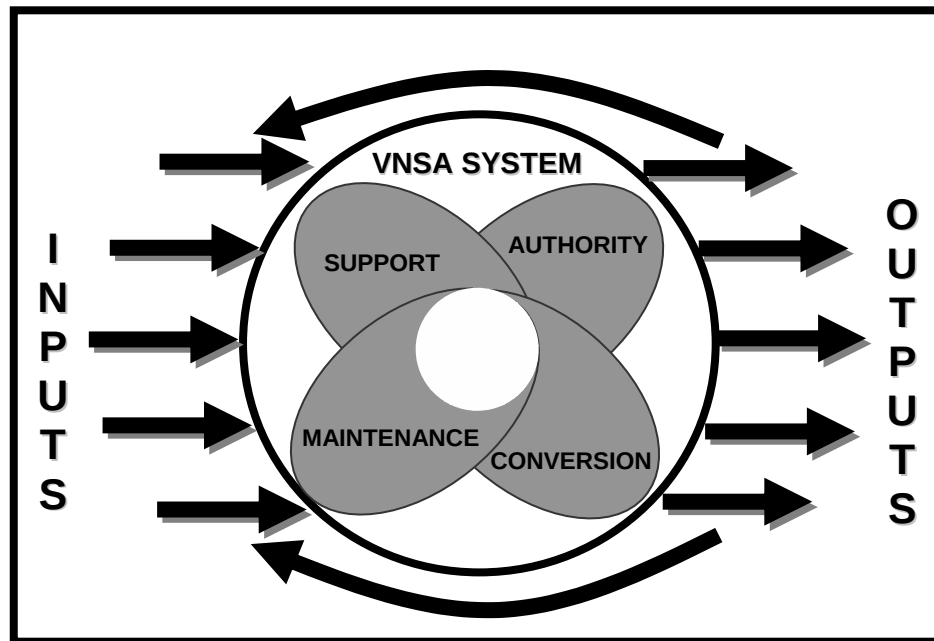
Subsystems carry out the conversions, the throughputs or energy reorganizations. All organizations are made of similar subsystems and functions. VNSA do vary, primarily in terms of the character of interfaces with other subsystems and the environment. Collectively, the subsystems do not equal the system since the system is more than, or at least different than, the sum of its parts. Reducing the Abkhazian ethnopolitical separatist movement in

Georgia to its subsystems builds an incomplete picture. We may be able to discern the skeleton, but we cannot comprehend the organism's holistic properties without first and second levels of systems analysis. We may learn names of leaders and numbers of militants under arms, but we fail to understand the criticality of the movement's relationship with Russian organized crime, or the efficacy of its efforts to build negative entropy through weapons acquisition and cash accumulation.

Organizational theory is replete with subsystem types and labels. Analysis of violent subnational groups, however, requires the employment of subsystems that lend themselves to collection, analysis, and effects-based targeting. Fortunately, such subsystems exist, and their value to organizational diagnosis has withstood scrutiny for nearly forty years. Applying subsystems and their associated functions to the problem of VNSA results in four core subsystems: support, maintenance, authority, and conversion. As shown in Figure 3, these subsystems are embedded in the VNSA system, which is exchanging energy in the form of inputs and outputs with its environment.

Support Subsystem. Religious students in Islamic schools, or *madrassahs*, are identified and recruited for *jihad*, money is collected and laundered through a front charity, small arms are purchased on the black market, and communiqués are faxed to media outlets around the world. These are just a few of the routine activities that constitute the system dynamics of the support subsystem. In modern organizational theory, support subsystems

Figure 3: VNSA Subsystems



“carry out environmental transactions of procuring the input or disposing of the output or aiding in these processes.”⁴⁵ Essentially, the support subsystem works at the boundary of the VNSA, monitoring and managing relations with the supersystem. Five types of environmental transactions are most critical to the VNSA: recruiting, resource acquisition, stakeholder associations, competitive learning, and operational employment. The last two are carried out by the authority and conversion subsystems respectively.

Recruitment. The recruitment mechanism can take many forms, but generally involves linking needs and expectations within a ripe population segment, or identity cleavage, with the agenda of a gestating VNSA. Identity mobilization is among the first instances of congruence where the leader, or identity entrepreneur, is fitting organizational goals to the likely at-risk population segment. Well after gestation, recruitment continues to attract members from among a sympathetic social cleavage. Once congruence is achieved between the VNSA and its potential members, the group will employ a variety of incentives to close the deal, including, but certainly not limited to, the tangible benefits of a salary, training, or shelter (transactional) and the more persuasive intangible incentives of ideology, sense of belonging, power, greed, and possibly the promise of eternal life (transcendental). The specific patterns of activities, consisting of recruiting agents, incentives, and procedures will vary by VNSA type. Militant religious movements recruit through mosques and *madrassahs* to support a radical theology. Warlords with private militias recruit through family and clan associations to support predatory wealth accumulation. Maoist insurgents recruit students through universities to support an ideological vision. And as evidenced on the streets of Baghdad and

Thomas and Casebeer—Violent Systems

Tikrit during 2003-2004, ethno-political Sunni groups hired one-shot insurgents using hard cash payments of over \$2500.⁴⁶

An important and often overlooked aspect of recruitment is selection. Selection preserves stability by weeding out risky, low performing recruits, or those that might prove difficult to socialize. From the VNSA perspective, a large recruiting pool improves prospects for greater selectivity based on a variety of criteria, which again are tailored to the VNSA type. While most VNSA types are likely to select based initially on a recruit's perceived commitment to the group's ideology and agenda, other factors certainly play a role. In small, cell-based, highly secretive organizations like ETA or November 17, dedication to the nationalist cause is not sufficient. Members must also be highly disciplined, capable of sustained covert activity, and in many cases, possessing or capable of learning required skills to include the preparation of improvised explosive devices. As in our ETA example, the specific selection criteria and procedures are likely to be fluid, reflecting the VNSA's adaptation to environmental change. Changes in recruitment and selection over time offer valuable insight to an organizations vulnerabilities and present an opportunity for exploitation if accurately judged.

Resource Acquisition. The resource acquisition function involves manipulation of the supersystem in order to obtain requirements for system performance.⁴⁸ There are three basic steps to analyzing this dynamic. First, the full range of resource requirements must be inventoried for the target VNSA. Requirements are many, but generally include money, weapons, training materials, logistical supplies, false documents, transportation, information technology, communication systems, etc.⁴⁹ For example, the FARC's requirements during its gestation

and early growth phases in the mid-1960s included such basic needs as food, clothing, and supplies.⁵⁰ As the FARC reached maturity in the 1980s, expanding its initial force of 350 fighters to the 15,000-20,000 today, its requirements increased and shifted to include training support, advanced weapons systems such as surface-to-air missiles, satellite phones, jamming equipment, aircraft, and more.⁵¹

Second, the specific mechanisms for acquiring the resources must be identified. Mechanisms vary widely for every requirement. For example, information technology may be acquired through front companies, direct acquisition at trade shows, theft from businesses, or illegal bartering with corrupt government agencies. Weapons can be readily obtained through black markets, theft, raids on police, corruption of security forces, or defeat of an adversary. Returning to the FARC, resources were acquired during the gestation phase through ambushes on security forces, raids on farms, kidnapping of hostages for ransom, blackmailing officials, and propaganda appeals to peasants.⁵² In the 1980s increased resource demands necessitated a shift to expanded alliances with drug cartels as well as exploitation of primary commodities such as cattle, oil, and gold.⁵³

Once all resources and the mechanisms for acquisition are identified, the extent to which the VNSA is dependent on specific resources for performance is evaluated using resource dependency theory. According to resource dependency theory, the environment is a powerful constraint on organizations, and therefore, resource dependencies must be effectively managed to guarantee the organization's survival and "to secure, if possible, more independence and freedom from external constraints."⁵⁴ Dependency is measured in terms of criticality and scarcity.

Thomas and Casebeer—Violent Systems

Critical resources are vital to system function. In fact, the system dies when its critical resources are exhausted. Critical resources for the FARC are the coca crops, and more importantly, the agricultural migrants associated with the drug industry, which are its social base.⁵⁵ Scarce resources are not widely available in the environment, and there is often a great deal of competition over them—diamonds and plutonium are scarce, landmines are not.⁵⁶ Resources that are critical and scarce demand the greatest organizational attention while also offering an appropriate focus for a disruptive C-VNSA strategy. Critical resources that are widely available, or scarce resources that are critical, reveal a second level of vulnerability while noncritical, abundant resources do not provide a profitable C-VNSA opportunity. Importantly, critical and/or scarce resources must be acquired in sufficient quantity and with appropriate timing to ensure the VNSA can survive temporary interference with its dependent relationship.

Stakeholder Associations. The stakeholder association dynamic involves obtaining social support and legitimacy through societal manipulation and integration.⁵⁷ Stakeholder dependency is closely related to resource dependency since many stakeholders control key resources. The evaluation of stakeholder associations provides direct insight to the relative importance of key relationships that must be sustained to ensure survival. For example, it is widely held that the Revolutionary Guard of the Iranian armed forces maintains a stakeholder interest in the Hezbollah in Lebanon, providing a wide range of support services to include money, sanctuary, and training. Strings are attached, although their strength remains a matter of dispute. In its 16 February 1985 foundational letter, Hezbollah asserted

We, the sons of Hizb Allah's nation, whose vanguard God has given victory in Iran and which has established the nucleus of the world's central Islamic state, abide the orders of a single wise and just command currently embodied in the supreme Ayatollah Ruhollah al-Musavi al-Khomeini, the rightly guided imam who combines all the qualities of the total imam....⁵⁸

With the death of al-Khomeini, the rise of more moderate political forces in Iran, and Hezbollah's growth into a dominant social, political, economic, and military organization in Lebanon, it can be reasonably argued the Hezbollah no longer takes orders from Tehran. Therefore, the character of this important stakeholder relationship has changed.

As with resource acquisition, the first analytical step is to map the network of stakeholder associations. Network analysis provides a complex web of relationships in which the VNSA is embedded.⁵⁹ It begins by inventorying all possible stakeholders, including, but not limited to state sponsors, sanctuary or safe haven providers, identity entrepreneurs, NGOs, weapons suppliers, diasporas, corrupt officials or agencies, sympathetic identity cleavages, financial institutions, and other VNSA. As one example, the Tamil rebels in Sri Lanka, the Liberation Tigers of Tamil Eelam (LTTE), are supported by stakeholders among the Tamil diaspora, including migrant communities, charitable NGOs, and front companies.⁶⁰ Where feasible, specific stakeholders must be identified as in the case of Shun Sunder. Sunder is a medical practitioner in California who has provided an estimated \$4 million to LTTE during the 1990s.⁶¹ Notably, not all stakeholder associations are defined in terms of financial support. In many cases, such as celebrity support for an independent Tibet, the association may provide no more than publicity or legitimacy.

With all stakeholders inventoried, the next step is to assess the mechanisms for sustaining relationships. While the association is often in the form of financial transactions through banks, donor bodies or front companies, support can also be managed through direct mailings, e-mail, telephone hotlines, community libraries, television and radio programs, conferences, and websites.⁶² The LTTE relies heavily on the Internet to build support, leading experts to conclude that it has been able to establish a truly global presence, permitting the group to “virtually and instantaneously transmit propaganda, mobilize active supporters and sway potential backers.”⁶³

Relative importance, or the centrality of stakeholder associations, is difficult to measure. Centrality is a function of both the actual and perceived value of an association to VNSA growth and performance. One method to determine centrality is to examine the VNSA’s strategy for dealing with stakeholders. Proaction involves extensive effort to maintain relations, address stakeholder interests, and anticipate future requirements.⁶⁴ Accommodation is a less active strategy that might entail infrequent interface, or only partial efforts to satisfy interests. The defense strategy involves doing the minimum required to keep the relationship alive, while reaction typically entails ignoring or rejecting the relationship.⁶⁵ The LTTE must be proactive in dealing with donor organizations in the Tamil Diaspora, whereas it takes a defensive, or even reactive, approach to dealing with moderates and scholars in Tamil society who do not share their agenda.⁶⁶

Resource acquisition and stakeholder associations are not the only two functions of the support subsystem, but they are the most critical to developing negative entropy and reducing uncertainty.

Excess critical and scarce resources are needed for the FARC to survive sustained counterinsurgency and counter-narcotic operations. Reliable access to these resources is essential to growth and expansion. In all associations, the ability of the relationship to survive crises is a function of how the strategy is applied over time. That is, a central stakeholder association that has been approached proactively over decades is more likely to survive misunderstanding, deceit and disloyalty than a relationship that has been handled defensively or reactively.

Maintenance Subsystem. *Jihadists* are groomed through *madrassahs*, training camps, and religious media; a Maoist insurgent is executed for collaboration with the state; and, an assassin is promoted for successfully killing a justice minister. These activities are among the primary functions of the maintenance subsystem. This subsystem mediates between task demands and human needs to keep the structure in operation to maintain stability and predictability.⁶⁷ Its overarching goal is to protect the VNSA organism and its organs (i.e., the subsystems) from uncertainty and positive entropy, thus ensuring the group's survival. Maintenance activities seek to preserve equilibrium, primarily through the socialization of personnel and a system of sanctions and rewards to maintain role performance.⁶⁸ Where the support subsystem focuses on accessing critical requirements, maintenance dynamics center on the "equipment for getting the work done," and in the case of VNSA, the "work consists of patterned human behavior and the 'equipment' consists of the human beings."⁶⁹ The primary functions of the maintenance subsystem include socialization as well as rewarding and sanctioning.⁷⁰ The interplay of these functions results in a trend to a more mechanistic organization

Thomas and Casebeer—Violent Systems

structure due to increased formalization and institutionalization.

Disrupting any of the functions has the effect of increasing positive entropy, and if sustained over time, can lead to system failure.

Socialization. Recruitment gathers prospective members, while socialization weds them to a set of organizational norms and values. Norms and values may not be clearly articulated early in the VNISA's life cycle, but they must become explicit during growth and before maturity in order to integrate members toward its goals. Ultimately, "norms make explicit the forms of behavior appropriate for members of the system."⁷¹ To determine if a norm is a subsystem or system property, the following criteria must be met: first, there is evidence of beliefs by individual members that certain behaviors are expected; second, a majority of group members share the belief; and third, there is general awareness that the norm is supported by most of the group's members, not just the leadership.⁷²

Collectively, values constitute the group's ideology and provide a more "elaborate and generalized justification both for appropriate behavior and for the activities and functions of the system."⁷³

Values become norms when they are operationalized by the group members in terms of specific behaviors. Despite a broad range of VNISA types, two value systems tend to dominate: transcendental and pragmatic.⁷⁴ Militant religious groups, ideological organizations, eco-warriors, and others generally embrace a transcendental value system, which places emphasis on morality, sacred duty, the supernatural, and symbolism. Transcendental values are difficult to inculcate, but tend to be more effective in sustaining loyalty. TCO and warlords with private militias epitomize the pragmatic value system with their emphasis on amassing wealth or power. The pragmatic value system can be

rapidly developed, but it is also more susceptible to disruption and defection in the face of a superior threat or more lucrative alternatives for members. The most effective VNSA foster a dual value system, manipulating symbols and delivering tangible value. Dual value systems have the added advantage of offering reinforcing sources of negative entropy; faith can be often be sustained even when cash runs short.

VNSA culture emerges from the evolution and propagation of norms and values. Diagnosing culture is exceedingly difficult, but when successful, cultural insight provide answers to practical issues, including:

- who matters?
- where are the boundaries?
- why and how does work get accomplished?
- what are problems?
- what is most important to the VNSA?⁷⁵

Cultural strength, or the extent to which members share the norms and values, is the system's glue. A VNSA with a strong culture, such as the IRA or Hezbollah, is more likely to have congruent subsystems, and to enjoy greater member commitment. An organization with an inflexible or weak culture will have greater difficulty dealing with supersystem turbulence.

Rewards and Sanctions. Rewarding and sanctioning reinforces culture, generating the negative entropy to survive betrayals and defections by members. This maintenance function works to maintain role performance through an allocation system, generally based on proscribed behaviors. In the world of VNSA, members who display cowardice, reveal operational secrets to the government, or betray the organization in any way are often killed.

Thomas and Casebeer—Violent Systems

Conversely, increased pay, promotion, prestige, and even promises of a martyr's paradise are used to offer incentives for a job well done. Diagnosis of the allocation parameters, or "who gets what and why," reveals opportunities for undermining role performance. The Real IRA militant who expects to gain promotion and prestige by bombing a police station is less likely to carry out future attacks if the result of his tactical success appears to be underappreciated, or if another member is given credit.

By way of another example, al Qaida relies on local *imams* of mosques and *madrassahs* to recruit potential militants. Maulana ul Haq, the head of the most famous *madrassahs* in Pakistan, Jaamia Darul Uloom Haqqania, presides over 2,800 students, many of who moved on to training camps in Afghanistan during the 1990s.⁷⁶ Some militants self select, like Mohammad Rashed al 'Owhali, who participated in the 1998 US Embassy bombing in Nairobi, Kenya. Al 'Owhali attended religious school in Riyadh where he was further exposed to *jihadist* value. This value was most likely operationalized, becoming a norm, while he was learning hijacking and kidnapping at the Khaladan training camp in Afghanistan.⁷⁷ The norm was reinforced on the battlefield, where he was distinguished in fighting with the Taliban. Based on his performance, he was rewarded with selection to special instruction on cell operations, including intelligence, administration, planning, and execution—essentially, he was taught how to replicate the VNSA system at a smaller scale.⁷⁸ The reward reinforced his commitment to the values of the system, resulting in a decision by the authority subsystem to charge him with executing an attack on the Embassy. Interestingly, there is some evidence to suggest that socialization was not fully achieved in al 'Owhali's case. When the

massive bomb exploded on 7 August 2003, al ‘Owahli had fled the scene when his plan to kill the gate guard failed because he had forgotten his gun.⁷⁹

Authority Subsystem. A spy gathers intelligence, key leaders meet to plan a series of urban bombings, a cell structure is implemented to ensure secrecy, and directions are issued for acquiring nuclear materials. These are sample activities of the authority subsystem, which integrates the managerial and adaptive subsystems.⁸⁰ This subsystem’s primary functions are learning, strategy, and control. Together, they comprise the decision-making structure of the VNSA, which is responsible for “controlling, coordinating and directing” the other subsystems.”⁸¹ The system dynamic of decision making may be the most difficult to diagnosis, but it is also the most important for a coercive C-VNSA strategy that requires the VNSA to retain cognitive capacity. Where defeat is the goal, undermining the authority subsystem is certain to induce uncertainty, incongruence, and ultimately, system failure.

Learning. The VNSA learns through intelligence collection, analysis, and dissemination. VNSA are cybernetic systems; they have a reflexive feedback capability that enables correction and in some cases, self awareness.⁸² The absence of feedback equals certain death. VNSA, like organisms, develop regulatory mechanisms early in their development. The most basic form of learning, which dominates the gestation and early growth period, is known as single loop learning, or simply as cognition. Developed by Chris Argyris and Donald Schon, single loop learning involves learning from the consequences of previous behavior, resulting in changes in “strategies of action or assumptions

underlying strategies in ways that leave the values of a theory of action unchanged.”⁸³ We learn from mistakes and new information.

The Islamic Army of Aden (IAA) in Yemen provides an example of changing behaviors based on experience while still clinging to an underlying value of battling Westerners, particularly Americans, as part of a global *jihad*. In 1998, the IAA kidnapped sixteen western tourists, including twelve Britons, two Australians, and two Americans.⁸⁴ Led by Abu Hassan, the group’s purposes included protesting the 1998 US military operation in Iraq known as Desert Fox and seeking the release of three colleagues being held by the Yemeni government on bombing charges.⁸⁵ A rare attempt by Yemeni security forces to rescue the hostages initiated a two-hour fire fight, leaving four hostages and three kidnappers dead. No prisoners were released, and Abu Hassan went to prison with two henchmen. Having failed to secure their objectives through kidnapping, the IAA changed tactics. In January 2000, an attempt to bomb a US warship failed when the explosive-laden raft sunk immediately after being launched. This feedback did not cause a change in tactics, but a reengineering of explosives on the raft. On 12 Oct 2000, a second raft blew a massive hole in the USS Cole destroyer, killing seventeen and injuring thirty nine.⁸⁶

Single loop learning is sufficient when changes in strategies and tactics can satisfactorily correct errors in performance or improve effectiveness. It is not always sufficient, however, when the supersystem is highly dynamic, or when the organization must change the values and norms that underlie culture. The ability to adapt, to not only correct behavior, but also to determine what behavior is correct, is essential for surviving crises.⁸⁷ It is a form of negative entropy known as double loop learning. The double loop

refers to two feedback interfaces that link the intelligence about performance or the environment to strategies as well as to the values served by those strategies.⁸⁸ The VNSA learns to learn. Returning to the IAA, the value of attacking Westerners was never abandoned even though strategy and tactics changed. A redefinition of values in terms of shift to nonviolent protest would have been an example of double loop learning. It might be argued, however, that the shift from kidnapping to suicide bombings was a lesser form of double loop learning because a group norm shifted from one of surviving an operation to one of dying while executing the attack. Since double loop learning provides negative entropy, a C-VNSA strategy must seek to drive groups to single loop learning if defeat is the goal. If coercion is the goal, however, our strategy should seek to enhance double loop learning so that the authority subsystem can affect changes in underlying values and norms.

Diagnosing single and double loop learning to support a C-VNSA campaign demands pattern analysis over time. It also requires an investigation of the mechanisms for collecting, analyzing, and processing intelligence throughout the system. All subsystems participate in learning through their interactions with the environment, and every individual, whether trained to collect intelligence or not, is a sensor. Distributed, informal intelligence collection is more likely during gestation and early growth, while it is likely to find formalized training and structures in late growth and mature VNSA. Many mature groups, including al Qaida, IRA, and FARC, provide expert training in intelligence collection as well as specific individuals or subunits that conduct reconnaissance and surveillance. Once the intelligence is collected, it must be analyzed and disseminated. Above the tactical level of operations, analysis is

normally an aspect of the strategy development function, while dissemination is a control function.

Strategy. Strategy is an output of the authority subsystem, reflecting the efforts of VNSA leadership to influence organizational outcomes by managing the group's relationship with the supersystem.⁸⁹ A successful strategy matches the competencies of the organization to the demands of the environment, and in so doing, the VNSA gains resources, operational success, legitimacy, and negative entropy for survival.⁹⁰ A good strategy crafts a congruent system. Diagnosing strategy is analytically challenging because one cannot simply rely on the statements of leadership or members—strategy is emergent, not directed. It is nonetheless essential to accurately diagnosis strategy since undermining the decision-making capacity will deliver a system crippling blow.

The strategy function is traditionally equated with rational decision making by leadership. According to the rational model, as articulated by Henry Mintzberg and explained later in the discussion of ecological deterrence, strategy is created based on a careful examination of 1) threats and opportunities in the environment and 2) strengths and weaknesses of the organization.⁹¹ Strategies and associated goals are identified to leverage opportunity and close performance gaps, and then implemented by a mechanistic organization.⁹² Rationality is achieved through defined rules and highly institutionalized relationships, which allow the entire structure to become subject to manipulation, i.e., an instrument of rational action.⁹³ To achieve this high degree of control and coordination, the formal organization is treated as a closed system. It is seen as a self-contained unit, functioning independently of changes in its environment.

The rational model is insufficient due to three primary, inter-related reasons: 1) the formal structure never fully succeeds in “conquering the non rational dimensions of organizational behavior;” 2) VNSA are also open systems and subject to environmental effects; and 3) VNSA have life cycles, resulting in a changing cognitive capacity relative to the phase of development.⁹⁴ Since VNSA are organic, cooperative systems, it is more appropriate to think of strategy as the direction the organization takes, regardless of whether it is intentional.⁹⁵ With this perspective, strategy is something that emerges as a function of system dynamics. Strategic planning may occur under conditions of bounded rationality by the VNSA leaders, but it is also greatly influenced during development and implementation by individuals, the subsystems and the environment.

Diagnosing strategy begins by comparing the publicly disclosed strategy, as reflected primarily in leadership statements and communiqués, with the observed strategy. There are many public strategies in circulation, ranging from the Maoist insurgency to the contemporary global *jihad*.⁹⁶ Observed strategy is assessed based on pattern analysis of past activities and operations. The difference between “stated” and “observed” can be explained by inventorying, assessing, and prioritizing the range of influences at each level of systems analysis. Linking these dynamics to the VNSA’s life cycle allows us to forecast alternative futures for the group.

In some cases, such as the many armed groups in Georgia and Azerbaijan that emerged in the early 1990s, initial “stated” strategies demanded little more than a degree of local autonomy. Warlords, such as Akaki Eliava in the Mingrelia area of Georgia, sought to retain their localized power after the end of the 1993

Thomas and Casebeer—Violent Systems

Georgian Abkhaz civil war.⁹⁷ Through the 1990s, warlords in the Svaneti region of Georgia and the north of Azerbaijan shifted their strategies to include the accumulation of wealth through illegal activities and the adaptation of more radical religious agendas. Although the change was never “publicized,” it can be assessed by observing the activities of the support, maintenance, and conversion subsystems.

Explaining the strategy begins at the supersystem level. In both countries, the roots of violence have deepened and the government’s impotence increased during the period. Moreover, illegal trade prospered with the demise of the Soviet Union, and refugee flows from Chechnya brought weapons and conflict. In Azerbaijan, inroads by Islamic groups, including Egyptian Islamic Jihad, the Hizb ut Tahrir al Islami, and others radicalized certain identity cleavages.⁹⁸ Looking inward, the support subsystem most likely placed demands for new sources of revenue to cover weapons acquisition and the maintenance subsystem socialized recruits based on new radical influences. The dynamics of these subsystems are contributing to the emergence of new strategies, including goals aligned with Hizb ut Tahrir al Islami, whose aim is to

resume the Islamic way of life and to convey the Islamic *da’wah* to the world. This objective means bringing the Muslims back to living an Islamic way of life in *Dar al-Islam* and in an Islamic society such that all of life’s affairs in society are administered according to the Shari’ah rules, and the viewpoint in it is the *halal* and the *haram* under the shade of the Islamic State, which is the Khilafah State. That state is the one in which Muslims appoint a Khaleefah and give him the *bay’ah* to listen and obey on condition that he rules according to the Book of Allah and the Sunnah of the Messenger of Allah and on condition that he conveys Islam as a message to the world through *da’wah* and jihad.⁹⁹

Even when Georgian warlords foreswear an endorsement of *jihadi* principles, observation of stakeholder associations, religious practices of key leaders, or even changes in the treatment of prisoners in line with Islamic practices (the laws dealing with prisoners are part of a subset of the *shari'a* known as *siyar*), can provide insight to the growing influence of Islamic groups. As with this abbreviated example, the key lesson is to ensure that analysis goes beyond rhetoric to examine real actions.

Control. Strategy is implemented by the control function, which attempts to align individual and subsystem actions with the strategy and goals. Many of the mechanisms of control are carried out by other subsystems, including socialization and rewarding and sanctioning by the maintenance subsystem, learning by the authority subsystem, and training by the conversion subsystem. In addition to assessing these dynamics to understand how control is achieved, and perhaps more importantly, how it can be disrupted, two additional aspects of control must be addressed: social structure and communications.

Social structures are formal and informal. The traditional organization chart provides a skeleton of the formal hierarchy for the distribution of authority as well as roles and responsibilities. This is a useful starting point for determining whether the VNSA uses a simple, functional, matrixed, network, or hybrid structure to coordinate and communicate. A more difficult task is to figure out the informal associations, which interlace the formal structure. These can be investigated by inquiring into the pattern of relationships as well as the exchanges between subsystems and individual members.

For both types of social structures, three measures allow us to determine the extent to which the organization is mechanistic or organic: complexity, centralization, and formalization. Complexity is a measure of the horizontal or vertical differentiation.¹⁰⁰

Complexity is advantageous in a dynamic, hostile environment, but it suffers from increased communication demands. Centralization refers to the diffusion of decision-making authority. Decentralized VNSA empower members, pushing at least operational decision-making authority to the boundaries of the system, or the periphery of the network. Al Qaida, for example, is highly decentralized. Formalization refers to the extent to which norms are explicitly laid out in directives, fatwas, and other media. Formalization discourages innovation, but has the benefit of increasing control.¹⁰¹ Mechanistic organizations are complex, formal, and centralized, while organic organizations are informal, decentralized, and often simple, although complexity has increased due to improved forms of communications.

Communication is the essence of the system, offering “the exchange of information and the transmission of meaning.”¹⁰² As the VNSA grows, communication will become increasingly complex due to differentiation of work, necessitating restrictions to prevent system “noise,” or information that distracts and misleads.¹⁰³ Without going into information theory, it is sufficient to say that a robust C-VNSA strategy will generate system “noise,” thus increasing uncertainty. Disrupting communications also undermines system congruence, making it difficult for subsystems to interact.

Achieving these effects requires an evaluation of the communication networks in the system. Even though all VNSA

continue to rely on couriers and face-to-face interactions to ensure security, sophisticated information technologies have improved communication in three ways: reduced transmission time, reduced costs, and increased scope and complexity of information.¹⁰⁴ Many VNSA, including al Qaida, are known to rely on satellite phones and computer networks. At least one ideological group, Animal Liberation Front, communicates between cells in the US and Europe using an encryption program known as Pretty Good Privacy (PGP) to send coded emails.¹⁰⁵ These mechanisms and others are not error free, particularly when combined with the misunderstanding inherent in human communication. The C-VNSA leverages these vulnerabilities.

Conversion Subsystem. Child soldiers learn to shoot an AK-47, health services are delivered to a community, a suicide bomber records a martyr's video, underground bunkers are built, guerilla forces ambush a convoy, a politician is kidnapped, or aircraft are used as missiles to attack landmarks. These functions and others constitute the dynamics of the conversion subsystem. This subsystem's primary function is task accomplishment, converting energy within the system and outputting a product to the environment.¹⁰⁶ In the case of VNSA, the product of most concern is conspiracy violence; however, an effective C-VNSA is also concerned with other products that reinforce the system of violence, such as training and illegal goods.

Operations. Operations can take many forms and do not always involve violence. The first step in the analysis is to identify all the operational activities conducted by the VNSA. Nonviolent operational activities, such as reconnaissance to gain intelligence or public demonstrations to spread a message, demand more attention,

as they are often important precursors to violence. Second, each operational activity must be linked to other supporting operational activities and to the subsystems involved. For example, surveillance is an operational activity that is also carried out by the authority subsystem to enable learning. Finally, the criticality of the linkages must be assessed to support the prioritization of C-VNSA actions intended to disrupt operations. Criticality can be assessed in terms of resource, stakeholder, and knowledge dependency.

The forms of collective violence and associated tactics are equally vital to our threat assessment. VNSA most often engage in conspiracy violence, i.e., highly organized violence with limited participation on a small scale.¹⁰⁷ Conspiracy violence can grow into internal wars as participation becomes more widespread and objectives expand to include overthrowing the regime, dissolving the state, or eradicating opposition.¹⁰⁸ In terms of tactics, VNSA tend toward the asymmetric, including violent crime, guerrilla operations, terrorism, and in some rare cases, cyberwarfare. These tactics differ principally in scope and objectives. Violent crime is typically directed toward individuals for material gain even though it can be highly organized with multiple targets. Specific acts include shooting, stabbing, kidnapping, beating, and other short-term acts that generally do not have second- and third-order consequences.¹⁰⁹ While guerrilla and terrorist operations share several similarities, guerrilla tactics generally mean a larger group of armed individuals “who operate as a military unit, attack enemy military forces, and seize and hold territory, while also exercising some form of sovereignty or control over a defined geographical areas and its population” (even if only temporarily).¹¹⁰ In contrast to crime and guerrilla operations, terrorism is designed to have

second- and third-order consequences, not the least of which is a dramatic psychological impact on a mass audience beyond the immediate target. For our purposes, terrorism is “the deliberate creation and exploitation of fear through the use or threat of abnormal lethal force in the pursuit of political change.”¹¹¹ As evidenced by the devastation of 11 September 2001, terrorism can reflect the most heinous designs of man.

Training and Production. Training converts the recruits of the maintenance subsystem into militants, terrorists or criminals, while production converts resources into useful materials, such as drugs, weapons, or social services, to name a few. Both processes are analyzed similarly and provide parallel relationships for exploitation by a sophisticated C-VNSA strategy.

First, inputs must be identified and linked to their appropriate source in the supersystem or one of the other subsystems. Second, the activities and associated infrastructure for each conversion must be dissected. Most VNSA, particularly mature groups like al Qaida, LTTE, IRA, and FARC, have well-developed and documented training programs. Al Qaida’s training programs in Afghanistan prior to the fall of the Taliban in 2001 were even videotaped and globally dispersed for recruitment, an example of the conversion subsystem serving the maintenance and support subsystems. Gestating and growing VNSA are unlikely to have sophisticated programs for training and production; however, they are inclined to acquire the skills or materials directly from government and nongovernmental sources until they are sufficiently differentiated to conduct home grown conversions. Many militia organizations in the US and elsewhere are known to import skills by gaining recruits

Thomas and Casebeer—Violent Systems

with prior military experience; these individuals then form the backbone of training programs.

An often overlooked, but exceedingly important, output is ideology in all its forms, ranging from communism to fascism to extremist religion. At its most basic level, ideology is “a set of core philosophical principles” that a group collectively holds about politics.¹¹² Ideology is not found lying on the street; it too must be converted from a variety of inputs including history, dogma, and social convention. These inputs are transformed by members of the organization into an ideological program. In recent history, al Qaeda has proven the most adept at exporting ideology, evidenced by the highly influential *fatwas* issued on behalf of Osama bin Laden and Ayman al-Zawahiri. Among many, one of the earliest appeared on February 22, 1996, when bin Laden announced the formation of the *World Islamic Front for the Jihad against the Jews and the Crusaders*. In this statement, bin Laden and cohorts set the agenda for the extended global *jihadist* insurgency that continues as of the time of this writing.

...Based upon this and in order to obey the Almighty, we hereby give all Muslims the following judgment: The judgment to kill and fight Americans and their allies, whether civilians or military, is an obligation for every Muslim who is able to do so in any country.... In the name of Allah, we call upon every Muslim, who believed in Allah and ask for forgiveness, to abide by Allah's order by killing Americans and stealing their money anywhere, anytime, and whenever possible.¹¹³

Conversion activities and associated facilities are often the main focus of counterinsurgency, narcotic, and terrorism campaigns: destroying cocaine production facilities in the jungles of South America, raining cruise missiles on terrorist camps in Afghanistan, protecting facilities against guerrilla attacks in Baghdad, or fighting

Islamic militants in the Pankisi Gorge of Georgia. Our C-VNSA also encourages disrupting training and destroying facilities and operatives; however, the most effective strategy targets all subsystems, recognizing that conversions do not have to occur for the VNSA to survive. Conversions do contribute to negative entropy by providing a surplus of trained members and products, and successful operations can produce internal and external support; however, the VNSA can survive an extended period of dormancy by this subsystem if the others remain active. For example, Hamas can hold off on suicide operations for years and still prosper, as long as it continues to recruit, socialize, maintain stakeholder relations, and learn.

Life Cycle Vulnerabilities

In a mature VNSA, the subsystems and associated functions outlined in Figure 4 are each generally well developed, interrelated and of relatively equal in importance to system functioning. When mapped against life cycle phases of a specific VNSA, however, the extent of their development and their relative value will vary substantially, presenting a unique VNSA signature. A subsystem's value, or criticality, is assessed in terms of its contribution to reducing uncertainty and increasing negative entropy, which combine to sustain congruence. Armed with this knowledge, a refined C-VNSA strategy will target the critical subsystem and take advantage of life cycle transitions.

Figure 4: VNSA Subsystems and Functions

SUPPORT	MAINTENANCE	AUTHORITY	CONVERSIONS
Resource Acquisition	Socialization	Learning (Intelligence)	Training
Stakeholder Associations	Rewards and Sanctions	Strategy (Decision making)	Production
Recruitment		Control	Operations

In ecological deterrence, we introduced four life cycle phases: gestation, growth, maturity, and transformation.¹¹⁴ These phases, although suggestive of linear development similar to the human life, do manifest in a nonlinear fashion. In some cases, two or more phases may occur simultaneously, as in a mature VNSA that continues to grow. The shift in phases is always a function of the system's relationship to the environment; however, the primary causal force may be an emergent strategy change driven by internal subsystem dynamics, or it may be induced by a C-VNSA strategy of environmental shaping. The transformation phase can take many forms, including transition from one phase to the other, duplication and propagation of similar systems, dormancy, or in the case of a successful C-VNSA campaign, system failure, i.e., death!

During the 1980s, the Sendero Luminoso (Shining Path) was a mature VNSA. Former university president Abimel Guzman led an authority subsystem with a well-developed culture based on the extreme elements of values and norms associated with Mao Tse Tung and Che Guevara. Even while the conversion subsystem waged collective violence in the form of murders, bombings and assassinations, the support subsystem was still pursuing the growth of the organization through an increasingly unsuccessful recruiting campaign that involved killing those who refused to join.¹¹⁵ It can be argued that the fear-based mechanisms employed by conversion subsystems directly contributed to Shining Path's decline by undermining the success of its support subsystem to gain resources and sustain stakeholder associations, particularly with the very peasants Guzman was "saving." With negative entropy depleted, the capture of Guzman in 1992 initiated system disintegration, forcing a transition to a dormant gestation phase. Of note, the

failure of the Peruvian government to satisfactorily alleviate the roots of violence in the ensuing decade contributed to the Shining Path's survival and early growth in the early 2000s.

As in the example, there are specific subsystems that tend to “lead,” or be the most critical, during each life cycle phase. During gestation, for example, the VNSA is a primitive collective response to a common problem: the roots of violence.¹¹⁶ At gestation, the idea is no more than an embryo in the minds of one or several identity entrepreneurs who are part of an at-risk identity cleavage. In order for a group to form, the identity entrepreneur and the nucleus of founders must be linked to resources, stakeholders, and future members. Embedding the primitive VNSA in the environment through a network of critical relationships is the responsibility of the support subsystem. Until the support subsystem does its work, maintenance and conversion subsystems will lack the people and tools required for socialization, sanctioning, training, production, and operations. Although the support subsystem is most critical during gestation, it is guided by a basic authority subsystem. Decision making and control are not the result of an elaborate participatory process at this point. Rather, the identity entrepreneur can easily set the agenda and control functions without the need of other subsystems due to a familiarity with all other group members.¹¹⁷

The growth phase is entered when all subsystems initiate activity; however, the relevant importance of the subsystems varies with VNSA. In early growth, the support subsystem continues to lead, but is increasingly interlaced with the development of specific maintenance and conversion subsystem functions. Maintenance functions are likely to dominate in VNSA that stress a

transcendental agenda, such as the Islamic Jihad in Palestine or the Kahane Chai in Israel. These groups and others place a greater premium on loyalty and commitment to the religious or ideological goals of the group. Conversion functions will dominate in VNSA that pursue a more pragmatic agenda, such as the Chinese Triads or the warlords of Afghanistan, where the accumulation of wealth or consolidation of power requires the production of drugs or the training of guerrillas to hold territory and extract resources.

The growth phase is characterized by high levels of uncertainty related to the idiosyncratic behaviors by group members, doubt about reliability of resources and stakeholders, and the evolving character of the organization. In an effort to increase stability and survivability, the growth phase will increasingly reflect efforts to differentiate and enforce roles and responsibilities. Therefore, the authority subsystem will assert itself during late growth by clarifying goals and structures. Differentiation generates pressure to integrate functions; this is carried out by the control function.¹¹⁸ Additionally, the VNSA leadership will recognize the importance of continued environmental scanning through intelligence collection activities as a means to reduce uncertainty and match its subsystems to the opportunities and constraints of the environment. In the most adept VNSA, learning will gain prominence—the earlier in the life cycle it does so, the more successful the VNSA is likely to be in a turbulent environment. Finally, sporadic violent acts can be expected during the growth stage; however, these are more likely for the purpose of establishing legitimacy, enhancing recruiting, collecting intelligence, and testing tactics than they are for achieving over arching VNSA goals.

In mature VNSA all subsystems perform in concert; congruence is achieved, uncertainty is managed, and negative entropy is built. Based on this ideal system type, each function is fully articulated in terms of sustainable, adaptable patterns of activity, the culture is strong, the decision-making process is based on double loop learning, control is efficient, training has efficacy, and operations achieve goals. Fortunately, this ideal rarely exists, but even growing VNSA trapped in single loop learning, or lacking sanctuary for training, or failing to attract new recruits, or running short of funds, are tough to defeat. With the systems-based, diagnostic tools presented here, the strengths and the weakness of the VNSA can be exposed for exploitation by the C-VNSA to follow.

COERCE

This analysis of VNSA focuses on the deterrence pillar of coercion and sets the stage for the future examination of warfighting. Coercion is the use or threatened use of force to induce an adversary to act in a different manner than planned.¹¹⁹ Under this umbrella, conventional deterrence centers on preventing an action that has yet to occur, while the second pillar of coercion, compellence, involves efforts to reverse an action that has already occurred, or to change a current behavior.¹²⁰ Coercion takes us to the cusp of war, but stops short of warfighting. The adversary group may retain the capacity for organized violence, but chooses not to develop or use it.¹²¹ Our interest is in deterrence strategies that dissuade VNSA from embracing collective violence in the first place. This is closely related, and some cases barely distinguishable, from compellence strategies that would induce VNSA to abandon their reliance on collective violence once they

have embraced its use. For example, we are more concerned in this section with deterring the Maasai tribe of Tanzania from taking up arms against the government than we are with tactics for defeating the Maoist rebels of Nepal in open battle. We are more interested in compelling the Kurdistan Worker's Party (PKK) to abandon terrorist attacks than we are with an operational plan for destroying the infrastructure of the Abu Sayyaf. Ecological deterrence further blurs the line separating deterrence and compellence (the latter is pursued in the next section) and argues for an expanded concept of deterrence that acknowledges the semiformal nature of VNSA early in their life cycles.

A successful deterrence strategy must account for the challenges posed by the range of VNSA types and their unique non-trinitarian character. It is our purpose to examine the conventional formulation of deterrence in light of these challenges. Essentially, we are asserting that traditional deterrence is only relevant under a highly ordered set of conditions that only apply to the rare formally organized or mature VNSA.

The life cycle concept also acknowledges the nonrational, or affective, factors that compel organizational behavior. Recognizing that emotive dynamics are always relevant to the decision making of VNSA, particularly during gestation and growth, is essential to crafting effective strategy. Traditional, rationality-based deterrence may still have a role to play throughout the life cycle; however, it is subsumed by a broader environmental shaping, or prevention, strategy. The result is ecological deterrence, which expands our deterrence toolkit to include a variety of forms of intervention. We apply ecological deterrence to create a strategy matrix that crosses

the life cycle with a three-prong strategy of shaping, denial, and punishment.

The form of organization our adversaries adopt will determine whether traditional concepts of deterrence will be effective in helping us formulate strategies to deal with them, and will thus affect whether we adopt a broader theory of deterrence. Before critically reviewing the Traditional Rational Choice (TRC) theory of deterrence, it will be useful to give the project context by distinguishing between broad and narrow conceptions of deterrence, and broad and narrow conceptions of psychology.

Narrow and Broad

A narrow conception of deterrence has a psychological component, where “psychology” is construed in the slimmest sense possible. Narrow deterrence revolves around preventing action by influencing another actor’s psychology directly. Broad deterrence, on the other hand, revolves around preventing action by either direct or indirect influence on psychology, where indirect is given a very liberal reading. Narrow conceptions of deterrence will be more likely to leverage rational actor assumptions, whereas broader conceptions will consider other aspects of the psychology of action, as well as environmental factors that are only indirectly—through a longer causal chain—related to psychological concerns.

Narrow and broad conceptions of deterrence go hand in hand with narrow and broad conceptions of psychology. Narrow psychology focuses only on traditional “folk psychological” concerns, i.e., it considers only beliefs, desires, and attitudes to be the objects of psychology proper. In its most constrained form, this school of thought represents only a small subset of possible belief/desire relationships. Narrow psychology contrasts with broad

psychology, which consists in considering all those states of the mind/brain information processing system that influence action, be they conscious or not, be they rational or not, be they distributed across an organization or not. They must only involve, either directly or indirectly, some aspect of information processing.¹²²

Proper consideration of the life cycle of VNSA forces us to adopt the broadest possible stance with regard to both these “conceptual cuts”; a broad conception of deterrence in conjunction with a broad conception of psychology allows us to deal with both the rational and nonrational aspects of information processing systems, whether in organizations or individuals, and it gives us the most possible “causal traction” as we attempt to prevent VNSA action. We call this conjunction ecological deterrence. Understanding why ecological deterrence is a desirable background for formulating deterrence strategy requires that we examine the assumptions of the classic picture.

Rational Choice

TRC theory makes several assumptions regarding an agent’s psychology. Some of these assumptions include that the agent:

- has a well ordered and transitive utility function;
- possesses full or perfect information, or some subset thereof that can be modeled using the assumptions of bounded rationality;
- is a “perfect reasoner” who has a reliable method of identifying the relevant premises in argument driven choices and uses rational rules of inference when working from these premises so as to reach a conclusion regarding what to do;
- has unlimited time to ratiocinate.¹²³

While these assumptions have received minor modification over the years, their core has remained more or less constant since being explicitly formulated by game theorists early in the Cold

War.* However, these assumptions are realistic only under certain conditions: they cohere best with the information processing characteristics of a large formal organization or of human beings in tightly constrained circumstances, such as those that characterize a classic post-Westphalian nation-state. They do not cohere well with the characteristics of fledgling non-state actors, nor with the vagaries of human psychology in the broadest terms. Simply put, they fail to capture a large portion of human information processing that is relevant to deterrence strategy.¹²⁵ Given that VNSA are often loosely coupled dynamic systems that do not fall in line with the characteristics of large, tightly structured, and rule-governed formal organizations, human “molar level” psychological processes will be even more important than in the classic picture, as these processes will be more likely to influence the action of the VNSA. For example, “filtering out” the irrationality of a single person in a large formal organization is difficult enough, but such filtering is next to impossible in a typical terrorist cell of three people.

Exceptions

As other theorists have pointed out, molar level psychological processes do not always conform to the normative predictions of the TRC model. Pertinent, although not exhaustive, examples of exceptions include heuristics and biases, ecological rationality, fast and frugal heuristics, metaphor and analogy, the storytelling mind, “hot” emotional cognition, and the dynamic nature of cognitive states. We will discuss these briefly in turn.

* For instance, Daniel Kahneman and Amos Tversky’s “prospect theory” is based on TRC assumptions but just changes the utility function based on whether the item being threatened is a gain or loss. See Daniel Kahneman and Amos Tversky, “Prospect Theory: An Analysis of Decisions under Risk,” *Econometrica* (1979, 47), 313-327.

The heuristics and biases research program originated by Kahneman and Tversky, argues that humans often take cognitive short cuts that do not conform to TRC theory.¹²⁶ These include such phenomena as *anchoring*, where the first external suggestion for a potential answer to a question influences the range of answers given by a subject (“Is the Mississippi River longer or shorter than 500 miles?,” or, more pertinently, “Would you have the United States station more or less than 10,000 troops in your country?”). Another example is the *availability heuristic*, where our judgments about relative frequency can be skewed by the availability of events to our memory (“Which is more common: the letter ‘k’ beginning a word, or the letter ‘k’ occurring as the third letter in a word?,” or, “Which is more common: terrorist incidents that involve crashing airplanes into buildings, or terrorist incidents that involve the use of bridges?”). The *representativeness heuristic* says that we judge the probability of events based on the extent that they represent the features of their parent populations, even when this leads to irrational conclusions (“Linda is 31, single, outspoken, and very bright. She majored in philosophy in college. As a student, she was deeply concerned with discrimination and other social issues, and participated in anti-nuclear demonstrations. Which statement is more likely? a. Linda is a bank teller, or b. Linda is a bank teller and active in the feminist movement.” Most people say ‘b,’ even though the conjunction of two statements *can’t* be more likely than the probability of either of them taken singly).¹²⁷

The ecological rationality program, explored by Gerd Gigerenzer, states that in certain cases the mind’s ability to leverage structure present in the environment so as to achieve reasonable conclusions can be affected by the format in which the information

is delivered.¹²⁸ An example here is the fact that whether probabilistic events are expressed in natural frequencies (“Ten out of every 1,000 women have breast cancer,” “Ten out of every 1,000 Palestinians is a terrorist”) or in terms of base rates (“The probability that one of these women has breast cancer is 1%,” “The probability that one of these Palestinians is a terrorist is 1%”) makes a huge difference in whether or not we can reason successfully from these premises. This gives us reason to doubt that human cognition works in the strictly formal manner assumed by TRC.

The “fast and frugal heuristics” agenda, also developed by Gigerenzer, notes that cognitively successful outcomes can be achieved even by mental processes that are not classically rational. As he states, “the major thrust of the theory is that it replaces the canon of classical rationality with simple, plausible psychological mechanisms of inference—mechanisms that a mind can actually carry out under limited time and knowledge....”¹²⁹ Being able to manipulate the inferences that *actually* occur is critical for deterrence theory. Examples of fast and frugal heuristics include “take the best,” where, when given a forced choice between two alternatives, you assume that the answer you recognize is probably the answer to the question.

Reasoning by metaphor and analogy, a research program explored by Mark Johnson, George Lakoff, Giles Fauconnier, and Mark Turner, argues that our most complex mental tasks are usually carried out not by the “classical mechanics” of the TRC, but rather by a set of analogy making and metaphor mapping abilities that form the core of human cognition.¹³⁰ Reasoning by analogy and metaphor can often lead to the same conclusions as a TRC-style deduction, but does so more quickly and cleanly; on the other hand,

they can also lead to critical mistakes, perhaps dangerous ones. For example, viewing the human mind “as a machine” can both enlighten and mislead us about the nature of human understanding.

The storytelling mind is a research program that combines metaphor and analogy into an exploration of the powerful grip narrative has on human cognition. Narratives can restructure our mental spaces in ways that profoundly impact our reasoning ability, and yet that cannot necessarily be captured by TRC assumptions. Consider, for instance, the grip that the “Jihad versus McWorld”¹³¹ narrative has on Al Qaida and how this affects the way they think about the future.¹³² As Mark Turner notes, “Story is a basic principle of mind. Most of our experience, our knowledge, and our thinking is organized as stories.”¹³³

The “hot mind” and affective/limbic considerations are on an agenda championed by neurobiologists such as Ralph Adolphs, Joseph LeDoux, and Antonio Damasio. They point out that reasoning itself is shot through with emotional and affective considerations, some of which operate subconsciously but nonetheless do more to affect the course of our reasoning than explicit arguments and premises do. Humans are emotional as well as rational creatures, and action occurs only when beliefs are conjoined with desires. The type of actions we want to deter lie at the crossroads of reason and emotion, which means emotional subsystems like fear- and pleasure-inducing limbic structures must be considered. “Somatic markers”—those mental structures that tie together emotional reactions and gut feelings with judgment and decision making—are crucial for fully understanding the complexities of decision making, both by individuals and by those

who find themselves in the larger superstructure of an organization.¹³⁴

The diachronic nature of human cognition has been the focus of recent work in dynamical systems approaches to human reasoning. Dynamic systems theory first pointed to the time-laden complexities of human thought.¹³⁵ TRC assumes that ratiocination takes place in a synchronic “timeless realm,” unaffected by the dynamic complexities of the cognitive system. The inference drawn today from a set of premises should be like the inference drawn tomorrow from the same set of premises. Such is not the case, however. Time matters as a component of our model of human cognition, and we should expand the assumptions of our deterrence theory to deal with the diachronic nature of decision making, as well as to comport with the diachronic nature of the organic growth and development of organizations.¹³⁶

Ecological deterrence pushes for a broad conception of deterrence insofar as any intervention that will eventually influence some aspect of VNSA information processing so as to prevent action should be labeled as a deterrent action. We also argue for a broad conception of psychology, as a rational actor focus preludes consideration of the psychology of the VNSA over all phases of its life cycle and mistakenly focuses only on a mature organization that is large, has a formal structure, and is in an environment of action that is highly constrained and specified.

Other traditional “conceptual cuts” that can be made when talking about deterrence are pertinent as well and can be accommodated using ecological deterrence. General deterrence versus immediate deterrence still matters. We have to adjust our strategy appropriately if we are looking to deter all species of

VNSA from acting rather than deterring a particular VNSA from performing a particular action. Denial is still a pertinent method, although our position is that denial of goal achievement is a TRC move appropriate mostly in the mature phase of development; we need to think of denial along the lines of “species specific” goals. That is, any move we can make that can disrupt the eventual goals of the mature form of the VNSA in question should be thought of as disruptive deterrence. Punishment tactics should be viewed in a similar vein.

All these conceptual cuts have a place in our theory of deterrence. However, they need to be augmented by general environmental considerations because the structure of the environment can have a dramatic impact on information processing. A broad conception of deterrence thus demands another conceptual cut: that of environmental shaping, which we define as actions taken to shape the environment so as to preclude the continued emergence of the organizational structures necessary to act on goals and intentions. This arises naturally as a result of taking ecological deterrence seriously.

Deterrence Strategy

The application of ecological deterrence concepts to deterrent strategy can vastly expand the number of tools we have in our deterrence toolkit. If all you have is a hammer, everything looks like a nail. If everything is in fact a nail, this is not a problem; but if it isn't, having more tools in the deterrent toolkit can provide the necessary flexibility to actually build a house that is safe to live in. It is instructive that TRC theorists have felt the need to festoon rational choice theory with qualifications and assumptions. This is praiseworthy, but the limiting conditions required to make the

Thomas and Casebeer—Violent Systems

normative model predictive are an indication that we might need to cast our conceptual net more widely. Moreover, the types of “creatures” we are trying to catch with our nets have changed, which means we need to modify both the form and matter of these nets.

In general, then, our deterrent strategy should meet the following criteria:

- it should be able to “capture” the successes of TRC theory as a subset of its domain;
- it should be driven by the biological metaphors discussed in the “life cycle” section of this paper (gestation, growth, maturity, transformation);
- it should be structured according to the useful conceptual divisions to be made between aspects of deterrence (general vs. immediate, denial vs. punishment, affective vs. rational considerations);
- it should be supplemented with a recognition that the VNSA organism emerges from and interacts with an environment in a loosely coupled open system, and that such an environment can be shaped so as to prevent the VNSA from maturing or so as to perform a kind of transformational “genetic engineering” whereby we shift the VNSA’s nature so that it becomes a peaceful movement;
- our deterrent strategy should be tested against empirically valid success measures; this means we have to be able to model the VNSA/environment interface so as to support counterfactual prediction (i.e., “*if* we hadn’t intervened in this way, *then* the NSA would have become violent”).

Driven by the recognition that instrumental rationality may be a characteristic of some mature VNSA but may not characterize the VNSA at all points in its life cycle (nor at any point for certain VNSA), our strategy should be a function of at least three things: whether we are focusing on shaping, denial, or punishment; what stage of the life cycle a given species of VNSA is in; and whether we are aiming at general or immediate deterrence. Figure 5

displays these relations. We will know which tool to use from our toolkit depending on where we are in the matrix.

The chart reflects the general fact that early in a VNSA's ontogeny, deterrent strategies that appeal to the affective component of cognition will most likely be more effective, whereas interventions at a mature stage for many VNSA can usefully leverage rational actor assumptions. The chart is not intended to be binary; at every step in the determination of deterrent strategy there will be both affective and rational components. We are merely emphasizing that at certain stages one approach may be more effective in a wider range of circumstances than the other.

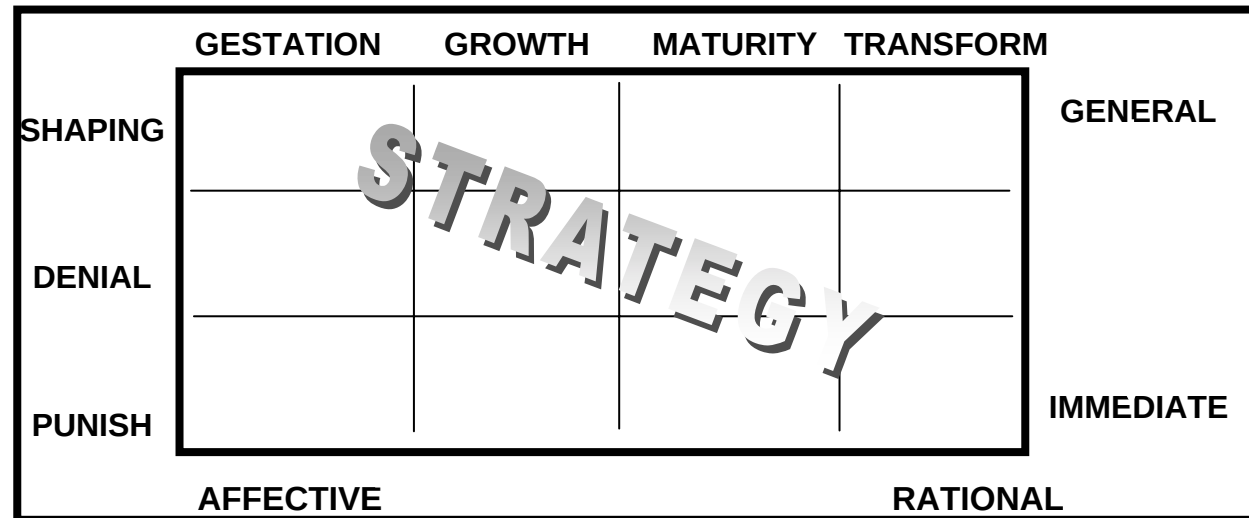
Traditional rational strategies involve appealing to the utility functions of the organization and actors involved so as to affect their decision-making calculus. These strategies include policy changes, the threat of incarceration, countermobilization, counterinsurgency operations, and the like.

Affective interventions, on the other hand, will not be driven by rational actor considerations but will instead appeal to the heuristics and biases embedded in human cognition; to the power of myth, narrative, metaphor, and storytelling to affect human world views; and may very well involve using "sub cortical" emotional systems to impact action via arational or irrational means. Since affective interventions are more unusual than rational interventions, they require more discussion; examples include traditional psychological operations, myth creation, alternative exemplar cultivation, metaphor shifts, and manipulation of national/tribal/group identities.

Traditional psychological operations, including the use of multiple media such as radio, television, print, and computers, often have as their goal the manipulation of subcortical systems, either by

Thomas and Casebeer—Violent Systems

Figure 5: Deterrence Strategy Matrix



creating an irrational fear of certain actions or by drawing on somatic markers already laid down by previous experience to encourage defection and withdrawal from plans of action. Interestingly, research indicates that people are more vulnerable to certain kinds of cognitive illusions if their lives are laced with “positive affect;”¹³⁷ it may very well be that a coordinated strategy will thus also include the creation of feelings of well being so that other affective strategies that appeal to heuristics and biases can be effective. In addition, positive psychological operations may have the effect of disrupting a critical aspect of the VNSA life cycle—recruitment—as disaffection and dissatisfaction are key elements in creating an at-risk population. Psychological operations often produce change by indirectly manipulating other affective strategies, such as myth creation.

Myth creation involves the weaving together of the narrative elements of a story with facts about past and present situations so as to create an emotionally compelling background that very often directly influences the susceptibility of a population to manipulation by “myth mongers.” The fanatical devotion shown by al Qaida operatives stems in large part not from any rational deliberative process but rather from the success Osama bin Laden and others have had in fashioning a coherent and appealing foundational myth. The events of September 11 can be thought of as the punch line of a chapter in an epic that sets “the warriors of God” against an “infidel West.” This myth did not propagate itself via rational actor channels, but instead was indoctrinated via a multi-pronged effort on the part of fundamentalist strains of Islam such as Saudi Arabia’s Wahabis. Successful myth creation may very well leverage the heuristics and biases listed earlier. It certainly takes advantage of

the availability heuristic, as this heuristic probably undergirds human propensity to form stereotypes.

Myth creation usually involves the effective use of narrative. As we formulate an “affective strategy,” we should keep the elements of a narrative in mind, for it is only by disrupting the story that one can interfere with myth creation. Good stories need protagonists, antagonists, tests for the protagonist, a promise of redemption, and a supporting cast of characters, at the very least. Disrupting al Qaida’s foundational myth may involve undermining the belief that Americans are the antagonists in the narrative bin Laden is constructing. We can either undermine the foundational myth being used to drive VNSA development, or we can construct an alternative myth that is a “better story” than the one being offered by the myth mongers. Examples of myth creation in action include the stories told by the rulers of Plato’s ideal city that were designed to motivate members of the different classes,¹³⁸ or the foundational myths that supported the violent actions of both the Hutus and the Tutsis during the Rwandan massacres of 1994.¹³⁹

Closely related to myth making is the strategy of creating alternative exemplars. Members of an at-risk population often become at-risk because of a failure to identify with a member of a nonviolent non-state actor or a member of the government. VNSA “identity entrepreneurs” can exploit existing ethnic, racial, economic, or social political differences by elevating someone who shares the same characteristics as the exploited class to a position of prestige or power. Members of the at-risk group then come to identify with that exemplar and may feel compelled to adopt the violent strategies advocated by the exemplar’s VNSA. Creating alternative exemplars who do not advocate violence or who can

show the way towards a nonviolent solution to the issues that are fueling VNSA emergence can go a long way towards interrupting the VNSA life cycle. Alternative exemplar creation may involve symbolic acts on the part of the government that tap those elements of hot cognition and heuristics and biases mentioned earlier. An example of the alternative exemplar creation strategy in action is the praise and warm endorsement heaped upon John Garang, the leader of the Sudanese guerrilla faction of the Sudanese People's Liberation Army (SPLA), during his visit to Washington just before Christmas of 1995. Such endorsement was critical for the recruitment and logistics boost the SPLA received that enabled Garang's forces to recapture crucial cities in southern Sudan soon thereafter.¹⁴⁰ In this case, we encouraged the growth of a VNSA by cultivating an exemplar saliently different from the leaders of the Sudanese regime.

An alternate affective strategy includes creating a metaphor shift that affects the way in which at-risk populations or members of a VNSA frame their actions. Given the power of metaphor to shape human thought, it should come as no surprise that shifting metaphors people use to frame worldviews and guide decisions can cause a change in their reasoning about the situation. For example, to convince someone that "cluster of cells" is a more appropriate metaphor for an unborn embryo than "young human" may very well change their stand on the issue of abortion.¹⁴¹ Shifting metaphors requires making connections between the way people presently view a situation or issue and the way you would like them to frame the situation or issue.¹⁴² The common refrain, "one man's terrorist is another man's freedom fighter," is a simple example of metaphor shift. Even the patriotic revolutionaries participating in the Boston

Tea Party were viewed as criminals and dangerous insurrectionists by many of their fellow colonists.

Manipulation of existing identities, such as national, tribal, or ethnic identifications, is another affective strategy.¹⁴³ This does not necessarily require creating new foundational myths or alternate exemplars; instead, skillful use of existing cleavages can decrease a VNSA's stock of negative entropy. This is the "flip side" of the identity entrepreneur's efforts that are often part of the genesis and growth of VNSA. For example, the Masaai warriors in Tanzania have skillfully manipulated existing identity cleavages so as to elevate the warrior aspect of Masaai culture over other aspects, e.g., pastoral herder or Tanzanian citizen. This involved the creation of camps for young Masaai; following their circumcision ritual, Masaai males attend the camp and learn compelling stories about ancient Masaai warriors while cultivating their hunting and combat skills. The Tanzanian government, if it wished, could exploit other aspects of Masaai history, including the fact that their lineage includes an important pastoral element, so as to deemphasize the violent aspects of Masaai culture to ensure they remain a peaceful non-state actor.¹⁴⁴

Critically, the strategy chart we have formulated points out that interventions that are effective at one point in VNSA development may be ineffective at another. The diachronic nature of VNSA development, and of the information processing that takes place at each stage, is reflected in the changing efficacy of particular strategies and in the varying ratio of affective to rational strategy elements as you move to the right on the chart. Taking organizational theory and extended psychology seriously means coming to grips with the fact that the same intervention at different

points in time can have dramatically different effects. TRC requires that our assumptions about the state of beliefs, desires, and attitudes be held fixed, as this is the only way rational inference can occur.

While such a task is beyond the scope of the current study, ideally, we would “flesh out” strategy charts for each of the eleven types of VNSA we identify. Particular strategies embedded in these charts would be tested against the empirical data for reliability and could then serve as cues for decision makers as they formulate the general shape of a deterrent strategy.

CONQUER

Armed with the increased insight into the structure and function of VNSA afforded by an open systems analysis of VNSA ontogeny, we can formulate a more comprehensive effects-based C-VNSA strategy. Should coercion fail, outright destruction of VNSA may be the only viable option.¹⁴⁵ Achieving this objective requires a C-VNSA strategy that takes into account the supersystem, system, and subsystem aspects of such actors, all married to the life cycle account of their ontogeny. In this section, we offer an analysis of general principles for C-VNSA strategy, a compendium of desired effects, and a set of strategic options that arise from the fusion of these principles and effects. The two pillars of this strategy are (1) denying the negative entropy, or stores of energy, required by the VNSA to survive crisis and/or attack, and (2) disrupting congruence, or fit, among subsystems to induce system failure, either immediately or over time.

The desired effects depend on whether our goal is coercion or defeat. For coercion, the measure of merit would be the actual change in behavior. For defeat, the measure of merit is the total failure of the VNSA system. In reality, behavioral changes will not

be clear and defeat a distant and sometimes elusive goal.

Nonetheless, we can measure progress in our C-VNSA campaign as a function of VNSA system characteristics and performance. At the system level, we should be pursuing effects of positive entropy, increased uncertainty and incongruence, all of which are essential to crippling a system. In terms of performance, systems theory helps as well by directing attention to an input metric of resource utilization, an output metric of goal attainment, and a conversion metric of process efficiency. Thus, we can think about input effects broadly as inefficient resource utilization, which can be further broken down into effects such as dysfunctional stakeholder associations, reduced recruitment and resource disruption. Conversion effects relate to subsystem performance, such as poor decision making, misperception, disrupted communications, or importantly to incongruence, a breakdown in role behaviors. Output effects, where assessment traditionally focuses, include failed operations, reduced quality products, and a general failure to achieve desired changes in policy or defeat of an enemy.

Principles

Military theorists often guide strategy formulation using principles of war. These are general principles that have withstood the test of time, and which can often serve as a useful guide for brainstorming about strategy. There are nine principles underlying the American way of war, ranging from mass to economy of force to surprise.¹⁴⁷ Some of these traditional principles will have analogues in our systems tutored view of VNSA, while others will not; the list of principles on offer is not necessarily intended to transcend the traditional principles of war, but rather works in concert with them to produce maximum target system disruption.

As a prelude to a more comprehensive discussion, we offer the following strategic principles to keep in mind when formulating a strategy to cope with VNSA.

1. *Leverage diachronic effects.* Much of the time, military theorists want systemic effects to manifest themselves immediately upon intervention into the system. If I bomb Germany's ball bearing plants, I expect Panzer production to drop almost immediately. In this sense, much of military strategy focuses, understandably, on synchronic effects: effects that manifest themselves simultaneously, or nearly simultaneously, when action is taken. However, open systems and the VNSA that develop within them present opportunities for diachronically driven interventions; these are interventions whose impact is often not felt until far later in the developmental cycle. The beauty of diachronic effects is that, owing to the feedback loops present in the system, they can offer a huge ratio between the cost of the intervention and its impact upon the system. Much has been made in the literature on chaos theory of the "butterfly effect," wherein sensitive dependence upon initial conditions entails that a butterfly flapping its wings in China can cause a tornado in Oklahoma a year later.¹⁴⁸ In chaotic systems, this means that certain diachronic interventions have generally unpredictable consequences; in an open system, however, regularities in causal relations between subsystems means that we can often predict what impact a diachronic intervention may have on the end state of the system. For example, injecting a small amount of thalidomide into a baby's bloodstream can have horrific large-scale developmental impact in the long run. The impact manifests itself reliably; "thalidomide babies," as the US found in

the 1960's when experimentation with this sedative for pregnant women reached its peak, usually grow only misshapen limbs.

In a VNSA, disabling or destroying identity entrepreneur influence may delay or even prevent VNSA ontogeny. For example, preliminary computer modeling of the situation in Peru in 1975 indicates that had Alberto Guzman not been on the scene serving as the lightning rod for efforts to organize a Maoist resistance to the Peruvian government, the Sendero Luminoso may not have developed at all, although the environmental preconditions that cause population disaffection would still have been present.¹⁴⁹ At this stage in Sendero's development, a single well-timed intervention could have dramatically altered the course of Sendero Luminoso development.

2. *Seek "synergy minus one" interventions.* Complex systems usually manifest synergy; they produce effects that one would not have otherwise expected from a mere additive summation of the parts of the complex system. For instance, gathering a critical mass of plutonium together does not merely produce yet more radioactivity, but instead leads to a high energy explosion. In much the same way, well-constructed VNSA are often able to leverage synergy to have impacts disproportionate to their size. For example, when many intelligent disaffected Japanese youth gather together and are placed in the same room with a charismatic leader and certain pieces of chemical weapons technology, you do not merely get a group of intelligent disaffected Japanese youth with a charismatic leader and chemical weapons technology; rather, you get Aum Shinrikyo and the subsequent nerve gas attack upon Tokyo's central subway system.¹⁵⁰ Synergetic systems are troublesome. However, this synergetic strength is also their

Achilles' heel; generally, the removal of even one component of the synergetic complex disables the complex entirely. The mere conjunction of Shoko Ashara—the leader of Aum Shinrikyo—and intelligent disaffected Japanese youth does not produce a nerve gas attack; all three components of the system must be in place.

Disabling synergetic subsystems by removing or neutralizing just one of the causal factors is called a “synergy minus one strategy.”¹⁵¹ Those wishing to combat complex systems would do well to seek out the subsystems that leverage synergetic effects and focus on disabling just one of the causal factors contributing to the production of the synergy.

Note that not all subsystems are synergetic; many will not be, but will instead impact the system in only a linear fashion. Ascertaining which subsystems contribute synergistically to system output is a challenge for intelligence analysts, model builders, and VNSA experts. Once those subsystems have been identified, their parts should be disabled.

3. *Disrupt well-connected nodes.* Certain subsystems will be critical for system effectiveness, whereas others will not. Generally, critical subsystems will lie at the nexus of multiple inputs and outputs. Our brains, for instance, are well-connected nodes in the human system; they receive multiple inputs from the remainder of the body and in turn have multiple outputs to it. Attacking these well-connected nodes can have a dramatic effect on system efficacy. You will be much more likely to paralyze an individual by attacking the brain than by attacking the hand. Indeed, even a semi-successful assault upon the frontal lobe will impact functioning much more than an entirely successful assault on both arms.

In a VNSA, well-connected nodes include critical leadership posts, financial centers, staging areas for difficult to acquire technologies and skills, and certain intelligence functions. For example, the skills brought to the table by the financier for Al Qaida's operations in Europe, Muhammad Galeb Kalaje Zouaydi, were critical during the growth stages. Disrupting the influence he had on the system might have had a cascading effect on the growth of al Qaida's cell structure in the continent.

4. *Leverage Feedback Loops.* Some subsystems will be recurrently connected to other subsystems; others will not. For a subsystem to be recurrently connected, its components must provide causal input into another subsystem, and that subsystem must, in turn, provide causal input back into the previous subsystem. For instance, the governor on an old-fashioned steam engine was recurrently connected to the remainder of the steam engine. The governor was a valve driven by a set of weighted armatures and its function was to prevent a steam engine from over speeding, which could damage or destroy the engine. As the speed of the steam engine increased, centripetal force caused the weights to rise, leading the valve size to close, which in turn restricted the flow of steam into the engine and slowed it down. The speed at which the governor maintained the engine could be adjusted by sliding the weights up or down the armature. The governor received steam and inertia as input from the engine; in turn, it provided input to the engine in terms of valve size. It was recurrently connected to the engine. This example is illustrative, as it also highlights how a single intervention upon the steam engine could radically change its state: change the status of the governor, and in turn change the status of the entire steam engine.

In general, recurrently connected systems that use an exponential multiplier to control the connection, are critical feedback loops for the system. Interventions that affect the status of these subsystems will have cascading effects on the system as a whole, as an example from aviation may demonstrate. Beginning flyers are subject to correction/overcorrection cycles in which an initial mistake in flight path results in an overcorrection in the opposite direction, which in turn results in an overcorrection back, and so on. In the worst cases, these oscillations increase until the pilot loses control of the aircraft, possibly overstressing the airframe or even crashing altogether.

In a VNSA, effective manipulation of their intelligence apparatus—say, by placing an agent inside their organization—can cascade. For instance, suppose that Hezbollah mistakenly believes that Israeli commandos are training with blank ammunition and will be vulnerable to a midnight strike. When the commandos effectively overcome the attacking Hezbollah force, Hezbollah may contemplate a retaliatory action. This retaliatory action will, in turn, be vulnerable to the same manipulation that the presence of the mole on the Hezbollah planning staff made possible in the first place. Absent intervention by someone who suspects an intelligence agent on the staff, Hezbollah could enter a death spiral relatively quickly. Overstressing the defensive cognitive subsystem of a VNSA can have a similar effect. Put a terrorist organization in a difficult position by feeding noise into its intelligence and counterintelligence functions. Being in this difficult position makes good intelligence all the more important which, in turn, magnifies the impact that the noise will have on the system. Arguably,

something akin to this happened with factions of the IRA in the late 1970s.¹⁵²

5. *Decrease negative entropy/increase entropy.* One way in which organizations attempt to isolate themselves from rapid environmental change and environmental disorder is by accumulating negative entropy. As entropy equates to disorder, negative entropy provides a stock of order that can be used to “ride out hard times” when the sustaining inputs the organization would normally import from its environment are reduced. For example, a terrorist organization needs a steady stream of recruits in order to execute its agenda. If recruits dry up, the group can decrease the impact this lack of resources has on it by drawing upon a reserve stock of recruits. In much the same way that some amount of body fat is useful to survive a famine period, a stock of negative entropy, such as a reserve pool of money, or a group of recruits in the training pipeline, enables a VNSA to weather poor environments.

Philosopher David Weissman makes this point at the abstract level: “Systems are complex, because each embodies a network of relations that are spatial, temporal, and causal. The new complex is sustained—i.e., stabilized—because the energetic bonds within it have established a particular equilibrium, one that will sustain this thing’s integrity until some greater energy is used to destroy it, or until energy within the system dissipates.”¹⁵³

Critically, a knockout blow can only be delivered to an organization if its key stocks of negative entropy are already disrupted. Attacking stocks may not directly impact the short-term ability of the VNSA to export its product, such as terrorist bombers or active cells, but it will set up the necessary conditions for a VNSA to die when it is attacked directly. For instance, owing to

our inability to interdict al Qaida's stock of negative entropy in the form of autonomous cells operating in continental Europe, any knockout blow we deal to the operational arm will be short lived. So long as al Qaida has fat to draw upon, starvation will not succeed on its own.

6. *Disrupt environment/organism interfaces.* Organizations need inputs to survive. Disrupting critical inputs, especially at developmentally important phases of the organization's life cycle, can stunt the organization's growth or possibly even shift it to an entirely different developmental pathway. In much the same way that vitamin D deficiencies cause rickets in young children that in turn affect the overall development of their muscular skeletal system, so can critical deficiencies create brittleness in a VNSA. A good model of VNSA ontogeny would provide policymakers with insight into critical variables.

At least in the gestation and growth phase, a large population of disaffected youth seems to be a requirement for a healthy terrorist organization. Lack of disaffection may cause the organization to be especially brittle and thus amenable to breakage around critical cut points. For instance, the November 17 radical leftist Greek terrorist organization, while a relatively healthy VNSA, nonetheless has a tiny membership of probably no more than 25 members. The recent decline in November 17 activity is directly attributable to Greek government action designed to boost popular support for the antiterrorist campaign, including appealing to Greek patriotism in advance of the 2004 Olympic Games in Athens.¹⁵⁴ By attacking the boundary layer between November 17 and the environment in which they thrive, Greece has successfully reduced this VNSA's

ability to export its product, as bombings and related violent activity have been on the decline.

Weissman drives home the point about the importance of environmental input for sustaining a system.

Every system has an inside and an outside. Each is a relationship of parts with an internal equilibrium and relations to those things outside from which the system draws material, energy, or information. The inside is constituted of the parts in their reciprocal relatedness. Energy or information is cycled through these bonds, so that every dynamic relation to things outside a system is mediated by its material properties and architecture, or by that interpretation of the outside created by this agent's synthesis of the available information. ...this is its distinguishing privacy and integrity, but also its vulnerability. For each stability is generated and sustained in the nourishing sea from which it derives energy and substance.¹⁵⁵

While VNSA are made more robust by certain environments, they are also made weaker by certain environments. Environmental shaping will be a critical part of any deterrent, compelling, coercion, or disruption strategy.

7. *Pay attention to life history analysis.*¹⁵⁶ The fact that VNSA have an ontogeny is important, as it opens the door for VNSA to adopt different "life history strategies" either rationally or through a combination of luck and appropriate environmental exigencies. In population ecology, life history traits are those traits that affect basic reproductive and survival schedules of organisms, such as size at birth, number of offspring, longevity, or stage-specific growth rate. There are tradeoffs among these components of life history (otherwise, for example, organisms would be produced large at birth and keep producing many large offspring in perpetuity). Of course, given that production of large offspring requires more energy and a longer gestation period, producing large offspring most often means

that fewer offspring can be produced. Different VNSA can leverage different trade-offs between these structural features. Combating VNSA effectively can be aided by diagnosing whether or not they will pursue two strategies in particular that organisms in nature have adopted.

Figure 6: r versus K Selection

<i>Attribute</i>	<i>r selection</i>	<i>K selection</i>
Mortality	Variable Unpredictable	Constant Predictable
Population Size	Variable Below carrying capacity	Constant Close to carrying capacity
Competition	Variable Often weak	Usually strong
Selection Favors	Rapid development Early reproduction Small body size Semelparity	Slow development Delayed reproduction Large body size Iteroparity
Length of Life	Usually shorter	Usually longer
Leads to	High productivity	High efficiency

Ecologists have identified two general strategies organisms can use from the life history perspective: r versus K selection. Figure 6 demonstrates the attributes of organisms that pursue an “ r -selected” strategy versus those that pursue a “ K -selected” strategy, where the

Thomas and Casebeer—Violent Systems

r and K refer to the values of the variables that will be maximized in the standard logistic equation:^{*}

Reading right from the “selection favors” label, which suggests there will be environmental selection pressures that encourage these traits, we can see that violent non-state actors, whether by accident or design, which pursue an r-selected strategy will be more likely to have parts, such as cells, that:

- develop rapidly,
- fission early,
- are small, and
- will probably only produce offspring cells once.[†]

Certain aspects of al Qaida appear to have adopted an r-selected strategy. On the other hand, reading right from “selection favors,” we can see that K-selected organisms, such as the Irish Republican Army, will:

- have a slower development cycle, but will have more “sticking power” once they develop,
- delay reproduction until an offspring organization can be ensured of survival,
- have a large organizational structure, and
- have the capacity to reproduce more often (“iteroparity,” as contrasted with semelparity).

Determining whether a VNSA will pursue an r- or K-selected strategy suggests important clues as to how it may progress throughout its life cycle. For instance, a cell-like structure that proliferates quickly is more like an r-selected life history. We could also expect that it will have high productivity (e.g., it will

^{*}See Vendermeer and Goldberg (2003). The mathematical details are not needed to grasp the concept at hand.

[†]“Semelparity” is the biological term for organisms that reproduce only once, but that produce large amounts of offspring when they do.

eventually engage in violent action) but will not be especially efficient at generating new cells itself because it is not efficient at resource conversion. The mortality for a cell is unpredictable; because it is so small, when it is detected, it can be destroyed with relative ease as compared to a large and complex organization. These similarities are merely suggestive, of course, but it may very well be that similar functional structures drive similar life history traits for both organisms and VNSA organizations.

8. *Increase uncertainty.* If organizations are to cope with and adapt to their environment, especially in the mature phase of their life cycle, they must have some cognitive capacity. Environmental scanning is a hallmark of a mature organization. In environments of uncertainty, the organization has to spend valuable time looking for resources in its environment. If such resources are unpredictable, the organization has to spend more time building up a stock of negative entropy, so it will forage more and spend less time actually producing a product. This also leads to increasing uncertainty. This is a strategy advocated by those sensitive to “netwar-centric” conceptions of the war on terrorism, such as John Arquila. At the extreme, an uncertainty-based strategy could create an analogue to “allostatic overload” in a human, where stress and fear disrupt the normal endocrine maintenance processes, thus accelerating wear and tear on tissues and boosting the chances of physio-pathology such as angst and social dysfunction.¹⁵⁷

9. *Implement across the system.* Even if the appropriate inputs do make their way into the organization, such inputs still must be reorganized by the system so as to be useful. Inputs must be processed into outputs. To confront outputs directly is to engage in a force-on-force confrontation with VNSA; this is effective in some

circumstances but not in others, and can play into the hands of an enemy that is planning on leveraging force asymmetries in its favor. A more effective way to disrupt the cycle would be to interdict the inputs via environmental shaping, but even the process itself is amenable to disruption.

Beginning with the input side of the input/processing/output equation, here is a brief list of strategies for attacking inputs:

Environmental shaping. Ascertain critical environmental variables influencing VNSA ontogeny. Shape the environment by removing those variables or making them harder to find. For example, if a VNSA is recruiting personnel from a disaffected population, take action to address the sources of disaffection. When fighting VNSA, states should take care to notice the relationships between the actions they take to counter such organizations and the environmental variables that serve as input to conversion processes. A lack of awareness in this area can cause a policy to backfire. For example, consider the case of the Basque separatist movement ETA. The group was established in 1959 as a nationalist movement to resist the political oppression of the Basque people that came into fashion after the Spanish Civil War ended in 1939. One tactic the Spanish government has used to address ETA is to disperse captured militia members to separate prison facilities when they are captured. Understandably, the Spanish government did not want ETA members to be able to collaborate secretly when they were imprisoned; indeed, the policy was enacted in 1998 by the Minister of the Interior Enrique Mugica, an ethnic Basque and a member of the Socialist Party. While the policy may indeed have prevented some collaboration, it had the adverse effect of breeding sympathy

for convicted terrorists among the general population, as families had to travel many miles to visit imprisoned friends and relatives. “The families, therefore, develop a sense of resentment against the central authorities. That resentment had bred sympathy for the basic demands of the terrorist group.”¹⁵⁸ This counterterrorist policy actually provided more raw input, in the form of disaffected Basque youth, for ETA conversion processes to act upon.

Financial interdiction. Interdict financial input into the organization. Busting money laundering networks and cracking down on the international flow of dirty money has been an effective input oriented strategy for multiple countries dealing with terrorism, including the United States in its struggle against al Qaida, and the United Kingdom in its struggle against the Irish Republican Army. The fungibility of cash makes it the preferred medium of exchange for most VNSA, so focusing on it can be an effective long-term strategy. However, VNSA have shown some considerable skill at finding creative alternative sources of funds, such as cigarette smuggling and coupon schemes, as well as an ability to use various forms of barter, such as illegal commodity trading in diamonds and drugs, to get their resources. As such, financial interdiction will be effective in dampening VNSA activity and decreasing VNSA efficiency, but should not be considered as a stand-alone silver bullet C-VNSA strategy.

Diaspora disruption. Diasporas who have fled a nation state because of an actual or perceived wrong sometimes support VNSA that attack the nation-state or its interests. As Cohen noted in 1997, “diasporas as a social form have predated the nation-state, lived uneasily within it, and now may, in significant respects, transcend and succeed it.”¹⁵⁹ The roots of violence identified earlier

feed the ability of a diaspora to influence the environment in which VNSA operate:

...diasporas draw strength and increased viability from [changes in global structures and processes.] In particular the role of the media and modern means of communication in mobilizing and facilitating diaspora politics cannot be underestimated. ...Second, the economic dimension of globalization is part and parcel of diasporas' economic relations with their homeland and with other parts of the diaspora.¹⁶⁰

If a well entrenched diaspora is providing significant input, be it moral, material, or manpower related, it may be necessary to disrupt the connections between the diaspora and the VNSA; this can be done using a counter narrative strategy or traditional law enforcement mechanisms. It may also involve addressing any bona fide grievances the diaspora may have.¹⁶¹

Counternarrative strategies. VNSA often sustain their input of recruits by telling a compelling story that helps the potential recruit frame the world in the terms the VNSA would like, such as a battle of the infidel West against the righteous Muslim world. Counternarrative strategies seek to disrupt the flow of recruits by reframing the story in a way that defuses the motivation to join the VNSA. For example, rather than being a battle of infidels against the righteous, perhaps the story is better framed in terms of those who would keep a nation downtrodden economically versus those who want to develop a better standard of living. In order to win the “story war,” the US should consider how to

- strengthen our research on public opinion;
- develop a rapid media response capability;
- prioritize public diplomacy in the foreign policy process;

- empower ambassadors and others to be story tellers;
- create US presence posts outside of foreign capitals;
- better utilize the media in the Arab world;
- bolster VOA and create new outlets and media;
- support outside partners;
- cultivate foreign leaders;
- sustain foreign exchange programs;
- engage Arab-Americans, or any other ethnic or religious group involved in VNSA prosperity, to communicate the US message.¹⁶²

As philosopher and systems theorist David Weissman notes, every system has a developmental history. Each is generated as antecedent stabilities interact or evolve: they are transformed, eventuating in this new complex, or they give up matter and energy, thereby supplying material sufficient to establish it....some stabilities are conscious of their histories, telling stories about them, reenacting parts of them. These are developmental histories defended as traditions.¹⁶³

To disrupt the ability of the authority subsystem to maintain cohesion on the part of its followers already in the organization, and to prevent it from reaching into a disaffected population so as to import manpower, is to interfere in an organization's developmental history.

Identity Gerrymandering. Some VNSA thrive on cleavages created by race, class, ethnicity, or religious background. Identity entrepreneurs exploit existing cleavages to increase recruitment. A gerrymandering strategy would seek to alleviate the sources of such cleavages, either by taking material steps to reduce the disparity between the groups or by otherwise alleviating the tension driving recruitment. For example, if Catholics really do earn less than other

Thomas and Casebeer—Violent Systems

Christians when wages are controlled, perhaps the British government could alleviate recruitment into the IRA by addressing the income disparity through a public benefits program.

Disrupting the process portion of the equation would involve intervening into any of the subsystems we have identified, including the support, maintenance, authority and conversion subsystems. Even if interventions into a particular subsystem are not successful, disruption can be achieved by boosting incongruity between successfully functioning subsystems. If the support subsystem cannot successfully feed into the conversion subsystem, this is functionally equivalent to entirely disabling the support subsystem itself. Support-related disruptions include convincing stakeholders not to materially or morally support the VNSA, interdicting recruitment efforts, and otherwise stifling resource acquisition. Authority-related disruptions include targeting key VNSA leadership or decreasing the span of control such leaders have within the organization, targeting intelligence units to drop an organization back to single loop learning, and interdicting flows of information. Conversion-related disruptions include intervening to prevent VNSA from actually carrying out violent actions. Maintenance-related disruptions would involve sabotaging the ability of a VNSA to socialize its members, or interfering with the rewards and sanctions system, perhaps by beating the VNSA at its own game and cultivating an alternate attractive identity replete with even greater rewards.

Output strategies, on the other hand, include as a subset traditional force-on-force interventions and confrontations. Owing to the asymmetrical nature of VNSA warfare, this will sometimes be a successful, other times not. Force-on-force interventions will

be more successful early in VNSA ontogeny, before the group has an effective training mechanism in place and before group identity has congealed to produce a cohesive fighting force. Conversely, this could have undesirable consequences, as the world audience may not see such an early act of aggression as necessary. Indeed, hitting a VNSA in such an early state of its ontogeny may be to act before anyone else perceives a threat, thus marking the attacker as more dangerous than the young VNSA. Perversely, force-on-force confrontations are perhaps the most studied of the interventions we've discussed, so we will not belabor the literature. For a concise historical review of successful force-on-force interventions, see Yonah Alexander's excellent edited volume *Combating Terrorism: Strategies of Ten Countries*.

However, there are other output related strategies besides confronting the guerillas and terrorists that emerge from the "business end" of VNSA, as VNSA produce other products besides men with guns. They also manufacture all the products necessary to sustain the inputs they need to accomplish stakeholder goals. This may include drugs, sex slaves, smuggled weapons, and the like. An output-based strategy can seek to displace important VNSA output by providing substitutes. For example, if a VNSA is boosting popular support by providing social services, the government could one-up the organization by providing the same service more cheaply and efficiently. If the VNSA is outputting drugs in order to provide a steady stream of capital so as to fund a weapons of mass destruction research program, a government could undercut the black market by legalizing certain drugs. VNSA have more outputs than suicide bombers, and a more comprehensive examination of

those outputs and the role they play in sustaining VNSA metabolism might reveal new confrontational policy options.

Ideally, for every VNSA we seek to coerce or destroy, a matrix will be built that lists inputs, processes and outputs for all the major subsystems of support, maintenance, cognitive and conversion. We could then “personalize” strategy around a group’s particular signature across this matrix. After matching instruments of state power to life cycle vulnerabilities, with the requisite sensitivity to the principles discussed here and with careful attention to the dynamics of the system we are about to intervene upon, we might discover a whole new suite of tools that can be used to coerce or destroy VNSA. “War” as such might not even be a necessity.

CONCLUSIONS

Systems analysis allows us to approach geographically, and even temporally, disparate groups like the Kumpulan Mujahidin Malaysia (KMM) or Colombia’s National Liberation Army (ELN) within a common framework. Each operates within a similarly structured supersystem, exhibits common system properties like negative entropy, and progresses through comparable life cycle stages, although not always in the same linear order. In the case of the KMM and ELN, both prosper in regions where the roots of violence are strong, failures in government prevalent, and identity mobilization rampant. Moreover, both are mature VNSA engaging in environmental scanning, converting inputs in the form of recruits, money and weapons, and exporting violence back into the supersystem.

Levels of analysis provide the scaffolding upon which we build the distinctive signature of each group. A VNSA’s signature is a function of its unique interactions, or patterns of behavior, within

and across the levels of the analysis. By way of example, the KMM's interactions with the supersystem in the form of identity mobilization and resource acquisition are constrained by a more capable Malaysian government, which has successfully detained 48 alleged members of the KMM under the Internal Security Act and limited overall group membership to 70-80 assessed members.¹⁶⁵ The ELN, on the other hand, prospers in the northeast of Columbia with a membership of 3000-5000 fighters due in part to Bogota's inability to control the Antioquia region.¹⁶⁶ The systems dynamic of "governance" in relation to critical VNSA subsystem functions is only one of several dimensions of the group's signature. Signatures enable our C-VNSA strategy to retain its global consistency using a menu of transportable instruments and effects while still being tailored to the challenges of a particular region or group.

Ecological deterrence promotes a fundamental shift in our thinking on deterrence, which should be founded in an interdisciplinary approach to assessing the dynamic nature of the VNSA threat. Ultimately, it should involve rethinking the intelligence architecture we use to support deterrence indications and warning (I&W). Ideally, we will modify our intelligence apparatus, keying it to identify the conditions that engender VNSA growth with a reliable set of I&W markers cued to critical life cycle transitions. Such a system, informed by the open-systems theory and life cycle considerations surfaced in this paper, will enable us to better predict what kinds of VNSA would emerge and when. This capacity will be critical in formulating an effective deterrent strategy.

Our paper has made several important conceptual contributions to deterrence theory and practice. We have focused on VNSA,

doing so within a systems theoretic framework; introduced the life cycle concept and its associated metaphors into VNSA thinking; discussed the importance of environmental shaping strategies for deterrence theory; and called for an expanded conception of both deterrence and rationality that includes the multiple aspects of information processing that takes place in VNSA, as well as affective considerations. Nonetheless, there is much that remains to be done, including more closely exploring the links between the system in which VNSA develop and how this affects critical life cycle transitions; discussing the tools we use to assess life cycle status; and, researching specific environmental shaping strategies as well as new affective and rational strategy elements. Much remains to be done before we can successfully accommodate VNSA within our deterrence, coercion, and disruption theories, and before we can formulate an effective strategy for them.

When disruption or defeat are the mission, this analysis should add multiple dimensions to a strategy that sometimes focuses too much on the product of the system and not enough on the system itself. To disrupt the importation of energy, shape the environment and attack the environment/organization boundary. To destroy throughput, have a process-oriented attack plan. To attack export, meet the product head on before it has been fully deployed. To interfere with the cyclic pattern of activities, interfere with internal activities that are critical, well-connected, or consist of exponential feedback loops. Attack negative entropy by disrupting or destroying critical stores. Disrupt the feedback and coding process by engaging in counterintelligence and influence operations designed to increase uncertainty and disrupt communication. Destroy homeostasis by attacking critical nodes and disrupting

system congruity. While doing these things, keep in mind our newly formulated principles of war for countering VNSA, as they should inform all actions whether directed at input, conversions, or output.

Our interdisciplinary application of open systems theory provides a powerful framework for diagnosing adversaries, shaping their development and structuring an effects-based strategy for coercion and conquering. It is a global approach to a global challenge.

NOTES

¹ Thomas Szayna, ed. *Identifying Potential Ethnic Conflict: Application of a Process Model* (Santa Monica, CA: RAND, 2000), 132.

² Charles Tilly, *From Mobilization to Revolution* (New York: Random House, 1978), 55. See also Ted Robert Gurr, *Why Men Rebel* (Princeton, NJ: Princeton University Press, 1970).

³ The instrument of the state is the army: organized, uniformed, and subordinate to the political leadership. The third element is the populace, which must be mobilized to participate and support the war. See Peter Paret, "Clausewitz" in Peter Paret, ed. *Makers of Modern Strategy: From Machiavelli to the Nuclear Age* (Princeton, NJ: Princeton University Press, 1986), 198-207.

⁴ For a comprehensive explanation of non-trinitarian war see Martin van Crevald, *The Transformation of War* (New York: The Free Press, 1991), 49-57.

⁵ Adapted from Gurr, 11.

⁶ The three-level approach to understanding asymmetric warfare was developed by former Air Force Captain Deron Jackson, Assistant Professor of Political Science, Department of Political Science, USAF Academy, in his paper "Asymmetric Warfare: Three Levels of Analysis," August 1999.

⁷ The indirect approach is explained in B.H. Liddell Hart's classic study, *Strategy* (New York: Signet, 1967).

⁸ Interview with Mullah Omar—transcript, 15 November 2001, 10:31 GMT. Available at

http://news.bbc.co.uk/1/hi/english/world/south_asia/newsid_1657000/1657368.stm.

⁹ Michael Ignatieff, "It's War But It Doesn't Have to Be Dirty," *The Guardian* (1 Oct 2001). Available at: <http://www.guardian.co.uk/Archive/Article/0,4273,4267406,00.html>.

¹⁰ Cited in Thomas G. Cummings, *Systems Theory for Organization Development* (New York: John Wiley and Sons, 1980), 6. Also see Von Bertalanffy's seminal work, "General Systems Theory," in *Main Currents in Modern Thought* (11:4, 1955).

¹¹ Cummings, 8-9.

¹² A useful primer for diagnostic practices is Michael I. Harrison, *Diagnosing Organizations: Methods, Models, and Processes* (Thousand Oaks, CA: SAGE Publications, Inc., 1994).

¹³ Troy S. Thomas and Stephen D. Kiser, *Lords of the Silk Route: Violent Non-State Actors in Central Asia* (USAF Academy, CO: Institute of National Security Studies, Occasional Paper #43, May 2002).

¹⁴ For a complete examination of the roots of violence, see Chapter 2 of Thomas and Kiser.

¹⁵ A sovereign state controls all matters of governance and administrative control, and holds ultimate and monopolistic command and control of the means of coercion, both of its citizens within its borders and entities outside its borders. From Thomas S. Szayna, ed. *Identifying Potential Ethnic Conflict: Application of a Process Model* (Santa Monica, CA: RAND, 2000), 33.

¹⁶ "Working Papers: State Failure Task Force Report," prepared by Daniel C. Esty, Yale University, Jack A. Goldstone, University of California-Davis, Ted Robert Gurr, University of Maryland, Pamela T. Surko, Science Applications International Corporation (SAIC), and Alan N. Unger, SAIC, 30 November 1995.

¹⁷ Lucio Fernando Oliver Costilla, "Reconstruction of Power and Democracy in the Age of Globalization," *Latin American Perspectives* (27 Jan 2000): 93.

¹⁸ Subcomandante Marcos, "A Southeast in Two Winds," 27 January 1994. Available at: <http://lanic.utexas.edu/project/Zapatistas/0.TXT>.

¹⁹ For a broader discussion of coercion as a form of state failure, read the analysis by Steve Kiser in Thomas and Kiser, 28-30.

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- ²⁰ Donald Snow, *Uncivil Wars: International Security and the New Internal Conflicts* (Boulder, CO: Lynne Rienner Publishers, Inc., 1996), 35.
- ²¹ Philip Selznick, "Foundations of the Theory of Organization," *American Sociological Review* 13 (1948): 25-35. Reprinted in Jay M. Shafritz and J. Steven Ott, eds. *Classics of Organization Theory* (Fort Worth, TX: Harcourt College Publishers, 5th Edition, 2001), 125.
- ²² Selznick, 125.
- ²³ Selznick, 125.
- ²⁴ Selznick, 126.
- ²⁵ Selznick, 128.
- ²⁶ Daniel Katz and Robert L. Kahn, "Organizations and the System Concept," *The Social Psychology of Organizations* (John Wiley and Sons, 1966). Reprinted in Shafritz and Ott, 257.
- ²⁷ Katz and Kahn, 260-265.
- ²⁸ Katz and Kahn, 260-263.
- ²⁹ Katz and Kahn, 262.
- ³⁰ Katz and Kahn, 262.
- ³¹ Katz and Kahn, 262.
- ³² Michael I. Harrison and Arie Shirom, *Organizational Diagnosis and Assessment: Bridging Theory and Practice* (Thousand Oaks, CA: Sage Publications, 1999), 52.
- ³³ Harrison and Shirom, 54.
- ³⁴ For a complete explanation of the rational choice model and critiques by Graham Allison and others, see Jeffrey Pfeffer, "Understanding the Role of Power in Decision Making," *Power in Organizations* (Marshfield, MA: Pitman Publishing, 1981). Reprinted in Shafritz and Ott, 304-318.
- ³⁵ John Hill. "China's Turbulent Backyard." *Jane's Intelligence Review*. (14:6, June 2002), 48-49.
- ³⁶ Katz and Kahn, 264.
- ³⁷ Katz and Kahn, 264.
- ³⁸ Ludwig von Bertalanffy, "General Systems Theory," in Ludwig von Bertalanffy and Anatol Rapoport, eds. *Yearbook of the Society for the*

Advancement of General Systems Theory (1956), 1-10, as cited in Katz and Kahn, 265.

³⁹ Katz and Kahn refer to equifinality as the ability of a system (organization) to reach the same final state (mature VNSA) from different initial conditions (system of violence) and by different paths of development. See Katz and Khan, 267.

⁴⁰ David Eshel, "The Rise and Fall of the Al Aqsa Martyrs Brigades," *Jane's Intelligence Review* (14:6, June 2002): 20.

⁴¹ Eshel, 21.

⁴² Chapters included Nablus, Jenin, Tulkarm, Ramallah, Bethlehem, and Hebron. Eshel, 23.

⁴³ Eshel, 22.

⁴⁴ Our diagnostic plan encompasses Harrison's nine areas of focusing for the gathering of organizational information: environment, inputs, outputs, goals and strategies, technology, structure, behavior and processes, culture, and systems dynamics. Harrison and Shirom, 34-35.

⁴⁵ Daniel Katz and Robert L. Kahn, *The Social Psychology of Organizations* (New York: John Wiley & Sons, 1978), 52.

⁴⁶ According to NPR reporter Emily Harris, "Some 90 U.S. troops have been killed by hostile fire since May 1 (2003), when President Bush announced an end to major combat. Many of the attacks on American forces appear to be coming from Iraqis loyal to Saddam Hussein's regime." From "US Troop Toll Mounts in Iraq," *NPR Morning Edition*, 2 October 2003.

⁴⁸ Katz and Kahn (1978), 84.

⁴⁹ A comprehensive examination of typical forms of support for insurgents, which also applies to other VNSA, is offered in: Daniel Byman, et al. *Trends in Outside Support for Insurgent Movements* (Santa Monica, CA: RAND, 2001), 83-99.

⁵⁰ Angel Rabasa and Peter Chalk, *Colombian Labyrinth: The Synergy of Drugs and Insurgency and its Implications for Regional Stability* (Santa Monica, CA: RAND, 2001), 26.

⁵¹ Suzanne Lassen, "Drug Trafficking and Terrorism in Colombia," *The Politics of Counter Terrorism: The Ordeal of Democratic States* (Washington, DC: The John Hopkins Foreign Policy Institute, 1990), 112.

⁵² Rabasa and Chalk, 24.

⁵³ According to Rabasa and Chalk, the FARC “took advantage of a cease fire with the government of President Belisario Betancur from 1984 to 1987 to expand and consolidate its operations in resource rich areas,” including cattle in the eastern plains, agriculture in Uraba and Santander, oil in the Magdalena valley and gold in Antioquia. Rabasa and Chalk, 25.

⁵⁴ I.M. Jawahar and Gary L. McLaughlin, “Toward a Descriptive Stakeholder Theory: An Organizational Life Cycle Approach,” *The Academy of Management Review* (26:3, July 2001).

⁵⁵ Rabasa and Chalk, 26.

⁵⁶ Mary Jo Hatch, *Organization Theory: Modern, Symbolic, and Postmodern Perspectives* (Oxford: Oxford University Press, 1997), 79-80.

⁵⁷ Katz and Kahn (1978), 84.

⁵⁸ Cited in Augustus Richard Norton, *Amal and the Shi’a: Struggle for the Soul of Lebanon* (Austin, TX: University of Texas Press, 1987), 168-169.

⁵⁹ Hatch, 65.

⁶⁰ The full extent of diaspora support to the LTTE is superbly detailed in Byman, et al, 42-55.

⁶¹ Byman, et al, 51.

⁶² Byman, et al, 45.

⁶³ Byman, et al, 46.

⁶⁴ Approaches for dealing with stakeholders are adopted from research by several organizational theorists into understanding stakeholder salience to a given company throughout its development. Stakeholder dependency theory is admirably discussed in Jawahar and McLaughlin.

⁶⁵ Again, see Jawahar and McLaughlin.

⁶⁶ During the 1990s, the LTTE assassinated leading moderates and scholars in Sri Lanka. Byman, et al, 47.

⁶⁷ Katz and Kahn (1978), 84-85

⁶⁸ Katz and Kahn (1978), 53.

⁶⁹ Katz and Kahn (1978), 53.

⁷⁰ Katz and Kahn (1978), 53.

⁷¹ Katz and Kahn (1978), 385.

⁷² Katz and Kahn (1978), 386.

⁷³ Katz and Kahn (1978), 385.

⁷⁴ Katz and Kahn (1978), 388.

⁷⁵ Thomas G. Cummings and Christopher G. Worley, *Organization Development and Change* (Cincinnati, OH: South Western College Publishing, 1997), 480.

⁷⁶ Peter L. Bergen, *Holy War, Inc.: Inside the Secret World of Osama bin Laden* (New York: The Free Press, 2001), 149.

⁷⁷ Bergen, 107.

⁷⁸ Bergen, 107.

⁷⁹ Bergen, 108.

⁸⁰ Katz and Kahn (1978), 84.

⁸¹ Katz and Kahn (1978), 55.

⁸² Hatch, 371.

⁸³ Chris Argyris and Donald Schon, *Organizational Learning II: Theory, Method and Practice* (Reading, MA: Addison Wesley Publishing Company, 1996), 20.

⁸⁴ Bergen, 176.

⁸⁵ Bergen, 181.

⁸⁶ Bergen, 167.

⁸⁷ Hatch, 372.

⁸⁸ Argyris and Schon, 20.

⁸⁹ Hatch, 101.

⁹⁰ “When the competencies of the organization fit the demands of the environment, then the organization is selected and retained (the population ecology view), provided with resources (the resource dependency view), and legitimized (the institutional view).” Hatch, 103.

⁹¹ Explained by Hatch, 105-110, drawing on Henry Mintzberg, “The Design School: Reconsidering the Basic Premises of Strategic Management,” *Strategic Management Journal* (11:3, March-April 1990), 171-195.

⁹² Hatch, 108.

⁹³ Selznick, 125.

⁹⁴ Selznick, 125.

⁹⁵ Hatch, 113.

⁹⁶ Typical insurgent strategies are expertly discussed in Bard E. O'Neill, *Insurgency in the Modern World* (Boulder, CO: Westview Press, 1980), 1-41.

⁹⁷ The status of non-state armed groups in the Caucasus region is well covered in Anna Matveeva and Duncan Hiscock, eds. *The Caucasus: Armed and Divided* (London, UK: Saferworld, 2003), 62.

⁹⁸ Matveeva and Hiscock, 62.

⁹⁹ Extracted from the official website of *Hizb ut-Tahrir* accessed on 27 Dec 2003 at <http://www.hizb-ut-tahrir.org>.

¹⁰⁰ Matveeva and Hiscock, 168.

¹⁰¹ Matveeva and Hiscock, 170.

¹⁰² Katz and Kahn (1978), 428.

¹⁰³ Katz and Kahn (1978), 430.

¹⁰⁴ John Arquilla and David Ronfeldt, *Networks and Netwars* (Santa Monica, CA: RAND, 2001), 35-36.

¹⁰⁵ Arquilla and Ronfeldt, 37.

¹⁰⁶ Katz and Kahn refer to this as the “production” subsystem; however, this label is too limited for the tasks. Katz and Kahn (1978), 84.

¹⁰⁷ Gurr, 11.

¹⁰⁸ Not included in our forms of violence typology is turmoil, which is “relatively spontaneous, unorganized political violence with substantial popular participation, including violent political strikes, riots, political clashes and localized rebellions.” Gurr, 11.

¹⁰⁹ These distinctions are fleshed out in greater detail in Bruce Hoffman, *Inside Terrorism* (New York: Columbia University Press, 1998), 41-44.

¹¹⁰ Hoffman, 41.

¹¹¹ This definition was offered by Troy S. Thomas in public lecture given at Florida State University Panama City on 12 February 2002. It integrates definitions from Donald J. Hanle, *Terrorism: The Newest Face of Warfare* (Washington, DC: Pergamon Brassey's, 1989), 105-119; and, Hoffman, 43.

¹¹² Charles W. Kegley and Eugene R. Wittkopf, *World Politics: Trend and Transformation* (New York: Bedford/St. Martins, 2001), 12.

¹¹³ Cited in Bergen, 95-96.

¹¹⁴ There are numerous alternatives to these labels; however, there is some general agreement on changes in differentiation and integration during the course of a VNSA's life. For alternatives life cycle constructs, we recommend reviewing the following: Richard L. Daft, *Organizational Theory and Design* (St Paul, MN: West Publishing, 1992); Robert E. Quinn and Kim Cameron, "Organizational Life Cycles and Some Shifting Criteria of Effectiveness," *Management Science* 29 (1983): 31-51.; John R. Kimberly, Robert H. Miles, and Associates, *The Organizational Life Cycle* (San Francisco: Jossey Bass Inc., 1980); and Larry E. Greinner, "Evolution and Revolution as Organizations Grow," *Harvard Business Review* (July-August 1972): 37-46.

¹¹⁵ Clifford E. Simonsen and Jeremy R. Spindlove, *Terrorism Today: The Past, the Players, the Future* (Upper Saddle River, NJ: Prentice Hall, 2000), 60-61.

¹¹⁶ Katz and Kahn (1978), 71.

¹¹⁷ Based on Larry Greiner's model of organizational life cycles. Evaluated in Hatch, 174.

¹¹⁸ Katz and Kahn stress the importance of coordinating the inputs, production and outputs so that "correct levels of raw materials are brought into the organization" and outputs (sales in the case of businesses, but violence in the case of VNSA) are in balance with planned production. Discussed in Hatch, 178.

¹¹⁹ This definition is adopted from Daniel L. Byman, Matthew C. Waxman, and Eric Larson, eds. *Airpower as a Coercive Instrument* (Santa Monica, CA: RAND Project Air Force, 1999), 10; who in turn drew upon the seminal works in this field: Thomas Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 1966), and Alexander George and William E. Simons, eds. *The Limits of Coercive Diplomacy* (Boulder, CO: Westview Press, 1971).

¹²⁰ Byman, Waxman, and Larson, 10.

¹²¹ Robert A. Pape, *Bombing to Win* (Ithaca, NY: Cornell University Press, 1996), 13.

¹²² For an introduction to the different senses in which one can use the term "psychological state," see: George Botterill and Peter Carruthers, *The Philosophy of Psychology* (New York: Cambridge University

Press, 1999), 12-48. The conception of cognition that views it as “computation across representations,” i.e., as information processing, is a standard one in the cognitive sciences.

¹²³ The list of assumptions varies from author to author; this list is a compilation of several standard recitations. For an example, see Ariel Rubinstein, *Modeling Bounded Rationality* (Cambridge, MA: The MIT Press, 1998), 7-10, which lists these foundational assumptions: knowledge of the problem, clear preferences, ability to optimize, indifference to logically equivalent descriptions of alternatives and choices. Compare also Martin J. Osborne and Ariel Rubinstein, *A Course in Game Theory* (Cambridge, MA: The MIT Press, 1994), 4.

¹²⁵ While we are, to our knowledge, the first to surface some of the considerations mentioned in this paper, criticisms of deterrence theory that rely on criticisms of the shortcoming of rational choice theory are not new. See Frank C. Zagare’s summary (and rebuttal) in “Rationality and Deterrence,” *World Politics* (42:2, January 1990): 238-260. See also Robert Jervis, et al. *Psychology and Deterrence* (Baltimore: The Johns Hopkins University Press, 1985), which is in need of updating given the rapid progress in the field of judgment and decision making.

¹²⁶ See their classic collection Daniel Kahneman, Paul Slovic, and Amos Tversky, eds. *Judgment Under Uncertainty: Heuristics and Biases* (New York: Cambridge University Press, 1982). For a general reference, see Terry Connolly, et al, eds. *Judgment and Decision Making: An Interdisciplinary Reader* (New York: Cambridge University Press, 2000).

¹²⁷ See Kahneman, Slovic and Tversky, as well as: Daniel Kahneman and Amos Tversky. “Choices, Values and Frames.” *American Psychologist* 39 (1984), 341-350, and also their recent book of the same title (New York: Cambridge University Press, 2000). For critical review of that book, see: Phillip E. Tetlock and Barbara A. Mellers. “The Great Rationality Debate.” *Psychological Science* (13:1, January 2002), 94-99.

¹²⁸ Gerd Gigerenzer, *Adaptive Thinking: Rationality in the Real World* (New York: Oxford University Press, 2000).

¹²⁹ Gigerenzer, 170.

¹³⁰ Classic works here include George Lakoff and Mark Johnson, *Metaphors We Live By* (Chicago: The University of Chicago Press, 1980); Dedre Gentner, Keith Holyoak, and Boicho Kokinov, *The Analogical Mind: Perspectives from Cognitive Science* (Cambridge, MA: The MIT Press, 2001); and Gilles Fauconnier and Mark Turner,

The Way We Think: Conceptual Blending and the Mind's Hidden Complexities (New York: Basic Books, 2002).

¹³¹ This is the structuring metaphor of Benjamin Barber's "clash of the world views" book *Jihad vs. McWorld: How Globalism and Tribalism Are Reshaping the World* (New York: Ballantine Books, 1996).

¹³² See Fauconnier and Turner, or Mark Turner, *The Literary Mind* (New York: Oxford University Press, 1998).

¹³³ See Turner. See also groundbreaking work here by Anthony Patton, unpublished manuscript, *The World as Story* (2002).

¹³⁴ Antonio Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain* (New York: G. P. Putnam and Sons, 1994).

¹³⁵ A classic work here is Robert Port and Timothy Van Gelder, eds. *Mind As Motion: Explorations in the Dynamics of Cognition* (Cambridge, MA: The MIT Press, 1995). See also Alicia Juarrero, *Dynamics in Action: Intentional Behavior as a Complex System* (Cambridge, MA: The MIT Press, 1999).

¹³⁶ On the biological side of the house, it is well known that the exact same interventions at different points in an organism's growth and development can have dramatically different impacts on outcomes (this is called "heterochrony"). See, for example John Gerhart and Marc Kirschner, *Cells, Embryos, and Evolution* (Malden, MA: Blackwell Science, 1997).

¹³⁷ Joseph Forgas, "Affect, Cognition, and Interpersonal Behavior: The Mediating Role of Processing Strategies," as printed in Joseph Forgas, ed. *Handbook of Affect and Social Cognition* (Mahwah, NJ: Lawrence Erlbaum Associates, Inc., 2001).

¹³⁸ See Plato, *Republic*, Robin Waterfield, Trans. (New York: Oxford University Press, 1993), Book Four.

¹³⁹ For more about these myths, see Ryszard Kapuscinski, *The Shadow of the Sun* (New York: Vintage Books, 2001). Owing to the (mostly fabricated) "early history" of the region, the Tutsis were viewed as being pastoral patrons (read: rulers) who preside over their clients (read: slaves), the Hutu agriculturalists. Under colonial rule by both the Germans and the Belgians, this foundational myth was reinforced, with separate identity cards being issued for both peoples. The Belgians even went so far as to argue that the Tutsi were, racially speaking, more closely related to white people, and were hence a superior race, putting in place a quite different but nonetheless related foundational myth. Needless to say, these myths played a large part in the violence that

erupted in 1994. For more, see the report from “Africa Action” on the world wide web: <http://www.africaaction.org/bp/ethcen.htm>.

¹⁴⁰ Bill Berkeley, *The Graves are Not Yet Full: Race, Tribe and Power in the Heart of Africa* (New York: Basic Books, 2001), 224-225.

¹⁴¹ See: Paul Churchland, “Toward a Cognitive Neurobiology of the Moral Virtues,” Reprinted in Joao Branquinho, ed. *The Foundations of Cognitive Science* (New York: Oxford University Press, 2001).

¹⁴² See Fauconnier and Turner for more advice here regarding how to enable these “frame shifts.”

¹⁴³ For an excellent discussion of this process see Daniel Byman, *Keeping the Peace: Lasting Solutions to Ethnic Conflicts* (Baltimore, MD: The Johns Hopkins University Press, 2002), 100-124.

¹⁴⁴ Various interviews, Masaai nationals in Tanzania, June 2002. For more background on Tanzania’s history, as well as detail on the Rwandan situation, see also Taisier Ali and Robert Matthews, eds. *Civil Wars in Africa: Roots and Resolution* (Montreal: McGill Queen’s University Press, 1999).

¹⁴⁵ From the US perspective, as one example of a state goal, the US national security objective is “...stop[ping] terrorist attacks against the United States, its citizens, its interests, and our friends and allies around the world and ultimately, to create an international environment inhospitable to terrorists and all those who support them.” See The White House, *National Strategy for Combating Terrorism* (February 2003), 11.

¹⁴⁷ The nine principles of war are mass, objective, offensive, surprise, economy of force, maneuver, unity of command, security, and simplicity. See US Army Combined Arms Center, *Army Field Manual (FM) 3 Operations* (Washington, DC: Department of the Army, 2001), Paragraphs 4.33-4.49.

¹⁴⁸ For an accessible account of the butterfly effect, and chaos theory in general, see James Gleick, *Chaos: Making a New Science* (New York: Viking, 1987).

¹⁴⁹ See Bartolomei and Casebeer (forthcoming, 2003). This is only a tentative result, as the model constructed by Bartolomei and Casebeer has not been subjected to rigorous validation and verification (although it has successfully retrodicted the growth curve for Peru’s Sendero Luminoso).

¹⁵⁰ See Ian O. Lesser, et al. *Countering the New Terrorism* (Santa Monica, CA: RAND Project Air Force, 1999). The sarin attack killed

a dozen people and wounded 3,976 others. Aum Shinrikyo had plans to launch a similar attack upon the United States.

¹⁵¹ This language is taken from Peter Corning, *Nature's Magic: Synergy in Evolution and the Fate of Humankind* (New York: Cambridge University Press, 2003).

¹⁵² See David J. Whittaker, *The Terrorism Reader* (New York: Routledge, 2001).

¹⁵³ David Weissman, *A Social Ontology* (New Haven: Yale University, 2000), 312.

¹⁵⁴ See the Council on Foreign Relations terrorism information website at <http://www.terrorismanswers.org/groups/rps.html>.

¹⁵⁵ Weissman, 313.

¹⁵⁶ Most of the information in this section, including the table, is adapted from John H. Vendermeer and Deborah E. Golberg, *Population Ecology: First Principles* (Princeton: Princeton University Press, 2003), 39.

¹⁵⁷ See Jay Schulkin, *Rethinking Homeostasis: Allostatic Regulation in Physiology and Pathophysiology* (Cambridge: MIT Press, 2003).

¹⁵⁸ Antonio Remiro Brotons and Carlos Esposito, "Spain" in Yonah Alexander, ed. *Combating Terrorism: Strategies of Ten Countries* (Ann Arbor: University of Michigan Press, 2002), 173.

¹⁵⁹ Robin Cohen, *Global Diasporas: An Introduction* (London: UCL Press, 1997), 520.

¹⁶⁰ Daphne Josselin and William Wallace, eds. *Non-State Actors in World Politics* (New York: Palgrave, 2001), 222.

¹⁶¹ See the essays in Alexander T. J. Lennon, ed. *The Battle for Hearts and Mind: Using Soft Power to Undermine Terrorist Networks* (Cambridge, MA: MIT Press, 2003).

¹⁶² See "Winning the War of Ideas" by Antony J. Blinken, for much more detail (as printed in Lennon).

¹⁶³ Weissman, 313.

¹⁶⁵ See the US Department of State report *Patterns of Global Terrorism* 2002. Available at: <http://www.state.gov/s/ct/rls/pgtrpt/2002/html>.

¹⁶⁶ Rabasa and Chalk, 30-31.