White Paper on Assessing and Anticipating Threats to US Security Interests

A Bio-Psycho-Social Science Approach for Understanding the Emergence of and Mitigating Violence and Terrorism

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Foreword

The trends in the strategic environment are speeding the redistribution of power across a range of actors around the globe. As power shifts, we frequently see competition emerge as empowered actors attempt to expand their spheres of influence, while others attempt to preserve the status quo. Empowered actors naturally seek to seize new privilege commensurate with their elevated power status – this is not new. What is new is that increasingly, populations are becoming connected through modern communications technology and are demanding change from their respective governments on a range of issues. Common grievances can now quickly mobilize a connected population and create opportunities for exploitation by outside state or non-state actors.

The combination of grievances, demands, and external exploitations of internal instability are challenging traditional United States responses to regional security problems. The utilization of "domains" for military operations has shifted among state and non-state actors. The land, sea, air, and space domains have belonged almost exclusively to states, with only the most powerful dominating the air and space domains. This is no longer the case. The rise of the cyber domain has re-empowered the human domain – populations – apart from the state. This is a complexity the Joint Force must address in earnest.

Success in the human domain depends on an understanding of the social, cultural, physical, informational, and psychological elements that influence human behavior. This understanding requires an integrative, multi-disciplinary Bio-Psychosocial approach that acquires, analyzes, informs, and develops responses to interacting factors to the operational challenges our Nation faces. This understanding will not only enable the United States to better address the biological, psychological, and social needs of our personnel, but will also serve to improve methods of developing awareness, and enhanced empathy for our allies' cultural and environmental contingencies and needs.

This body of work is an important step in cultivating a shared understanding of the foundational aspects of human behavior, and I look forward to continued research and development in this arena. It is critical to our future success operating in the ever-important Human Domain.

JOSEPH L. VOTEL
General, U.S. Army

Executive Summary: Dr. James Giordano, Georgetown University

Over the past four years, ongoing activities of the Strategic Multilayer Assessment (SMA) group have focused upon the validity and viability of neuro-cognitive techniques and technologies to be operationalized within national security, intelligence, and defense initiatives. Operationally, neuro-cognitive approaches have been, and are being evaluated, and in some cases iteratively employed, in the assessment, analysis, interdiction, influence, mitigation, and/or deterrence of factors contributory to intent and acts of global aggression and violence that threaten the United States (US) and its allies.

Through these projects, it was recognized that the value of neuro-cognitive techniques and technologies are best—and in some cases only—realized if and when they are incorporated and employed within (and to optimize) a more expansive orientation to human thought and action, which encompasses, appreciates, acknowledges, and engages the interactive dynamics of humans-in-environments.

This approach is known as the bio-psychosocial model, with homage to George Engel, who developed this paradigm—originally in reference to the scope and conduct of biomedicine—to describe humans as biological organisms, who psychologically experience and respond to the social (i.e., physical, group, economic, political) environment(s) in which they are embedded and function.

This whitepaper, *Assessing and Anticipating Threats to US Security Interests: A Bio-PsychoSocial Science Approach for Understanding the Emergence of and Mitigating Violence and Terrorism* represents the work of intra- and extramural subject matter experts (SMEs) from multiple disciplines, convened to provide views and insights to define and further develop a bio-psychosocial approach to understanding, assessing, and influencing the cognitions and behaviors of individuals and groups that are devising, recruiting, training, and implementing organized aggression and violence. In light of current national and international security concerns, a major focus of this report is upon those bio-psychosocial factors that are influential to, and influenced by the activities of the group known as Islamic State of Iraq and the Levant—ISIL (or Daesh/Da'ish).

The report is formally divided into five (5) sections:

- Introduction; and Review of Related SMA Projects/Work;
- Biological Perspectives On Behavior;
- Psychological Perspectives On Behavior;
- Social Perspectives On Behavior; and
- Operational Perspectives.

Following the Introduction and Review of Related SMA Projects, each section has been developed in a way such that the reader may delve into each/any of the sections to gain both an overview and subsequently more finely-grained, detailed insight to (biological, psychological, and/or social) aspects of individual and/or group aggression and violence. In keeping with the core principles of the bio-psychosocial model, these sections are interactive and reciprocal.

The reader need not proceed in any particular order, but may elect to begin with any section, so as to gain understanding of how and why certain (biological, psychological, or social) dimensions affect, and are affected by others. In each chapter, reference is made to information in/of other chapters, and the reader can use these references as direction to find related and supportive information. The final section of this report affords an overall operational perspective.

Thus, if and when taken either in part or in sum, this report will provide a working view to the ways that bio-psychosocial variables—and a bio-psychosocial approach—are important to understanding aggression and violence, and informing and articulating national security, intelligence, and defense efforts to analyze, deter, and/or prevent its incitement and occurrence.

The general information provided in each section is summarized below.

Introduction: The Bio-Psychosocial Approach: Dr. James Giordano and Celeste Chen detail the integrative, interactive, and reciprocal relationship(s) that exist between (neuro)biological systems, psychological (i.e., cognitive and behavioral) effects and expressions, and the influence of and upon the social environment. From this perspective, they describe how bio-psychosocial relationships can engender and perpetuate aggression and conflict, and posit how these variables may effectively inform—and provide targets for—approaches to conflict prediction, prevention, and resolution. Giordano and Chen state that targeting biological and/or psychological factors can be important and useful to altering social behaviors, just as engaging social and behavioral components can influence psychological and biological correlates. Giordano and Chen argue that given the bio-psychosocial foundations of individual and group identities, attitudes and values it is therefore important to: (1) evaluate the potential role that these factors play in human thought and actions in particular settings and circumstances, and (2) re-frame national security, intelligence, and defense initiatives of conflict negotiation and resolution to more effectively target—and affect—salient bio-psychosocial variables.

A Review Of SMA Bio-Psycho-Social Investigations: In this chapter, Sarah Canna summarizes SMA's interest in neuro-cognitive factors contributing to social dynamics of inter-individual and inter-group cooperation, dissonance, radicalization, aggression, and violence. She presents overviews of SMA projects that addressed the potential role that the neuroscience community

could exercise to both understand, and perhaps operationally influence, aggression in ways that could be applied to the fields of counterterrorism, deterrence, and information operations. She illustrates that through these studies, conferences, and reports, SMA has played a definitive role in bridging scientific insights and capabilities to the needs and mission of the operational community. In light of these prior and ongoing efforts, there is sustained and increasing interest in the advances in global security that can be achieved through the integrative engagement of brain science, social sciences, and computational technology. The present report evidences SMA's continuing dedication to addressing these capabilities and fortifying the USG's capacity in national and international security.

Biological Perspectives On Behavior

The Role Of Emotions In Human Behavior: Perspectives From Neuroscience And Cognitive Psychology: Drs. Diane DiEuliis, William Casebeer, and James Giordano provide a brief overview of neurological structures, systems, and mechanisms that function in the initiation, execution, and regulation of interpersonal, group, and environmental interaction. The reciprocity of internal and external environmental effects and responses are detailed, with particular emphasis upon key brain structures and pathways operative in reinforcement, reward, fear, and anger, as influential to dispositions to, and execution of aggressive and violent thought(s) and acts.

This is the shortest of the sections in that considerable prior work by our group has yielded a large body of information about the neurobiology of cooperative, aggressive, and violent cognition and behavior; the intent was not to re-iterate that work here. Rather, this section is intended only to provide (1) a concise presentation of the neurological bases of biological systems affecting—and affected by—psychological functions in response to socio-environmental stimuli (from the individual to the international level), as (2) means to illustrate that—and how—(neuro)biology is essentially nested and functional within psychological and social dimensions and dynamics.

For more detailed and specific examinations of neurobiologic and neuro-cognitive variables that are involved in aggression, and for explicit discussion of if and how various techniques and tools of neuro-cognitive science can be operationally employed, the reader is referred to the following previous SMA reports:

- *Social and Cognitive Neuroscience Underpinnings of ISIL Behavior and Implications to Strategic Communication, Messaging, and Influence* (2015)
- *Leveraging Neuroscientific and Neurotechnological Developments with Focus on Influence and Deterrence in a Networked World* (Revised; 2014)

- *Topics in Operational Considerations on Insights from Neurobiology on Influence and Extremism* (2013)
- *Topics in the Neurobiology of Aggression: Implications to Deterrence* (2013)
- *Neurobiological and Cognitive Science Insights on Radicalization and Mobilization to Violence: A Review* (Second Edition; 2012)
- *Cyber on the Brain: The Effects of CyberNeurobiology and CyberPsychology on Political Extremism* (2012)
- *National Security Challenges: Insights from Social, Neurobiological, and Complexity Science* (2012)

Psychological Perspectives On Behavior

How ISIL Recruitment Tactics Target The Adolescent Brain: Dr. Victoria Romero describes how neurological and psychological characteristics of adolescence make adolescents particularly vulnerable to recruitment tactics employed by fringe and antisocial groups. Noting that while ISIL is not the first group to take advantage of such vulnerabilities, the group has become particularly adept in such pursuits. Dr. Romero emphasizes that undermining ISIL's influence will require understanding adolescents' mind and brain, and developing intuitively appealing counter-messages that (1) are emotionally impactful instead offering logical arguments, (2) avoid emphasizing risks associated with joining ISIL, (3) undermine ISIL's claims of belongingness and peer affiliation, and (4) provide alternate means for social acceptance.

Psychological Bases Of Aggression: The Role Of Moral Emotions In Radicalization: Dr. Jason Spitaletta defines that operations to deter, disrupt, and/or defeat the move from legal participation in the political process toward violent political action must utilize every relevant scientific and technological advantage available. Dr. Spitaletta details the moral emotions: anger, disgust, and contempt, and explains how these can be risk factors for emotional vulnerability that affect individual decisions to radicalize. Studying these phenomena as relevant to negative radicalization is necessary in developing understanding and better operational tools and technology for Military Information Support Operations (MISO) to influence persuasion, emotion, and trust.

Emotional Reactions To Uncertainty Versus Ambiguity: In this chapter, Dr. Jason Spitaletta defines uncertainty and ambiguity as distinct, yet often confounded, in the psychological literature. He notes that both are highly relevant to studies of psychological bases of violent extremism. Ideologies, articulated in narrative form, attempt to reduce uncertainty and ambiguity and reinforce in-group biases. Uncertainty is also a psychological objective of terrorist operations as it reinforces existing biases, may paralyze a populace, and deter counter revolutionary/insurgent movements. Understanding emotional reactions of—and to—

uncertainty and ambiguity may enable Military Information Support Operations (MISO) to develop more sophisticated products and series to exploit these phenomena in select target audiences.

Psychological Effects Of Terror: Dr. Jason Spitaletta explains terrorism as a psychological warfare tactic that conjoins violence and propaganda, to modify behavior through coercion and persuasion. He asserts that ISIL/Daesh employs terror as a psychological objective to reinforce existing in-group biases and to impede unaffiliated target audiences into passive compliance. Terrorized target audiences may be difficult to influence; thus it is necessary to understand psychological phenomena associated with terror. Dr. Spitaletta describes some of these phenomena in detail.

Entrepreneurs Of Fear—The Emotional Impact Of Terrorism On Target Audiences: Dr. Nicholas Wright discusses how terrorists' target audiences may include general populations, protective services officers, high-level decision-makers (who may be directly affected or come under political pressure), or local populations (e.g., in counter-insurgency campaigns in Iraq or Afghanistan). Dr. Wright explains that in all these audiences: (1) the size of terrorism's psychological impacts is determined by the neural phenomenon of "prediction error," which explains audiences' ability for adaptation; (2) terrorism's psychological impacts are also determined by perceived distance from the stimulus and/or its effect(s); (3) prediction error can affect the fear, as well as resilience and even thriving. Dr. Wright uses cases (e.g., Second Intifada; the Iraqi use of scud missiles against Israel) to illustrate how differences in prediction error elicit these effects.

Fear And Anger Elicited By Terrorist Attack: The Power Of Jujitsu Politics: In this chapter, Drs. Clark McCauley and Sophia Mosalenko define emotions and their neuro-cognitive bases and behavioral impact. The authors then define *jujitsu politics* as a terrorist strategy of outrageous attack that is designed to evoke an over-reaction that will bring new sympathy and support to the terrorist cause. Drs. McCauley and Mosalenko argue that: (1) terrorists' targets are subject to emotions that affect their political choices; (2) terrorists' targets experience more anger than fear; (3) both fear and anger produce over-reactions that serve the terrorists' jujitsu politics; and (4) definitions of terrorism that focus on fear blind against the power of anger in eliciting jujitsu politics. They conclude by positing that political resilience to terrorist attack requires public understanding that there is more to fear than fear itself, and thus anger-mongering can be more dangerous than fear-mongering.

Social Perspectives On Behavior

Security Trends And Their Consequences: Drs. Paul Rogers and Dana P. Eyre describe the "revolution in military affairs"—a revision in doctrine and approach—that promised rapid,

decisive wars. However, in the face of complex social change dynamics, the "revolution in military affairs" did not deliver security. Rogers and Eyre posit that the lessons of the past decade suggest that "liddism"—trying to keep the lid on insecurity without addressing the root dynamics of conflict—is not merely unsustainable, but may actually be self-defeating. They argue that the current military "control paradigm," and the associated institutional infrastructures of defense departments and ministries, armies, and armament industries, emphasize the maintenance of stability, if necessary by force, rather than the production of a just social order, and conflict prevention through addressing embedded future drivers of conflict.

But, they note, that the type(s) and extent of problems that are currently being faced cannot be contained by force alone. Threats can and must be anticipated if violence is to be prevented. Understanding the social context(s) of threat is at least as important as efforts to understand psychological dynamics. Change in this direction is now on-going, with militaries grappling with their roles in "stability operations," "wide area security," and "gray zones." Some of the work now being undertaken centers on ideas such as sustainable security or "human security" and provides hope of new thinking. The authors state that in this light, the neurobio-psychosocial approach described and presented in this volume may be of help. Currently, such approaches are being developed and applied to analyzing and countering mindsets and activities of movements such as ISIS. However, Rogers and Eyre recommend that it may also be useful to apply this bio-psychosocial approach to the Western security community in order to understand how it might more easily and optimally meet these substantial future challenges.

Emotions And Behavior: Running Hot And Cold, Morally Speaking, And Impacts On Influence Activity To Counter Daesh: Dr. William D. Casebeer explains how radicalization often involves a moral component: what it means to be radicalized is to believe it permissible to treat out-group members indiscriminately in ways that would not be acceptable or permissible toward in-group members. Dr. Casebeer asserts that Daesh believes it permissible to indiscriminately kill non-Muslims for political purposes, which is what makes them a terrorist organization. He then proceeds to examine neural bases of moral cognition in exceptional detail, so as to shed light on biological responses to psychological and social stimuli and why emotional reactions to narratives and stories are such an important factor to consider when designing information campaigns. He describes how neuro-cognitive (i.e., bio-psychological) factors provide useful information and processes that can be targeted by (counter) narratives to reduce the number of people vulnerable to malignant messaging used by terrorist groups to generate permissive operating environments.

Dr. Casebeer urges a conciliatory approach that integrates natural and social sciences and the humanities, to facilitate interest in, and understanding of empirical exploration of social/moral

behavior. He describes the opportunities for scientists to develop approaches, both theoretical and experimental, to understand real-world, "dirty" biological computation and how it produces social and functional behavior. He concludes by illustrating that such work could impact the way the United States and its allies approach radicalization and countering the threat posed by groups such as Daesh, and offers the bio-psychosocial approach as important to operational and tactical counter-terrorism and counter-radicalization initiatives.

Understanding The Social Context: Following Social And Narrative Change Via Discourse And Thematic Analysis Surrounding Daesh In The Middle East: Dr. Lawrence A. Kuznar posits that thematic analysis of key regional actors in the Middle East is crucial to establishing the larger social context in which groups contend and message one another to threaten, appeal and recruit. He defines several key questions as relevant to US national security concerns, and explains how these can be addressed by examination of regional actors' use of language, inclusive of the degree of concern expressed about Daesh; indications of actual will to fight Daesh; and the grievance as a motivating force of rebellion against current regimes.

Dr. Kuznar reports that: (1) non-state groups fighting Daesh express the most concern with threat, while the rhetoric of state-level groups is more measured and indicative of greater ambivalence; (2) Daesh expresses the strongest resolve to fight, greatest emotional attachment to goals, and most vivid hatred of their enemies; (3) Shia militias, Sunni tribes rebelling against the Government of Iraq (GoI), and Syrian Kurds express greatest resolve to fight Daesh, while states express less of a will to fight; and (4) while many groups in the region express a sense of victimization and grievance, Sunni tribes express this sentiment to a far greater degree than any other group.

Organizational Determinants Of Aggression: From Putin To al-Baghdadi: Dr. Gina Scott Ligon and Mr. Michael McRoberts describe organizations (i.e., social institutions) as extensions of the (bio-psychological) people who lead them. From this view, they examine how organizations are structured and operate as a way to predict aggression—and changes in aggression—from our adversaries. The authors argue that full manifestation of violence from an aggressive leader depends on an organization, and that organizations have multiplicative effects on individual actions. Ligon and McRoberts then detail institutional and signaling theories to provide a framework to assess aggression of our adversaries and the organizations (i.e., the top management teams) they construct around them. Building on other chapters in this volume, Ligon and McRoberts describe how indices of leader aggression can be accessed and assessed via objective signals a given leader sends across multiple settings and time periods. They conclude with a discussion of markers of leader aggression that are available—and assessable—in top management team/inner circle composition and processes.

Predicting Hostility: The "emic" Perspective For Forecasting Threat: Laurie Fenstermacher describes the term "emic" (i.e., as in "phonemic") for first person perspectives and "etic" (i.e., as in "phonetic") for third person or observer perspectives. The "emic" analysis of data serves to help understand those elements (i.e., set of sounds) which convey specific (psychological and perhaps social) meaning to native speakers of a language, and complements or contrasts the "etic" perspective, which results from studying behavior from outside a particular system.

Ms. Fenstermacher describes advanced methods and text analytic algorithms developed by the US Air Force Research Laboratory that enable identification, extraction, and interpretation of discourse markers associated with the "emic" perspective that enable analysts to make meaning about threat. These methods and algorithms afford a significant increase in enabling anticipatory analysis of violent events. Importantly, the verbal cues on which methods and algorithms are based typically occur in advance of the actual event. Thus, Fenstermacher advocates their utility in providing leading indicators of violence, enabling either (1) collection of other confirmatory information, or (2) action to accelerate, mitigate, or prevent the event(s).

Predicting And Reducing Hostility: Insights From Cognitive Models And Cognitive Behavioral Therapy: In this chapter, Drs. Rachel Wurzman and William D. Casebeer describe core beliefs as networks of linked concepts and emotions that filter social information-processing; information contradicting activated schema are processed more shallowly than others. This explains why fact-based messaging does not often change "irrational" behavior, and why environments, beliefs, and behavior should be targeted jointly in information operations. The authors cite attribution theory as useful to predict messaging that can foster perceptions of hostile intent in others, by "hijacking" social information processing networks to change cognition. In light of this, they note that some forms of counter-messaging may actually strengthen existing beliefs. To prevent this, they advocate tactics and strategies that target benign attribution schema and meta-cognitive control. In this way, strategic information operations may restructure dysfunctional cognition to mitigate hostility by reverse-engineering cognitive-behavioral therapy (CBT). Drs. Wurzman and Casebeer posit that CBT models must be adapted to non-Western cultures, and should consider interaction effects when dealing with differences between operators and "audiences." By attending to cultural differences in self-construal and behavioral attribution, the authors assert that strategic information operations may harness bio-psychosocial information, understanding, and effects to engage more successful counter-messaging initiatives.

***Si Vis Pacem, Para Bellum*: Applying Thematic Content Analysis To Anticipating Threats To US Security:** Drs. Bradford H. Morrison and Peter Suedfeld review how methods of at-a-distance thematic content analysis (TCA), in particular scoring of integrative complexity (IC) and motive imagery (MI), can be used to forecast if and when political actors will execute political violence

against the United States. In assessing potential threats, tracking IC and MI can also be used to help forecast if a cycle of confrontational moves will lead to war. The form of violence may vary, depending on the relative strengths and resources of the two sides, from a surprise attack to episodic outbreaks against a background of low-level proxy action; yet, changes in IC have been found to precede both. The authors note that while TCA is not a panacea (e.g., forecasting the form of violence would require broader understanding of strengths, resources, and interests of relevant parties), it can be used together with other analytics to help forecast both the likelihood that an adversary will engage in violence, and the timing of that violence.

Operational Perspectives

Bridging Research And Practice: Using Proactive Narratives: Drs. Pamela Rutledge and Jerri Lynn Hogg relate how the current proliferation of increasingly sophisticated, accessible, media platforms and tools have enabled heretofore unimaginable messaging opportunities. The authors note that consumers have unprecedented control over media consumption and are active media creators and distributors. Such media choices and consumer behaviors foster questions about harnessing their impact and influence for key target audiences (TA). Complex media environments demand responsive technical evaluations that maintain sight of needs to translate specialized knowledge and findings into usable models and applications for operational use.

This chapter argues for an integrative approach to better prepare the MISO operators in the field. Providing MISO officers with a theoretical framework can facilitate day-to-day needs and clarify those domains where additional subject matter expertise may be required. The integration of theories enables proactive clarification of meta-narratives, development of approved narrative threads, and/or adaption of media and narratives to maintain visibility and coherence for the cultivation of trust.

In sum, Drs. Rutledge and Hogg state that:

- Networked communications influence user assumptions and impact perceptions of individual and collective strength.
- Integrating research and theoretical tools expands the ability to develop better media messaging.
- Narratives can model alternative behaviors, create new myths, and signal organizational change within a greatly expanded narrative space.

The Urgency To Shift Paradigm On The War Against ISIS In The Narrative Space: In this chapter, Dr. Christophe Morin argues that there is urgent need to rethink and retool the war against ISIS in the narrative space. Recent reports suggest that counter-messaging strategies have not been successful and/or have had an opposite effect on potential recruits. Dr. Morin

suggests that persuasion has a bottom-up effect on the brain which explains why so many campaigns attempting to convince current and future jihadists using logic (a top-down progress) have been—and are—doomed to fail. Instead, Dr. Morin proposes the effectiveness of influencing emotional responses to affect or alter decisions and actions when developing messages that have bottom-up effect on key targets, especially young adults. Using neuroscientific tools like EEG, Galvanic skin response (GSR), and eye tracking, it is now possible to assess and select the best messages in record time. Neuromarketers have used these methods successfully for over a decade. Dr. Morin concludes by advocating the expanded use of this approach to assist military strategists to make more immediate and decisive progress to win the battle in the narrative space.

Winning The Battle In Narrative Space Using Applied Neuroscience: Enhancing and Modernizing The PSYOP Process: Herein, MAJ Gregory Seese, MAJ Shawn Stangle, CPT Robby Otwell, SFC Matthew Martin, and LTC Rafael Linera provide a broad overview of significant improvements in the understanding of human cognitive processes afforded by recent developments in neuroscience. These methods show that traditional collection approaches fail to provide holistically effective metrics to plan and assess modern persuasive efforts. The authors note that media neuroscience techniques that where once cost prohibitive and confined to a laboratory are now affordable, compact, and mobile. They argue that USASOC can capitalize on recent advancements in media neuroscience and integrate the field's most currently available equipment, training, and techniques into the PSYOP force. This new technology can be leveraged to augment and enhance the existing social/behavioral science methods presently in use. This will then contribute to an increase in the effectiveness of DoD influence campaigns, as it modernizes both the practices and equipment used within the PSYOP Force.

Background

It has been well-established that both the sources and types of threats to US national security interests have broadened over the past decades. The major threats we face certainly appear in diffuse locations spanning the physical and virtual realms. The sources of these threats have also diffused beyond the realm of well-equipped armies; the power to cause large-scale impact has moved from big armies to, in some cases, a few individuals. At the same time, major threats to US interests have conducted sophisticated multi-domain offensives in ways previously reserved to states. Consider for example, ISIL's ground operations as a traditional attack vector, together with its global multi-media campaign that has served as a vector for attack in many ways independent of the fight on the ground.

The means we use to assess current threats, and more importantly in identifying the conditions in which new threats are likely to emerge, should be equally as expansive and integrated. There have been many studies over the past decades that have expanded our understanding of the nature of militarized threats to US interests. As time goes on however, we need to keep expanding the analytical tool kit to keep apace and get ahead of evolving threats. The main theme of this white paper is the need for a holistic approach that incorporates the societal, psychological, and biological dynamics that support the conditions within which threats to US security continue to emerge.

The good news is that there have been exciting advances in the biological, psychological, and other sciences relating to human behavior in the past decade that have been refined to the point where they can and should provide important input into US security policy and implementation. This brief paper presents short introductions to these as they relate particularly to countering radicalized violence and terrorism.

After two decades of seemingly unanimous recognition that understanding human behavior is at the core of identifying and managing threats to US security, advances in applied bio-psych-social techniques and research have occurred in academia, industry, and government laboratories. The last few years have also seen a marked improvement in bridging the gap between these advances and the operational and planning world where there is growing appreciation of the need for a good grounding in human behavioral sciences due to the very complex operational environment. Likewise, the academic community has made large strides in demonstrating to practitioners and operators that their research methods are valid, add value to operational and strategic concerns, and are in many cases more accessible than practitioners initially believed.

Introduction

The Bio-Psychosocial Approach: Dr. James Giordano and Celeste Chen, MS(c), Georgetown University, Washington DC

The Bio-Psychosocial Approach: Engaging a Neuro-Ecological Model

In his seminal piece *The Need for a New Medical Model: A Challenge for Biomedicine*, George Engel introduced what he termed, a "bio-psychosocial approach," which acknowledged that humans are biological organisms functioning psychologically within their social environments.[1] Ongoing work by our group has advocated the employment of the neuro-cognitive sciences in developing both (1) an enhanced understanding of the ways that neurobiological, psychological, and ecological factors interact to influence thought, emotions, and behaviors, and (2) tool kits for operationally assessing, accessing, and affecting these factors (see for example, SMA Report Topics in the Neurobiology of Aggression: Implications for Deterrence[2]). Important to note is that our approach does not regard or employ neuroscience as "reductionist." Rather it views and utilizes neuroscience as a science of relationships. In this light, a neuro-cognitive approach allows for inter-theoretical reductionism, so as to take psychology and explain it, in part, through neurobiology. But to contextualize the reality of an organism in the world, psychobiology must be framed within the social ecology. This enables a view and understanding of systems-in-systems. Within this schema, the function of parts can never be fully dis-embedded from the whole, nor can the whole be depicted or understood absent its parts. As shown in Figure 1, there is reciprocity of the entirety of systems and their component elements.

[1] G.L. Engel, "The need for a new medical model (a challenge for biomedicine)," *Science,* 196 (1977); 129–136.

[2] J. Giordano and R. Benedikter, "Toward a systems' continuum: on the use of neuroscience and neurotechnology to assess and affect aggression, cognition and behavior," in *Topics in Neurobiology of Aggression: Implications for Deterrence* (Washington, DC: Strategic Multilayer Assessment Group, 2013), 69-85.

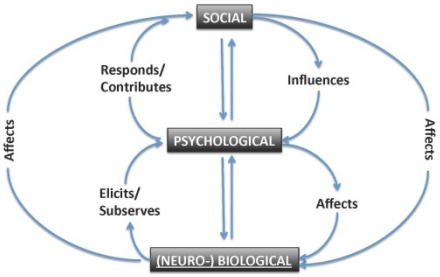

Figure 1: Systems reciprocity

Working within a bio-psychosocial model, neuro-cognitive techniques and technologies can be utilized to apprehend relationships between (1) internal and external human environments, (2) networked systems within and between organisms, and (3) interactions of individuals and groups that are nested in environments, in and across time. Simply put, this bio-psychosocial approach is aimed at assessing, accessing, and affecting systems *qua* systems. Important to the application of neuro-cognitive techniques and technologies within bio-psychosocial model is our concept of "neuro-ecology," defined as "studies of interactions between neural systems embodied in individuals, that are embedded in groups and environment(s) framed by time, place, culture, and circumstance."[3][4][5][6] These reciprocal relationships span from the synaptic to the sociopolitical scales, affecting human cognition, perception, psychology, decision-making, and behavior on a variety of levels of effect. Examining the neuro-biological factors involved in underlying psychological and social phenomena afford deeper insight(s) to potentially targetable variables operative in cognitive biases, aggression, conflict, and violence.[7]

For example:

- Social cooperation has been shown to involve specific, coordinated patterns of activation across several brain regions: In studies where subjects are placed in Prisoner's

[3] Ibid.
[4] J. Giordano, R. Benedikter, and N.B. Kohls, Neuroscience and the importance of a neurobioethics: A reflection upon Fritz Jahr. In Muzur, A., Sass H-M. (eds.). Fritz Jahr and the Foundations of Integrative Bioethics, LIT Verlag Münster, Berlin, 2012.
[5] J. Giordano. "Neuroethics: Traditions, tasks and values." *Human Prospect*, 1 (2011): 2-8.
[6] J. Giordano. "Neuroethics- two interacting traditions as a viable meta-ethics?" *American Journal of Bioethics – Neuroscience*, 3 (2011): 23-25.
[7] J. Giordano, R. Benedikter, and N.B. Kohls. Neuroscience and the importance of a neurobioethics: A reflection upon Fritz Jahr. In Muzur, A., Sass H-M. (eds.). (Fritz Jahr and the Foundations of Integrative Bioethics, LIT Verlag Münster, Berlin, 2012).

Dilemma Game scenarios, regions associated with reward and punishment, as well as emotional processing, exhibit significant activation, putatively suggestive of engagement of neural systems that establishes "cooperative social interactions as rewarding," and produces "a representation of a somatic state of an emotional experience that follows mutual cooperation."[8]

- Studies have correlated social bias to discernible patterns of activity in brain networks (primarily pathways of the limbic system, with considerable engagement of discrete subparts of the amygdala) that are involved in threat detection, fear processing, and emotional learning.[910]
- Research suggests that activity within brain networks that function in self-referential contexts that may be operative, at least in part, in evoking feelings of empathy. Activity within the inferior parietal lobe, superior temporal sulcus, and limbic system has been correlated to cognitive reception and responses of social and interactive cues, with findings suggesting "that the greater the degree of identification of the viewer with the stimuli, the greater the degree of social interaction perceived."[11]

But the reciprocity of effect is essential. Just as neural network activities may be operative in behavior, components of ecology also exert effect upon the structure and functions of the brain: London taxi drivers experience growth in the hippocampus –the brain region involved in memory formation and learning –in a manner proportional to the length of job experience, i.e. the more they navigate, and engage navigational experience, the greater the functional connectivity and activation of neural networks involved in such cognitive processing.[12] Such receptivity to effect is optimized during critical periods of development (e.g.- pre-adolescence and adolescence), and can be affected by a host of environmental variables.[1314]

[8] J. Rilling, et al, "A neural basis for social cooperation," *Neuron,* 35 (2002): 395–405.

[9] D.M. Amodio, E. Harmon-Jones, and P.G. Devine, "Individual differences in the activation and control of affective race bias as assessed by startle eyeblink responses and self-report." *Journal of Personality and Social Psychology*, 84, (2003): 738–753.

[10] W.A. Cunningham, M.K. Johnson, C.L. Raye, J.C. Gatenby, J.C. Gore, and M.R. Banaji, "Neural components of conscious and unconscious evaluations of Black and White faces," *Psychological Science*, 15, (2004): 806-813.

[11] L.M. Oberman, J.A. Pineda, and V.S. Ramachandran, "The human mirror neuron system: a link between action observation and social skills," *Soc. Cog. Affect. Neurosci. 2*, (2007): 62–66.

[12] E.A. Maguire, "Navigation-related structural change in the hippocampi of taxi drivers," *Proc. Natl. Acad. Sci. USA*, 97 (2000): 4398–4403.

[13] Leslie Paul Thiele, "Brain sculpting as moral practice: A neuro-Aristotelian approach," In *Essays on Neuroscience and Political Theory: Thinking the body politic,* edited by Frank Vander Valk (Abingdon: Routledge, 2012), 119-140.

[14] JM Schwartz, S. Begley, *The mind and the brain: Neuroplasticity and the power of mental force* (New York: Harper Collins, 2002).

Such bio-psychosocial interaction(s) can be observed at each stratum of neuro-ecology, from the individual to the societal scale. On an individual level, humans possess ability to consciously relearn and modify their behavior in response to their ecology. On an institutional level, biology can become molded and the body politicized by elements of the surrounding ecology (see Ligon, this volume). Within a neuro-ecological context, the politicization and transformation of the individual arises from the ways in which the ecology of institutional discipline can enforce habits of thought, gesture, and behavior. Social and cultural systems can exert effect at biological and psychological levels, which can affect collective culture and group dynamics. This reciprocal action "...specifies that there can be mutual influences between microscopic (e.g., biological) and macroscopic (e.g., social) factors in determining brain and behavioral processes."[15] Within this context, such relationships can evoke feedback loops: Learning can be understood as the integration of information from an individual's sociopolitical environment—or ecology—into the biological mechanisms underlying the behavior; this integration can then exert its effects into behavior that drives, amplifies, and shapes the sociopolitical ecology (see Figure 1 above). Such relationships may thus produce distinct value systems and ways of thought that are characteristic of each culture. These differences in value systems can then lead to differences in priorities, goals, and preferences for action.

The Neuro-Ecology of Tension and Conflict: Bio-Psychosocial Systems in Interaction

The ways in which these differences either become reconciled or engender conflict can thus serve as focal points for study. As bio-psychosocial organisms, individuals express their internal states through behavior, which exists within and is informed by an ecological milieu. Tension, one such internal state, exists at the intersection of a state of need and the awareness of this need as an organism with a set array of capabilities competing in an ecosystem with limited resources. Tension arises when individuals with differing value/evaluation systems and priorities assess their ecology and act upon courses of action that limit, disrupt, or, on a broader level, affect the other's needs. Disruption in needs-fulfillment can elicit behavioral changes—such as conflict—which can in turn affect the ecology and behaviors of surrounding social organisms.[16]

[15] J.T. Cacioppo, P.S. Visser, "Political psychology and social neuroscience: Strange bedfellows or comrades in arms," *Political Psychology*, 24, (2003): 647-656.

[16] J. Giordano, "Brains and Environments: Neuro-Cognitive Bases of Aggressive Ideation and Behavior, and the Potential Utility of Neuro-Cognitive Science in Assessing and Altering ISIS' Narratives and Activities," in White Paper on Social and Cognitive Neuroscience Underpinnings of ISIL Behavior and Implications for Strategic Communication, Messaging, and Influence (Washington, DC: Strategic Multilayer Assessment Group, 2015), 8-15.

Group dynamics, for example, play a critical role in framing interactions between groups with conflicting values or needs. Dissimilarity in beliefs, attitudes, and values "increases negative orientations toward others."[17] Members within groups often display favoritism towards other in-group members, while perceived conflict motivates in-group members to de-humanize out-group members, thereby facilitating and priming individuals towards intergroup aggression, xenophobia, and prejudice.[1819]

Such phenomena can be further reinforced by the bi-directional relationships that exist between biological events and sociopolitical behavior. When humans exert prejudice and accompanying feelings of disgust, distinct patterns of activity are observed in brain areas normally involved in social interactions (Kelly, 2011, p. 125). Cognitions and expressions of disgust, evolutionarily developed to promote survival-enhancing behaviors (e.g., disgust towards feces can discourage an individual to come into contact with potential sources of disease), can further amplify out-group prejudice and intergroup aggression (Kelly, 2011, p. 124).

Conflict can be construed as being elicited when one social entity perceives or is made to perceive that: (1) behavioral preferences are incompatible with others' preferences and actions, (2) mutually desirable resources are in short supply, and/or (3) salient values or attitudes that direct behavior are perceived to be different than values or attitudes held by particular others (for overview, see Giordano, 2015).[20] In conflict, there exists a series of bidirectional relationships between the individual and the group, biology and ecology, and self and group identity. Conflict stems from an escalation of tensions coupled with (and to) a conscious awareness of competing needs and/or incompatibilities.

Neuro-Ecology and Bio-Psychosocially Influential Narratives

Understanding the bio-psychosocial relationships that engender and perpetuate aggression and conflict may thus effectively inform approaches to conflict prediction, prevention, and resolution. Targeting biological and/or psychological factors can be important and useful to altering social behaviors, just as engaging social and behavioral components can influence psychological and biological correlates. At both the individual and societal levels, long-term obstacles to conflict resolution often stem not from the content of the issues being disputed, but rather from the cognitive-emotional barriers produced by the perception of conflict.

[17] N. Struch, S.H. Schwartz, "Intergroup aggression: Its predictors and distinctness from in-group bias," *Journal of Personality and Social Psychology*, 56, (1989): 364–373.
[18] Ibid.
[19] Daniel Kelly, *Yuck: The Nature and Moral Significance of Disgust*, (Cambridge, MA: MIT Press, 2011) 115.
[20] M.A. Rahim, T.V. Bonoma, "Managing organizational conflict: A model for diagnosis and intervention," *Psychological Reports*, 44 (1979): 1323–1344.

Components of these cognitive barriers, from the differential activity of particular neural networks, to large(r) scale social variables, such as relative fortitude and qualities of in-group identity and attitudes toward out-group members, contribute to a process through which perspectives and values become more resistant to change. During this 'freezing process,' identities and divisions become integrated into larger worldviews, which then distort and codify how cohesion and conflict are perceived.[21] Efforts in conflict resolution can be interpreted as threats to a larger set of identities, priorities, and beliefs that are manifest, experienced, and expressed at biological, psychological, and social levels—essentially resulting in a sort of structured immunity to efforts at negotiation and peace building.

Given the bio-psychosocial foundations of individual and group identities, attitudes, and values operant in disposing, evoking, and sustaining behavior, we opine that it is important to evaluate the potential role that these factors play in human thought and actions in particular settings and circumstances, and to re-frame conflict negotiation and resolution to more effectively target—and affect—salient bio-psychosocial variables. For example, examining the role and impact of narratives at the biological, psychological, and social levels can then further enable the use of discourse as a viable tool to affect individuals' and groups' attitudes, values, and actions. Recognizing how certain narrative components can affect aggression, and conflict, and which elements influence cooperative relationships and social mobilization can be useful to inform tactics and strategies of in- and out-group identity, individual and collective cooperativity, values and values' desiderata, and conflict negotiation and resolution.

As William Casebeer has noted (in this volume, and prior SMA whitepapers—for overview see Canna, this volume), analyzing the neuropsychological effects of narrative elements can be used to establish more persuasive, effective vehicles of communication. This can be critical within the context of in- and out-group negotiations and relationship-building. As Thomas Schelling states in *Arms and Influence*,

> "...deterrence is about intentions—not just estimating enemy intentions but influencing them. The hardest part is communicating our own intentions. A persuasive threat of war may deter an aggressor—the problem is to make it persuasive, to keep it from sounding like a bluff" (Schelling, 1966, p. 35).

Successful deterrence and leveraging of power thus rests on an ability to craft a narrative of threat that effectively elicits certain neuropsychological responses within a larger ecological (i.e., social and cultural) context. Indeed, operative messaging through a variety of media, and

[21]Daniel Bar-Tal, Eran Halperin, "Socio-Psychological Barriers to Conflict Resolution," in *Intergroup conflicts and their resolution: Social psychological perspective*, edited by Daniel Bar-Tal (New York: Psychology Press, 2011): 217-240.

political and social bargaining and compellance, can be approached in similar ways: Tailoring narrative components that affect and appeal to biological, psychological, and social levels can produce stories that influence discourses and actions to evoke tactical and strategic effect.

As Jason Spitaletta reports in this volume (and elsewhere; see for example, prior SMA reports mentioned by Canna, this volume), narratives and discourse are often used (and therefore can and should be used in/as psychological operations—PSYOPS—tools) to: (1) introduce and fortify rationales for action, (2) encode collective knowledge, (3) enforce belief systems, and (4) create and/or define individual and community values and identities.[22]

Operational Employment: Assessing and Affecting ISIL

Bio-psychosocially oriented approaches can be used to de-stabilize existing narratives, which we posit to be particularly applicable to interdicting current recruitment, sustainment, and motivating enterprises of the Islamic State of Iraq and the Levant (ISIL). As ISIL seeks to continue its expansion and maintain its foothold, there has been a marked shift in focus of its propaganda from themes of mercy, belonging, and brutality to themes of victimhood, war, and utopia.[23] Understanding why this shift has occurred, as well as the social and psychological effects of such thematic content, may provide new efforts to de-stabilize, counter, or substitute ISIL's propaganda effort(s).

For example, over a one-month period, ISIL's official outlets produced more than 1000 discrete pieces of propaganda—a "…mixture of photo essays, videos, audio statements, news bulletins, posters, theological essays, and so on."[24] More than half of the propaganda produced during this period featured civilian life in ISIL territories within a utopian narrative, which promoted an image of ISIL communities as well-organized, productive, and viable societies. As a recruitment tool, this narrative promotes the opportunity to become an in-group member of a structurally cohesive, economically productive community. De-stabilizing this narrative would necessitate understanding the social and psychological impact (and arguably neurobiological processes and effects) of the dominating themes: religion, economic prosperity, and sound governance on ISIL's target audience. Combating the social and psychological effects of the narrative could then involve de-legitimizing the offer of group membership in ISIL and disseminating narrative elements and content providing alternative venues for group participation.

Similarly, redefining the psychological framework of ISIL's narrative of victimhood can very well undermine the way in which ISIL utilizes graphic acts of violence. While ISIL is able to recruit

[22] Jessica Senehi, "Constructive Storytelling: A Peace Process," *Peace and Conflict Studies* 9, no. 2, article 3 (2002): 41-60.
[23] Charlie Winter, *Documenting the Virtual 'Caliphate,'* (Quilliam Foundation, October 2015), 6.
[24] Ibid., 5.

and intimidate at the regional and international levels through these acts, such violence only possesses legitimacy within the framework of a narrative of victimhood. The narrative of Sunni persecution becomes key not only in justifying ISIL's use of violence as a legitimate response, but also in legitimizing ISIL's very existence.[25]

Perhaps more insidiously, adversaries are not depicted as alive or human in ISIL's war propaganda. Media bytes of rockets fired at an unseen enemy, along with the defilement of the imprisoned and the dead, conceptually otherize and dehumanize non-ISIL members.[26] Through a bio-psychosocial lens, these social experiences can also manifest neuro-cognitive effects that can further drive and affect behavior. A body of neuro-cognitive science research suggests that humans are constantly and biologically primed to recognize other beings as social agents. By "otherizing" and de-humanizing their adversaries, ISIL could very well be weakening such activity as they socially condition their followers. Providing countering narratives that humanize forces that ISIL perceives as adversarial could undermine behavior so as to de-escalate or reduce ISIL's preference for gratuitous violence.

The interplay between individual psychology and a larger collective human ecology thus becomes a critical area of study. Understanding ISIL's successes necessitates a nuanced comprehension of how ISIL has effectively utilized an array of pre-existing cultural narratives to establish its legitimacy. Strikingly put,

> "..It is impossible to understand jihadism—its objectives, its appeal for new recruits, and its durability—without examining its culture. This culture finds expression in a number of forms, including anthems and documentary videos, but poetry is its heart...It is in verse that militants most clearly articulate the fantasy life of jihad."[27]

Connecting the psychological impact of narratives and storytelling to the biological and behavioral ways in which humans respond to certain social cues and environments can thus have robust and influential implications. Such information can be utilized to craft and/or de-stabilize narratives, and, on a broader level, target and affect factors to which narrative elements may appeal so that new narratives and priorities can develop. Identifying and then targeting factors that contribute to ISIL's appeal can mitigate success of its recruitment efforts. Factors can be categorized as both external and internal: External factors include cycles of poverty, lack of education, and dearth of social opportunities, as well as specific events—recent

[25] Ibid., 23.
[26] Ibid., 27.
[27] Bernard Haykel, Robyn Creswell, "Battle Lines: Want to understand the jihadis? Read their poetry," *The New Yorker*, June 2015.

military conflicts or flashpoint events.[28] These external factors often compound pre-existing internal psychology. Jessica Stern notes:

> "...Internal motives stem from what an individual wants or needs… in terms of the perceived benefits of membership in an extremist group, such as a feeling of belonging, escape into a new identity, adventure, or money. Foreign fighters have personal needs that are met by joining an organization, and those personal needs may become more important over time."

Recognizing trends in potential recruits' needs may thus stem the tide of foreign and regional fighters. An array of strategic narratives that provide alternative outlets would be best informed by a comprehensive understanding of the relationships among recruits' psychological needs, and external behavior within their surrounding ecology.

Creating an environment wherein certain narratives thrive while others do not take root becomes crucial. ISIL draws its power through narratives that appeal to pre-existing needs, whether economic, existential, moral, or social. Weakening ISIL's reach means both (1) providing answers and opportunities to meet those pre-existing needs, creating a structure, and (2) recasting the role the West plays within the ISIL narrative. Stern writes,

> "…the West sometimes plays right into the hands of terrorist ideologues, whose success depends not only on the appeal of the narrative they weave, but also their ability to illustrate it with facts, or at least pictures that appear to be facts."[29]

The reaction of Western nations to ISIL tactics to date has tended to strengthen the narrative that ISIL uses to project itself at home and abroad. And when regions under ISIL lack free access to information, these narratives further cement ISIL's stronghold by providing a framework upon which ISIL dictates culture, governance, and community.[30] ISIL narratives imprison individual thought by structuring behavior. The cultural and thought prison that ISIL creates becomes analogous to philosopher Michel Foucault's analysis of the prison, wherein the body in its social and biological form becomes the means through which power and discipline are exerted on the mind. Structure and routine enforce certain habits and gestures, which then transcend behavior into the realm of thought. As an institution, ISIL derives its power through a system of discipline that affects the individual on the biological, psychological, and social levels. Understanding and then targeting those effects can thus de-stabilize not only the appeal of ISIL but also the ideas that sustain its existence. As contributors to this volume explicate, methods

[28] Jessica Stern, J. M. Berger, *ISIS: The State of Terror,* (New York: Ecco Press, 2015).
[29] Jessica Stern, "Flights of Fancy; Many Muslim Youth Espouse Jihad as a Fad," *Globe and Mail*, June 2006.
[30] Charlie Winter, "Fishing and Ultraviolence," *BBC News*, October 2015.

to engage processes and efforts that affect and appeal to the individual as a bio-psychosocial being will prove to provide a powerful toolkit—and strategy—indeed.

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A Review Of SMA Bio-Psycho-Social Investigations: Sarah Canna, NSI[31]

Introduction

The Strategic Multi-Layer Assessment (SMA) program[i] serves as a think tank for US Combatant Commands (COCOMs) within the Joint Staff. It provides planning support to Commands with complex operational imperatives requiring multi-agency, multi-disciplinary solutions that are not within core Service/Agency competency. The SMA team brings to bear subject matter expertise from academia, think tank, industry, and government to address defined challenges in and to national and global security.

Since 2010, SMA has convened investigations into the biological, psychological, and social drivers of aggression. This work closely complements qualitative analyses done by political scientists and cultural experts on understanding adversarial behavior and intent.[ii] Particularly important have been the SMA's efforts to develop a fortified view into if and how the brain sciences can be validly useful, operationally engaged, and, therefore, of value to any such psychosocial analytics. An overview of SMA investigations into neuroscientific approaches to aggression are provided in Table 1 below.

Table 1: SMA Publications Related to Aggression and Neuroscience

	Time	Year
1.	Assessing and Anticipating Threats to US Security Interests	2016
2.	Maneuver and Engagement in the Narrative Space	2016
3.	Social and Cognitive Neuroscience Underpinnings of ISIL Behavior and Implications to Strategic Communication, Messaging, and Influence	2015
4.	Leveraging Neuroscientific and Neurotechnological Developments with Focus on Influence and Deterrence in a Networked World (Revised)	2014
5.	Topics in Operational Considerations on Insights from Neurobiology on Influence and Extremism	2013
6.	Topics in the Neurobiology of Aggression: Implications to Deterrence	2013
7.	Neurobiological & Cognitive Science Insights on Radicalization and Mobilization to Violence: A Review Second Edition	2012

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8.	Cyber on the Brain: The Effects of CyberNeurobiology & CyberPsychology on Political Extremism	2012
9.	National Security Challenges: Insights from Social, Neurobiological, and Complexity Science	2012
10.	Neurobiology of Political Violence: New Tools, New Insights	2010
11.	Protecting the Homeland from International and Domestic Terrorism Threats: Current Multi-Disciplinary Perspectives on Root Causes, the Role of Ideology, and Programs for Counter-radicalization and Disengagement	2010

In an attempt to summarize the contribution of these papers to the study of bio-psycho-social indicators of aggression, we created a simplified table (Table 2) of indicators with clear citations. For additional detail, please see the original source material cited. To avoid the need for an extensive Works Cited section, we use the following in text citations format: (Author, Publication Number from Table 1).

As noted elsewhere in this report (see, for example, Giordano and Chen; Casebeer; Casebeer and Wurzman) and those aforementioned, is that any discussion of the contribution of the neurosciences to a mechanistic understanding of cognition and/or behaviors is that the brain does not exist in isolation form the organism in which it is situated, or the environments that the organism encounters and engages. There are other (i.e., non-neural) biological, as well as psychological and social, influences that must be considered. This table does not adequately represent how intertwined many of these factors are in motivating individuals towards violence. None of the experts cited believe only one factor is responsible for aggression. Moreover, this table does not reflect elements that *moderate* an individual's propensity for violence.

Table 2: Bio-Psycho-Social Indicators of Aggression

Simplified Indicators of Aggression		
Biological	**Psychological**	**Social**
Hormones[iii] (e.g., oxytocin & trust; dopamine & reward)	Emotion[iv] (disgust, contempt, anger)	Environment (grievance, inequality, uncertainty, etc.)[v]
Genomics & Epigenetics[vi]	In-group/Out-group polarization[vii]	Identity, Significance & Belonging[viii]
Neural mechanisms[ix]	Stories & Narratives[x]	Ideological & Cultural beliefs,

		Sacred values[xi]
Neuro-ecology[xii]	Personal experiences (trauma, humiliation)[xiii]	Social networks & connections[xiv]
Childhood development[xv]	Personality traits (narcissism, altruism, rigidity, dependency)[xvi]	Perception of threat[xvii]
Innate biological factors (intrinsic aggression)[xviii]	Dehumanization of other[xix]	Non-verbal behavior[xx]
Information processing (heuristic, peripheral, systemic)[xxi]	(Lack of) Empathy[xxii]	Status & Glory[xxiii]
Evolution[xxiv]	Psychopathy[xxv]	Self-interest[xxvi]
Pathology[xxvii]	Low tolerance for ambiguity and low cognitive flexibility[xxviii]	
Neuroeconomics[xxix]	Prediction error[xxx]	
Physiological measures (heart rate, blood pressure, etc.)[xxxi]	Loss aversion[xxxii]	
	Incentives vs. rewards and punishments[xxxiii]	
	Impulsivity control[xxxiv]	
	Capacity to suppress moral norms against harming others[xxxv]	
	Strong group leadership and institutions[xxxvi]	

Summary of Prior Work

While SMA has produced a number of papers on aggression since 2008, the first publication that recognized the benefit of inputs from the neuroscientific and psychological communities was "Protecting the Homeland from International and Domestic Terrorism Threats," (January, 2010) with two chapters focused on psychology and neuroscience respectively. In the first, Anthony Lemieux, currently at Georgia State University, suggested that individual-level triggers within certain intergroup and environmental contexts may be at the heart of understanding motivations for terrorism. In the second, Thomas O'Connor, Austin Peay State University, used

strain theory to explain how unfairness, grievance, injustice, inequity, envy, and spite have been proven to have biological connections, making it imperative to consider both sociological and biological factors in understanding the propensity to engage in aggression.

Recognizing the potential contribution of the neuroscience field to studies of terrorism, SMA convened a workshop entitled, "Neurobiology of Political Violence: New Tools, New Insights" in December 2010. The workshop facilitated broad discussion of the current state of neuroscience, neurobiology, and social psychology as related to deterring political violence. While most panelists emphasized the relative prematurity of applying current research to real world problems within the national security and homeland defense space, they all agreed that the tools of neuroscience and related fields would serve to better inform current deterrence and messaging strategies. The workshop focused upon the complex relationships between attitude and intent formation and, ultimately, manifestations of behavior.

In September 2011, in a publication entitled, "Countering Violent Extremism Scientific Methods & Strategies," Dr. William Casebeer addressed extremism at the group level by focusing on at-risk populations. He identified a mechanism to do this by identifying those "at risk" as well as assessing "group identity" of likely extremist groups based on criteria drawn from research in sociology (social movements and mobilization) and cognitive/social psychology, respectively. This assessment and forecasting method provided insights on aggression and the ability to identify risk factors and locations where violent extremism is likely to emerge.

In July 2012, SMA deepened its investigation of the contributions of the scientific community to understanding the roots of aggression in its publication, "National Security Challenges: Insights from Social, Neurobiological, and Complexity Sciences." The collection of essays explored future population-centric national security challenges through the lens of an integrative approach to neural, social, and systems' sciences, and emphasized "enduring" themes that are focused on the interactions of populations and their environments.

Exploring the crossover between the information revolution and aggression, the SMA whitepaper "Insights from Neurobiology on Influence and Extremism" in fall 2012 contained three volumes to include: (1) Cyber on the Brain: Insights from CyberPsychology and CyberNeurobiology on Political Extremism, (2) Topics in Operational Considerations on Insights from Neurobiology on Influence and Extremism; and (3) The Neurobiology of Aggression/Counter-Aggression. These reports provided the operational and policy communities with a deepened understanding of the unique neurobiological and behavioral factors that underlie political extremism, specifically in the cyber realm.

Realizing the extent of work conducted by SMA contributors on the topic of aggression and neuroscience was vast, in December 2012, SMA conducted a literature review of all relevant

material prepared to date on those topics. The review found that while the social sciences have provided planners and operators with an understanding of the "who," "what," and more recently the "how" of radicalization, the neuroscience community has expanded an understanding of "why" aspects of radicalization. Thus, it was hoped that planners, operators, and social scientists can employ tools and techniques of/from the brain sciences to develop more finely grained insights on the relations between biology, psychology, and ecology/environment and, in this way, enhance prior and ongoing efforts to correlate potential influence-effect relationships that may be provocative of aggression and violence.

In the February 2013 publication entitled "Topics in the Neurobiology of Aggression: Implications to Deterrence," SMA questioned how neuroscience could help to better influence individual and group cognitions and behaviors. The material was presented in three parts: a summary of the basic neurobiology, chapters on behavioral impacts of that neurobiology, and a "systems summary" that integrated these issues. Topics included the role of genes and environment, group vs. individual aggressive behaviors, the role of trust and altruism, reward/punishment, and premeditated vs. impulsive aggression, among others.

Due to high demand for this kind of work by the defense community, SMA shortly thereafter produced a white paper in April 2013, "Insights from Neurobiology & Neuropsychology on Influence and Extremism—An Operational Perspective." This report provided the operational and policy communities with a deeper understanding of the unique behavioral and neurobiological factors that underlie political extremism enhanced by interaction in the cyber realm. It addressed implications of advances in neurobiology and neuropsychology for the way the United States Government (USG) plans and executes military operations as part of a comprehensive approach to counter violent extremists and the spread of their violent political narratives. The paper focused on the intersection of emerging cyber technologies and human biology and included neurobiological dimensions of cognition and behavior.

Subsequently, SMA returned to the issue of deterrence, releasing "Leveraging Neuroscientific and Neurotechnological Developments with Focus on Influence and Deterrence in a Networked World." This white paper focused on possible ways that insights from the neurosciences may be incorporated and used within the USG's approaches to conduct optimized influence and deterrence operations for the purpose of maintaining global stability. This paper used the term "neurodeterrence" to refer to the consideration and application of evolutionary neurobiological information about cognition and social behaviors that are important to deterrence theory in contexts of conflict.

In June 2015, SMA examined the use and utility of neuroscience to messaging, with the publication of "Social and Cognitive Neuroscience Underpinnings of ISIL Behavior and Implications for Strategic Communication, Messaging, and Influence." This white paper

addressed terrorist behavior in general and ISIL behavior in particular. Unique to this work was the melding of neuroscientific understanding of the structure and functions of the brain with social and cultural influences, so as to provide more integrative insights to motivations for, and determinants of terrorist behavior.

Interest generated by this report prompted development and release of an SMA white paper on "Maneuver and Engagement in the Narrative Space" in January 2016. This paper integrated work from a wide perspective on the topics of strategic communications, narrative analysis, social change, sociology, and neuro-psychology, and built a framework for understanding the role of narrative in contemporary security operations. This paper reflected, and sought to advance, USG understanding of what is required to succeed in the conflicts it faces today and tomorrow.

SMA's interest in contributions from the scientific community began with appreciation for the insights social psychology could provide for understanding individual- and group-level motivations for radicalization and violence. It became clear, shortly thereafter, that the neuroscience community presented an under-accessed capability to provide tools and techniques to both understand, and perhaps operationally influence, aggression in ways that could be applied to the fields of counterterrorism, deterrence, and information operations. In these ways, SMA has played a definitive role in bridging scientific insights and capabilities to the needs and mission of the operational community. In light of these efforts, there is sustained and increasing interest in the advances in global security that can be achieved through the integrative engagement of brain science, social sciences, and computational technology. SMA remains dedicated to addressing these capabilities and fortifying the USG's capacity in national and international security.

Biological Perspectives on Behavior

The Role Of Emotions In Human Behavior—Perspectives From Neuroscience And Cognitive Psychology: Drs. Diane DiEuliis, William Casebeer, and James Giordano

Introduction: Emotions, Brain, and Behavior

As noted in the introductory material, developing an integrative an understanding of the ways that neurobiological processes are involved in—and affect—cognition and behavior is axiomatic to a bio-psychosocial approach to augmenting national security operations. As detailed by Sarah Canna in this volume, a number of prior SMA white papers have described facets of the neurobiology of human behaviors such as aggression, violence, radicalization, decision making, and cooperation, among others. As presented in the May 2015 whitepaper (Giordano J, DiEuliis D. (eds.) *Social and Cognitive Neuroscientific Underpinning of ISIL Behavior, and Implications for Strategic Communication, Messaging and Influence*), this neurobiology involves a networked circuitry that receives stimuli from the internal (i.e., bodily) and external environment, generating emotional responses, and integrating cognitive and behavioral output.

Basic Neurobiology of Emotion

Figure 2 (reprinted here from the aforementioned prior SMA whitepaper) illustrates that this neural network entails pathways from the brain stem, subcortical limbic system (e.g., the hippocampus and fornix, which are involved in learning and memory; and the septal nuclei, including the nucleus accumbens—involved in behavioral activation and modulation, and the amygdala), and frontal and prefrontal cortex. The amygdala, primarily involved in regulating emotional tone, receives sensory input from thalamic and olfactory nuclei, as well as input from brain stem and midbrain regions that are involved in autonomic arousal, reinforcement and reward (in response to stimuli from the environment). Neuronal networks from the amygdala project to cortical and limbic regions that encode memories of previous or similar stimuli that a person has experienced. Once memory circuits are engaged, frontal cortical networks that participate in decision-making are engaged.

In general terms, the amygdala is responsible for fast, “gut reaction” emotional responses, while the frontal cortex is involved in slower, more analytical assessments. It is important to note that while this network can be seen as a generalized template of brain structure and function, the actual development, functional integrity, and specific patterns of activation and response can vary individually (and perhaps differ in the same individual as a consequence of certain factors over time). These factors include both internal variables (genetic and epigenetic dispositions, relative activity of neurochemicals, and hormones) and external variables—as described in the introduction, and elsewhere in this volume.

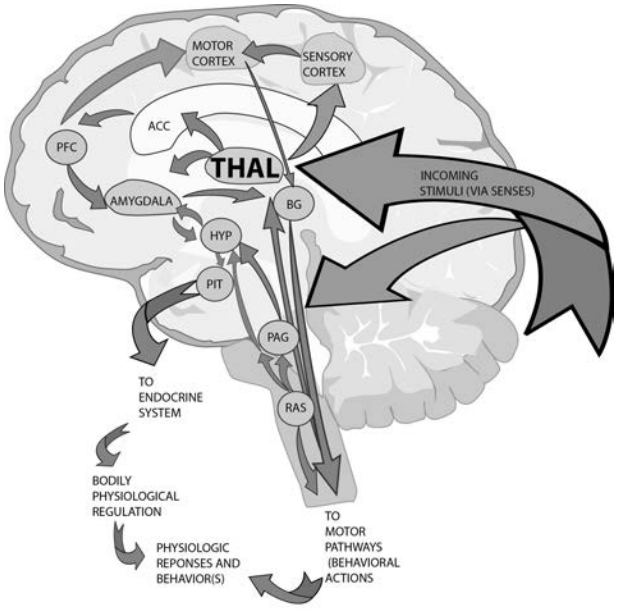

Figure 2: Diagrammatic Representation of Neural Networks Involved in Emotive/Cognitive Processing

Abbreviations: ACC = anterior cingulate cortex; BG = basal ganglia; HYP = hypothalamus; PAG = periaqueductal gray region; PFC = prefrontal cortex; PIT = pituitary; RAS = reticular activating system

Note: Size of regions not drawn to scale

The Palette of Human Emotion(s)

It had been previously believed that primal emotions and cognition represented distinct processes. After all, humans tend to feel emotions, but think about cognition, and initial (animal and human) neuroanatomical and neurophysiological studies suggested that discrete regions of the brain appeared to be involved in emotional and cognitive functions. However, recent neurophysiologic and neuroimaging studies have revealed common patterns of neural network participation and activation, and cooperative and sometimes reciprocal relationships between emotive and cognitive processes (Damasio, 2005; Levenson, 1994). In sum, emotions are neurologically-generated bodily responses to stimuli that are contextually interpreted and framed through cognitive processing; as stated by neuroscientist Antonio Damasio (1995), emotions are "...the feeling of what happens" [in the body in response to event]. To be sure, emotions are an aspect of cognition. We are aware of them, contextualize and intentionalize their experience, and their occurrence can influence cognitive processes and processing.

The evolution of emotional states, functionally designed to promote survival, cannot be divorced from cognition, and thus decision making and human behavior writ large. Emotions affect how humans view their environment, what they believe, and how they act and operate in

that environment. Primary, or primal, human emotions are fear, anger, sadness, disgust, and pleasure. Importantly, emotions have evolutionary significance in that they provide functional or adaptive survival benefit. For example, fear is known to stimulate the well-known "fight or flight" response in many animal species including humans.

When threat is perceived, a general arousal mechanism is engaged, which activates the neural circuitry described above. "Meaning" of the stimulus is ascribed (by cognitive sampling, matching to memory or object, event, experience, and outcomes of action(s)—via disposition, observation, orientation, decisions, actions, and consequence, an embellishment of Boyd's *OODA Loop*, as shown in Figure 3, detailed in our work in/for prior SMA white papers,[32] and described in further detail by Spitaletta elsewhere in this volume) and neural mechanisms subserving subsequent cognitive (e.g., fear, anger, etc.) and bodily responses (e.g., sustained sympathetic arousal) are activated. Fear is both a reactive and proactive response that is reflective of, and prepares the organism for a potentially dangerous (i.e., injurious) situation. Prior experience and memory enable establish learned responses to fear-invoking scenarios (see Figure 3).

[32] See: Giordano J, Casebeer W, DiEuliis D, in Topics in operational considerations on insights from neurobiology on influence and extremism (SMA Report, April 2013); Giordano J, in Neurobiology and cognitive science insights on radicalization and mobilization to violence: A review (SMA Report, June 2012).

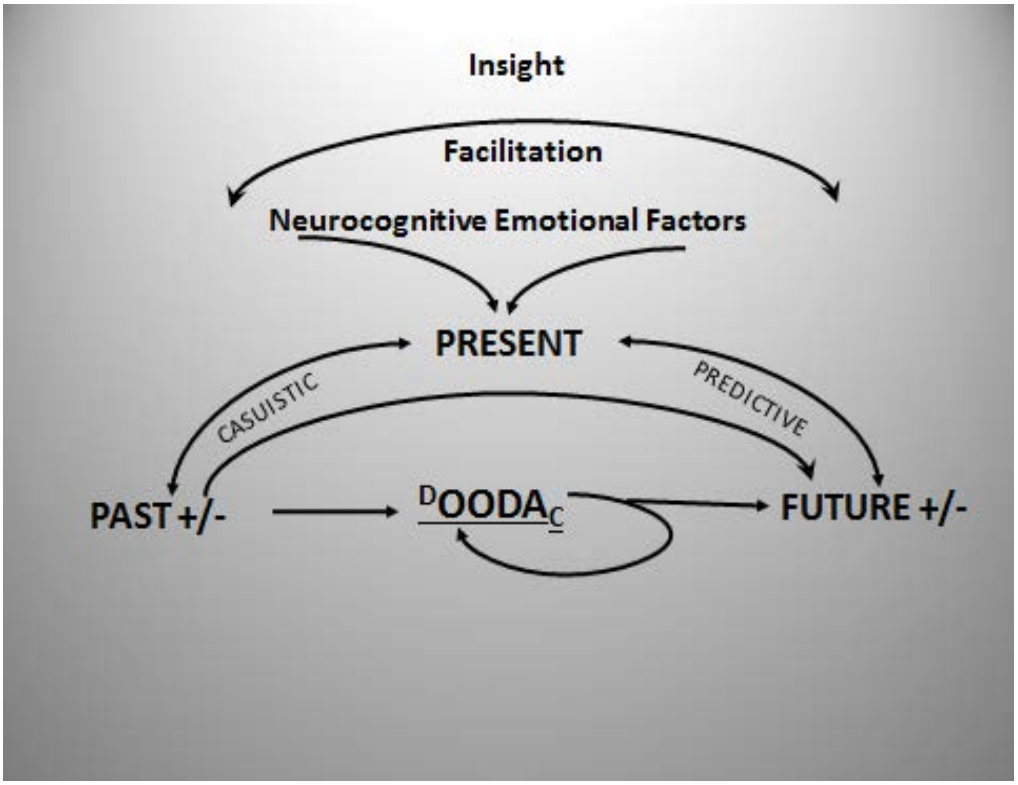

Figure 3: Schematic Representation of Neuro-Cognitive Processes in Decision-Making
Abbreviations: D-OODA –C = Dispositions, Observations, Orientation(s), Decisions, Actions, Consequences (an embellishment of Boyd's OODA Loop, as described in text).

NB: +/- symbols refer to relative positive or negative valence of past and future events (and consequences/outcomes of agents' actions) that influence current dispositions, observations, and orientations that affect decision-making and ultimate action-course(s).

It has been shown that the underlying biochemical milieu present during emotional processing has effects on cognition, and prolonged emotional states can affect cognition, even when environmental cues for those emotional states have abated or are absent. Emotional cues can either increase or decrease cognitive processes, such as learning and attention (Damasio, 2005), working memory (Iordan, 2013), and what is described as "cognitive control" (Kalanthroff, 2015). A congruence of mood and extent of attention that is paid to sensory cues has been demonstrated (i.e., "state or mood-dependent attention;" Van Dessel, 2012). For example, someone who is experiencing sadness may not only give more attention to sadness-provoking sensory cues in their environment, but may also tend to interpret other, more ambiguous, external cues and stimuli in a similar manner (Schicke, 2013).

Emotions can also accentuate certain kinds of cognitive performance. For example, it has been shown that under conditions of elevated stress or anxiety, some kinds of cognitive processing of

vigilance to one's environment tends to be enhanced (Moriss, 2013; Robinson et al., 2013). Importantly, this hypervigilance may cause processing of other sensory information to be altered and/or reduced, so the individual may differentially attend (or not attend) to various environmental cues and information while under duress. Models have been proposed to predict this type of mood congruence (Harle, 2015) that might provide a useful tool to aid in the in development of strategies and tactics of information presentation, narrative development, and MISO/PSYOPS.

Assessing and Affecting Emotions: Toward a Bio-Psychosocial Approach

Clearly, humans are biological organisms who respond to social environments through psychological responses and expressions that affect cognitive state and behavioral activities. Emotion is integral to cognition, and cognition is integral to behavior. As explained in the introductory chapter of this report, and depicted in Figure 4, these relationships of biology, psychology, and social embeddedness and effect are reciprocal, interactive, and labile.

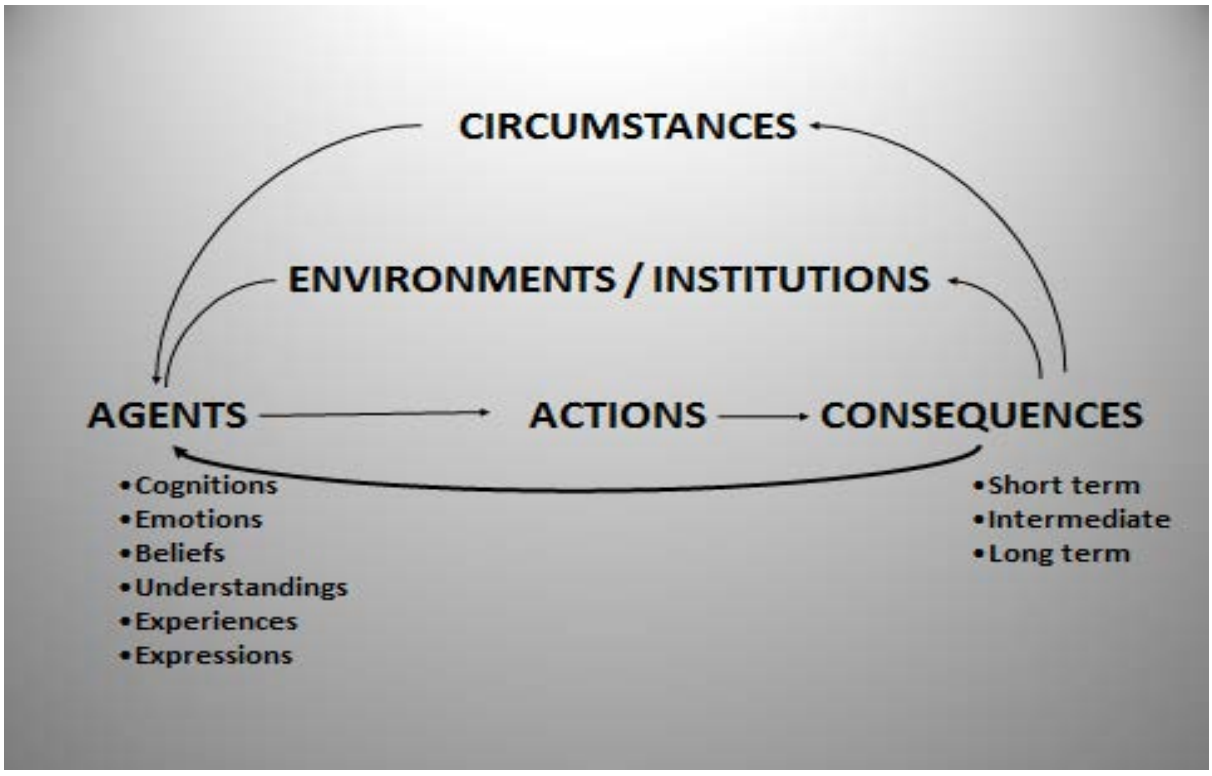

Figure 4: Interactions of Neuro-Cognitive Factors with Socio-Environmental Situations and Effects

They can be assessed and affected as targets operative in human thought, decision-making, and behavior. Understanding the relative contribution of each—and all in sum—is therefore

defensibly important to informing and developing more finely grained approaches to influencing human thought and actions, which—as explicated elsewhere in this volume—are crucial to MISO and PSYOPS components of national security, intelligence, and defense agendas (for overviews, see: Giordano, 2016; Wurzman and Giordano, 2014; Giordano and Wurzman, 2011).

Notes

1. See: Giordano J, Casebeer W, DiEuliis D, in *Topics in operational considerations on insights from neurobiology on influence and extremism* (SMA Report, April 2013); Giordano J, in *Neurobiology and cognitive science insights on radicalization and mobilization to violence: A review* (SMA Report, June 2012).

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Psychological Perspectives on Behavior

How ISIL Recruitment Tactics Target The Adolescent Brain: Victoria L. Romero, IST Research[33]

Abstract

The neurological and psychological characteristics of adolescence make adolescents particularly vulnerable to recruitment tactics employed by fringe and antisocial groups. ISIL is not the first group to take advantage of adolescents' vulnerabilities, but the group has become particularly adept at doing so. Undermining their influence among potential recruits in this age range requires an understanding of the adolescents' state of mind and brain; counter-messages that are intuitively appealing to older adults may be ineffective, or even counter-productive among this audience. In particular, messages directed to adolescents should (1) focus on emotionally impactful messages instead of logical arguments, (2) avoid emphasizing the risks associated with joining ISIL, and (3) undermine ISIL's claims to provide belongingness and peer affiliation and provide alternate means for social acceptance.

Introduction

On February 23, 2016 the government of Iraq's semi-autonomous Kurdish region reported that Pashmerga (Kurdish) troops had rescued a 16-year-old Swedish girl who had traveled first to Syria, then Iraq, after being recruited by a member of ISIL (CBS News, 2016). This girl wasn't the first Western teenager enticed to leave the relative safety and stability of Europe to travel to an active warzone to join ISIL. Her decision to put herself at great personal risk to join a militant group best known for extreme violence, hatred, and misogyny is astounding to most Western adults; it is difficult to conceive how this teenager arrived at this decision. Although this is an extreme example, this type of risky decision-making is not atypical for adolescents—in fact, this behavior is consistent with what is known of the development of the brain and the way these developments impact behavior. An examination of the characteristics of adolescents' neurocognitive development can shed light on the appeal of ISIL's recruiting tactics among adolescents and young adults, and may inform our efforts to undermine ISIL's influence on this vulnerable audience.

There was a time when adolescence was believed to be a cultural construction, an artifact of the way children are raised in Western societies (Lesko, 2001). However, we now know that adolescence is marked by significant structural and functional neurological changes that have significant impacts on reasoning and behavior. These changes, both neurological and behavioral, are not only culturally universal, but they are observed in a wide range of species

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including non-human primates, elephants, rodents, and birds (Somerville, Jones, & Casey et al., 2010). The changes in the brain that coincide with adolescence (and perhaps even define adolescence) result in a developmental window in which organisms exhibit heightened appetitive motivations, are attracted to risk, are inordinately influenced by emotion, and show a strong preference for peer affiliation over other social interactions. In species-typical environments, this constellation of characteristics conspires to launch adolescents from their parents' nests, dens, and basements in order to establish their own territories, seek mates, and procreate. In other words, as aggravating as adolescent behavior may be to adults, it is usually adaptive, in an evolutionary sense. However, in atypical environments, adolescents' risk-seeking and emotion-driven decision-making can put them in significant peril. Some descriptions of ISIL recruiting estimate that as many as two-thirds of ISIL recruits are under 21 years of age (Morin, 2016). This chapter briefly reviews the neurocognitive changes that occur during adolescence, then examines how ISIL messaging capitalizes on these characteristics to attract young recruits and what we may do to counter their influence.

An adolescent's brain is structurally and functionally different from both a child's brain and an adult's brain at the region, circuit, and system levels (Steinberg, 2010). The neurological changes that occur during adolescence are as dramatic and as important as in any other part of life, and the impact on behavior is equally dramatic. A thorough review of all the changes that occur through adolescence is beyond the scope of this paper; here we focus on three key developments and resulting behavior changes that are directly related to adolescents' vulnerability to extremist recruiting tactics.

Prefrontal Cortex and Impulse Control

The prefrontal cortex is often blamed for all adolescents' seemingly irrational behaviors. It is true that the prefrontal cortex is among the last regions to mature, reaching maturity as late as the early 20s in males. However, prefrontal immaturity cannot be to blame for all the changes we see in adolescence. The prefrontal cortex develops along a steady, linear trajectory from early childhood to adulthood (Casey, 2015). If prefrontal immaturity was the sole cause of risky-decision-making, peer influence, etc., these characteristics would be more prevalent in children than in teens and would show a slow decline across adolescence. That is not the case; these characteristics peak in mid-adolescence (not coincidentally, the age of the Swedish girl rescued in Iraq). Thus, prefrontal immaturity cannot be singularly responsible for all adolescent behavior.

However, there is one characteristic that does mature gradually from childhood to adulthood: self-control (Casey, 2015). Self-control develops steadily beginning in infancy, progresses throughout childhood and adolescence, and plateaus in early adulthood (before declining in old age). The impact of prefrontal immaturity seems more exaggerated in adolescence than in

childhood because adolescents have a greater need for self-control. Adults do not expect children to exercise a great deal of self-control and there are rules and other supports in place that exert control over children. Adolescents, however, often find that their freedom and responsibilities advance faster than their developing capacity for self-control. This is coupled with a great *need* for self-control due to two other key neurocognitive developments: increased influence of emotion-processing regions on decision-making and increased activity in reward circuits that cause adolescents to seek out risk, novelty, and peer affiliation. These new developments challenge, and often overwhelm, adolescents' developing self-control.

Subcortical Circuits and Emotion-Driving Decisions

When considering brain changes associated with adolescence, the subcortical regions of the brain are often overlooked. However, subcortical areas, including the basal ganglia and structures within the limbic system (such as the nucleus accumbens and the amygdala), are key in the regulation of appetitive drives and the processing of emotion. During adolescence, there is increased functional connectivity between these areas and the prefrontal cortex, indicating that these regions may become more involved in decision-making. In fact, Montague and Berns (2002) among others, have found increased activation of the accumbens and amygdala during decision-making in adolescents when making risky choices and processing emotional information. This is consistent with behavioral evidence that adolescents are unduly swayed by emotion. When reasoning about a hypothetical, moral dilemma, adolescents *can* exercise high-level logical reasoning and make adult-like choices, but when faced with a personal decision, adolescents rely more on emotions and less on reason (Gardner & Steinberg, 2005). Adolescents may be perfectly capable of well-reasoned decisions, but logic is superseded by emotion when decisions are highly emotional and personally relevant. In effect, the emotional aspects of decisions are heightened and the behavioral result is that adolescents who are cognitively capable of logical decision-making nonetheless make emotion-driven decisions.

Students of the science of persuasion know that emotionally driven messages can be more impactful than cognitively driven messages (e.g. Petty & Cacioppo, 1986); this effect is particularly true for adolescents. Although ISIL may engage in vigorous online debates on religious tenants, Western policy, and similar topics, it is unlikely that the logical elements of these arguments are responsible for recruiting large numbers of adolescents. Rather, it is the emotion included in these arguments that is likely to appeal to adolescents. Efforts to counter these arguments often focus on dissecting the logic of the arguments (e.g., demonstrating how ISIL claims are inconsistent with mainstream Islamic teachings). These logical arguments may be very well-reasoned, but are unlikely to resonate if they lack equivalent emotional impact. Columbia's influence campaign to encourage FARC defections made expert use of emotion. Rather than debating the merits of the FARC organization, the campaign focused on reminding FARC recruits that their mothers missed them and were waiting for them to come home for

Christmas. The campaign tugged at recruits' heartstrings and was so effective that one of the FARC's conditions for entering into negotiations with the government was that the Christmas campaign be discontinued (Foreign Policy, 2015).

Dopaminergic Rewards Circuits, Risk-Seeking, and Peer Influence

Adolescence is marked by increased activity of the dopaminergic pathways linking limbic, striatal, and prefrontal regions. These changes in dopaminergic circuits are associated with increased reward-seeking and appetitive behavior in adolescents (Steinberg, 2010). This manifests as increases in sensation-seeking and risk-taking behavior. Adults often perceive adolescents' drive to engage in risky behavior as a denial or misunderstanding of the risks. That's the not the case; adolescents are able to understand and reason about the risks of behaviors in which they engage (Reyna & Farley, 2006). They don't take part in risky behavior because they don't understand the risks; they take part in risky behaviors because they are attracted to risk.

This calls into question one of adults' most intuitive counter-arguments to ISIL recruiting: to emphasize the risk associated with joining ISIL. Adults wonder how adolescents can be ignorant of the extreme danger they put themselves in by associating with ISIL. The answer is, that adolescents are not ignorant of the danger; they recognize the danger and are drawn to it. In fact, romanticized danger may be one of ISIL's greatest selling points to adolescents craving exotic adventures. Such messages are perfectly suited to the neurocognitive state of adolescence. Emphasizing the risk associated with joining ISIL is unlikely to dissuade these adolescents; they already understand the risks. *In fact, highlighting the risks may even backfire and make ISIL more attractive to risk-seekers.* A more effective tactic may be one that undermines ISIL's messaging by portraying the reality of joining ISIL as mundane, even boring. Adolescents who are extreme enough in their risk-seeking to consider joining ISIL will be more dissuaded by disillusioning tales of boredom and bureaucracy than by dire warnings that only whet their appetite for danger.

Another consequence of the increased activity of dopaminergic pathways is increased sensitivity to social rewards. Adolescents are highly receptive to peer interaction that activates the same reward circuits as non-social rewards. This is the same reward circuit that underlies addictive behavior (Wise, 1996); in fact, rats that learn that they can press a lever to induce electrical stimulation of this reward circuit will choose the reward over all other stimuli to the point of starvation, pressing the level up to 7000 times an hour (Olds & Milner, 1954). Similarly, the most reward-sensitive adolescents may be driven to seek peer affiliation and approval to their own detriment. Additionally, puberty is associated with an increase in oxytocin receptors, increasing the impact of oxytocin on brain and behavior further increasing teens' propensity to

seek social bonding and peer approval. ISIL recruitment preys on this need for peer interaction and approval by painting a picture of a brotherhood (or sisterhood) of camaraderie.

Adolescents attracted to ISIL expect to join a cohesive group of like-minded peers who have banded together for a common purpose (Winter, 2015). In fact, Western recruits are often treated poorly and are not perceived by other ISIL members to be of equal standing. Some efforts have been made to use disaffected former recruits to counter ISIL's promise of acceptance and brotherhood. From a neuroscientific perspective, this tactic has potential to undermine one of ISIL's appeals to adolescents, as long as the defectors are genuine and relatable. A related tactic may be to counter ISIL's influence by reaching isolated youth before ISIL does. The promise of affiliation and social approval will be most appealing to youth who lack affiliation and approval elsewhere. Programs and activities that fill this gap with prosocial groups can reduce the likelihood of adolescents being recruited without ever mentioning ISIL.

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Psychological Bases Of Aggression: The Role Of The Moral Emotions In Radicalization: Dr. Jason Spitaletta (Maj, USMCR), The Johns Hopkins University Applied Physics Laboratory & Joint Staff J7

Abstract

Operations planned and executed to deter, disrupt, and/or defeat the process by which an individual, group, or mass of people move from legal participation in the political process toward violent political action must utilize every relevant scientific and technological advantage available. The moral emotions—anger, degust, and contempt—can play an integral role in the individual decision to radicalize; therefore the emotional vulnerability to circumstances that may give rise to these emotions can be considered risk factors. Studying these phenomena as they apply to negative radicalization is a necessary step in developing understanding of and empathy for the issues and individuals involved. This deeper understanding is not an academic exercise, but rather an operational necessity to develop better tools and technology to design Military Information Support Operations (MISO) products for persuasion, emotion, and trust.

Introduction

One aspect of radicalization entails the process by which an individual, cohesive group, or inchoate mass of people move from legal participation in a belief ideal or political process toward more extreme forms of belief representation of political action (Crossett & Spitaletta, 2010). A risk factor for such radicalization is a variable associated with an increased likelihood of the process coming to fruition; however, the presence of this variable is neither deterministic nor implicitly characterological (Spitaletta, 2013a). The risk of radicalization is increased when risk factors and circumstances corroborate individual biases and provide an opportunity for an individual to behave in a manner that reinforces a cultural norm or projected identity. Among the more prevalent theories regarding emotional vulnerability as a risk factor for radicalization (Spitaletta, 2013) is the role that frustration plays in anger and, ultimately, aggression (Crossett & Spitaletta, 2010). The frustration-aggression hypothesis identifies the incongruence between subjective needs and objective reality as the cause of disappointment/aggravation that is then displaced (Maile et al, 2010); this has been postulated to be among the root causes of extremist violence (Crossett & Spitaletta, 2010). Frustration results when stimuli prevent an individual from attaining some goal. This has been identified as a necessary condition for aggression (Berkowitz & Harmon-Jones-2004); however, it is typically inhibited by contextual factors such as social norms and/or threat of punishment (Maile et al, 2010). When an aggressive response is suppressed, the use of alternative strategies may fail to achieve the desired goal, thereby reinforcing aggressive behavior, and perhaps elevating it as a dominant response (Maile et al, 2010). Bandura's (1978) social-learning theory of aggression suggests that violence follows observation and imitation of an aggressive model, and a variant of this theory has been invoked to explain terrorist behaviors, not as the consequence of innate aggressiveness, but of cognitive

restructuring of social and moral imperatives. This cognitive restructuring occurring over time, can increase the likelihood that an individual will view aggressive behavior of an organization or social movement as consistent with their views and aims (i.e., what is referred to as being ego syntonic) and in this way, also increase the likelihood that an individual will identify with the ethos of such an organization. This hypothesis requires deeper understanding of what Hutcherson and Gross (2011) refer to as the "moral emotions" of patho: anger, disgust, and contempt.

Better understanding the moral emotions also helps to appreciate Sternberg's (2003) Duplex Theory of Hate, which entails also entails fear. The Duplex Theory of Hate has three components: the negation of intimacy whereby the creation of psychological distance can decrease empathy toward a target or victim; passion, or a combination of anger and fear in response to threat that psychological activates an individual against the instigator of threat; and commitment or de-legitimization and/or devaluation of an individual/group through contempt (Borum, 2011). This deeper understanding is not an academic exercise, but rather can be seen as an operational necessity if we are to develop better tools and technology to design MISO products for persuasion, emotion, and trust (Spitaletta, 2013b) that can be employed to deny, disrupt, or deter negatively violent radicalization processes (Spitaletta, 2013a).

Anger

Grievances, whether personal and/or political, may cause sufficient frustration to initiate the radicalization process. This requires nonaggressive response(s) to frustrations, which heretofore were dominant, to become subordinated to an aggressive response (Maile et al, 2010). Grievances can be experienced by proxy; vicarious victimization can be experienced through exposure to electronic media or social networks (Crossett & Spitaletta, 2010). Perceived grievances are supported by ideological frameworks with a view of perceived problems, a vision of the future, and a prescription for action (McCauley & Moskalenko, 2008). Whatever the grievance, it must be sufficiently palpable for the frustration to simmer long enough to result in anger.

Anger, an emotional state that can vary in intensity from mild irritation to intense fury, is mediated and accompanied by physiological changes including elevated heart rate, blood pressure, and adrenaline and noradrenaline levels (Speilgeberger, 2009). The cognitive dimension of anger entails a set of appraisals that guide the valence of perceived affective stimuli (Cox & Harrison, 2008). Kassinove & Suckhodolsky (1995, p. 174) define the affective dimension of anger as "a subjective, negatively felt state associated with cognitive deficits and distortions as well as physiological correlates that occur in response to stimulus that is perceived as negative and may result in maladaptive patterns of behavior." Anger can be considered to be both a trait and a state variable, wherein "trait anger" refers to the

overarching construct of anger (a relatively stable predisposition to react to stimuli perceived as negative in an angry manner), while "state anger" refers to the emotional response to an immediate stressor that may vary in both intensity and duration (Cox & Harrison, 2008; Spielberger, 2009). The manifestation of anger can be described in terms of ''anger-in'' (the conscious suppression of an angry response to a stimulus) or ''anger-out" (the overt expression of anger) (Cox & Harrison, 2008; Spielberger, 2009). One particularly maladaptive behavior associated with "anger-out" is aggression.

Aggression is the externalization of anger (Cox & Harrison, 2008) through a set of behaviors that cause or lead to harm, damage, or destruction of an organism and/or artifacts such as property and other inanimate objects (Siegel & Victoroff, 2009). Aggression is subserved by a neural network of the limbic system and the prefrontal cortex (PFC) (Murphy, 2003) that specifically engages the amygdala, dorsal medial prefrontal cortex (dMPFC), and ventral and orbital medial prefrontal cortices (vMPFC/OFC) (Cocarro et al, 2007). The neural correlates of affective aggression entail activation that originates in the amygdala, whose signals are then transmitted to other limbic structures including the hippocampus, parahippocampal gyri, hypothalamus, thalamus, and cingulate cortex (Siegel & Victoroff, 2009). Insufficient PFC activation may prevent inhibition of brain structures located in the limbic lobe and without proper inhibition messages from the PFC; the amygdala can drive behavior in an unconstrained manner (Adams, 2006). Lesions to any part of this system can result in forms of aggressive behavior (Siegel & Victoroff, 2009).

Although much research on the limbic-PFC network has been established in studies of clinically aggressive populations including violent offenders with both borderline and anti-social personality disorders, and sub-clinical violent offenders (Cocarro et al, 2007), it is important to note that these mechanisms appear to be operative in all individuals, and are differentially engaged under particular environmental contexts, to some extent. The research related to sub-clinical violent offenders is likely the post applicable to the study of radicalization; however, it should not be assumed that those seeking to affiliate with VEOs are either maladaptively aggressive or abnormally violent beforehand.

The Duplex Theory of Hate holds that the combination of anger and fear in response to threatening stimuli is a necessary in producing the extreme negative orientation to an object (Sternberg, 2003). Neuroimaging research has identified increased amygdalar activation during the subjective experience of fear, but not necessarily during anger, disgust, and/or sadness (Lindquist et al, 2012). The amygdala is, however, activated during exposure to aversive stimuli from multiple sensory modalities and those responses are subject to rapid encoding and habituation (Zald, 2003). Inputs from the amygdala are filtered by the PFC, which regulates the signal intensity to modulate engagement of perceptuo-motor networks that are operative in

conative aspects and the expression of aggression. Modulating impulsivity can inhibit the limbic structures that generate aggressive affect (Adams, 2006). The somatic marker hypothesis holds that the PFC functions as an important element in the neural network processing of complex situations and the type of emotional state associated with that experience (Damasio et al., 1996). This theory might be operationalized to create messaging that exploits known neural processes to inhibit aggressive responses.

Disgust

Disgust is one of the basic human emotions, generally resulting in an aversive reaction to stimuli. The emotions of contempt, anger, and disgust are often confounded in experimental literature; however, Gutierrez et al. (2012) differentiate the three as the response to violations of social/community ethics, violations of individual ethics, and violations of divinity ethics, respectively. Disgust elicits repulsion and elimination, particularly toward members of an out-group and it, and not anger, transcends aggression to hostility and has been posited to be a more reliable predictor of violence behavior (Matsumoto et al., 2010). Disgust obtains two principle forms: (1) concerns with purity/sanctity of the body (e.g., aversive reactions to foul-smelling substances) and (2) moral disgust (e.g., revulsion at the thought of incest and/or cannibalism) (Guiterrez, et al, 2012). Moral disgust also exists along a continuum, but is often considered to be a more powerful (e.g., emotionally evocative and behavioral sustaining) form (Pizarro et al., 2011). In fact, the subjective experience of disgust can exacerbate appraisal of immoral acts (Pizarro et al., 2011). The neural correlates of disgust involve a network of the cingulate cortex, orbitofrontal cortex, occipital cortex, and the nucleus accumbens, which have been postulated to play a role in emotion processing, anticipation, and regulation (Klucken et al., 2012).

Contempt

Contempt, unlike anger and disgust, is distinctly human in its origin (Rozin et al., 1999) and is a less-severe manifestation of disgust that is related more to the evaluation of competence than of moral propriety (Hutcherson & Gross, 2011). Contempt, like disgust, serves the purpose of experience and expressing a negative judgment (Rozin et al., 1999) absent a distinct threat (Hutcherson & Gross, 2011). Contempt is often a necessary component of prejudice and/or racism, as it tends to occur more often inter- than intra-group (Rozin et al., 1999). Individuals may become contemptuous of out-group victims (Borum, 2011), a phenomenon that violent extremist propaganda often seeks to exacerbate and exploit (Spitaletta, 2015).

Conclusion

Although explanations solely at the level of individual psychology are insufficient to explain how and why an individual chooses to become a terrorist, the incorporation of multiple sub-disciplines within psychology can be useful to comprehend the phenomena associated with

negative radicalization (Spitaletta, 2013). An appreciation of the moral emotions, to which this chapter served as a brief introduction, is a necessary component to understand and ultimately counter (or altogether prevent) the radicalization process. This requires a more nuanced approach that includes both personalized persuasion efforts as well as intelligence-driven direct action (Spitaletta, 2013). Additional research is required to identify and validate both observable behaviors associated with risk factors for radicalization as well as the ability for such processes to be interdicted. The resultant findings could provide additional scientific and technical rigor to fortify and/or expand current counterterrorism tactics.

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Emotional Reactions To Uncertainty Versus Ambiguity: Dr. Jason Spitaletta (Maj, USMCR), The Johns Hopkins University Applied Physics Laboratory & Joint Staff J7

Abstract

Uncertainty and ambiguity are distinct, yet often confounded, phenomena in the psychological literature that have considerable relevance when studying the psychology of violent extremism. Ideologies are often articulated in narrative form to reduce uncertainty and ambiguity and reinforce in-group biases. Uncertainty is also often a psychological objective of terrorist operations as it not only reinforces existing biases but also may effectively paralyze a populace and deter a counter revolutionary/insurgent/terrorist social movement. Understanding the emotional reactions of uncertainty and ambiguity may enable Military Information Support Operations (MISO) planners to develop more sophisticated products and series to exploit these phenomena in select target audiences.

Introduction

Ideology is a necessary but not sufficient element that affects both recruitment and retention within violent extremist organizations (VEO) by (1) providing intellectual common ground for a movement, (2) reducing uncertainty, (3) justifying violent actions, and (4) motivating members to persist through difficulty (Bos, Spitaletta, Molnar, Tinker & LeNoir, 2013). Human beings tend to dislike ambiguity and uncertainty in their social and physical environments. Through generalized beliefs, individuals seek to give meaning and organization to unexplained events. Common agreement on certain beliefs also enables individuals to operate collectively toward desired goals. Leaders can interpret situations in terms of the group's beliefs or ideology, translating abstract, ideological beliefs into specific, concrete situations in which actions are to be taken (Bos et al., 2013) .

Ambiguity

Ambiguity is a psychological phenomenon that is difficult to both define and measure (Kahneman & Tversky 1982). Ambiguity is a subjective variable that results from ignorance of a process and/or the result of said process (Einhorn & Hogarth, 1985). Ambiguity in the military context refers to the occurrence of multiple, plausible interpretations of "outside information" and "unfolding circumstances" that feed "observation" (Baran & Scott, 2010). Along with isolation, powerlessness, boredom, and anger, ambiguity is one of five psychological stress dimensions in military operations (Bartone, 2006). Ambiguity can result from an unclear or fluctuating mission, unspecific rules of engagement, indistinct chain of command, imprecise roles, and vague normative behaviors (Bartone, 2006). The ambiguity inherent in competition can result in a wide range of emotional reactions that strain the psychological capacity of an individual (Janelle & Hatfield, 2008).

Coping with change is adaptive in competitive environments as it contributes to cognitive flexibility and improved emotional integration (Jeswal, 2011); the generalized capability of coping with ambiguity is referred to as ambiguity tolerance (Zvolensky, 2010). Discussion of intolerance of ambiguity (IA) preceded that of intolerance of uncertainty (IU) in the psychological literature (Bochner, 1965; Grenier, Barrette, & Ladouceur, 2005). Early research focused on IA as a personality attribute (Bochner, 1965) while later research focused upon the relationship of IA to intelligence (Bors, D. A., Gruman, J. A., & Shukla, 2010). More recently, IA has come to refer to an individual likelihood to interpret confusing or vague stimuli as threatening or discomforting (Grenier et al, 2005). IA comprises a set of cognitive reactions that tend to simplify complex situations into binary choices, as well as a set of emotional reactions—including expressions of uneasiness, discomfort, dislike, anger, and anxiety—and resultant avoidant behavior (Grenier et al., 2005). While parsed by both Grenier et al. (2005) and Zvolensky et al. (2010), differentiating IA and IU is quite nuanced and, at times, arcane.

Uncertainty

Uncertainty is often described as the subjective experience of unknown probabilities (Einhorn & Hogarth, 1985); however, the psychological aspects are more complex. There are two types of uncertainty: the first is attributed to external factors (or dispositions) and the second to internal factors (or ignorance) (Kahneman & Tversky, 1982). Within these types, there are four variants of uncertainty: frequencies and propensities (external) and arguments and confidence (internal) (Kahneman & Tversky, 1982). The source of uncertainty notwithstanding, uncertainty is an emotional state caused by ambiguous stimuli being "observed" (Grenier et al., 2005). Put simply, uncertainty is a feeling ascribed to a person, while ambiguity is a property of the stimulus. Intolerance of uncertainty (IU) is a cognitive phenomenon that leads an individual to worry (Koerner & Dugas, 2006) both (1) directly through an attentional bias toward negative information (Hirsch & Inzlicht, 2008) and (2) indirectly through positive beliefs about worry,[xxxvii] fixation on problems, and/or cognitive avoidance (Koerner & Dugas, 2006). IU can also lead to a cognitive shift to verbal processing over visual processing to limit emotional arousal (Huang, Szabo, & Han, 2009). As any dynamic environment is inherently uncertain (Campbell, 2006), IU individuals may not adapt well to "unfolding circumstances" as they have a tendency to adversely react emotionally, cognitively, or behaviorally to (or in anticipation of)[xxxviii] uncertain situations. IU affects "observation," "orientation," "decision," and "action" during uncertain situations (Dugas et al., 2005) and is an indicator of susceptibility to anxiety (Dugas et al., 1998).

The subjective assessment of uncertainty tends to vary with familiarity: the greater the "previous experience" with a particular set of circumstances, the less uncertainty, and therefore the less subjective stress (Grier, 2012). This is consistent with Klein's (1997) research on experts who arrive at better decisions sooner, and who experience less stress in uncertain situations and decision-making than novices. IU can manifest as the desire for predictability

and/or predilection towards cognitive stasis (Bredemeier & Berenbaum, 2008) while confronting a task where the effect of one's input on a system is indeterminate (Osman, 2010).

Thus, uncertainty tolerance can be considered to be analogous to cognitive flexibility. As stated earlier, cognitive flexibility, along with emotion regulation, attention, and situational awareness, is an important component of mental fitness (Stanley & Jha, 2009). Cognitive flexibility includes a number of dynamic processes including the capability to: (1) adapt to "unfolding circumstances," (2) "orient" to prioritize mental resources, (3) shift perspective, and (4) reconcile "outside information" and "action" (Kashdan & Rottenberg, 2010). Cognitive flexibility allows one to consciously deviate from proscribed patterns when "unfolding circumstances" provide negative "feedback" as well as avoid "actions" that may compromise "cultural traditions" or preexisting values (Kashdan & Rottenberg, 2010). Cognitive flexibility increases both the volume of and rate at which information may be processed during "orientation," resulting in the development of better situational awareness.

A common reaction to uncertainty is one of concern (for the ego as well as the objective of the goal directed behavior) and preoccupation with what is unknown, a process that strains limited attentional resources and diminishes cognitive performance (Janelle & Hatfield, 2008). The fixation on unknown information and the attempts to resolve it, which Lipshitz and Strauss (1997) classified as reduction can inhibit decision-making. IU can exacerbate the common attentional bias toward negative information (Hirsch & Inzlicht, 2008) resulting in an increased estimate of perceived threat (Bredemeier & Berenbaum, 2008) and can lead to the inability to act when faced with an uncertain situation (Dugas et al., 2005). High IU individuals prefer either very easy or very difficult tasks due to the low risk of an unexpected outcome resulting in cognitive disorientation, unsettling experience, or (at worst) lowered self-esteem (Kashdan & Rottenberg, 2010). Intermediate challenges moderately push the limits of ones' knowledge, skills, and/or abilities and thus do not provide predictable estimates. These challenges are therefore avoided by high IU individuals (Kashdan & Rottenberg, 2010), what Lipshitz and Strauss (1997) would refer to as suppressing uncertainty. Similarly, people with high IU may not effectively interact with strangers or tolerate being exposed to situations in close interpersonal relationships whose consequences are unpredictable (Kashdan & Rottenberg, 2010). During periods of uncertainty, people tend to be suspicious of what they hear and rely on their personal experiences, believing only those things which they have seen with their own eyes (Bos et al, 2013).

Conclusion

VEOs may attempt to sew social disorganization and conditions of uncertainty through a combination of kinetic and non-kinetic psychological operations (Bos et al., 2013). Generalized or uncertain threats tend to produce more anxiety than fear as the details are deliberately

omitted and left to the imagination of the target audience (Bos et al, 2013). The threatener captures attention at a point when target audiences are under stress and thus seeking to eliminate uncertainty and ambiguity (Bos et al, 2013). The threatener may also suggest escape routes and alternatives and make compliance demands that are readily accepted in order to eliminate the uncertainty of the threat and reduce terror (Bos et al, 2013). Understanding the cognitive manipulations at play and their concomitant emotion effects will enable not only a richer contextual understanding of adversary persuasion tactics but also shed insight into how to go about countering or undermining said tactics.

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Psychological Effects Of Terror: Dr. Jason Spitaletta (Maj, USMCR), The Johns Hopkins University Applied Physics Laboratory & Joint Staff J7

Abstract

Terrorism is a psychological warfare tactic that exists at the confluence of violence and propaganda, where the former seeks to modify behavior through coercion and the latter through persuasion (Bos, Spitaletta, Molnar, Tinker, & LeNoir, 2013). Daesh, more so than many violent extremist organizations (VEOs), employs terror as a distinct psychological objective to not only reinforce existing in-group biases but also paralyze the unaffiliated target audiences into a form of passive compliance (Spitaletta, 2015). Terrorized target audiences may be particularly difficult to influence and thus it is necessary to understand the psychological phenomena associated with terror. The following paper attempts to briefly describe some of those phenomena.

Introduction

The purpose of terrorism is to deliberately induce an unremitting, paralyzing sense of fear that permeates one's psyche (Breckenridge & Zimbardo, 2007). Fear precipitates the acute secretion of catecholamines and glucocorticoids typical of the human stress response. This response is elicited by four situational characteristics: novelty, unpredictability, threat to survival, and perceived lack of control (Lupien, McEwan, Gunnar, & Heim, 2009), all of which have been identified in survivors of terrorist events (Gates, et al., 2002). Emotional responses to man-made disasters are considerably more stressful than responses to naturally occurring phenomena (Breckenridge & Zimbardo, 2007) and thus terrorism can be particularly psychologically devastating.

The psychological manifestation of terror is neither simple nor straightforward because different audiences will respond with various interpretations of terrorist acts. Observers may identify with either the victims or the aggressor based on in-group bias and not necessarily the subjective morality of the act (Schmid, 2005). Victims of and/or witnesses to terrorist attacks may go into a state of acute stress (termed acute stress disorder, or ASD) (APA, 2013). Symptoms of an acute stress response include recurring thoughts of the incident, irrational fears of previously normal activities, significant deviation from one's daily routine, survivor guilt, a pronounced sense of loss, a reluctance to communicate feelings, and a subjective uncertainty or loss of control. If these symptoms persist for more than thirty days after a traumatic event, an individual may be experiencing posttraumatic stress disorder (PTSD). Symptoms of PTSD fall into three main categories: intrusive memories, avoidant behaviors, and arousal. Intrusive memories, or episodes of re-experiencing the event that disrupt daily life, include flashbacks, nightmares, and/or uncomfortable or disturbing reactions to those memories. Avoidance includes emotional numbing, feelings of detachment, the inability to

recall the traumatic event, a general malaise (particularly toward activities previously considered pleasurable), avoiding people and/or places that are reminiscent of the event, and an uncertainty regarding the future. Arousal symptoms include difficulty concentrating, startling easily (and with a more exaggerated reaction), hypervigilance, irritability, and difficulty sleeping. Diagnostic criteria for PTSD include a history of exposure to a traumatic event meeting two criteria and symptoms from each of three symptom clusters (APA, 2013). The psychological consequences of a successful act of terrorism are both acute and chronic and tend to increase with proximity to the event. Populations exposed to the attack show higher rates of PTSD and those suffering losses as a result of the attack show higher rates of depression (Galea et al., 2002).

Under uncertain conditions, individual cognitive processes are biased toward emotionally evocative events, resulting in an increased estimate of a perceived threat and a tendency toward indecision. When individuals perceive they lack the necessary information to come to a judgment, they tend toward negatively balanced information; this is particularly so in the aftermath of a terrorist incident. Social amplification (which is also increased under ambiguous and/or uncertain conditions) further magnifies the negative bias and thus social interaction further compounds the effect of a terroristic act (Bos et al, 2013). Although unintentionally, media coverage of acts of terror exacerbates the aforementioned phenomena and thus increases the effect of an attack, therefore incentivizing such tactics. Given the ubiquity and global reach of modern media outlets as well as social media, this trend is unlikely to cease.

Individual Responses

The effect of terrorism upon individuals differs widely as behavior patterns are affected to a large extent by personality and previously established behavior habits. It is not the objective character of the threat that determines an individual's behavior so much as his/her subjective evaluation of the situation (Bos et al., 2013). Human response to threat also varies according to the nature of the threatening situation—whether it is specific or uncertain. The terrorist may wish to have the threatened party perform a particular act and may issue a highly specific threat.

Where the threat is clearly defined and specifically communicated to an individual, with demands, alternatives, and consequences apparent and persuasively stated, an individual's reaction is probably based on a relatively clear assessment of known variables and he/she may comply out of fear of having the threat carried out. However, the terrorist may seek to cause disruptive behavior or panic by issuing an uncertain, generalized threat. The very ambiguity of the situation makes rational decision-making and assessment functions break down and leads to hysteria and panic (Smelser, 2011). The more specific the threat, the more fear inducing it is;

the more vague the threat, the more anxiety inducing it is, making an individual hypersensitive to ordinarily neutral situations and causing disruptive behavior (Bos et al, 2013).

The relative intensity of threat, regardless of whether it is vague or specific, determines whether a person will be able to take effective action; whenever the magnitude of threat is great, it tends to produce an ineffective or irrational response regardless of the vagueness or specificity of content (Bos et al, 2013). Others argue that threats or threatening acts need not necessarily grow in magnitude for terror to intensify; the mere continuance of threats over a period of time is sufficient to intensify the reaction (Whithey, 1962).

When uncertain threat leads to a state of hysteria, the individual attempts to remove the ambiguity of the threatening situation by identifying some certain source—even if the "source" has little or nothing to do with the real origin of the threat. In certain cases, this can lead to the individual identifying with the aggressor instead of the victims, particularly if there is an uncertain (or divided) group loyalty or the message is particularly disturbing such as videos of ritualistic decapitation (Spitaletta, 2015). A corollary human response to hysteria is the predilection to suggestion, in trying to identify the source of the threat and redefine the uncertain situation, an individual is more susceptible to rumors and targeted influence operations that exploit these biases (Smelser, 2011).

Individuals narrow or restrict their span of attention under threat. Becoming hypervigilant, they focus their attention on the threat and the threatener, to the virtual exclusion of other stimuli. Thus, hypervigilance leads an individual to concentrate on the demands and suggestions of the underground threatener and reduces his/her attention to communications from the government or security forces. In a group context, the prolonged isolation or segregation can foster a sense of humiliation or collective loss of self-esteem. If the group experiences a growing sense of stigmatization or isolation directed against the group, individual members, or their constituents, their propensity for a violent response may increase. Organizations can experience a sense of helplessness and rage in response to collective attacks against the group or other actions designed to demonstrate the group's inferiority (Post, Ruby, & Shaw, 2002). If an individual can perceive no avenue of escape from a threat, he/she develops a sense of helplessness and this sense increases the stress reaction. If the purpose of a threat is to achieve compliance with certain demands, a threat that leaves the individual with no influence over the outcome may backfire. The individual either breaks down and is unable to comply or pursues an opposite, hostile course (Bos et al., 2013). Convincing those individuals to purpose an opposite course in the face of attempts by Daesh to influence them through terror should be considered a psychological objective of Military Information Support to counter-Daesh operations.

Group Responses

Uniting against a common enemy is one of the most powerful activators and unifying factors for identity groups, increasing the group's cohesion, decreasing internal dissent, and increasing a sense of unified purpose. External threats are often the catalyst for identity groups to radicalize toward violent action. In small groups, an out-group threat leads to increased group cohesion, increased respect for in-group leaders, increased sanctions for in-group deviates, and idealization of in-group norms (McCauley & Moskalenko, 2008). The group can also perceive a serious threat to individual members or their leaders after physical attacks (including arrests, torture, and assassination) or catastrophe. The combination of isolation and outside threat makes group dynamics more powerful in the underground (McCauley & Moskalenko, 2008). The group experiences fear that the regime or other opponent is attempting to destroy the group as a whole (Post, Ruby, & Shaw, 2002). The underground group, isolated from society, develops tighter cohesion in response to shared danger, providing an exaggerated variant of the fight-flight group (Post, 1987).

Cultural factors are also a significant variable in human behavior under threat. Unique cultural mores and beliefs frequently affect an individual's sense of threat or subjective experience of terror. Segregation and isolation exacerbate a perceived threat, particularly during times of conflict (Bos et al., 2013). Understanding how these particularly attitudes, beliefs, and values interact within the target audiences effected by Daesh is a necessary step in not simply countering Daesh but making the target audience more resilient to attempts to terrorize them.

Conclusion

The effect of terror upon individuals cannot always be determined from an objective description of the terrorist act. That which threatens or terrorizes one individual may not affect another in the same way. This brief paper focused on the traumatic, largely negative, effects of terrorism; however, there are actions that might be taken to counter some of these effects. Hobfoll and colleagues (2007) identified that the positive aspects of posttraumatic growth, or the positive psychological change experienced subsequent to adversity, can only occur when sufficient effort is allocated to transform thoughts about such growth into action. Focusing on influencing thoughts of post traumatic growth to prosocial actions not only has the potential to improve the quality of life of a terrorized target audience but also relies on behavioral foci which is more operationally sound (Mackay, Tatham, & Rowland, 2011). It is important to note, however, that Hobfoll and colleagues (2007) also found that post traumatic growth to be related to increased psychological distress, more authoritarian attitudes, and support for vigilantism, therefore messaging that design to cultivate post traumatic growth must be sufficiently nuanced to avoid unintentional psychological effects that might hinder operations. The humanitarian aspects of Operation Inherent Resolve remain crucial in degrading Daesh as

do appreciating the psychological vulnerabilities amongst the target audiences that result from terrorism.

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Entrepreneurs Of Fear—The Emotional Impact Of Terrorism On Target Audiences: Dr. Nicholas D. Wright,[34] University of Birmingham, UK, and Carnegie Endowment for International Peace, Washington DC

Abstract

Terrorists' target audiences may include general populations, protective services officers, high-level decision-makers (who may be directly affected or come under political pressure), or local populations (e.g., in counter-insurgency campaigns as in Iraq or Afghanistan). In all these audiences:

(I) The size of terrorism's psychological impact is crucially determined by the neural phenomenon of "prediction error." This explains how audiences adapt, or not.

(II) The size of terrorism's psychological impact is also determined by perceived distance.

(III) The content of the emotional impact is not just fear. It can lead to resilience and even thriving.

(IV) The cases described here include: the Second Intifada and the Iraqi use of scud missiles in 1991.

(I) The Size of Terrorism's Psychological Impacts: The Neural Phenomenon of "Prediction Error"

A core insight from neuroscience is that when we make an action, the impact it has on the other's decision-making is crucially modulated by the action's associated "prediction error."[35] This prediction error is simply defined as the difference between what actually occurred, and what the other expected to occur. The greater the associated prediction error, the greater the psychological impact of the action.

A simple prediction error framework helps to forecast an event's impact on an audience. One asks *"how unexpected was the event from that audience's perspective?"*

An important instance is shown in Figure 5 below, where an event can either occur or not occur, and can either be expected or not expected. Strategic bombing illustrates different combinations of these effects. First, an event occurs and was not expected, so has a large associated prediction error. For example, World War I German air raids on London were small-scale, but being so unexpected had a large psychological impact and caused panic. Second, extrapolating from this, influential inter-war airpower theorists suggested powerful and recurrent bombing would psychologically paralyze an adversary causing rapid collapse. However, such recurrent bombing is well expected. For example, in the Luftwaffe's "Blitz" on

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[35] Prediction error is central to how humans understand, learn, and decide about the world. See Wright (2014) for a further discussion from which the description here draws.

London, recurrent bombing exerted far greater destructive power but had far less psychological impact than forecast. Third, an event is expected but doesn't occur, so this absence itself leads to large prediction error. For example, in the Vietnam War, US campaigns bombed regularly and used pauses as a conciliatory signal.

	Event not expected	Event expected
Event occurs	a) Associated with prediction error	b) No prediction error
Event not occur	(trivial case)	c) Associated with prediction error

Figure 5: Illustrating Prediction Errors (Prediction Error = Actual Event - Expected Event)

The nature of events can also be more or less unexpected, so that the prediction error associated with the event can increase or decrease its impact. For instance, ISIL continually keeps the nature of its executions novel so that they remain salient—using beheadings, televising those beheadings on-screen (they had been off-screen), multiple beheadings, putting people to death by immolation and by using explosive charges/bazookas (e.g. Winter, 2015).

Additional cases below relate to the Second Intifada, and the Iraqi use of scud missiles in 1991.

(II) The Size of Terrorism's Psychological Impacts: Distance

Perceived distance from terrorist acts also affects the size of their impact. Following the 9/11 attack in New York City (NYC), 10% of adults who lived south of 110th street in Manhattan presented symptoms consistent with post-traumatic stress disorder (PTSD), while 20% of those who lived only a few blocks away from the Twin Tower assault (e.g., south of Canal Street) presented symptoms. PTSD incidence was 11% in NYC, compared to rest of the United States at 4%. In NYC, this incidence declined to 9.5% after one month, 1.7% after four months and 0.6% after six months (Galea et al., 2002, 2003).

(III) Content of Terrorism's Emotional Impacts

This prompts the question of "*what emotional reactions are exhibited by target audiences?*" One observes multiple reactions,[36] of which five key symptoms are:

1. *Fear:* This is often the prime objective of terrorism. Indeed, in reviewing definitions of terrorism, scholar Bruce Hoffman defines terrorism "as the deliberate creation and exploitation of fear through violence or the threat of violence in the pursuit of political change."[37] Fear is commonly reported; for example, among New Yorkers after the 9/11 attacks, anxiety/fear was the second most frequently cited reaction (after sadness)

[36] See Brandon and Silke, 2007 for an excellent discussion and further illustrations of the emotional impacts described here.
[37] Hoffman, 2006, p. 40

reported by callers to the free counseling services (reported by over 12,000 individuals from October 2001 through March 2002) (Felton, 2002). This is also reflected in high rates of acute stress disorder (ASD) and PTSD, as discussed above.

2. *Sadness, anger, disbelief:* The most frequently reported emotional responses among Americans after the 9/11 attacks were anger, sadness, and disbelief (NBC/WSJ poll, 2001). Sadness was the most frequent reaction among New Yorkers, followed by anxiety and fear (Felton, 2002).
3. *Social emotions:* Cognitive desire(s) and behavioral attempts toward seeking others is common. Almost 100% of individuals surveyed after the 9/11 attacks said that they talked with others about the attacks. 75% of Americans reported having checked on the safety of close family members, making checking on and seeking others the most common coping strategies (Schuster et al., 2001).
4. *Cooperation and strengthening of the in-group against the common enemy:* Even relatively unpopular French President Hollande doubled his poll popularity from 21% to 40% after the Charlie Hebdo attack, although in the subsequent Bataclan attack there was less of a poll increase (as might be anticipated given habituation to a large terrorist attack) (Guardian, 2015).
5. *Compensatory responses lead to resilience and even thriving:* During the German Blitz on London, there was no significant increase in reported "neurotic disturbances" (Jones et al., 2004, 2006). After two years of the Second Intifada, the majority of telephone respondents reported being optimistic—both personally and in their attitude and regard toward Israel (Bleich et al., 2003).

(IV) Cases

The cases below relate to the Second Intifada and the Iraqi use of scud missiles in 1991.

Prediction Error: Israel and the Second Intifada (2000-2004)

A prediction error framework helps explain the psychological impact of events during the Second Intifada. This was an intensive period of indiscriminate suicide bombings, shootings, and Katusha rocket attacks from late 2000 to 2004. It started following breakdown of July 2000 Barak-Arafat peace talks, and Ariel Sharon's visit to Temple Mount/Noble Sanctuary on 28 September 2000.

There were severe psychological impacts. In many ways the effects were more psychological than physical. For example, in Hadassah University Hospital, which treated more terror-related victims than any other hospital in Israel, 60% of admissions were psychological during the first 24 hours following the first round of attacks (Shalev, 2005). Further, there was a greater number of patients presenting with acute stress responses than with physical injuries (i.e., with a ratio of approximately 10:1) (Kutz and Bleich, 2005).

Prediction errors also forecast the evolution of the psychological impact. The Second Intifada started unexpectedly, with 42 civilian deaths averaging annually from the end of the First Intifada in 1993-2000, which subsequently increased to 190 deaths annually from October 2000 through February 2004. The Second Intifada from 2000 was very different in nature and extent from the First Intifada (1987-93). In this instance, 60% of deaths were from suicide bombings and 30% were from shootings (Shalev, 2005), and attack patterns changed from sporadic and selective targets in occupied territories to more random and extensive attacks in the heart of Israel. Suicide bombings also tended to cause a larger number of casualties.

However, the population then accommodated in four ways. First, there were changes in behaviors and attitudes. In the initial stage of Intifada the public avoided public places, then they adapted and returned to normal life as best possible.[38] Second, large-scale public events, such as Independence Day celebrations, were cancelled during the early period and re-instated later. Coping behaviors, such as checking on and seeking others, helped to reduce uncertainty (and thus prediction error). Third, the prior experience of terrorism may have helped to lessen overall negative impact and effect(s). US and Israeli medical students in Israel in March 2003 reported no differences in their perceived sense of safety, although the American students indicated a higher level of fear and reported having altered activities to a greater extent in response to threats of attacks (Kovatz et al., 2006). Fourth, adaptation was so pronounced that Ariel Sharon's anti-terrorist advisor warned in April 2004 that Israelis were "too complacent" and that their alertness "dwindled a bit" (O'Sullivan, 2004).

The key points to be taken from these findings are that the initially unexpected nature of the actions led to increased prediction error and so increased their psychological impact, while effects later lessened as attack(s) became less unexpected.

Scud Missiles and the 1991 Gulf War

During the first Gulf War, the Iraqi military fired 39 scud missiles against Israel from January-February 1991, and the Iraqi government leveraged threats of limited chemical and/or biological warfare. On 2 August 1990, Iraq invaded Kuwait. At two in the morning on 17 January 1991, the day after the UN deadline for Iraqi withdrawal, Iraq launched the first of 39 ballistic missiles to be fired in 18 attacks on Israel: an average of one firing every 2.5 days. 26 missiles fell in the Tel Aviv area and six landed in Haifa. Of the attacks, two-thirds involved a single missile, and the highest number of missiles launched in a single attack was eight.

Again, the psychological effects incurred were revealed to be greater than the physical effects: approximately four times as many people died from indirect (e.g., heart attacks) than direct (i.e., blast-induced) effects, and two-thirds of these indirect casualties were due to acute

[38] Betya Ludman reported in (Sheppard, 2008)

psychological causes. Of 1059 war-related hospital emergency room admissions, only 234 were from direct injuries caused by missile strikes (of which two died), while of the 825 indirect casualties, 11 died (from heart attacks, or suffocation as a result of incorrect gas mask use), and 554 were admitted for acute psychological distress (Sheppard, 2008).

Here we see the evolution of the psychological impact. As the observer Uzi Rubin noted, the first attacks "...shocked Israel's government and its military High Command to its core." The psychological effects were initially high and then decreased over time, which was evidenced in four ways. First, cardiovascular deaths increased markedly during the first few days (e.g., 147 on day one, from an average of 92). Second, habituation by the second week of attacks was evidenced by decreased use of hotlines and diminished report/use of self-injection(s) of atropine to counter effects of anticipated bio-chemical weapon attack. Third, from the first to the fifth day of the missile campaign, the total number of patients admitted to hospitals with stress responses and atropine poisoning declined from 93% to 21%. Fourth, work examining the psychological reactions of people displaced after an attack showed progression of four temporal stages, the last of which was acceptance (Sheppard, 2008).

As the nature of the attacks became more predictable, the associated prediction error decreased. Israelis became more accustomed to threat, and the accompanying fear of threat diminished. This was augmented by a greater predictability of when (after dark) and where (metropolitan areas) attack(s) might occur, and the nature and extent of the damage an attack could incur (e.g., conventional versus non-conventional/bio-chemical). Given that all attacks occurred at night (i.e., more predictable timing) and all missiles were conventionally armed (i.e., more predictable nature and extent of damage and injury), the Israeli government divided the country into high risk and low risk zones, and issued "missile forecasts."

(V) Concluding Comments

Biological responses relate with psychological factors, which in turn relate to perceived threats in the social environment. An improved understanding of the relationships between biological, psychological, and socio-environmental factors will help inform and develop tactics and strategies to influence thought, action, resilience, and reactivity—with applications across a range of national security operations.

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Fear And Anger Elicited By Terrorist Attack: The Power Of Jujitsu Politics: Drs. Clark McCauley[39] and Sophia Moskalenko, Bryn Mawr College

Abstract

We argue that (1) terrorists' targets are subject to emotions that affect their political choices, (2) terrorists' targets experience more anger than fear, (3) both fear and anger in reaction to terrorist attack produce over-reactions that serve the terrorists (*jujitsu politics*), and (4) defining terrorism as an attempt to coerce by fear blinds us to the power of anger in determining reaction to terrorism.

Fear and Anger Elicited by Terrorist Attack: The Power of Jujitsu Politics

Recent years have seen increased attention to the role of emotions in radicalization to terrorism and in terrorists' choice of targets. This trend challenges the rational-choice perspective that dominates current social science, as many analysts have recognized that self-sacrificing behavior of terrorists can no more be explained as a means-ends calculation than the self-sacrificing behavior of soldiers and police officers. Emotion can move individuals to self-sacrifice when calculation does not (McCauley & Moskalenko, 2011).

In this chapter, we expand consideration of the power of emotion in intergroup conflict to consider emotions experienced by the targets of terrorist attack. We pose the question: *What emotions do they feel and what are the security implications of these emotions?*

What are Emotions?

As noted elsewhere in this report (see chapters by: Giordano, DiEuliis, and Casebeer; Spitaletta; Ligon), emotions are understood in psychology as reactions to situational appraisals that have powerful implications for individual well-being. Different attention-grabbing situations are associated with different constellations of neuranatomic, biochemical, and behavioral events, and these constellations are what we call emotions. Thus, perceived threat of harm is associated with bodily changes and ideas preparing reactions of fight or flight; subjectively this constellation is experienced as fear. Similarly, perceived insult or injustice is associated with bodily changes and ideas preparing for retribution and revenge, and this constellation is experienced as anger.

The key point is that biology and individual experience make the association between a situational appraisal and its corresponding emotions almost automatic. We do not decide to feel fear in the presence of powerful threat, nor do we decide to feel anger in the presence of insult and injustice (although the occurrence and extent of these emotions can be modified

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through training and experience). The constellation of reactions we experience as fear or anger are pre-potent and practiced rather than chosen or judged.

What are the Emotions Experienced by Targets of Terrorist Attack?

The obvious reaction to terrorist attack is fear. After the 9/11 attacks, airports were closed; when they were re-opened, bookings were decreased by at least thirty percent. Border controls were increased. Airport security was increased. Terrorism produced fear, at least for a time. More recently, the San Bernardino, California attacks of December 2015 led some US political figures to call for banning Muslim immigrants to make Americans safer from jihadist attack. It is easy to say that terrorism terrorizes (for further discussion of this effect, see: Spitaletta, this volume).

However, a study by Back, Kufner, and Eglof (2010) indicates that anger, not fear, is the dominant reaction to terrorist attack. Using linguistic raking analysis, this study searched social media for emotional words among the millions of texts sent in the US on September 11, 2001. Results indicated that both fear-related and anger-related words were common immediately after the attacks hit the news, but anger-related words increased throughout the day and by the end of the day were six times higher than fear-related words.

In addition, experiments have found that US students responding to images of the 9/11 attacks with anger are more likely to favor aggressive reactions to terrorism, whereas reactions of fear and sadness are related to support for more defensive reactions (Wetherell et al, 2013). Across several experiments, anger reactions were related to support for attacking terrorist leaders in foreign countries, support for war against countries harboring terrorists, and out-group derogation of Arab Americans and Palestinians. In other studies, fear reactions were associated with increased support for government surveillance and restriction of civil liberties.

In short, the action tendency associated with anger is retribution; thus, anger in response to terrorist attack is associated with aggression and out-group derogation. Fear is associated with defensive strategies of surveillance and curtailed civil rights. Fear brings costly defensive tactics, but anger is the emotion sought by terrorists aiming for what has been called *jujitsu politics*.

Jujitsu Politics

Jujitsu politics is the terrorist strategy of outrageous attack designed to elicit an over-reaction that will bring new sympathy and support to the terrorist cause. This strategy was made explicit as early as 1969 in Carlos Marighella's *Minimanual of the Urban Guerilla*. As shown below, it was advanced further by Dr. Ayman al-Zawahiri in his political biography, *Knights under the Prophet's Banner* (first version published in Arabic 2001):

> The masters in Washington use these [apostate Muslim] regimes to protect their interests and to enter the dirty battle against Muslims in their place. But if the shrapnel of battle were to reach into their houses and bodies, would they not exchange charges with their clients concerning who was negligent in his role? Would they not then be presented two choices—both bitter—either they can enter battle directly with Muslims and thereby transform the battle into clear jihad against the infidels or they can begin to review their plan anew after conceding the failure of their harsh and brutal confrontation against Muslims (translation from Ryan, 2012, p. 79).

In short, al-Zawahiri counted on the presence of Western troops in Muslim countries to outrage Muslims worldwide, who would then be compelled to rise to fight Westerners, just as they previously rose to fight the Russians in Afghanistan. Al-Zawahiri miscalculated: US power in Afghanistan did not rouse jihad. In contrast to Russian violence in Afghanistan, US violence against the Taliban was controlled and restrained; collateral damage in pushing the Taliban from Afghanistan amounted to only a few thousand civilian casualties. But US power in Iraq gave al-Qaeda the rallying call for Muslims sought by al-Zawahiri. In 2016 it is collateral damage from drone strikes abroad and discrimination against Muslims in Western countries that support jujitsu politics.

The Dangers of Defining Terrorism as Intention to Terrorize

It is difficult to see the importance of anger in reacting to terrorist attacks because government definitions of terrorism usually include the idea that terrorists intend to coerce a government or its citizens by fear. The US Department of Defense defines terrorism as “the unlawful use of violence or threat of violence to instill fear and coerce governments or societies.” Similar definitions are used by the US Federal Bureau of Investigation, US Federal Emergency Management Agency, and USA PATRIOT Act of 2001.

From a social science point of view, it is unhelpful to include a hypothesis about terrorist motivation in the very definition of the phenomenon to be explained (terrorism). Equally important, however, is that focusing on fear blinds us to the escalations in anger that can produce the kind of over-reactions and collateral damage that terrorists seek to evoke.

If we focus on the idea that terrorists seek to terrorize, then we are led to think that fighting back must entail explicit, strong demonstrations that we are not paralyzed by fear or coerced into change of policies. If terrorists seek to paralyze us with fear, then we have done our best when we return the attack with interest, no matter the collateral damage. But if terrorists seek to elicit anger, to achieve over-reactions that will strengthen their cause, then we must fight back by showing control and avoiding collateral damage. Simply put, if terrorists are playing jujitsu politics, then we must play the politics of restraint.

This is not a novel insight. The US Army/Marine Corps Counterinsurgency Field Manual (2006) gives close attention to the insurgent strategy that aims to mobilize new support by eliciting over-reactions to insurgent attacks. Unfortunately, this insight has not always permeated counter-terrorism policies, and is almost unknown among political leaders and the citizens they represent. Without public understanding of the power of jujitsu politics, terrorists will continue to profit by exploiting over-reactions powered by anger.

In sum, our argument entails four points:

- Targets of terrorist attack experience anger as well as fear.
- Anger leads to aggressive over-reaction that strengthens support for terrorists.
- Definitions of terrorism that focus on fear blind us to the power of anger and the dangers of jujitsu politics.
- Political resilience to terrorist attack requires public understanding that we have more to fear than fear itself: anger-mongering can be more dangerous than fear-mongering.

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Social Perspectives On Behavior

Security Trends And Their Consequences: Dr. Paul Rogers, Bradford University, and Dr. Dana P. Eyre, SoSA Corp

On taking office in 1993, the Director of the Central Intelligence Agency, James Woolsey, characterized the changed post-Cold War environment, noting in testimony to the Senate Intelligence Committee that "Yes, we have slain a large dragon…But we live now in a jungle filled with a bewildering variety of poisonous snakes." Over the rest of the decade the US military sought to adapt to this changed environment. This change effort, undertaken by both Democratic and Republican administrations, culminated in Secretary of Defense Donald Rumsfeld's emphasis on a "Revolution in Military Affairs"—a scaling down of nuclear forces, anti-submarine warfare, and heavy armor, while developing intelligence, surveillance and reconnaissance capacity; advanced command and control; amphibious strike; stand-off aerial systems; and special operations forces. The aim was a transformation in war-fighting strategy, through which technical superiority and information "dominance" would enable rapid, decisive military action to deal with national security challenges.

The visceral shock of the terrorist attacks of 9/11 saw this put into practice. First in Afghanistan, where precision strike special forces and a local militia drawn from the northern warlords ousted the Taliban in a matter of weeks. Then President George W. Bush's 2002 State of the Union address extended the "war on terror" to confront an "axis of evil," with Iraq the first to experience 21 days of "shock and awe" combat operations. These operations enabled the US to rapidly reach Baghdad with an invasion force of only about 160,000 troops, in the face of an Iraqi force that was, at least on paper, twice its size and operating with "home field advantage."

The revolution in military affairs seemed to have worked on 1 May 2003 when President Bush made his "mission accomplished" speech, and promised a remaking of the Middle East. But this was to be the high point of what have proved to be very difficult wars that are now moving into their third decade and have involved tens of thousands of deployed troops to date in what can be described as definitely an "old school" approach to warfare. In these engagements, the United States has had over 6,000 military personnel killed and approximately 30,000 seriously injured. Overall, well over a quarter of a million people have died, mostly non-combatants, and over half a million have been injured; there have been well over eight million people displaced, at least half of them across borders, and there are now failed and/or failing states in Afghanistan, Iraq, and Libya, with the Syria/Iraq war potentially to be joined by Libya. Al-Qaida has survived; it has spawned ISIL with offshoots in Libya and Yemen and has fostered links with groups across the Sahel and southern Asia. As well, ISIL has, in the past year, begun to promote attacks overseas, most notable being the assault in Paris. Some senior military leaders on both

sides of the Atlantic concede that the wars are not being won and that a sustained, potentially generation-long, war seems possible.

On its own this is deeply problematic, but the challenge is even more difficult when other, much wider and longer-term trends shaping the evolving global situation, are recognized. Although the so-called "war on terror" catalyzed these changes—and fostered reflection on them—these larger, continuing trends predate the attacks of 9/11, and are profoundly changing the Western security environment. While insights to conflict dynamics can usefully be gathered at the individual and small group levels (i.e., the neurobio-psychological and socio-psychological levels reviewed elsewhere in this volume), the realities of broader scale global political, economic, and social trends, and their impact on conflict must also be recognized. Globalization matters, not just for economics, but for anticipating security threats as well.

Over forty years ago, the geographer Edwin Brooks warned of the need to avoid a dystopic future of "a crowded, glowering planet of massive inequalities of wealth buttressed by stark force yet endlessly threatened by desperate people in the global ghettoes." This grim view is not inevitable, yet the trends likely to shape such a problematic future are present. Three trends, in particular, must be central to any effort to anticipate the evolution of security challenges:

- First, the current global economic system has produced variable growth (both in time and in distribution of wealth) while significantly failing to ensure sufficient equity and emancipation. Although global economic development has raised millions from the depths of poverty in China and India, over a billion people still remain in severe poverty. Seventy-two million people—one percent of the global population—now hold wealth equivalent to that of the other ninety-nine per cent, and the rate of economic differentiation has accelerated since the 2007-2008 financial crisis. A trans-national elite has evolved that is unparalleled in history, while the middle class has been challenged within the West, declining on both sides of the Atlantic. These inequalities have been particularly problematic in the Middle East, where economic growth, "always volatile, slowed considerably after 2011 due to political instability, the escalation of violence and civil wars, and, more recently, lower oil prices."[40]
- Second, while greatly improved levels of global education are welcome, and global communications interconnection brings great benefits, they have also greatly increased the global awareness of proliferate marginalization—a core factor that has fueled the Arab Spring and now aids the extension of al-Qaida/ISIL into new territories. Thus, while wealth has been increased to unprecedented levels in the modern era, its translation

[40] http://menaviz.worldbank.org/new_social_contract/index.html#1

into improved quality of life has been irregular, at best, and education and modern communications have highlighted the reality of such inequity.

- Third, these changes, along with the social and economic disruptions and pressures caused by industrial and technological revolutions (that are making many industries throughout the world obsolete), social disruptions induced by global cultural flows, and the pressures evoked by youth bulges in many parts of the world, have combined to produce a revolution of frustrated expectations that will be worsened by the rapidly evolving impact of global climate disruption. As the environmental carrying capacity of croplands declines it is to be expected that considerable social and political instability will occur. Climate disruption is currently the most severe example of an unsustainable anthropogenic impact on global ecosystem homeostasis.

In an economically divided and environmentally limited world, with a marginalized but informed (and connected) majority, these trends will result in radical movements of opposition, some of which will embrace the violent overthrow of what is perceived as an unjust socio-political order. The current range of violent Islamist-orientated movements may seem to be the dominant security problem, but that is a faulty, and potentially dangerous analysis.

The so-called "Islamist" groups are certainly very significant with their eschatological foundation making them particularly difficult to counter. But extreme movements may embrace quite different identities inclusive of various religious, ethnic, nationalistic, or political outlooks that can manifest singularly or in combination. Thus, we face not a "clash of civilizations" but a potential "age of insurgencies," with other recent or current models being Sendero Luminoso and the Naxalites. Indeed, neo-Maoism may also become far more significant within a decade of two.

The current and on-going changes seen in the world are, perhaps ironically, similar to those changes seen in the transitions of the trans-Atlantic economies during the age of "nationalization" at the end of the 19th century. During that era, local economies and social structures were disrupted by innovations in transportation (e.g., railroads, trans-oceanic ship travel), industrialization, corporatization, and large-scale social change (e.g., internal and external migration), with resulting substantial, and not insignificantly violent, political turmoil. "Radicalization" was a phenomena of this era as much as our contemporary era; the context of disruptive social change, vast economic inequality, and increasing density of communications produced a range of violent social change efforts. The concept of "propaganda of the deed" (so central to our daily experience today) was originally articulated by Mikhail Bakunin in 1870 during this period of great turmoil in Europe.

The 19th century offers reflective insights to the challenges of security and social order in an era of globalization and disruption. The same changes are now occurring on a global scale, and are

generating similar—albeit more widely spread—disruptions. But they occur today in a different environment, with means of mayhem, mass violence, and mass communication being more readily available. What is required is a sophisticated and fully independent analysis of both the problems likely to be faced, and how such problems might be managed, mitigated, and, most importantly, avoided.

Militaries have played a role in addressing the disruptions of nationalization; the US Army, for example, was seen as "the forces of order in a disordered era" (in the words of the official US Army history of the era).[41] However, such efforts took place within the context of extant, functional, governments. The violent disruptions that occurred in the United States and Europe during the era of nationalization were ultimately not addressed by militaries, but rather by social and political change.

Today, at the global level, military doctrines emphasize the role of military force in maintaining security. The "revolution in military affairs" promised rapid, decisive wars. It delivered these wars, but in the face of complex social change dynamics, the "revolution in military affairs" did not deliver security. The lessons of the past decade suggest that "liddism"—trying to keep the lid on insecurity without addressing the root dynamics of conflict—are not merely unsustainable, but may actually be self-defeating.

The current military "control paradigm," and the associated institutional infrastructures of defense departments and ministries, armies, and armament industries, emphasize the maintenance of stability, if necessary by force, rather than the production of a just social order and conflict prevention through addressing embedded future drivers of conflict. But the type(s) and extent of problems that are currently being faced, experience suggests, cannot be contained by force alone. Threats can and must be anticipated if violence is to be prevented. Understanding the social context(s) of threat is at least as important as efforts to understand psychological dynamics. Change in this direction is now on-going, with militaries around the world grappling with their roles in "stability operations," "wide area security," and "gray zones." Some of the work now being undertaken in a handful of centers, on ideas such as sustainable security or "human security," gives some hope of new thinking. What has been described in this volume as the neurobio-psychosocial approach may help. Currently, such approaches are being developed and applied to analyzing and countering mindsets and activities of movements such as ISIS. It may also be useful to apply this bio-psychosocial approach to the Western security community in order to understand how it might more easily and optimally meet these substantial future challenges.

[41] Laurie, Clayton, and Ronald H. Cole. 1997. The Role Of Federal Military Forces In Domestic Disorders, 1877–1945. Army Historical Series CMH Pub 30-15, Washington, DC.

To be sure, understanding, and change, is vitally necessary. It hardly bears saying that the last decade has turned out to be very different than was promised by visions of a “revolution in military affairs.” The lessons of current conflicts suggest that tinkering at the margins is not sufficient. James Woolsey’s remarks proved prescient—“the dragon” was indeed “easier to keep track of” than a complex “jungle filled with a bewildering variety of poisonous snakes.” We must understand conflict, not just at the neurological and psychological levels, but as a socio-political and economic phenomena on the global scale. And we must not only understand “why men fight,” but how people build just social orders, and how we can best bring sustainable peace out of violent conflict.

Emotions And Behavior: Running Hot And Cold, Morally Speaking, And Impacts on Influence Activity to Counter Daesh: Dr. William D. Casebeer[42] (USAF, Ret), Lockheed Martin Corporation

Overview

Radicalization often involves a moral component: what it means to be radicalized in part is to believe that it is permissible to do things to out-group members—such as harm or kill them indiscriminately—that you otherwise would not be willing to do to in-group members. *Daesh* believes it is permissible to indiscriminately kill non-Muslims for political purposes, which is what makes them a terrorist organization. Examining the neural basis of moral cognition can shed light on why it is that emotional reactions to narratives and stories are an important factor to consider when designing an information campaign to reduce the amount of people vulnerable to malignant messaging being used by terrorist groups to generate permissive operating environments.

Research in morality and the moral emotions: (1) mainly focuses on three inter-related categories: the moral emotions, moral social cognition, and abstract moral reasoning. (2) Research varies in terms of whether it deploys *ecologically valid* or *experimentally simplified* conceptions of moral cognition. The more ecologically valid the experimental regime, the broader the brain areas involved. (3) Much of the research depends on simplifying assumptions about the domain of moral reasoning that are motivated by the need to make experimental progress. This is a valuable beginning, but as more is understood about the neural mechanisms of decision-making, more realistic conceptions will need to replace the simplified conceptions. (4) The neural correlates of real-life moral cognition are unlikely to consist in anything remotely like a “moral module” or a "morality center." Moral representations, deliberations, and decisions are probably highly distributed and not confined to any *particular* brain sub-system.

Discovering the basic neural principles governing planning, judgment, and decision-making will require vastly more basic research in neuroscience, but correlating activity in certain brain regions with well-defined psychological conditions helps guide neural level research. Progress on social phenomena will also require theoretical innovation in understanding the brain’s distinctly *biological* form of computation that is anchored by emotions, needs, drives, and the instinct for survival. This highlights the need for influence operations that take seriously the primacy of emotions in governing reactions to messaging activity and in considering the social context in which the emotions are activated.

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Introduction

The neurobiology of moral cognition remains a hot topic. After preliminary definitions and some brief discussion of moral theories and their implicit assumptions about the nature of the psychology of morality, we canvass the empirical work targeting the moral emotions, moral social cognition, and abstract moral reasoning, before reaching general conclusions about the form and nature of the neural mechanisms of moral cognition and tracing out entailments for messaging activity in counter-radicalization.

Defining Moral Cognition

What is moral cognition? What is a moral judgment? In any inquiry, delimiting the domain is critical (for example, if you are interested in studying the neural correlates of *face recognition*, you need to have a working conception of just what constitutes a *face*). In the moral realm, this problem is magnified many times over, as there is disagreement even among professional ethicists regarding what we should properly call a moral judgment or an act of moral cognition. We need to cast our net widely enough such that we don't eliminate what are in fact aspects of moral reasoning, but narrowly enough such that we identify a bona fide and manageable area of study.

Two items to note: first, on any theory of what morality consists in, moral reasoning will involve a series of cognitive acts that issue in a conclusion (either implicit or explicit) about what one *ought* to *do* or *think*. As moral philosophers would put it, moral reasoning is probably a species of practical reasoning—reasoning about what we should do or think now, such as whether to negotiate with terrorists, not necessarily about what others have done nor about strictly empirical matters, such as whether there is water on Mars. Moral cognition thus deals with cognition about *norms* rather than cognition about *facts*. Nevertheless, since good reasoning about norms is knowledge-dependent, the difference is one of degree rather than kind. Broadly speaking, then, moral reasoning deals with *cognitive acts and judgments associated with norms, or with facts as they relate to norms*. Note that the term "judgment" here should not be used in a linguistically chauvinistic manner. Social animals such as wolves and baboons do show understanding of conspecific norms, as well as of the groups' local conventions, pecking order, division of labor, and even who has what kind of knowledge (Brothers, 1997).

Second, how widely you cast your moral cognitive net varies according to your background substantive theory of morality, in much the same way that your face recognition net's width would vary according to your background theory about faces. This may seem to present us with a vicious circularity: we need to have a normative theory of morality in place before we can identify the neural correlates of moral cognition; but on the other hand, one advantage of identifying the neural correlates of cognition is that it may allow us to eliminate certain moral theories as being psychologically and neurobiologically unrealistic. However, this circularity

(appearances to the contrary) is *not* a vicious one: theories and their domains *co-evolve*, informing one another, in many areas of the sciences. To continue with our face recognition example, experiments accomplished by Fantz in 1961 demonstrated that babies as young as two months have a preference to attend to faces.[43]

Work by Johnson and Morton in 1991 showed that newborns even attend preferentially to just a triangular arrangement of three blobs. Studies such as these used objects with face-like features to *simulate* faces; some critics argued that these were not enough like *actual faces* to justify the contention that these babies have a preference for faces as such. Further research has used stimuli that are more like traditional faces (although puppets used while studying newborns still sometimes have only a "family resemblance" relation to actual adult physiognomies), but researchers have reduced the demands they make upon face stimuli as they have recognized the value of being able to explore face recognition capacities using alternate stimuli regimens.

This give-and-take process between theory and domain may result in a domain that is "fuzzy" rather than sharply delineated. For example, if someone were to identify the neural correlates of musical cognition, we might expect different brain resources to be recruited depending upon whether the music is emotionally resonant, or depending upon whether the subjects listen to Ludwig Beethoven's "Fifth Symphony" or John Cage's "Four Minutes Thirty-Three Seconds" of silence. This does not mean, though, that the domain of musical cognition is not worthy of study nor that it is "unscientific," especially if at least some reliably recruited subsystems are involved. Categories that are *strikingly* ad hoc (for example, the neural correlates of basketball playing), may best be analyzed by breaking them down into their constituent "natural-cognitive-kind" components, of course; and it may very well turn out that empirical investigation of any domain might actually *eliminate* that domain as a contender for the identification of uniquely involved brain regions. In the case of moral cognition, the empirical work has illuminated some reliably involved brain systems, but as we will argue later, it is highly unlikely, given the data, that we shall find anything like a well-defined "moral reasoning module" in the mind/brain.

Our initial take on the domain of moral cognition, then, can and should be informed by a background moral theory (in our case, a neo-Aristotelian virtue theory, according to which moral concerns relate to what we have to *think* and *do* so as to *function well* as human beings). Related pragmatic considerations are useful too: what do professionals say about the moral domain and what are the points of contention? What has the extant research considered the proper domain of moral cognition? What do intermediate and high level theories (such as

[43] See his (1961) "A method for studying depth perception in infants under six months of age," or his (1965) "Visual perception from birth as shown by pattern selectivity."

"pure" moral psychology) have to say about the domain? In the review that follows, we use all these factors to identify the literature to summarize.

A Brief Tour of Major Moral Theories and Their Associated Psychologies

It will be useful to keep in mind the three major extant normative moral theories and the assumptions they make about human psychology. The first theory is the venerable and ancient virtue theory. First articulated by Plato and Aristotle over 2,000 years ago, it maintains that moral questions are questions regarding what kind of people we must be so as to function as best we can, identifying certain character traits that are necessary for us to function properly. Moral judgments are judgments about what traits we must cultivate so as to live maximally functional lives.

Moral cognition (in its broadest sense) involves a far-reaching understanding that relates to our well-being (in the broadest sense). The emphasis in this theory is on "knowing how" to be virtuous, not merely on "knowing that" a certain act would be praiseworthy. It focuses as much on skill, habit, and praxis as on theory and abstraction. Virtue theorists pay close attention to the role of the emotions in ethical affairs, assigning it an important role in moral education and the moral life. Virtue theory is generally thought to have the richest moral psychology of the major moral theories, as reason, appetite, emotion, and affect all play vital roles in the mental life of an effective moral agent.

Utilitarianism, Jeremy Bentham and John Stuart Mill's seventeenth and eighteenth century ethical theory, has as its guiding principle the idea that states of pleasure and pain (in a rich, sophisticated sense, not just in a "pig-like" sense) are the obvious "goods" and "bads" in the universe. We are obliged, then, to take those actions or follow those rules that, if taken or followed, would produce the greatest amount of happiness for the greatest number of sentient beings (where sentience is an indicator of your ability to experience pleasure and pain). A utilitarian's moral psychology would also be fairly rich; a good utilitarian reasoner would be especially effective at forecasting the consequences of actions and at identifying particular actions that would be conducive to the greatest happiness for the greatest number, and would be motivated to take such actions.

The third major moral theory is deontology, from the Greek *deon* for "duty" (literally: the study of our duties). This theory identifies morality with doing one's duty, and in its most famous version (articulated by Prussian philosopher Immanuel Kant in the eighteenth century), we use the dictates of pure reason to discover what duties we owe to other free and reasonable creatures. The principal test we use to discover our duty is the Categorical Imperative, which tells us (in two of its several formulations) that we should act only on those maxims that we can will to become a *universal law*, and that we ought not to treat others *merely as means* but always also as ends worthy of respect. Morality consists in doing your duty for the sake of duty

alone, and not because it will gratify your nerve endings or because your emotions move you to take action. What kind of cognitive faculties are posited by the Kantian system? The ability to reason "purely," for one. Exactly what this capacity consists in is difficult to determine.

At the very least, however, it involves formulating language-like maxims that are then checked for consistency. If emotion or affect tags or marks the maxims and the associated logical processing that is accomplished over them, then the reason is not pure—either we will fail to respect reason as such owing to bad advice from our limbic system, or our maxim will become tainted with the inappropriate motivation even if we 'do the right thing' (remember, we should respect reason—do our duty—for duty's sake alone).

Note that all three of these moral theories provide us the ammunition we need to address what is wrong about the terrorism—to understand why groups like Daesh are morally objectionable. On a utilitarian theory, sanctioning the killing of innocent people for political purposes is likely to generate unhappiness on the whole; indeed, terrorism serves as a strategy and tactic just because it terrorizes. On a deontic theory, we disrespect people when we treat them with no regard for their past behavior; the innocent—those who have not violated someone else's rights—do not deserve to be punished. To kill them for political purposes is to treat the merely as a means to your political end. Finally, virtue theory would note that raising people who believe it is permissible to harm others for no good reason is likely to result in the development of traits that are not conducive to living a flourishing human life—our moral exemplars are not terrorists.

To a first approximation, neuroscientific results suggest that the moral psychology of humans and other social animals such as chimpanzees, baboons, ravens, and wolves, are more consilient with the assumptions of virtue theory than with other theories. To justify this hypothesis, we draw on a selected sample of results that reveal strong links between emotion, social cognition, explicit learning (declarative memory), and implicit learning (skills, habits, conditioning, priming). In addition, we suggest that considerations from evolutionary biology, developmental psychology, and developmental neuroscience also favor this hypothesis.

Research on the Neurobiology of the Moral Emotions in Moral Reasoning

1. A Famous Accidental Experiment: Phineas Gage

One of the earliest and most famous "experiments" involves the accidental injury of railway foreman Phineas Gage late last century. On September 13, 1848, an accident sent a dynamite tamping iron through (among other structures) Gage's prefrontal cortex in both hemispheres (see Figure 6 below). It is reasonable to infer that the ventral and medial areas of Gage's prefrontal lobes were all but destroyed. Following the accident, Gage was a changed man; he

became unreliable at work and eventually became a homeless drifter and alcoholic.[44] His motor control and sensory perception, however, were normal, so far as the evidence shows. While it is difficult to know exactly what parts of Gage's brain were damaged, we do know that his social behavior changed dramatically following the accident. Later research revealed this was most likely due to bilateral damage to his prefrontal cortex caused by the passage of the rod. The Gage case is important because it provoked study on the role of the frontal structures in temperament and self-control and suggested a link between reasoning and the emotions.[45]

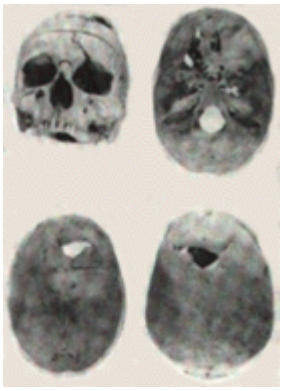

Figure 6: Gage's Skull. Courtesy of Science (May 20, 1994, p. 1102)

2. Prefrontal Cortex (PFC)

In mammals and reptiles, the brain's regulatory core is situated in the brainstem/limbic axis (see Figure 7 below). Basic regulatory functions that depend on brainstem circuitry include breathing, blood pressure, arousal, thermoregulation, shifts in behavioral state from wakeness to sleep to dreaming, integration of signals from the all-pervasive interoceptive system that carries signals about a host of features of the inner body, and coordination of inner drives (for food, sex, oxygen, etc.) with perceptions (e.g., flee now—do not feed). The emotions associated with anoxia, hunger, thirst, sexual desire, and fear of being killed are very powerful. The evolution of larger brains capable of adaptive social behavior involved an expansion of frontal cortex, with preservation of the regulatory platform in the brainstem/limbic axis and its innervation of frontal structures. The cortical expansion permitted more sophisticated predictive capacities that relied upon more complex motor planning and decision-making, more

[44] Here is an online resource for more information about Gage: http://www.deakin.edu.au/hbs/GAGEPAGE/.

[45] Gage even has two books about him: Malcolm Macmillan's An Odd Kind of Fame: Stories of Phineas Gage (2000), and John Fleischman's children's book (!) Phineas Gage: A Gruesome but True Story About Brain Science (2002).

complex attentional operations, and more complex relationships between the range of emotions, drives, and behavior.

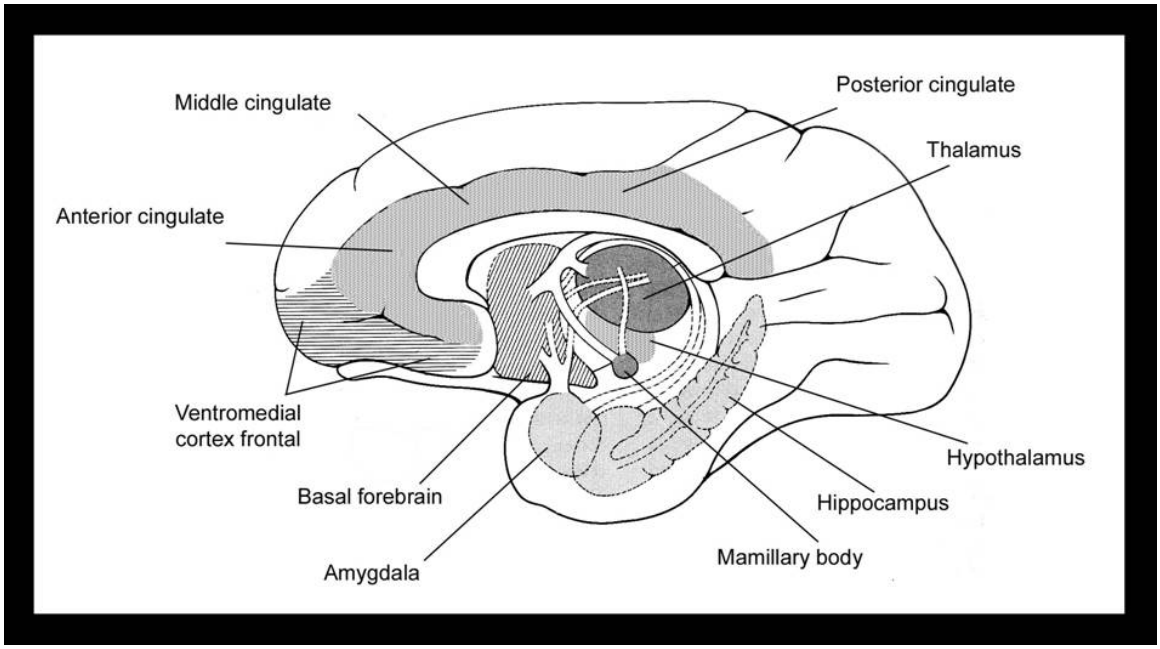

Figure 7: Diagrammatic Representation of Principal Limbic Structures

Humans share most of their genes with other vertebrates, and the brain is organized in essentially the same way in all mammals. Although it is not impossible that moral behavior as seen in humans is produced by a totally new brain structure, such novelty looks improbable given what is known about brain organization and development. On the contrary, moral behavior in humans appears closely linked to social behavior in other species, and differs mainly in level of sophistication, some of which is undoubtedly language-dependent. From an evolutionary perspective, the survival of the animal depends on its maintaining its inner milieu within a very narrow range of values. Consequently, however fancy the capacities for predicting, deferring gratification, and recognizing and behaving in accordance with social rank and order, the framework holding it all together is the emotion/drive/body-preserving circuitry in the brainstem/limbic axis.

The prefrontal cortex (PFC) is defined at that part of frontal cortex that lies anterior and medial to the motor and premotor cortex (see Figure 8 below). In primates, the territory is vast, and is far less well understood both anatomically and physiologically than the sensory systems in the more posterior regions of the brain. Experimentally, prefrontal cortex has been much more difficult to explore than sensory systems, largely because its neurons are many synapses distant

both from the receptor surfaces and from the motoneuron-muscle interface. Given PFC input from brainstem and subcortical structures, it is not surprising that the specific neuronal response patterns, even when found, may be difficult to interpret.

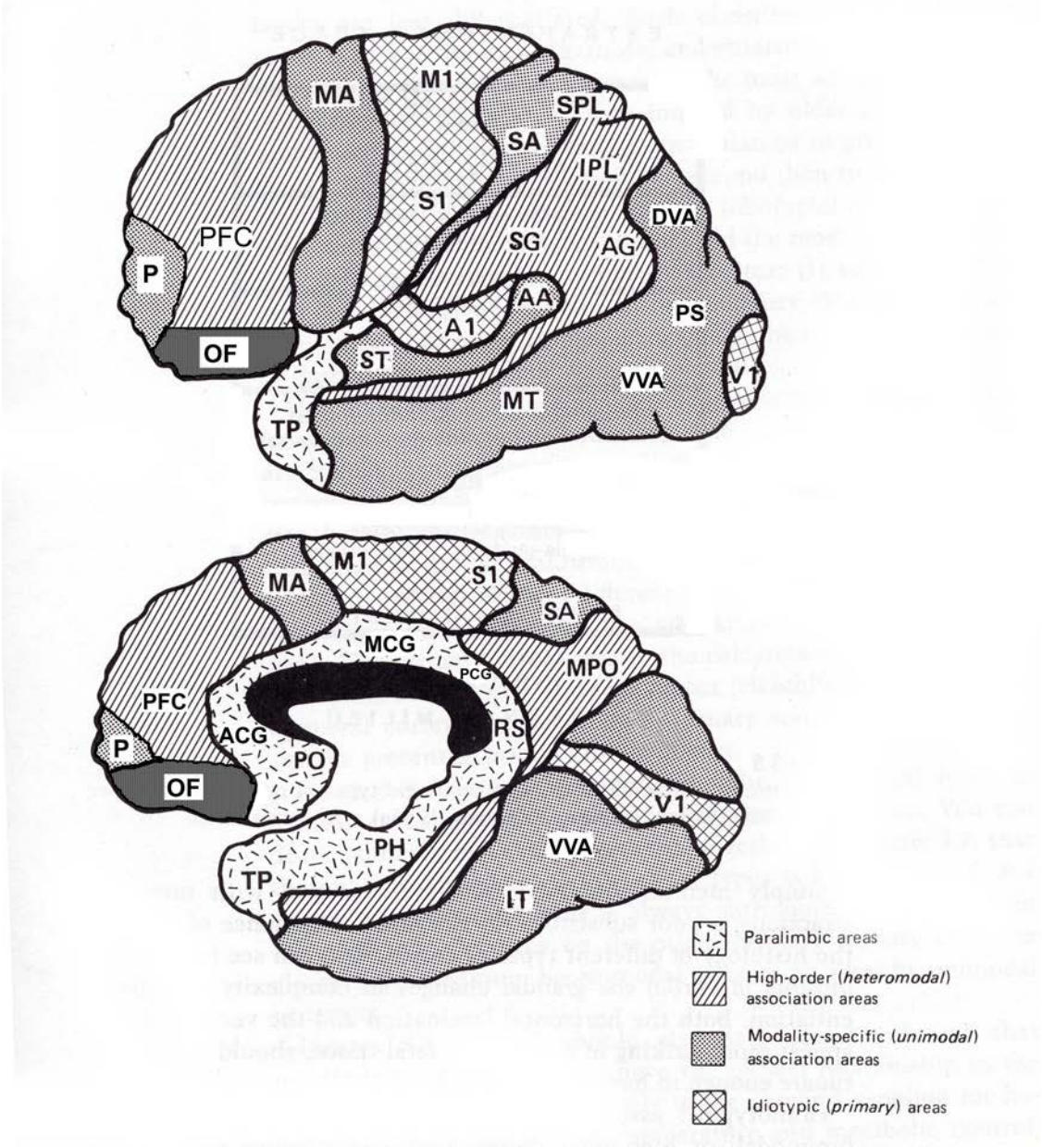

Figure 8: A schematic characterization of cortical areas in relation to distance from the sensory or motor periphery[4647]

[46] Upper: lateral aspect. Lower: medial aspect.

[47] Abbreviations: PFC: prefrontal cortex; OFC, orbital-frontal cortex; F, frontal pole; ACG, anterior cingulate cortex; MCG, middle cingulate cortex; PCG, posterior cingulate cortex; PH, parahippocampal area; M1, primary motor area; MA; supplementary motor areas; S1, primary somatosensory area; SA;

Nevertheless, some important neuron-level results have been obtained. Single neuron studies in monkeys have revealed a specific region of the dorsolateral cortex that respond preferentially during a delay period to holding specific kinds of information, such as the precise spatial location of a target (See Fuster, 1995; Goldman-Rakic, 1987). The correlative lesion and imaging studies confirm the importance of this area for holding information on-line in working memory. This is one of the first results at the neuronal level that ties a specific function (holding spatial information during a delay) to response patterns of specific neurons (those that fire only in the absence of the stimulus and that show preference for a specific position in space).

A second important set of results from prefrontal cortex concerns individual neurons that respond when either the monkey *makes* a specific movement, such as grasping with thumb and index finger, or when it sees another make precisely the same movement (Rizzolatti, Fogassi, and Gallese, 2001). The behavior of these "mirroring neuron systems" or "mirror neurons" suggests that when seeing the other make the movement, the premotor cortex generates incipient motor commands to match the movement. It is possible that these signals can be detected as intentions, albeit off-line intentions, which are used to interpret what is seen (e.g., "he intends to share food"). Related results now show other neuron populations tuned to both executing a specific action and *hearing* another perform that very action.

The mirror-neuron research helps begin to explain how even newborns can imitate actions such as grimacing and sticking out the tongue. It also motivates the hypothesis that *inner simulation* of other behavior is an important ingredient in development of a representational network known as a "theory of mind" (ToM). Just as brains represent the causal and categorial structure of the world (e.g., "nettles can sting"), so they represent the causal and categorial structure of conspecific behavior (e.g., "he will get angry if I refuse to groom him"). A ToM network is probably what enables us to make predictions regarding what others are intending or will feel if I do *this*. It is probably what enables a chimpanzee, for example, to know whether a high-ranking male across the table is able to see the food she is grabbing or whether the food is occluded from his view by a box and can be safely taken (Call, 2001).

Synaptogenesis and neuronal mylenation in PFC occurs significantly later in development than in sensory and motor systems. This is consistent with the behavioral data on the development of emotional and behavioral maturity in children. For example, though infants reliably imitate sticking out the tongue, adults do not. Three-year olds explain and predict what other humans do mainly by reference to desires and perceptions, but are not yet in command of the notion of

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associative somatosensory area; SPL, superior parietal lobe; IPL, inferior parietal lobe; SG, supramarginal gyrus; AG, angular gyrus; A1, primary auditory area; TP, temporal pole; ST, superior temporal gyrus; IT, inferior temporal; MT, medial temporal; MPO, medial parietal-occipital; VVA, ventral visual area; DVA, dorsal visual area, V1, primary visual cortex; PO, preoptic area; CG cingulate gyrus. Adapted from Cytowic (1996).

belief. Three-year olds can use counterfactuals about desires and can easily answer such questions as "if Billy wanted a cookie and I gave him a pencil would he be happy?" Whereas children at age four typically can correctly say that their friend will falsely *believe* that there are candies in a box, children at age three typically cannot. The emergence in children of a full-blown ToM corresponds with the ability to lie,[48] suggesting that they understand what will be falsely believed by the other person and what that person will accordingly do. To a first approximation, improvements in capacities for impulse-control, self-regulation, and ToM sophistication appear to track synaptogenesis and mylenation in PFC.

Lesion studies of humans with focal brain damage as well as experimental focal lesions on monkeys have demonstrated a relationship between prefrontal tissue and planning, decision-making, emotion, attention, memory for spatial and temporal patterns, and recognition of a mismatch between intent and execution. This is a large set of complex functions, and so far, the precise nature of the relationship between these functions and the specific nature of the contribution made by PFC remains unclear. Within the last decade, the use of imaging techniques such as functional magnetic resonance imaging (fMRI) has encouraged new probes into prefrontal function in humans and monkeys, though the spatial and temporal resolution of imaging techniques is still poor.

Since there are about a million synapses in a cubic millimeter of cortical tissue, a technique with spatial resolution in the millimeter range is, though useful, still very crude. In particular, it will be difficult to determine the precise functions and their dependencies unless we have techniques with finer resolution than what is provided by existing imaging technology. Likewise, it will be difficult to determine *network* properties until we have high-temporal resolution techniques for accessing thousands of neuronal responses simultaneously. Nevertheless, it should be noted that an important contribution of imagining studies consists in guiding higher-resolution techniques to explore specific areas and indicating the distribution of areas showing heightened activity in precisely specified conditions.

Despite the difficulties in exploring prefrontal regions, the link between moral decision-making, social cognition, and the emotions is beginning to emerge. Converging results from lesions studies and imaging studies indicate that ventromedial (VM) prefrontal damage is consistently associated with impairments in practical decision-making, moral decision-making, emotion, and feeling (see for example, Saver and Damasio, 1991; Damasio, 1994; Bechara et al., 1994; and Anderson et al., 1999). Patients with focal VM lesions show abnormally flat responses when shown emotional pictures, and they also show poor results on tasks where they need to rely on feelings to guide complex self-directed choices (see Figure 9 below). These findings are

[48] See Alison Gopnik's summary in her "Theory of Mind" entry from the MIT Encyclopedia of the Cognitive Sciences (1999, pp. 838 - 841).

consistent with what is known about the neuronal pathways connecting limbic and brainstem structures to VM (see below).

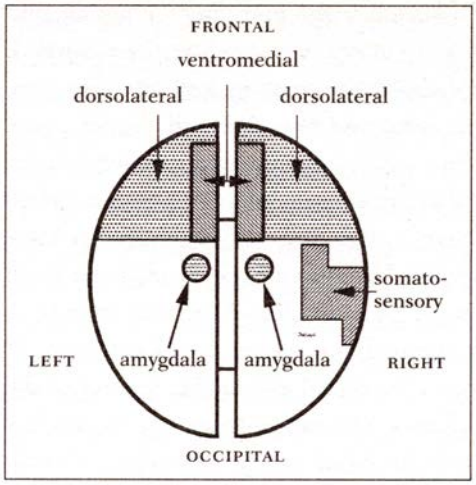

Figure 9: A schematic characterization of location of ventromedial cortex the prefrontal region and its relation to somatosensory cortices and insula (courtesy of Hanna Damasio)

Magneto encephalogram (MEG) studies of youngsters with conduct and self-control disorders (Bauer and Hesselbrock, 2002) show a similar result. The finding has also been confirmed with functional magnetic resonance imaging (fMRI) work involving multiple normal subjects (such as Moll et al.'s 2002a and 2002b studies which detected VM, as well as superior temporal sulcus, recruitment when subjects viewed scenes evocative of moral emotions) and by positron emission tomography (PET) studies of multiple normal humans (see Houdé et al., 2001).

Within the ventral prefrontal cortex, orbitofrontal cortex (OFC) is the large cortical region lying just above the orbits of the eye. Evidence suggests it plays a critical role in *cuing* morally appropriate behavior in adulthood and in *acquiring* moral knowledge in childhood. For example, Anderson et al. (1999) found that while patients with adult-onset and childhood-onset OFC damage displayed similar abnormal social and moral behavior, their scores on standardized tests of moral reasoning were markedly different. Those who suffered from *early* onset damage performed remarkably poorly, exhibiting overly egoistic moral reasoning more appropriate for a ten year old, whereas adult onset subjects performed normally on the standardized tests.

Connections between the reinforcement learning circuitry—in the interoceptive system, the amygdala, the hippocampal structures, and OFC and mediated by the dopamine system—seem to be necessary for acquiring moral skills, social perceptions, and an understanding of social expectations, whether or not the knowledge can be articulated. To a first approximation, if the

feelings incident upon punishment and approval in its various forms cannot be associated with specific social events, moral and life-skill learning are impaired (Baxter and Murray, 2002). Simple conditioning, for example, associating a tone with a pain, is still possible, but with OFC damage, the complex cognitive processes involved in social learning and social cognition are disconnected from feelings that arise when social disutilities are visited upon an agent. It is also worth noting that OFC shows a relative decline in activity during REM sleep, which is consistent with the decreased social inhibition and lack of insight that typifies dreams. Limbic structures, by contrast, are relatively active during REM, which again is consistent with the frequency of strong emotional components in dreams (see also Kahn et al., 2002.).

To round out the connectivity story, it should be noted that the PFC is reciprocally connected not only to subcortical structures but to sensory corteces beyond their primary areas; i.e., extrastriate visual cortex, S2 (somatosensory cortex), and A2 (auditory cortex). These pathways presumably provide perceptual signals relevant to guiding PFC operations. Although textbooks commonly assign PFC an "integrative and executive" role, this description will continue to be almost vacuous until much more of the basic neurobiology is understood. That is, in PFC we need anatomical identification of neuron types, the physiology of specific neuron types, the principles governing plasticity in the region, and more detail about the precise nature of the connectivity patterns and “what causes what.”

In the early stages of science, we often have to make do with rough ideas. We do have rough ideas, based on behavioral studies under a range of conditions and with a range of animals, that *integrative* functions involve drawing on a broad range of signals to extract a new and more abstract representation, and that *executive* functions have something to do with choice and motor behavior that draw on skills and habits, as well as current perceptions. This is vague, but it can be improved, revised, and reconstructed as science proceeds. Since PFC functions are critically dependent on signals from limbic structures, we briefly profile some aspects of limbic function.

3. Limbic Structures, Emotions, and Drives

The limbic structures are a highly interconnected set of subcortical regions that include the hippocampus, amygdala, basal forebrain and hypothalamus. The only cortical structure included is the cingulate cortex—that part of the medial cortex that forms a band bordering the cerebral commissures. Activity in all these structures is modulated by the main four neurotransmitter systems originating in distinct brainstem nuclei and identified in terms of their specific transmitter: dopamine (DA), norepinephrine (NE), serotonin (5-hydroxytryptamine; 5-HT)—what are known as monoamines (MA), and acetylcholine (ACh). Changes in these systems can have powerful effects on cognition, consciousness, anxiety levels, aggressiveness, sexual drive, moods, and on the emotions. For example, as we fall asleep, the

activity of the NE and 5-HT systems tapers off, and at their lowest level, we are in deep sleep. As the REM period approaches, ACh levels increase, and at their highest levels we are in full dreaming state. Lowering levels of serotonin in monkeys changes social rankings, and results in self-defeating aggression and reckless behavior. Males with a mutation in a gene that results in low 5-HT levels (MAO-A gene on the X chromosome) and who are maltreated in childhood are about three times as likely to have conduct disorders and display irrational violence than those who have the normal gene, and about twice as likely as those who have the gene but had a normal childhood (Caspi et al., 2002).

The Amygdala

The amygdala is a multi-component structure highly connected to the prefrontal cortex, and to other limbic structures including the hippocampus and the basal forebrain. One specific component (the lateral nucleus) has been identified as crucial for aversive-conditioning, for negative feelings such as fear, and for recognizing a situation as fearful and a face as showing fear. Other regions of the amygdala form part of the complex reward circuitry involving the positive emotions (Hamann et al., 2002). These regions are also implicated in a range of addictions.

A plausible hypothesis is that among other things, the amygdaloid complex modulates storage of emotionally significant or arousing events. Roughly, perceptions involving events of great importance to the organism's survival provoke specific emotions (anger, fear, delight, disgust) and with amygdala activity, are more likely to be permanently stored than perceptions involving emotionally neutral events. The amygdala's reciprocal connections to hormonal systems including the glucocorticoid (stress hormone) system and the opiod systems also lend credence to the hypothesis. Considerable evidence links the amygdala with various forms of implicit or nonconscious memory (including conditioning), and its connections to the hippocampus indicate it also serves in explicit memory.[49]

Adolphs et al. (1998) report that the amygdala is critical for aiding retrieval of socially relevant knowledge about facial appearance. Three subjects with complete bilateral amygdala damage were asked to judge the approachability and trustworthiness of unfamiliar people. All three subjects judged unfamiliar people to be more approachable and more trustworthy than did controls. Interestingly, the subjects were able to make normal judgments when the descriptions were *verbal* rather than *visual*. This indicates the amygdala is particularly critical for making

[49] Paré et al. (2002) note that the amygdala projects to virtually all levels of the central nervous system; they postulate that amygdala oscillations during sleep may play a role in promoting synaptic plasticity in these portions of the nervous system, thus facilitating interactions between neocortical storage sites and temporal lobe structures involved in declarative memory. This purportedly explains why sleep deprivation harms memory recall.

appropriate moral judgments about visual stimuli (especially faces), while the processing requirements for words and sentences tap a broader range of information-laden brain structures in frontal cortex.

Recent work by Weinberger et al. (2002) indicates that proper amygdala function as it affects general temperament might be regulated by one critical gene sequence. Using fMRI on twenty-eight subjects, those whose DNA contained a shorter than normal length of a critical promoter gene for a protein that assists the distribution of 5-HT, showed heightened activity in their right amygdala while processing a task related to matching angry and frightened faces. Bluntly: subjects with the short allele are more prone to anxiety and to feeling threatened even in non-threatening situations, which might lead to a tendency towards dysfunctional sociability.

The Cingulate Cortex (CC)

The cingulate cortex has a number of subregions that appear to make somewhat different contributions to normal brain function. Regulation of selective attention, regulation of motivation, and detection of mismatch between intention and execution are associated with anterior regions (ACC). Work in both humans and monkeys indicate that the ACC conveys reinforcing stimuli to other parts of the cortex, and plays a key role in addictive and obsessive-compulsive disorders (see Figure 10 below). Montague et al. (2002) indicate that leveraging rostral ACC activation (along with the nucleus accumbens, the caudate nucleus, and the VM/orbitofrontal cortex) is needed for cooperative behavior among subjects playing a version of the "Prisoner's Dilemma" (as the popular press said *brains want to cooperate because it feels good to do so*).[50] In sum, ACC proper functioning is important for what researchers call "motivated action;" as Damasio puts it, the ACC constitutes the "source for the energy of both external action (movement) and internal action (thought animation, reasoning)."[51]

[50] The technique used to capture fMRI data from two subjects or more simultaneously as they are interacting socially is called "Hyperscanning"; this type of development promises to add another layer of ecological validity to the imaging regimen. We applaud it and hope to see more researchers using it, as we mention in section 4.0. See Montague et al (*NeuroImage*, 2002).

[51] (Damasio, 1994, p. 71).

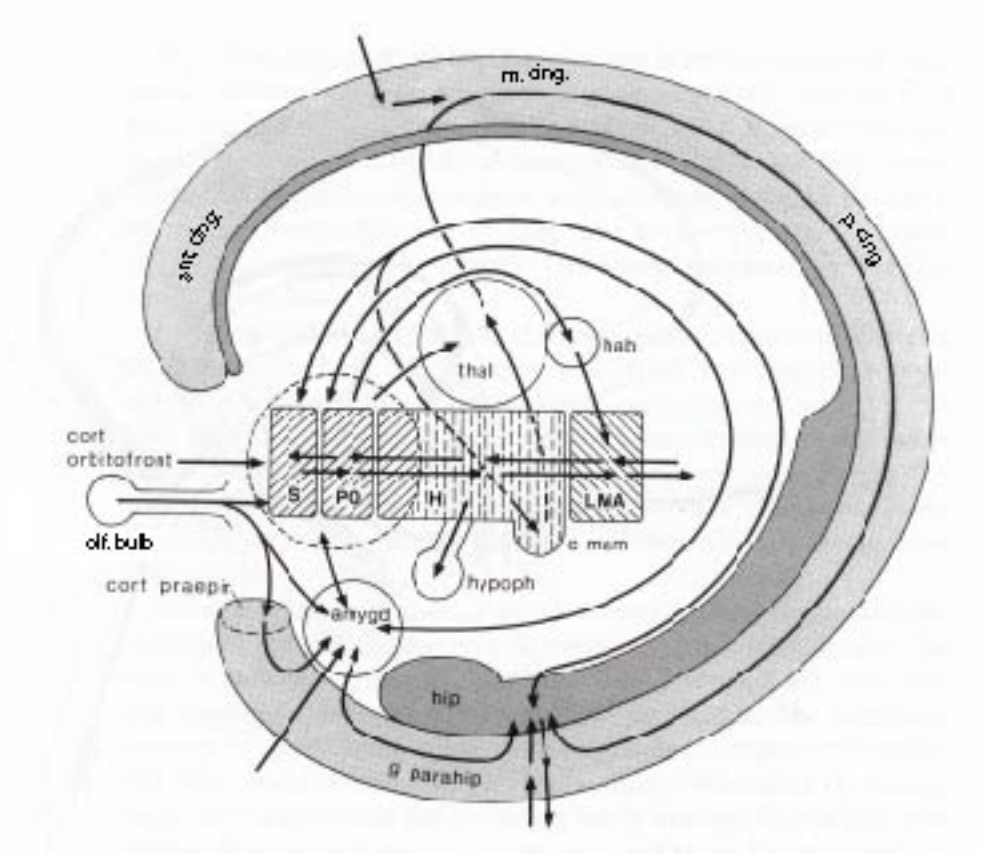

Figure 10: A schematic showing some of the pathways in the limbic structures (modified from: Nieuwenhuys, 1985).[52]

Recent fMRI work by MacDonald et al. in 2000 using a modified version of the Stroop task (which involves naming the ink color of colored words; famously, it takes subjects longer to name the color of the ink if the word *spells* a *differing color*) indicates that the ACC is involved in evaluative processes, "such as monitoring the occurrence of errors or the presence of response conflict, which occurs when two incompatible responses are both compelling."[53] They conclude that the ACC is particularly important for identifying just when it is that an organism needs to be more strongly engaged in controlling its behavior. Experiments by van Veen et al. (2001, 2002) support this conclusion, as does work by Bunge et al. (2001), which suggests the anterior cingulate is involved in detecting the organism's need for higher cognitive control.

[52] Abbreviations: a.cing anterior cingulate gyrus; m.cing., middle cingulate gyrus; p. cing g. posterior cingulate gyrus; hip, hippocampus; g. parahipp, parahippocampal gyrus; thal, thalamus; S, septum; PO, preoptic region; H, hypothalamus; LMA, limbic midbrain area, c mam, mammilary body; hypoph, hypophysis (pituitary); hab, habenula; olf bulb, olfactory bulb, amygd, amygdala.

[53] MacDonald et al (2000), p. 1836.

This role for the ACC is consistent with it being, in some obscure sense, a fountainhead for motivated action. When the ACC is dysfunctional, subjects become catatonic, with severe impairment of reasoning and emotional expression, or they may become hyper-addicted, with similar impairments. Alien hand syndrome, in which the ipsilesional hand tends to behave independently of the agent's conscious control, is associated with ACC lesions that probably also involve the adjacent commissures. The alien hand may, for example, grab food from someone else's plate or grope a stranger, much to the embarrassment of the agent. Sometimes a person with alien hand syndrome is able to control the hand by hollering at it to stop.

Hippocampal Structures

The hippocampal structures include the hippocampus, the parahippocampal cortex, the entorhinal cortex, and the perirhinal cortex, all of which are organized in a very precise manner and show highly specific activity patterns in the awake period and during REM. The route from other parts of cortex to the hippocampus is through the entorhinal cortex. This circuitry is essential for learning and remembering specific events or episodes. These structures are not, however, the site of permanent memory storage, but are needed for the transfer of information to various parts of the cortex. It is still very unclear, however, what exactly the hippocampus does in processing events for storage, what exactly is transferred to cortex, and how the transfer to cortex is achieved. According to the leading hypothesis (Hobson and Pace-Schott, 2002), memory rehearsal occurs in the hippocampus during REM, and when the brain shifts to deep sleep stages, information is transferred from hippocampus to cortical structures. Some single neuron research on rats tends to support this hypothesis, as do the data exploring the regular cranking up and down of the neurotransmitter systems (NE, 5-HT, ACh) that regulate shifts from wakeness to REM to deep sleep.

Memory in electronic computers is absolutely the wrong model for memory in brains. In brains, information storage is essentially never the relevance-free, value-free, skill free, past-free business it is in electronic computers. In brains, not all details of an experience are stored and remembered, but generally only the highly processed and the "salient" or *me-relevant* parts. This seems to imply that in the weeks and months during which the hippocampus is "handling" such an input, a lot of sifting, sorting, and reconstructing occurs. This business, whatever it really is, depends on many factors, including the brain's needs, its previously stored memories, its implicit memory, future plans, mood, and so forth.

In moral judgment, it appears the hippocampus facilitates conscious recollection of schemas and memories that permit past events to figure in current decisions. For example, faced with a complex problem such as how best to resolve a hostage situation, or how to persuade a child to acquire manners, the recollection of relevant past experiences along with their emotional

valence is important, and this recollection is dependent on hippocampal structures, but also involves other limbic structures as well.

A caveat: many of the most important forms of moral reasoning that we exercise rely on background social skills, social perceptions, and tacit use of a theory of mind. That is, much day-to-day moral reasoning does not consciously involve complex moral schemata or convoluted moral modeling. Consider, for example, airplane manners or doctor's waiting room manners: one does not have to deliberate about whether to stare at someone odd, whether to laugh at a pratfall of a shy child, whether to jump ahead of handicapped passengers, or whether to pretend to be carrying a bomb. One does not have to deliberate about whether to protect a child from a snarling pit bull or from a careening car. Much of the time, we rely for fast judgments on well-worn skills and habits of character, informed by feelings.

Nonetheless, abstract moral reasoning *is* sometimes needed, particularly when our skills give conflicting judgments or no judgment, or judgments opposed by those we respect, and yet *something* must be done. And a decision *not* to act has consequences every bit as much as a decision *to* act. Should I give the order to put sleeping gas in the theatre under siege? Should I, as a member of the jury, agree to the death penalty of a child murderer? Should I tell a lie to protect an innocent person? Abstract moral reasoning probably depends on those brain structures that subserve morally-neutral forms of abstract thought as well as practical reasoning about how to get things done.

Moral reasoning is one aspect of the ubiquitous real-world, biological, "dirty" computation that permits a brain to navigate a world and manage in a range of environments, new as well as familiar. This sort of computation generally aims to get a good answer in good time, rather than an optimal answer in however-long-it-takes. Proving a theorem in mathematics might have no time pressure whatever; making a decision under threat from a human or other animal virtually always has severe time constraints. Dirty computation makes decisions in appropriate time under uncertainty, and it is guided by a range of feelings generated by current perceptions, past memories, imagined consequences, deep preferences, and passing fancies—all toned and molded by the brainstem's neuromodulator systems.

Moral State-Spaces

A useful conceptual device for thinking about the moral nature of the activities accomplished by these brain systems is to construe their activity as embodying a moral state space. We can usefully think of much of the activity of frontal cortex and the limbic/brainstem axis as consisting of a moving point in an *n*-dimensional space, where *n* could (in the most complex of cases) be determined by making the activity of every neuron involved in the subsystem an axis of the space. Using the mathematical technique of multi-dimensional reduction, it may be possible to boil these high-dimensional spaces into lower-dimensional ones wherein we can

capture the principal components of the space using traditional conceptual terms. Alternately, our failure to capture such principal components areas might signal the need for articulation of a new vocabulary and concepts necessary to fully capture the dynamics and structure of the space. As an example, it might be appropriate to think of the activity of these higher-order systems as taking place in this hypothetical moral state-space, and this can serve as a useful conceptual device (see Figure 11 below):

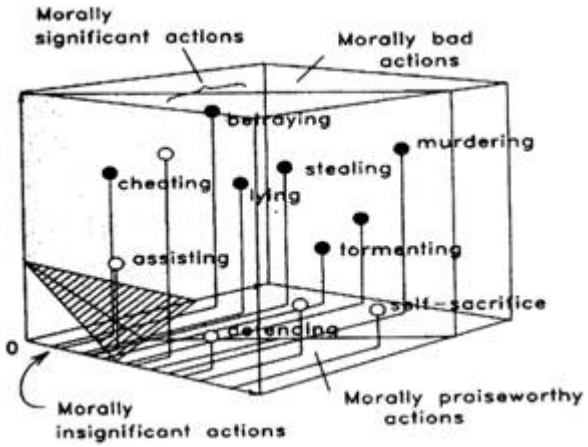

Figure 11: A hypothetical moral state-space after dimensional reduction (modified from: Paul Churchland, 1998)

Recap and Coda: The Importance of the Emotions in Moral Reasoning, and Potential Impacts for Counter-Radicalization Strategy

A problem with brain research on moral phenomena is that constraints of rigorous experimental design mean that tests are conducted in highly artificial situations that often do not resemble the actual circumstances in which real moral cognition occurs. "Ecological validity" is difficult to achieve, especially in the case of moral reasoning. There are several reasons why this is so. Moral cognition is oft-times:

1. **Hot.** That is, affective and conative states are part and parcel of moral judgment (for example, the virtuous person is appropriately *angry* at unjust events). This is not an accidental feature, but an endemic feature. Hot cognition is especially difficult to capture in artificial experimental settings.
2. **Social.** Moral judgments are virtually never made in a social vacuum. Rights, duties, obligations, norms of conduct, etc., all are made manifest and have their origin in a social atmosphere. Normally one lives among kin and community, where there are social expectations, social hierarchies, divisions of labor, and conventions for dealing with those who violate social norms. This characterizes animal as well as human groups. Social environments are notoriously difficult to simulate when you are encased in a

giant fMRI magnet, although Montague et al.'s "multi-scanner" methodology will go a long way towards correcting this deficiency.[54]

3. **Distributed.** Moral cognition is part of a broader network of understanding molded by multi-modal interactions with the world. Life is usually not limited to a single dimension of stimulation, but embedded in a rich context. Evolution is very conservative and new capacities are knit into preserved structures, not built from scratch. Social behavior appears to be rooted in the brainstem/limbic axis and prefrontal cortex, with input from sensory and multi-modal corteces. Notice that this embraces pretty much the whole brain. Consequently, the worry is that the optimal conditions for engaging the affective/cognitive equipment do not coincide with the reduced conditions needed to do experiments in an fMRI chamber (e.g., using bits of written text, small photographs, etc.).
4. **Organic.** Moral judgments are exquisitely context sensitive. Concerns about the fundamental attribution error aside, the fact remains that in *one* context I am likely to praise someone for telling a lie ("You look lovely in that spandex outfit"), and in another I am likely to *condemn* them ("Here at Enron our books are in *perfect* order"). Experimental setups will eventually have to find a way to take this context sensitivity into account, and that is difficult to do without compromising other aspects of the testing regime (sometimes, those very aspects that are necessary to get interpretable results at all).
5. **Genuine.** Many of the phenomena our moral theories and their psychologies hope to explain include things like *akrasia* ("weakness of the will"), moral motivation (when do people behave morally, and why?), and moral heroism (as when someone sacrifices his life for another). Addressing these phenomena requires exposing subjects to bona fide morally laden situations to engage the affective/cognitive functions. Experimental setups that assume too much regarding connections between dry "moral judgment" and wet "action in the world" may lead us to incorrect conclusions regarding the interface of emotion, reason, and action.
6. **Directed.** Anti-realism about morality aside, moral judgments are about *things*, broadly construed. In much the same way that a visual system seeks to construct a stable percept of the world, so does a moral cognitive system seek to construct a stable projection of the interface of cognition and action. In much the same way that the visual system becomes increasingly skilled in categorizing the causal structure of the world, so the social affective/cognitive system becomes increasingly skilled in navigating the social *cum* practical world. Moral judgments tell us what we ought to think *so that* we know what to do. Isolating the doing from the knowing via an artificial experimental regimen

[54] See their (2002) article "Hyperscanning: Simultaneous fMRI during Linked Social Interactions" (*NeuroImage*, Vol. 16, No. 4, pp. 1159-1164), mentioned in previous footnote.

> can remove the directedness of moral cognition. As for me and my house, when in the magnet, we will throw the switch to divert the trolley on to the track where only one child is playing. But what we'd do outside the magnet is likely anyone's guess...

Thus far, those experimental setups that are *most* ecologically sensitive support the hypothesis that moral cognition is a large-scale brain affair depending on the appropriate coordination of many areas. Research at a range of levels of organization from synapses to neurons to areas and systems points to the conclusion that the organism which best triangulates norms will be one that uses (1) multi-modal signals (2) conjoined with appropriately cued executive systems that (3) share rich connections with affective and conative brain structures (4) which draw upon conditioned memories (5) and insight into the minds of others so as to (6) think about and actually behave in a manner enabling it to function as best it can.

These capacities will have neural correlates, but generally such correlates will be multi-faceted high-order functional relationships. Although *localization* of functions in cortex is still a common aim, increasingly the evidence shows that especially for complex functions, the aim is misguided. While it is true that there are regions that in the adult seem more or less specialized for particular functions, the idea that there are centers or modules or localized functions is largely a myth of pre-1980 neuroscience. If we cannot expect modules for depth-perception, motion perception, or language, it is unwise to expect them for affective/cognitive representation.

Fair warning: even these seemingly commonplace observations about moral cognition smuggle in an agenda. When combined with these caveats, the research discussed so far indicates there probably is no such thing as a "pure reasoning" capacity (contra Kant), that purely cognitive moral judgments probably do not motivate intrinsically (contra Plato), that good moral cognition is shot-through with emotion (contra Kant), that moral judgment and social judgment are tightly intertwined (contra Kant), and that the ability to accomplish utility calculations alone does not adequately capture the demands of good moral reasoning (contra Mill). We think the literature thus far best coheres with an appropriately updated and scientifically burnished virtue theory along the lines advocated by Aristotle in his classic treatise Nicomachean Ethics. These conclusions highlight the necessity of making the foundational assumptions that drive experimental setups an *explicitly articulated* portion of further work on the NMMC.

Moreover, they highlight the necessity of viewing moral cognition as being on a par with everyday forms of reasoning. For example, the question "Who should I dance with?" is not radically different from the question "Shall I tell a lie?" and (as one's limbic system knows) both can be relatively trivial or fraught with social peril. From the point of view of the brain and its me-relevant style of computation, there is no genuine distinction between "pure" practical reason and moral reasoning. Instead, at bottom it is only a matter of convention that we call

certain judgments about what will be most functional for us "moral judgments" while others are purportedly *merely* judgments of prudence (although one difference is often that the former are highly affect-laden). One caveat, however: moral reasoning is reasoning about what one should think or do so as to manage life well (on our neo-Aristotelian paradigm), and it *is* true that some of our most significant reasoning in this domain deals with serious matters of social interaction and thus will reliably activate, for example, ToM modules and limbic "tags." There's room for amicable détente here.

Upshots for Influence Activity and Concluding Thoughts

The impact of these observations on counter-radicalization, messaging and influence activity are apparent.

First, a comprehensive influence campaign designed to increase the likelihood that vulnerable populations attend to counter-Daesh messaging must arouse and engage the audience; ignoring the emotional dimensions of how brain schema change by focusing only on facts at the expense of frames and emotional resonance increases the likelihood that influence activity will have no impact.

Second, connecting abstract concerns about justice and human rights to the kinds of daily activities we engage in so as to survive is important; does Daesh activity make it more likely that a particular family or a particular person will not be able to access potable water and fresh food for their loved ones? A concrete circumstance makes it more likely that the brain's native mechanisms will be engaged in the same manner as they are during daily activity.

Third, comprehensive influence campaigns will also focus on social structure and social milieu; as social primates, our brain evolved to enable us to cooperate with each other to achieve common goals. This makes us sensitive to social context and ripe to be primed to model certain behaviors when our peers and social networks are engaging in them. Influence is as much about shaping those networks and environments as it is about sending a particular message to them.

Finally, influence is a long-game as well as a short-game; developing habits and dispositions in the brain takes time, and setting conditions that will generate other habits and dispositions will also take time. Strategic patience is a necessity.

Until recently, moral philosophy has remained relatively detached from the natural sciences, including oddly enough, evolutionary biology. Neuroscientists and cognitive scientists, on the other hand, have recently become intensely interested in social/moral behavior as techniques have made its empirical exploration possible. What are needed are cross-disciplinary studies that rely on the best research of all the relevant disciplines. This means that moral philosophers will need to think the unthinkable, namely that the empirical results in the evolutionary and

neural sciences have an unavoidable impact on moral philosophy. But it also means they can be useful in designing ecologically valid experiments. Likewise, it means scientists will need to develop approaches, both theoretical and experimental, to understand real-world, "dirty," *biological* computation and how it produces social and functional behavior. Far from being drudgery, these challenges are exciting—rarely have moral philosophers and cognitive scientists lived in such interesting, non-faddish, "justifiably hot" times. That this work could impact the way the United States and its coalition allies approach radicalization and countering the threat posed by groups such as *Daesh* is gratifying, and gives academicians and scientists a chance to have impact on important and consequential strategic, operational, and tactical counter-terrorism and counter-radicalization issues.

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Understanding The Social Context: Following Social And Narrative Change Via Discourse And Thematic Analysis Surrounding Daesh In The Middle East: Dr. Lawrence A. Kuznar,[55] Indiana University–Purdue University, Fort Wayne, and NSI, Inc.

Abstract

Thematic analysis of key regional actors in the Middle East helps to establish the larger social context in which groups contend and message one another to threaten, appeal, and recruit. Several key questions relevant to US national security concerns can be addressed by looking at how regional actors use language, including the degree of concern different groups have about Daesh, indications of their actual will to fight Daesh, and the role of grievances in motivating rebellion against current regimes. Key findings include:

1. Non-state groups fighting Daesh express the most concern with the threat; the rhetoric of state-level groups is more measured and indicates more ambivalence about the Daesh threat.
2. Daesh, by far, expresses the strongest resolve to fight, emotional attachment to their goals, and hatred of their enemies (Kuznar & Moon, 2014).
3. Shia militias, Sunni tribes rebelling against the Government of Iraq (GoI), and Syrian Kurds express the greatest resolve to fight Daesh; states express less of a will to fight.
4. While many groups in the region express a sense of victimization and grievance, the Sunni tribes express this sentiment to a far greater degree than any other group.

Introduction

National security threats grow out of, and are influenced by broad social contexts; they are the product of interactions of individuals and groups that are nested in environments (see: Giordano and Chen, this volume). This is very true regarding the current instability in the Middle East surrounding Daesh (Islamic State, ISIS, ISIL) (Astorino-Courtois, 2015). Not only has Daesh been able to exploit grievances of Sunni populations, but the complex network of alliances and antagonisms between the region's state and non-state actors has presented many opportunities for Daesh to realize its goal of fomenting epic showdowns between Sunni and Shia, and between their own movement and the West (Kuznar, 2015). Key issues that have emerged in the fight against Daesh have involved identifying the extent to which some groups actually oppose Daesh, their resolve to fight Daesh, and the role grievances play in undermining support for regional governments.

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In an effort to understand the broader (i.e., psycho-social and political) contexts that influence Daesh's ability to operate and achieve its goals, a thematic analysis (Bernard & Ryan, 2010; Braun & Clarke, 2006) was conducted of speeches and other propaganda by a number of key actors in the region. Based upon this and related analyses, the following questions will be addressed in this chapter:

- Who is concerned about Daesh?
- Who speaks as though they are resolved to fight?
- Who feels aggrieved?

The Actors and the Corpus

To date, speeches from the following 13 groups have been gathered (see Table 3 below). Because of the length of our sustained Daesh analysis effort, Daesh represents nearly half of all documents. An effort was made to gather a corpus from other relevant groups; additional material is being gathered on groups in the corpus and additional groups are being added to the corpus. The results presented in this paper are, therefore, interim. The key metric used in the thematic analysis is the density (count/words X 1000 in document) with which a theme is mentioned; the underlying assumption is that the importance of an issue correlates with the density with which it occurs.

Table 3: Middle Eastern Corpus

ME Regional Corpus		
Group	Authors	Coded Docs
Government of Iraq (GoI)	Abadi	3
Daesh	Adnani, Baghdadi, Turkani, others	50
Iran	Khamenei, Rouhani, Suleimani	9
Israel	Netanyahu	6
Jordan	King Abdullah	3
Kurdistan Regional Government (Iraq, KRG)	Barzani, PM, media	4
People's Protection Units (Syria Kurds) YPG	Official YPG Website	5
Saudi Arabia	King Salman, MoFA, Amb UN	8
Shia Militias, Iraq	Ameri, others	6
Sunni Tribes, Iraq	Hatem al Suleiman, other Sheikhs	8
Syrian Assad Regime	Assad	2
Turkey	FM Cavusoglu, PM Davutoglu, media	7
Al Nusra Front	al Julani	2
	Totals	113

Who Seems Concerned about Daesh?

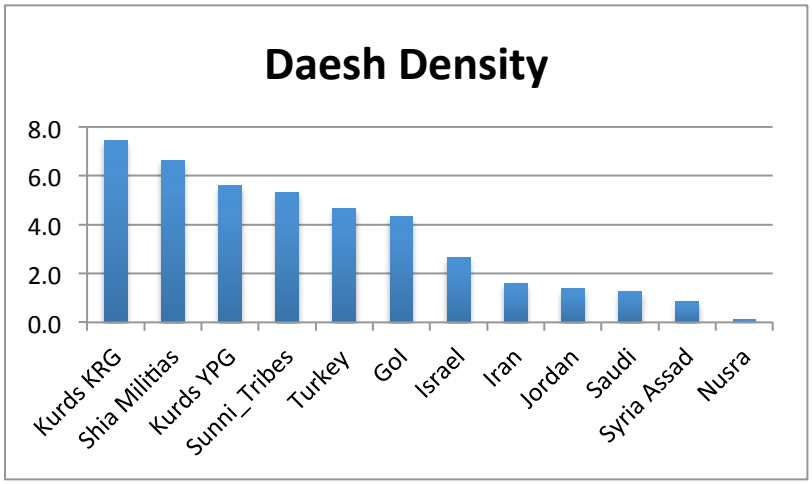

Figure 12: Concern with Daesh as measured by average density with which it is mentioned by a group

Groups vary on the extent to which they mention Daesh as a concern. Non-state groups such as the Kurds and Shia militias, and even Sunni tribes rebelling against GoI mention Daesh frequently. States in the region mention Daesh much less often, and notably, Daesh is a minor topic for the Assad regime and the al Nusra Front.

Who Speaks as though they have Resolve to Fight?

Some elements of discourse provide insight into a group's resolve to fight. These measures should be compared against actual performance in combat in order to fully gauge the efficacy of language as a measure of fighting resolve. However, previous research has demonstrated that these themes are associated with violent intent and action (Kuznar & Yager, 2012; Kuznar, Yager, Clair, & Stephenson, 2012).

The following metrics are used to gauge resolve to fight.

- Density with which a group talks about the need to fight
- The use of rhetorical devices (inflammatory language, pejoratives, sarcasm, repetition, hyperbole, etc.). Rhetorical devices do not convey specific information, but they are used to amplify a message, and therefore reflect resolve on an issue.

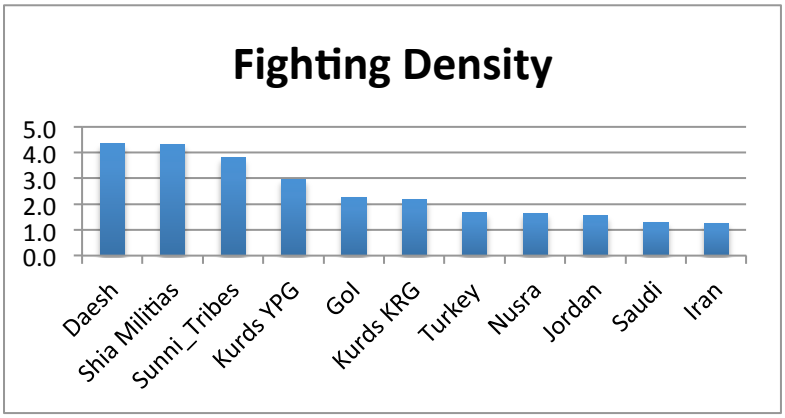

Figure 13: Density with which the need for fighting is mentioned

Daesh definitely mentions fighting the most densely of any other group, and they perceive fighting as an absolute religious necessity (*qitaal*) (Kuznar & Moon, 2014). It is interesting that Shia militias mention fighting nearly as densely as Daesh, followed by Sunni tribes rebelling against the GoI and the Kurdish YPG (see Figure 13 above).

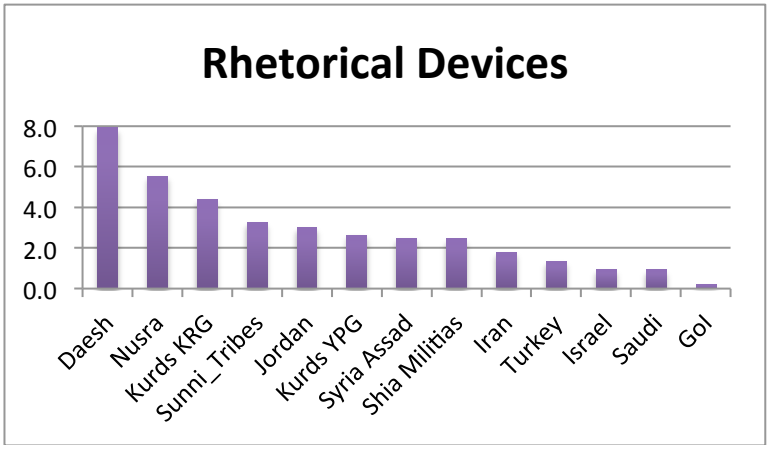

Figure 14: Density of rhetorical devices used by groups

Daesh far exceeds all other groups in the average density with which they use rhetorical devices (**Error! Reference source not found.**). Part of this is explained by Daesh's extensive use of pejoratives; they make frequent use of name calling to express their disdain for their enemies. Al Nusra Front is intermediate between Daesh and other groups. State groups are clearly more measured in their use of rhetorical devices.

Who Feels Aggrieved?

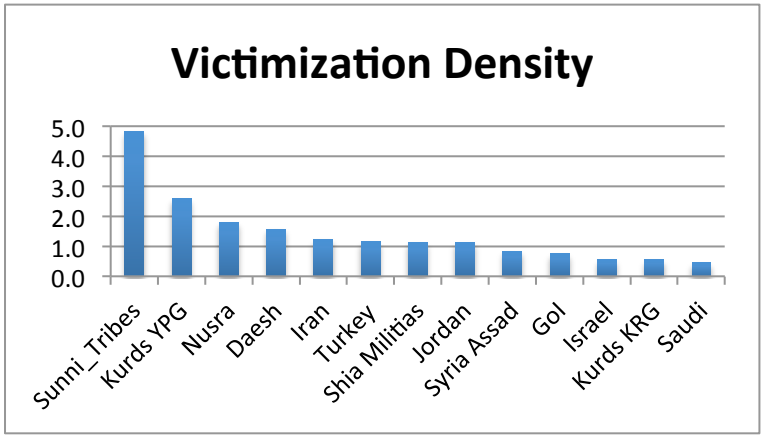

Figure 15: Victimization

In previous studies of both state (Iran, India, Pakistan, Syrian Assad Regime) and non-state (Taliban, Afghan Mujahideen) groups (Kuznar, 2014; Kuznar & Yager, 2012; Kuznar et al., 2012), victimization was a ubiquitous justification for violent action and claims of victimization often increase before violent action. Therefore, the extent to which a group claims victimization is a powerful indicator of their sense of grievance and their desire to rectify wrongs.

Sunni tribes mention their victimization twice as often as Kurdish YPG. All other groups pale by comparison. Al Nusra Front makes claims of victimization more than Daesh, which is consistent with al Qaeda's claim to defend Muslims, compared to Daesh's emphasis on creating a contemporary Caliphate whether Muslims are being oppressed or not (Kuznar, 2015) (Figure 15).

Relevance

These interim findings provide initial, but nevertheless useful and important insights to the social context in which threats to the US in the Middle East can be anticipated and countered.

To the extent that Daesh represents a threat to US national security, potential allies who are similarly concerned with Daesh as a threat are primarily non-state actors (such as Iraqi Shia militias, Kurds, and especially Syrian Kurdish YPG). States in the region, while expressing concern, do so with much less emphasis. The Assad regime and al Nusra Front mention Daesh very little. The lack of mention of Daesh by the Assad regime and al Nusra Front reinforces the idea that their primary concern is other enemies. The moderate mentioning of Daesh by states indicates that they are unlikely to be reliable and constant opponents to Daesh. The only allies in a fight against Daesh who indicate a consistent concern are non-state groups, most notably Shia militias and Kurdish factions.

Similarly, the resolve to fight is most strongly expressed in non-state groups. States are less strident and more ambivalent in their claims. Both Daesh and Shia militias exhibit an "all-in" attitude when it comes to the will to fight.

The Sunni tribes analyzed in this report express, by a large margin, the strongest sense of grievance and victimization, reinforcing the notion that there is a great rift between them and the GoI, and others allied with the GoI (such as the US).

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Organizational Determinants Of Aggression: From Putin To al-Baghdadi: Dr. Gina Scott Ligon,[56] University of Nebraska Omaha, and Michael McRoberts, Department of Defense

Abstract

Organizations (i.e., social institutions) are extensions of the (bio-psychological) people who lead them (Bass & Bass, 2009). In the context of the present effort, examining how organizations are structured and operate is one readily available way to (1) define socio-psychobiological and bio-psychosocial dynamics and interactions of individuals, groups, and institutions/organizations, and through these approaches, (2) more accurately predict aggression—and changes in aggression—from our adversaries. We argue that the full manifestation of violence from an aggressive leader depends on an organization; moreover, organizations have multiplicative effects on individual actions. Thus, we use institutional and signaling theories to provide a framework to assess aggression of our adversaries and the organizations (i.e., the top management teams) they build around them. Building on others' chapters in this volume, we detail how indices of leader aggression can be accessed via objective signals a given leader sends across multiple settings and time periods. We conclude our chapter with a discussion of leader aggression markers available in top management team/inner circle composition and processes.

Institutional And Signaling Theory: How Aggression Translates Through Organizations

There is a rich body of research dating back to Weber in the 1920s where scholars have assessed the formal scope and power of organizations, as well as articulated a set of technical guidelines on how to study and examine them (Weber, 1924; Peters, 2011; Tolbert & Zucker, 1999). In a review of institutional theory, Lamers and Barbour (2006) articulated interrelated aspects that guide the understanding and use of formal institution theory. For the purposes of the present effort, we identify three of these that justify the use of this theoretical lens for understanding adversaries' aggression. First, institutions consist of observable routines that are consistent across varied settings. Moreover, we assume there is an underlying set of decisions that drive the harmonious behaviors across multiple indices (e.g., national instruments of power) and settings. Second, institutions are manifestations of beliefs in that they can be described as cognitive and emotional elements underlying a set of behaviors. For example, behaviors seen in medical institutions are manifestations of the beliefs of what constitutes "good medicine."

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Similarly, behaviors seen in aggressive adversaries are manifestations of the beliefs of what is justified aggression (James & LeBreton, 2012). For example, a senior leader may surround himself with a team that has a history of inciting violence and aggression (e.g., Daesh appointed Omar al-Shishani to the Shura Council given his penchant for violence and guerilla warfare). Third, institutional theory allows for examination of how two or more institutions (i.e., actors) relate to each other. For example, given that institutions manifest beliefs and eventual decisions of their leaders and members, institutional communication theory would suggest that adversaries encode, interpret, and receive signals from each other in a dyadic, recursive fashion (Schramm, 1963). However, in a competitive, adversarial environment, information asymmetry exists; in other words, different organizational members know different pieces of information. Thus, to use institution theory to predict aggression, we draw upon signal theory to resolve such information asymmetry about latent and unobservable qualities such as intent for aggression within a given adversary organization.

One useful model for ascribing unobservable characteristics when information asymmetry exists is signaling theory, used to describe behavior when two parties (e.g., individuals or organizations) have access to different information (Connelly, Certo, Ireland, & Reutzel, 2011). Used in a variety of scientific disciplines, from anthropology to zoology (Bird & Smith, 2005), signaling theory is fundamentally concerned with reducing information asymmetry between two parties by identifying observable signals from a sender to a receiver as they relate to underlying, latent variables (Spence, 1973). One concrete case found in biology, for example, is that a large rack of antlers is an honest signal that provides females with information about male genetic quality (Zahavi & Zahavi, 1997).

In sports, a college football coach may visit a high school recruit in a limousine to signal a resource-rich environment (Turban & Cable, 2003), while a young firm may stack their board with well-known directors to signal to potential investors about the firm's legitimacy (Certo, 2003). Signaling theory is frequently used in entrepreneurship literature, where scholars have assessed the signaling value of board members (Certo, 2003), top management team (TMT) characteristics (Lester, Certo, Dalton, Dalton, & Canella, 2003), angel investor presence (Elitzur & Gavius, 2003), and media sentiment (Carter, 2000). Each of these examples illustrates how one party may assess underlying quality—a latent, intangible characteristic akin to constructs associated with understanding adversary aggression. In short, signaling theory suggests that organizations "communicate" to us, and one of those communications may be that of increasing levels of aggression.

Top Management Teams

SMA has an interdisciplinary approach to examine leaders of adversary organizations, and scholars have studied both state leaders (e.g., the SMA white paper on Assad in 2014 detailed

his integrative cognitive complexity based on examinations of his speech patterns and background) as well as VEO leaders (e.g., the recent SMA SOCCENT project enlisted scholars in personality psychology and anthropology to assess Daesh leader speeches). In a technical report detailing the organizational structure of Daesh, we identified a complex organization led by an inner circle with a variety of backgrounds, expertise, and motivators. For example, we found Daesh TMT has three types of members: true ideologues (e.g., al-Baghdadi, the PhD in Islamic Studies who focused on domestic operations), pragmatists (e.g., al-Kharmoush, the financial officer who was a former Baathist), and some violence seekers (e.g., al-Shishani, the former Chechen fighter who was well-versed in guerilla warfare). Before turning to the implications of TMT composition, we first review the leadership and organizational psychology literature on aggressive leaders and their inner circles.

O'Conner and colleagues (1995) were the first to examine leader correlates of power orientation, or whether leaders make decisions based on mutual trust and intent for organizational growth (i.e., leaders who use socialized power) versus making decisions to shore up personal position at the expense of followers (i.e., leaders who use personalized power). In a study of world leaders, they identified that those who were more personalized in the pursuit of power were more self-aggrandizing, mistrustful of followers, had negative life themes throughout their life course, and treated others like objects rather than whole people. In addition, Post (2002) added that destructive leaders evidenced clinical and subclinical levels of narcissist personality disorder, which was related to risk taking behavior, increasing levels of aggression toward others (even those in inner circle), and poor planning for long-term consequences. In short, personalized leaders may use both passive and active forms of aggression to ensure their position of power in an organization, regardless of potential negative consequences to others. One way these leaders manifest this personalized power orientation is the array of followers they allow into their Top Management Team.

Thoroughgood, Padilla, and colleagues (2012) developed a framework for identifying the types of followers most often found in the inner circle of an aggressive, personalized leader. In distinguishing between different susceptible followers of aggressive leaders, Padilla et al. (2007) identified (1) conformers/passives (e.g., followers who obey the follower out of fear), versus (2) colluders/actives (e.g., followers who engage in aggression as well for personal gain). Thoroughgood and colleagues (2012) extended this dichotomy to five types of followers associated with aggressive leadership: a) conformers: (1) lost souls (individuals who may have unmet basic needs, low self-concept clarity), (2) authoritarians (individuals who view it as the leader's legitimate right to exert power over the organization no matter what the cost), (3) bystanders (individuals who are passive and motivated primarily by fear) and, b) colluders: (4) opportunists (individuals who have dark personalities that mirror the motivations of the senior leader; ally for opportunity for personal gain), and (5) acolytes (individuals who believe in the

leader's mission/vision because it directly aligns with their own values and beliefs; following because the leader is perceived as "expert").

There are at least three implications from this work on aggressive leaders and their followers for the present effort. First, aggressive leaders are likely to surround themselves with some variant of these types of followers in order to pursue their destructive goals. While not all aggressive leaders become destructive, those who construct organizations and TMTs to give rise to such personalized power motives are most likely to translate their aggression into violence rather than have it mitigated. Second, identifying follower motivations and characteristics can provide key signals to a leader's aggression. For example, Adolf Hitler identified Heinrich Himmler as a key follower with shared values and beliefs, but who was unable to lead without Hitler's help. The two together, however, were able to act on aggression to engage in significant amounts of destruction. Examination of the relationship between the two suggests that Himmler was a classic "acolyte follower" (Levy, 2005). Finally, there may be signals that can indicate when these leadership teams have been constructed, allowing for greater prediction of increasing levels of aggression. One recent example of how such a team came together was that of the Russian TMT who launched a massive aviation and missile attack on Daesh in Syria in fall of 2015.

Case Example of Top Management Team Signaling Increase in Aggression: Russia

After the United Nations meeting in late September of 2015, President Putin announced military action in Syria. Prior to this action, President Putin assembled TMT from his broader cabinet composed of Prime Minister Dmitry Medvedev and Minister of Defense Sergei Shoigu, along with others. While these two individuals work closely with President Putin on a variety of issues, the construction of this particular inner circle and their behaviors could serve as one signal for increasing aggression.

The Destructive Leader: President Putin

President Putin has behaved in increasingly aggressive ways (Lieberman, 2014). While publicly he justifies these actions with increasing status to Russia (BBC News, 2014; Kagan, 2008; Putin, 2000), his actions also illustrate need for personalized power at expense of greater good (Slav, 2016), intense focus on competition against adversaries (Hill & Gaddy, 2015), and risk-taking behavior throughout his life course (Sakwa, 2007). Coupled with these markers of a personalized, destructive leader is a life history of aggression and the need to subvert others to his will (Reisinger, 2012). For example, his tenure in the KGB was marked by his stance to fight when he perceived an insult, as well as defeat opponents at all costs (Putin, Gevorkyan, Timakova, Kolesnikov, 2000).

As described throughout this volume, aggression has biological bases that lead to individuals seeking out opportunities to actualize them. In an examination of President Putin's life history,

it appears the need to defend himself proactively and decidedly has followed him through early judo competitions to the St. Petersburg town hall (Sakwa, 2007). When coupled with derailing leadership characteristics such as the need for attention and risk taking, destructive leaders can become more aggressive by seeking greater power (rather than physical aggression) later in life as their health begins to decline and their bodies age (Huesmann, Eron, Lefkowitz, & Walder, 1984). We argue that the composition of an inner circle of close lieutenants allowed for President Putin's aggression to channel through his organization efficiently and without impediment most recently in the Russian involvement in Syria.

The Authoritarian Conformer: Minister of the Defense Sergei Shoigu

Russian General Shoigu made his name in the government starting in 1990, where one of his most notable characteristics is "not making any enemies" (*Economist,* 2015). Described as a reassuring presence, General Shoigu wisely ceded the spotlight to President Putin, and he has been a loyal follower—giving gifts to the President such as his favored black Labrador retriever, and accompanying Putin on patriotic vacations. In addition, General Shoigu has restored credibility to the Russian military. He focuses equally on force readiness and public affairs, allowing unprecedented media access to document accomplishments and bolster the army's reputation, specifically. He is positioned by President Putin as his "go-to" man, but he rarely speaks directly to the public. Authoritarian conformers possess rigid, hierarchical attitudes that prescribe leaders' legitimate right to exert power over them and accept such influence unconditionally (Altemeyer, 1998; Thoroughgood et al., 2012). Authoritarians defer to destructive leaders not because of shared values, but instead they obey simply because the leader holds a higher rank in the organization (Hinkin & Schriesheim, 1989). In groups of destructive leaders, authoritarians may also hold attitudes of general intolerance and punitiveness toward out-group members and adversaries. Thus, authoritarian followers—particularly competent and intelligent followers—in the wake of a destructive leader can create a toxic union (Altemeyer, 1998; Thoroughgood et al., 2012).

General Shoigu was largely out of the public eye, despite being the face of strong military force to his domestic audience. In examining the Kremlin's recount of high level meetings leading up to the announcement of increased aggression in Syria, Shoigu was either listed as not present or did not have prominent speaking roles, despite involvement of other members of the Security Council (Kremlin.ru, September 25, 2015). Given his role as Defense Minister, it is unlikely that he was left out of decisions, as he had already met with his peers in the region such as Defense Ministers of Iran and Syria. One potential implication is that the minimized public role of General Shoigu, particularly when juxtaposed against his prominent private role in Syria, signaled a deliberate military endeavor, rather than more overt sabre rattling that is left to his well-spoken peers and senior leader. In subsequent messages, however, General Shoigu

has signaled his careful execution of President Putin's orders, "Mr. President, in line with your instruction, on December 5 we increased intensity of our strikes…" (Kremlin news, 2015).

The Opportunistic Colluder: Prime Minister Sergio Medvedev

Prime Minister (PM) Medvedev owes much of his career to President Putin, as they have known each other since 1990 across the St Petersburg town hall, the federal government, and the Kremlin (Azar, 2007). PM Medvedev is popular inside of Russia, with experience on the reputation-building national projects and careful messaging about his Kremlin "liberal" status in the leadership team. He is consistently portrayed as likeable, loyal, and trustworthy by Putin, and in interviews PM Medvedev describes himself as Putin's "good guy" in negotiations (Zeinalova, 2015). Related to the theory of destructive leadership inner circles (Thoroughgood et al., 2012), PM Medvedev most likely fits the profile of an opportunist, or a follower with similar personality characteristics, values, and beliefs as Putin's, who sees his relationship with Putin as an opportunity for personal gain (Lipman-Blumen, 2005).

Opportunists carry out direction with the implicit belief that their compliance is linked to contingent rewards, and this has been shown the case throughout PM Medvedev's rise through the ranks under Putin. Opportunists have voracious personal ambition, and a proclivity for engaging in manipulation for personal gain without concern for the common good or for others (Christie & Geis, 1970). Machiavellian behaviors such as forceful persuasion, cunning, deception, and manipulation to gain personal power are common between opportunists and peers, while managing "up" behaviors such as flattery and withholding criticism are more likely toward their leaders (Clements & Washburn, 1999; Thoroughgood et al., 2012).

One opportunistic relationship PM Medvedev established has been with Bashar al-Assad, as described by an open letter from Medvedev in Syrian newspaper al-Watan (May 9, 2010). Despite this, PM Medvedev remained largely absent from the public eye leading up to the decision to engage in the Syria conflict against Daesh. After the decision was made public, however, PM Medvedev became a key messenger for President Putin, following up on what President Putin had initiated during his earlier calls and visits to Israel, Turkey, Saudi Arabia, Iran, Syria, and the United States. PM Medvedev has sent messages via Russian media such as, "only Russia's involvement has changed the situation," (RT News, 2015), and "This [US] position is short-sighted and weak because strong leaders and states which take responsibility, hold talks on these occasions, even if they give different assessments of the situation," (RT News, 2015). This behavior suggests that the PM is amplifying the signal of aggression not by defending Russia national interests, but instead denigrating United States leadership when compared to Russia—a perfect justification for aggression given the profile of the competitive President Putin. In addition, his behaviors may signal less of a commitment to stabilizing Syria

than a commitment to "winning" on the world stage when compared to the United States and other perceived competitors.

Summary and Implications

The toxic trio of Putin, Medvedev, and Shoigu may have allowed for a precise amplification of President Putin's signals of aggression, with both members broadcasting destructive elements of planning and implementation for increased violence. In this chapter, we have highlighted one benefit of institutional theory for examining leaders, particularly when combined with signaling theory to identify objective manifestations of latent leader characteristics such as intent for aggression. We provided one case example of a recent act of increased aggression from Russia, with attention to objective markers that may have signaled escalation from this particular TMT.

In other reports, we have also detailed how this can be applied to violent ideological non-state leaders such those in Daesh (Ligon, Lundmark, Crowe, & Simi, 2014). Despite the potential for application, this approach is not without limitations. First, aggressive leaders are not absolutes. Like all human behavior, we describe aggressive leaders (and their organizations and followers) as general tendencies; there are times when these teams will act in ways that appear more prosocial and cooperative. However, when compared to non-aggressive leaders, the behaviors we described in teams such as those in current Russian leadership inner circle are more likely to signal aggression. Next, signal theory is typically used to identify the signals organizations *want* to send (e.g., organizational health via a strong board member composition).

Herein, however, we applied it to draw inferences about a latent variable (aggression) that may not be as readily communicated given the clandestine nature of violence and destruction among adversaries. It is unclear if we can reliably and validly abstract the signal of a TMT formation from markers such as "lack of presence" at important meetings such as the inference we drew from Shoigu behaviors leading up to Syria. Much more work needs to be done to validate this potential way to examine TMT composition and process as a way to predict aggression in adversaries.

Finally, we only selected two members of President Putin's inner circle to illustrate two different types of members who amplify aggression in unique but complimentary ways. There are certainly other key members involved in this and other aggression by Russia. For example, the current Foreign Minister Sergey Lavrov played a significant role externally in managing the move in Syria, while the Chief of Staff Sergei Ivanov managed day-to-day internal affairs. Profiling signals from each of these key players, as well as identifying their primary followership motivations (Thoroughgood et al., 2012) would also benefit this analysis.

This last limitation leads to our final and perhaps most important conclusion. Using the assumption that organizations are extensions of leaders, signal theory would suggest that TMT

composition and behavior is one of many organizational signals of underlying aggression and changes in aggression driven by the underlying aggression of the senior leader. Moreover, signal theory indicates that to obtain a reliable index of underlying latent variables (e.g., aggression), signals must be received from multiple sources across time and setting (Chung & Kalins, 2001). Institution theory would echo that organizations, particularly those led by a personalized, destructive leader, lead to collective action across individuals, teams, and multi-team systems. This collective decision-making results in a harmonious set of signals, albeit signals that vary in observability, intensity, clarity, and strength (Lampel & Shamise, 2000).

Thus, while we have outlined one type of signal (i.e., the top management team) of underlying aggression in an adversary, other types of organizational features (e.g., organizational structure) and processes (e.g., norms around decision making and collaboration) may also provide useful in assessment and prediction. The present chapter has provided a unique way of examining correlates of aggression in leaders using one readily observable signal:the composition and behavior of the TMT. This may prove particularly useful as a complement to narrative analysis, brain imaging, and other techniques described throughout this volume.

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Predicting Hostility

The "emic" Perspective For Forecasting Threat: Ms. Laurie Fenstermacher,[57] Air Force Research Laboratory

Abstract

Advanced methodologies and text analytic algorithms developed by the US Air Force Research Laboratory enable the identification, extraction, and interpretation of discourse markers associated with the "emic" perspective and enable analysts to make meaning about threat. The methodologies and algorithms are a big step forward in enabling anticipatory analysis of violent events. Importantly, the verbal cues on which methodologies and algorithms are based typically occur well in advance of the actual event; thus, they provide leading indicators of violence, enabling either the collection of other information to confirm or action to accelerate, mitigate, or prevent the event.

The "emic" Perspective for Forecasting Threat

Forecasting is defined as calculating or predicting some future event or condition (Merriam-Webster Dictionary). This definition falls short in that it neglects that forecasting involves humans trying to anticipate a set of contextualized plausible futures regarding the behaviors of other humans. And, while observing the behaviors of humans may afford some clues about what they might do in the future, ala "creatures of habit," humans are adaptive, creative, and often surprising. So, forecasts based on previous events or behaviors are often inaccurate, or at least not accurate as often as we would like them to be. The Defense Advanced Research Projects Agency (DARPA) Integrated Conflict Early Warning System (ICEWS) program sought to develop the capability to forecast country level instability across the area of regard (AOR) of a combatant command (COCOM). The resulting algorithms, transitioned to US Pacific Command (USPACOM) and US Southern Command (USSOUTHCOM), were statistical models for events of interest (EoI) such as "domestic political crisis" or "regime change" using features based on events analysis in which text documents from news sources were coded: "who" did "what," "where," and aggregated. This approach resulted in monthly forecast accuracies over 95% (Kettler & Hoffman, 2012). However, when the same approach was used to forecast violent events by an organization, Boko Haram, the accuracy based on events analysis dropped to 36% (Fenstermacher et al., 2014). *What's missing*?

The goal of anticipating threats is to anticipate a "person or thing likely to cause damage or danger" or anticipating "the possibility of trouble, danger, or ruin" (Oxford Dictionary). Certainly, the perennial "bad actors" may be a threat; however, those anticipating threat must allow for the possibility of a person or organization surprising us; for example, acting violently

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for the first time, or conversely, cooperating when they have traditionally used violence as a tactic. Perhaps the reason we are so often surprised is a lack of perspective(s). Forecasting or anticipating threat based solely upon an observer's (third person) perspective has limits. To more fully understand and relate human behavior, anthropologists, forensic investigators, and storytellers (among many others) recognize the need to incorporate multiple perspectives. These perspectives go by different names. Kenneth Pike, a linguist, coined the term "emic" (as in "phonemic") for first person or participant perspective and "etic" (as in "phonetic") for third person or observer perspective. He wrote that it was the "emic" analysis of his data that served to help him understand those elements (i.e., set of sounds) which convey specific meaning to native speakers of a language (Pike, 1957). The "emic" perspective facilitates a view of "behavior as from inside the system" and complements or contrasts with the "etic" perspective which results from studying behavior "as from outside a particular system" (Pike, 1967). In this light, we can think of the "emic" perspective as the *"in their shoes"* perspective.

How does the "emic" perspective enhance the ability to anticipate threats? By attempting to "...capture participants' indigenous meanings of real-world events" (Yin, 2010) and look at "...things through the eyes of member of the culture being studied" (Willis, 2007), an analyst can better interpret and make meaning of plausible futures and intent. The etic, or third person, perspective encompasses the external view of a culture, language, meaning associations, and real-world events based on "etic" constructs: accounts, descriptions, and analyses expressed in schemes and categories regarded as meaningful and appropriate by…observers (Lett, 1990). Without the "emic" perspective, there is the possibility of overlooking hidden nuances, meanings, and concepts (Morris, et. al., 1999) in that an "outsider's (etic) perspective can never fully capture what it really means to be part of the culture" (Olive, 2014). Both perspectives are "part of any understanding" (Agar, 2011); however, while both perspectives are important for an explanation of human thought and behavior, the current balance of sensor data collection/processing/analysis is overwhelming toward the "etic" perspective. Adding the "emic" perspective provides unique insights and important early indicators or signals of impending action (violence, cooperation, etc.); for example, the discourse "signals" that reflect that changing of or rationalization of a new attitude towards a behavior. In addition, it provides important context to enable meaning making about the underlying dynamics and potential courses of action. One of the ways to assess the "emic" perspective is to look at what people/organizations/governments say or write.

The "aha" moment in research focusing upon the need to rethink how to forecast violence or anticipate threats occurred following the discovery that the inclusion of sentiment variables, along with events analysis variables, markedly improved the ability to forecast the advent and cessation of violence (Shellman, et. al., 2013a). This began a sequence of US Air Force Research

Laboratory efforts focused on identification and interpretation of discourse and discursive behaviors that enable anticipatory analysis (early indicators or "signals"), which precede a future event or behavior (e.g., violent event). The research is focused on developing both methods and text analytics to find and interpret discursive patterns and practices related to social identity, affect, integrative cognitive complexity, trustworthiness, and worldview. The initial goal was to forecast violent events; however, the longer-term objective is to more fully assess threat in order to develop and assess appropriate courses of action.

Early research exploring the "emic" perspective and analyzing discourse in order to forecast events focused on social identity. Inspiration came from National Air and Space Intelligence Center (NASIC) analysts, who had identified a distinctive discursive pattern in the discourse of groups prior to the group engaging in violence, involving varying intensity of in-group euphemization and out-group derogation. The result of this and a subsequent effort were multi-lingual methodologies (i.e., Arabic and Pashto), documented in primers transitioned to operational customers, including the NASIC , which enable the detection and interpretation of discourse related to social identity (in-group/out-group) (Toman, et. al., 2010; Fenstermacher, et. al., 2012).

Additional research explored affect as a mechanism to understand and forecast behaviors based on the understanding that aggregated sentiment was too coarsely grained for forecasting behaviors. The effort explored the impact of affect expressed in a dynamic system: government, population, and dissidents, non-state actors who use means (e.g., protest, violence) to meet their political needs. Text analytic algorithms coded events (Shellman, 2008) in the Philippines and Egypt from 2001 to 2012 as well as affect (e.g., anger, fear, disgust) (Plutchik, 1980). For example, "the Swiss government lauded Suu Kyi for her courage" would be coded as "positive" sentiment and under the "joy" affect class; whereas, for "The King is appalled" the sentiment would be coded as "negative" and the affect class as "disgust."

Relationship models were estimated in order to assess the impact of societal emotions on dissident and government behaviors as well as the impact of government and dissident behaviors on societal emotions. This approach elucidated relationships between societal fear of dissidents and increased dissident hostility in both the Philippines and Egypt. It also highlighted differences in the impact of certain classes of affect on behaviors; for example, the impact of societal disgust expressed toward the government. In the Philippines, societal disgust toward the government was associated with reduced repressive behaviors; whereas, in Egypt societal disgust expressed toward the government increased repressive behaviors (Shellman, 2013b).

The next step was to explore if automated methods could be developed to identify and extract markers in discourse (viz., spoken or written speech) that could enable an understanding of intent and/or forecast violent behaviors. When an act of violence occurs, forensic analyses

invariably identify precursor "signals," including discursive behaviors. These behaviors have been described and studied in previous research. Bandura (1990) outlined mechanisms used to disengage the moral sanctions to violence, including dehumanization (e.g., the Nazi cartoons depicting Jewish people as rats during the 1930s and 1940s). Numerous studies on the relationship between integrative cognitive complexity (ICC; the extent to which a person/organization recognizes new ideas/perspectives and is able to integrate them) and subsequent behaviors demonstrated a link between a drop in ICC and subsequent hostility/violence (Suedfeld & Tetlock, 1977; Suedfeld, 2010). Social identity (in-group/out-group) has been identified as a factor in motivating violence. As threats from out-groups increase, in-group identification increases, and, as in-group identification increases, out-group derogation increases, as does the likelihood of violence against that group (Pyszczynski, 2013). Sentiment/affect coding focused on anger, fear, and disgust expressed by the in-group with the expectation that the trajectory from anger to disgust is a signal of impending violence (Matsumoto, 2014). And, of course, as previously mentioned, discursive patterns related to social identity had been identified as useful for forecasting hostility (Toman, et. al., 2010).

The initial automated text analytic effort identified several *independent* discourse markers useful for forecasting behavior: ICC, sentiment expressed by in-group toward out groups (social identity), idea density, vocabulary diversity, and keyness. Idea density is the amount of information contained in a certain number of words, vocabulary diversity is the range of vocabulary used in a text, and keyness is the frequency of the use of certain words in a text relative to comparative texts (a way to track the salience of topics over time).

A case study was conducted on the People's War Group (PWG), a violent organization associated with the Naxalite communist movement in India from 1998 to the present. The data used were 35-50 page newsletters (1998-2010). All the markers, apart from aggregated negative sentiment towards the out-group, were correlated with increased violence in a statistically significant manner. A forecasting model with all of the *automated* (i.e., excluding keyness) discourse markers resulted in 92% correlation between the predicted (forecasted) and actual numbers of monthly bombings in sample and 80% out of sample, a surprisingly powerful model of group-level violence (O'Brien, et. al., 2013). As the research progressed, the discourse analysis algorithms were modified to include new metrics, independent complexity indicators ("differentiation," "integration"), and content analysis (e.g., "loaded" language, loyalty rhetoric, hedging rhetoric).

A second case study on al-Qaeda, based on the Haverford corpus and Inspire Magazine (1998-2011) extracted the same discourse variables as the PWG study as well as the use of interrogatives/subordinate clauses and resulted in 82% correlation between predicted and actual attacks. A recent forecasting study on FARC attacks, directly coding Spanish language for

markers related to vocabulary diversity, integrative cognitive complexity, disgust expressed by in group towards out group, deceptive language, and adversarial language resulted in 77% correlation between actual and predicted attacks.

So, how important is the "emic" perspective for forecasting? A case study investigated the use of three different text analytic algorithms for forecasting violence by Boko Haram, a violent extremist group in Nigeria (Fenstermacher, 2015). The data used were from news feeds, social media, and Boko Haram YouTube video transcripts. Separate statistical forecasting models were developed for the features/markers extracted from the three text analytic methods. The first was based on event analysis (O'Brien, 2010); that is, coding events (kidnapping, coup, bombing, etc.). The second was based on sentiment/affect analysis (e.g., society to Boko Haram disgust), and the third was based on the discourse analysis variables discussed previously including those based on content analysis (e.g., Boko Haram to government hostility), social identity, integrative complexity, idea density, and vocabulary diversity. The events analysis based forecasting resulted in the predicted events correlating with actual events 36% of the time. The result based on sentiment analysis was slightly higher, 49%. The result based on the discourse markers was 69%. The results based on an integrated or "fused" model (all three sets of variables in a single forecasting model) was 86%.

In this case, the "etic" perspective (events analysis) was not sufficient. And, while the "emic" perspective (sentiment/affect analysis and discourse markers) is useful for forecasting, the best forecasting performance overall resulted from combining the events analysis ("etic") and the "emic" perspectives, as one would expect.

Conclusions and Looking Forward

Emic information provides unique insights and important early indicators or signals of impending action/violence as well as important context to enable meaning making about threat (Fenstermacher, 2015). There are verbal cues contained in discourse, found in language associated with the expression of affect (e.g., fear, anger, and disgust), the ability to differentiate and integrate different perspectives (integrative complexity), and social identity. To be able to forecast and make meaning of human behavior requires both "etic" and "emic" perspectives. The discursive behaviors that help to enable an "emic" perspective are often leading indicators of cooperation and violence, far in advance of the physical behaviors. AFRL has developed both methods and text analytic algorithms to enable meaning making from the "emic" perspective. These algorithms are a step toward providing the ability to "analyze, inform, and provide commanders at every level with the knowledge they need to prevent surprise" (Otto, 2014).

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Predicting And Reducing Hostility: Insights From Cognitive Models And Cognitive Behavioral Therapy: Drs. Rachel Wurzman,[58] University of Pennsylvania, and William D. Casebeer,[59] (US Air Force, Ret.), Lockheed Martin

Bottom line up front

1. Core beliefs (i.e., schema) are networks of linked concepts and emotions that act as filters in social information-processing; information contradicting activated schema are processed more shallowly than others.
    - *This explains why fact-based messaging does not often change "irrational" behavior.*
2. Environments, beliefs, and behavior should be targeted jointly in information operations.
    - *Personal and social identities mediate their dynamic interrelationship.*
3. Attribution theory predicts that messaging to foster perceptions of hostile intent in others works by "hijacking" social information processing networks to change cognition.
    - *Consequently, subsequent "counter-messaging" may* strengthen *existing beliefs.*
4. Hostile attribution and reactive aggression are part of our default schema; creating environments that activate benign attribution schema and meta-cognitive control is an important part of counter-messaging strategy.
    - *Strategies to decrease reactive aggression must target factors favoring each.*
5. Strategic information operations may be able to restructure dysfunctional cognition to mitigate hostility by reverse-engineering cognitive-behavioral therapy (CBT).
    - *Leverage cognitive dissonance by coupling messages to other actions or events.*
6. CBT models must be adapted to social-cognitive realities of non-Western cultures, and consider interaction effects when these differ between operators and "audiences."
    - *Attend to cultural differences in self-construal and behavioral attribution.*

Introduction

Why does the behavior of others so often seem completely irrational? Why do people regularly act—with great passion and enthusiasm—against their own interests, and why are they blind to that fact? Understanding the answers to these questions permits the formulation of strategy to address these conundrums. To the extent that sound strategy depends on accurate predictions of an opponent's motivations, actions, and reactions, it is critical to every stage of military planning to understand how cognition, emotion, and behavior interact to influence another's perception of reality. Cognitive models for behavior provide a layer of insight that adds to our understanding of the neurobiological basis for behaviors such as aggression by reframing assumptions from conventional rational actor models about how attitudes and motivations

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drive behavior. Specifically, knowledge, beliefs, feelings, and behavior are reciprocally and contextually interdependent in cognitive models,[1] meaning that information operations targeting these separately may encounter unintended effects or unexpected resistance to change.

This chapter will describe how social-cognitive information processing models of behavior provide insight into: (1) unanticipated reactions to military information support operations (MISO) campaigns and kinetic operations, (2) the apparent intractability of certain irrational beliefs and hostile attitudes and (3) integrative affective-cognitive-behavioral mechanisms for messaging at the group level. We suggest that integrative social-cognitive models can be leveraged to identify specific social and social narrative risk factors that predispose others to attribute hostile intent to ambiguous or even benign actions, and to predict subsequent aggressive responses to ambiguous environmental cues. Cognitive-behavioral therapy also yields insights that can inform novel strategies to mitigate distorted perceptions of US actions, which are so effectively exploited by the Daesh narrative for recruitment and mobilization purposes. Accordingly, insights afforded by the cognitive model of behavior and cognitive behavioral therapy provide a useful framework for integrating the biological, psychological, and social perspectives articulated in the preceding chapters.

Cognitive Model Insights into Hostility and Aggression

Social-Cognitive Information Processing Models of Behavior

Instead of assuming that explicit stimuli are objectively perceived, cognitive models assume that perception is biased by expectation and core beliefs.[2] Clark, Beck, and Alford (2008) define these core beliefs, or *schemas*, as "relatively enduring internal cognitive structures of stored generic or prototypical features of stimuli, ideas, or experiences that are used to organize new information in a meaningful way, thereby determining how phenomena are perceived and conceptualized."[3] In other words, schemas are intrinsically-biased knowledge structures that consist of constitute a contextual framework for behavior. Schemas provide this framework through clusters of concepts and emotions, whose associations with one another are linked, encoded, and reinforced in memory

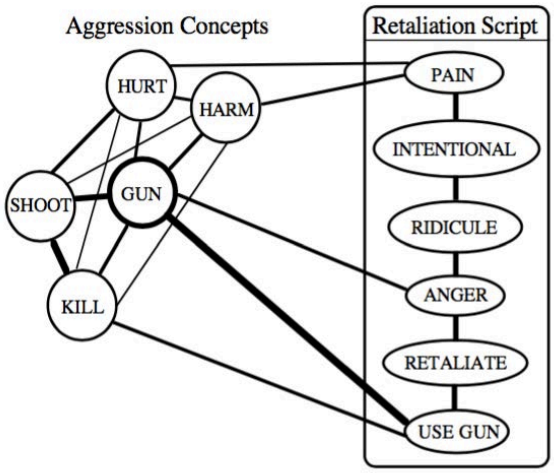

Figure 16: Simplified associative network with aggression concepts and a retaliation script (Figure 1 in Anderson & Bushman, 2012; originally from C.A. Anderson et al., 1998)

through experience.[1] The capacity for any constituent concept or emotion to activate the whole structure depends on how many linked elements have been activated and the strength of association among those elements.[4] Environmental cues, including implicit or explicit messages, activate concepts and/or emotions in the structure. If these are activated past a threshold, the entire schematic structure is activated, consciously experienced, and used to process incoming information. If that threshold is not reached, the schematic knowledge structure is *primed*, meaning a subtler stimulus could activate it in the near-future.[2] Activated schemas filter incoming information, including influencing basic sensory perception and what stimuli reach consciousness.[5] In sum, schema activation is essential to social-cognitive information processing by filtering *whether* socially-relevant information is *perceived*, and what that information *means*.

Schemas exist within memory to efficiently organize past experiences and supply the internal context within which one chooses an appropriate behavioral response to a given situation.[6,7] Upon activation, schemas trigger cognitive behavioral sequences called *scripts*, which are learned patterns of cognitive-behavioral responses to events and social interactions in one's world.[8] This is illustrated in Figure 16 above from Anderson *et al.* (1998), which illustrates a network of associations within an "aggression" script.[9] The figure portrays the way that (1) evoked concepts are linked with emotions, that (2) lead to a scripted sequence of automatic thoughts (e.g., attribution of "intentional" to "ridicule"), and (3) subsequent emotional responses (e.g., "anger") that motivates behavior in stereotypical ways (e.g., "retaliate" and "use gun").

Schemas and scripts are linked through *conditional beliefs* (e.g., "only in fighting and dying for a cause is there nobility in life") and *attributions* (i.e., identified cause for an event), which supply meaning to events and social stimuli[5,10,11]. The processes by which knowledge structures such as schemas, scripts, and conditional beliefs become activated are cognitive, but with sufficient rehearsal can become fully automated.[1,12] The emotional reaction triggered by such automated cognitions (i.e., thoughts reflecting conditional beliefs or causal attributions) typically prompt behaviors that either seek to avoid encountering an anticipated aversive experience, which leads to negative reinforcement of the script, or elicit responses from others that confirm the biased interpretation of the event or stimulus.[13] Strong emotions also encode such experiences into memory, increasing the likelihood of that script's activation in the future. Thus, automatic thoughts and scripts that trigger strong emotional reactions have the overall effect of reinforcing the core schema.

The implication of this is that counter-messaging—by simply activating these knowledge structures—carries the risk of reinforcing the strength of existing attitudes and behaviors. The emotional response to subliminal automated thoughts, triggered by activating the schema,

serves as a powerful filter that prioritizes processing of information consistent with pre-existing values (i.e., "truth claims") embedded in the knowledge structure. Given that knowledge-based messaging risks merely reinforcing the strength of existing beliefs, it may be necessary to prime alternative knowledge structures by targeting behavior and experience *before* directly targeting knowledge or beliefs.

Hijacked Heuristics: Implications for Behavior and Messaging

Attributions mediate the link between external events and personal behavior by systematically rendering causal judgments about events around one's self; in social contexts, such events include self-directed behavior by others. According to attribution theory, causal attributions about others' intentions follow systematic rules. However, in contradiction to common assumptions in conventional rational actor models, these do not necessarily consist of logical principles or even rational processes. Thus, while useful for considering deterrence and influence, rational actor models have required additional bounding and augmentation to accommodate the various ways that beliefs and behavior are not necessarily logically derived (see, for example: Casebeer, SMA Report, May 2015, Ch. 4). For example, some rational actor models, such as from game theory, postulate that behavior is rational from the perspective of the actor's value system. However, they tend to construe value systems as consisting of cognitive constructs that are considered rational only inasmuch as they lay claim to some perceived truth.[14] Where rational actor and game theory models tend to fall short is in explaining why people are resistant to blatantly obvious, tangible, and even *lived* information that a reveal a given truth claim as, in fact, false.

According to social and cognitive psychology, non-rational attributions and biased interpretations of information in locally inconsistent ways occur as a result of heuristic use among the "systematic" rules for reaching causal explanations.[7,10] Heuristics reflect universal tendencies towards *non-rational* shorthand rules, which reduces the array of potentially useful information when causal attributions must be made quickly.[15,16] While often providing more efficient means to accurate conclusions, heuristic processes may also lead to irrational or inaccurate judgments.[7] The efficient use of heuristics requires less cognitive energy, which introduces a motivational factor predisposing humans to avoid or take shortcuts when processing highly cognitively complex information. This leads to several well-known tendencies such as *confirmation biases* (which result from overweighting cues supporting already-held beliefs and discounting of those contradicting them).

Several nonrational tendencies bias social-cognitive information processing. The *availability*, *accessibility*, *salience*, *anchoring*, and inferred *representativeness* heuristics all bias the relative consideration given information with potential causal relevance (for more detailed descriptions, see Dodge, 2006).[7] For example, the *availability* heuristic is associated with judgment errors

such as overestimating the likelihood of events seen in the media.[20] S*alience* heuristics lead to non-rational tendencies such as *parsimony* (tending to they tendency to terminate information search processes prematurely when the first cause becomes salient) and the tendency to *over-weigh negative information* relative to positive information because it is generally more salient.[21] Consequently, employment of a *salience* heuristic favors asymmetrical errors in causal attributions such as the *fundamental attribution error* (wherein actors will attribute their own actions to situational requirements but the same actions in others to stable personal dispositions), because salient information about one's own situational context is more available than it is for others. The tendency to attribute hostile intent to others' behavior, called the *hostile attribution bias*, is a related error that also involves the tendency of humans to "match motives with consequences for oneself."[7,22]

Heuristics and the biases they foster can and are frequently exploited by information operations of all kinds, including marketing and politics.[23,24] In politics, this can be seen in messaging strategies where the same causal attribution is repeatedly applied to a tremendously varied set of events where the effects might be construed as negative for a particular group or interest (e.g., the tendency of political partisans to attribute the cause of anything negative to an incumbent President). The effect of this is that "President Bush" or "President Obama" becomes the most cognitively *accessible* explanation for things that go wrong. In social-cognitive information processing terms, the "President Bush" or "President Obama" schema is primed in the target audience by any negative event in the political sphere, along with other associated schemas, scripts, and affects (e.g., anger, frustration, moral outrage, or humiliation) also activated by that event's context (or its narrative framing). Over time, repetition of this cognitive-behavioral script in messaging contributes to an intensifying effect of hostility of anger whenever the president or members of his party are mentioned.

Over time, due to the reciprocal relationship between such cognitions and affect, individuals may develop cognitive distortions, which are characterized by conditional beliefs or rules that bias negative interpretations of neutral and ambiguous cues.[25] They also may foster hypersensitivity to more overtly negative cues and/or exclude positive cues from perception. This process by which beliefs contributing to hostile attribution biases can motivate as well as be motivated *by* behavior operates in essentially the same way clinically, wherein specific *dysfunctional schemas* engender vulnerability to various psychological disorders. The table below lists common cognitive distortions associated with—but not limited to—psychological disorders.

Table 4: Exampled of cognitive distortions (Knapp & Beck, 2008)

Table 1 – Examples of cognitive distortions

Cognitive distortions
1. Catastrophizing – Thinking that the worse in a situation will happen, without taking into account the possibility of other outcomes. Believing that what has happened or will happen will be terrible and unbearable. Examples: *"Losing my job will be the end of my career". "I will not stand separating from my wife". "If I lose control this will be my end".*
2. Emotional reasoning (emotionalizing) – Presuming that feelings are facts. Thinking that something is true because one has a very strong feeling (actually, a thought) about it. Leaving the feelings to guide the interpretation of reality. Presuming that the emotional reactions necessarily reflect the real situation. Examples: *"I feel that my wife does not like me anymore". "I feel that I'm the laughing-stock of my colleagues". "I feel desperate, thus the situation should be desperate".*
3. Polarization (all-or-nothing, dychotomic thought) – Looking at a situation in only two categories, mutually exclusive, rather than in a *continuum.* Perceiving events or people in absolute terms. Examples: *"Everything went wrong in the party". "I should always get the highest grade, otherwise I'll be a failure". "Something is either perfect or worthless". "Everything was a total waste of time".*
4. Selective abstraction (tunnel vision, mental filter, negative filter) – One aspect of a complex situation is the focus of attention, whereas other relevant aspects of the situation are ignored. One negative (or even neutral) part of a whole situation is highlighted, and all which remains is not perceived. Examples: *"Look at all the people who do not like me". "My boss gave me a poor assessment"* [focusing on only one negative comment and neglecting all the positive comments].
5. Mental reading – Presuming, without any evidence, that one knows what the others are thinking, not taking into consideration other possible hypotheses. Examples: *"She does not like my talking". "He is thinking I'm inopportune". "He did not like my project".*
6. Labeling – Putting a global, rigid label on oneself, a person or a situation rather than labeling the specific situation or behavior. Examples: "I'm incompetent". *"He is a bad person". "She is stupid".*
7. Minimization and maximization – Characteristics and experiences which are positive in themselves in other people or situations are minimized, while the negative aspect is magnified. Examples: *"I have an excellent job but everybody does". "Getting good grades does not mean that I'm smart, the others can get better grades that I do".*
8. Imperatives ("I should have" and "I have to") – Interpreting events in terms of how things should have been rather that simply focusing on how things are. Absolute statements in an attempt to provide motivation or modifying a behavior. Self demands, demands to the others and to the world to prevent the consequences of not meeting these demands. Examples: *"I have to be in control of all things". "I should be perfect in everything I do". "I shouldn't be upset by my wife".*

Systematic cognitive distortions (e.g., catastrophizing, emotional reasoning, and selective abstraction) occur as dysfunctional schema, such as hostile world schema, are activated. This results in the hijacking of cognitive and perceptual filters such that information will only penetrate to be deeply processed if it is amenable to interpretation consistent with the cognitive distortion. *Note that the cognitive distortions in the table above are also highly prevalent in, or leveraged by, Daesh messaging—indeed, such distortions are essential to many types of their propaganda***.** Strategic combinations of action and messaging can bias the selection of specific cognitive-behavioral scripts for entire populations. Populations can be trained to respond with predictable affective behaviors by delivering messaging that leverages heuristic tendencies to encourage automatic and distorted cognitive processing of ambiguous events and experiences. Politically-motivated actions, either violent or non-violent, can be used to "activate" strong emotional experiences and predictable reactions. Subsequently, the cognitive distortions may be directly and explicitly transmitted in messaging whose purpose is to explain and interpret the "activating" event or experience—for example, a terrorist attack, a military invasion, or the introduction of provocative legislation. The provoked emotional context reinforces the messaging by priming the system to make it easier to encode distorted patterns of cognition imposed by the messenger. When such events as are used to provoke strong emotions in this way become part of the group's narrative, such cognitive distortions

may become systematic and inextricable from the group's narrative, in which schema and associated cognitive behavioral scripts are embedded.[27] Consequently, according to Knapp and Beck, "the activation of these [dysfunctional] schemas interferes with the capacity for objective appraisal of events, and reasoning becomes impaired." [11]

To be effective, messaging must overcome these cognitive distortions. However, because resistance to information that is uncongenial with existing attitudes merely trigger the emotions and engage the filter, it is difficult for information-based message campaigns to penetrate, much less affect the narrative. Most often, processing uncongenial information engages counter-arguing processes, which have the effect of reinforcing existing schema, beliefs, and attitudes. In cases of identity fusion, the consequence is potentially even more severe. Clinical research shows that when networked concepts and their associated emotions are powerfully linked to schematic core beliefs—especially self-referent beliefs associated with a person's *identity*—they are extraordinarily difficult to shake.[28] In essence, identity fusion constrains the processing of information and affective experience of reality and truth so as to reinforce the integrity of both self-and group-referent knowledge structures, such as "who we are" and "why we exist." Challenging fused individuals with information that is uncongenial with sacralized beliefs risks not only strengthening these beliefs, but risks being perceived as a challenge to their identity. The principle of identity synergy in Swann's model of identity fusion predicts that distributing information that challenges either their personal *or* social identities will backfire and strengthen their commitment the group.[29,30]

Hostile Schema and Aggressive Behavior

How does the biased attribution of others' intent contribute to aggressive behavior, and how can it be used to predict aggression? An individual's learned patterns of, use, structure, and accessibility of various schemas provide further constraint on the way people frame social experiences. According to social-cognitive information-processing models, early childhood events encode benign or *hostile world schemas* into memory, which may be invoked during the process of attributing intent to other social actors. Beliefs about one's self, or "self-schemas," have a particularly strong biasing influence on how the behavior of others towards oneself is construed, because they set threat-detection sensitivity levels and influence one's affective tendencies. In turn, high sensitivity for threat-detection in turn increases arousal level and primes *hostile world schemas*, or schemas that frame negative experiences as being due to hostile intent by others, such that their activation is more likely in ambiguous situations.

Developmental studies from infant through childhood and adolescence demonstrate that humans reliably develop a hostile attribution bias and default tendency to respond aggressively when the outcome of an act has aversive consequences. As children, we can also learn to recognize "mitigating cues" that signal benign intent, and to exert effortful cognitive control

over angry, aggressive responses to inhibit them (indeed, there are many contexts where we are predisposed to cooperate even in the face of adverse consequences, such as with close relatives). However, many environments in which children are raised do not favor the stable acquisition of a benign attribution style. According to Dodge's model (2006), benign attribution styles are fostered by early experiences with a secure attachment relationship to a primary caregiver characterized by warm and trusting interactions, modeling of benign attributions by valued adults and peers, success in important life tasks, and rearing in a culture that values cooperation and the whole community**.** In contrast, experiences that Dodge links to fostering a hostile attribution style include physical abuse, modeling of hostile attributions by peers and adults, failure in important life tasks, and rearing in a culture that values self-defense, personal honor, and retaliation. While culture does not strictly determine reactive attitudes (on the contrary), it is an important part of the ecology that shapes individual's reactions to messages and circumstance.

According to attribution theory, one's behavioral affect and response to an event is constrained by the same factors that determine how the cause of the event stimulus is perceived.[7] As shown in Figure 17 (right), a combination of personal and situational factors contribute to and interact with the present internal state of arousal and activated cognitive and affective schemas, which give rise to cognitive appraisals (i.e., such as causal attributions of others' behavior arises) and behavioral selection. The situational context, such as whether a provocation was forseeable or not, intentional or not, and whether there were perceptible mitigating circumstances, will affect both cognition and affect (causal attribution and emotional response), and, as a result, also determine the likelihood of an aggressive action.[7,31-33]

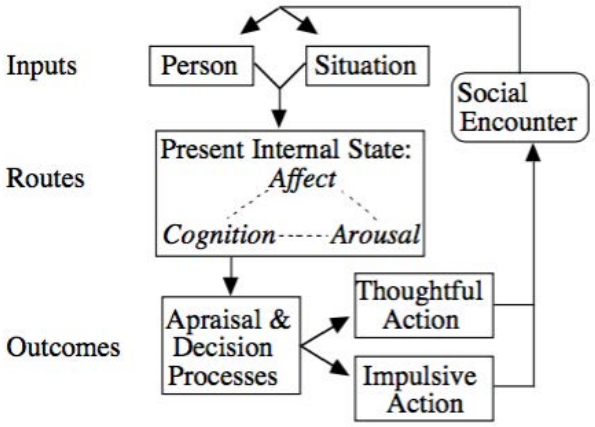

Figure 17: The general aggression model episodic processes (Figure 14.5 in Anderson & Huesmann, 2003; from Anderson & Bushman, 2002)

While early life experiences will either favor the development of stably benign or hostile schemas in childhood, *stable hostile attribution styles do not always lead to chronic reactive aggression*. Depending on the development of other schema and scripts, hostile attribution biases as often contribute to anxious or depressive cognitive-affective orientations towards events, as opposed to aggressive orientations.[34,35] Both one's personal and social identities may also act synergistically to influence other variables that determine aggressive tendencies, such as one's internal dispositions, normative beliefs about aggression,[36] and long-term goals.[2,30] The

specific tendencies towards aggressive behavior in any given individual also depends on: (1) other neurological processes related to impulse-control and emotional reactivity; (2) social information-processing necessary for response selection and decision-making; and (3) situational factors such as ambient threats, external contingencies, mood, and levels of fatigue or arousal.[2] Importantly, the action selected has consequences for the social encounter, and updates the person-specific and situation-specific variables.

Hostile versus benign attributions for specific events are strongly influenced by situational factors such as emotional state, the threat-level within one's physical and emotional environments, and the interpersonal ("dyadic") social context. Attribution theory research has indicated that correspondent inferences about an act are more likely to be made in the context of important realms of one's life, which are said to have high "motivational salience," or in "highly charged" social situations.[10] Provocations concerning disrespect, relationship threat, threats to peer status, and sacred values are therefore very likely to result in attributing hostile intent to the actor.

Importantly, the nesting of affect and cognition within social behavioral contexts means that hostile attribution biases—indeed, all beliefs and attitudes—can motivate behavior as well as be motivated *by* behavior. With this in mind, hostile world self-schemas, especially those featuring experiences of individual or group persecution, may be seen to specifically motivate aggressive behavior and terrorism in several ways. *Reactive* aggression, considered as angry or aversively-motivated aggression in response to provocation, has been repeatedly linked to hostile attribution bias.[7,22,37-39] However, terrorism is arguably better characterized as *proactive* (i.e., instrumental) aggression, which is characterized as aggression that is deliberately and methodically carried out under affective states of low arousal.[40] Unlike reactive aggression, proactive aggression has consistently been shown *not* to correlate with hostile attribution bias. Instead, such as in bullying, proactive aggression is predominantly activated by the expectation of rewarding consequences.[41] In the case of Daesh, one anticipated "reward" is the reactive aggressive behavior displayed by the West.

Xenophobic reactions in Western nations also serve a secondary instrumental aim. Daesh can use the social rejection, anger, and overall heightened hostile attribution bias fostered by xenophobia to reinforce an association between hostile world schema (including vengeful ideation) and a Muslim identity in potential recruits.[28] According to Swann and colleagues, bonding experiences with fellow in-group members, especially traumatic ones, foster the belief that fellow group members experience the world in fundamentally the same way, which produces profound feelings of connection that facilitate identity fusion.[30,42] Scott Atran and colleagues have found that "initially mundane issues can become sacralized under conditions of heightened perceptions of threat, especially if these issues are also implicated in religious ritual

and rhetoric." [28,43] Nurturing hostile attribution bias in order to increase threat perception may therefore be used by Daesh as "cognitive and behavioral means that promote deeper internalization of values, so as to immunize them from normative influences" in foreign fighters.[28]

While hostile world schemas and stable attribution tendencies typically form during childhood, they certainly can also be socialized through adult experience—particularly after traumatic experiences. Daesh leverages this powerfully in its utilization of terrorism as part of its messaging and recruitment strategy. From this angle, terrorism serves as instrumental aggression whose strategic aim is to generate social conditions in Western countries that perpetually prime, if not activate hostile world schemas. This not only increases the salience of messaging, which explicitly "models" cognition that is rife with hostile attribution bias, but ensures that recruits will have highly accessible experiences to deepen the *encoding* of such schema. By increasing the "ambient" threat-level in the West, they not only manipulate the affect and behavior of Western nations, but also reshape cognitive and affective schemata so as to increase the receptivity to messaging among potential recruits.

Mitigating Hostility: Insights from CBT

Social-cognitive information processing theories consider personality as the sum of a person's knowledge structures including beliefs, goals, and expectations. [44] Thus, from a social-cognitive psychology perspective, we might view a population manipulated by propaganda as analogous to the *process* of developing a collective personality disorder, inasmuch as their cognition becomes biased towards a dysfunctional belief, resulting in emotional dysregulation and escalating maladaptive behavior.[45,46] This is *not* to say that we should pathologize individuals in whom such propaganda has been successful, nor that we should subject the entire population to cognitive-behavioral therapy for disturbing or destructive world-views. Instead, our point is that by understanding this process as analogous to the development an treatment of psychopathology, we can gain insight into the mechanisms by which vulnerable populations acquire malignantly-distorted cognitive-behavioral scripts though propaganda, and what steps may be required to reverse the process. Unfortunately, just as personality disorders are particularly resistant to treatment, reversing cognitive distortions reinforced behaviorally over many years is likely to be equally challenging to change.[11] It took time to develop and entrench the distortion, and its reversal may require a similarly long time to accomplish. To be successful, counter-information operations must often take the long view.

Changing maladaptive behavioral scripts entails restructuring the cognitive processing of beliefs and attributions associated with dysfunctional schemas.[5,11] Typically, this involves training an individual to become aware of subliminal "automatic thoughts" whose content reflects beliefs, goals, and expectations, which further filter information processing and bias social cognition. By

becoming aware of the factors that bias perception and behavioral script engagement, individuals can consciously test the validity of these beliefs or expectations by altering their behavioral response to situations and observing the subsequent effects and feelings. With experience, new "cognitive-affective units" can be learned and reinforced by more positive behavioral outcomes. This process serves as the foundation of cognitive-behavioral psychotherapies.

Mechanics of Cognitive Behavioral Therapy

Cognitive therapy emphasizes "the influence of distorted thinking and unrealistic cognitive appraisals of events on an individual's feelings and behavior."[5] The principles of CBT work to bring the reinforcing cycle of thoughts, feelings, and behaviors into conscious awareness so that dysfunctional core beliefs at work in these can be identified, and then challenged. Therapists ask patients questions to encourage them to consider alternate hypotheses for attributions made to events and others' behavior in situations for which they experienced bad outcomes. Strategies for behaving differently in similar situations in the future are suggested that provide an opportunity for a different experience of outcome that confirms the alternate hypothesis. This basic therapeutic structure is common to all forms of CBT, but therapies tend to differ by whether the focus is on cognitive restructuring or coping mechanisms to tolerate distress.[11,45]

Several cognitive-behavioral approaches (such as stress inoculation training) involve first training patients in techniques such as mindfulness to increase their ability to tolerate and cope with feelings of emotional distress. Once a degree of basic emotional regulation skills are achieved—usually in 3-6 sessions, the process of recounting painful experiences from which maladaptive behaviors developed can begin. In some techniques, exposure and response-prevention therapy is implicitly integrated with cognitive restructuring and coping skills training exercises in order to bring into awareness the role that avoidance of distressing feelings plays in perpetuating social and behavioral intra- and inter-personal dynamics that perpetuate the cycle.

Cognitive behavioral therapy is the most validated and common therapeutic approach to treating trauma, PTSD, anxiety, depression, as well as (to a lesser degree) anger and hostile aggression.[49] The formation of hostile attribution biases are highly associated with psychopathologies other than conduct disorders and pathological aggression, including depression, anxiety, somatic disorders, and personality disorders. In addition to their recognition as factors that increase the likelihood of somatic complications and physical morbidity with things like heard disease and insomnia, anger and hostility are also generally associated with worse outcomes for cognitive-behavioral therapy.[50,51] While CBT is still demonstrably superior to other therapeutic approaches, patients whose cognitive and emotional dysfunction is characterized by anger and hostility are more resistant to treatment,

even when depression and anxiety are the treatment targets and not necessarily antisocial, conduct, or aggressive behavioral problems.[52-56]

A few reasons are thought to be responsible for the intractability of symptoms whose dynamics involve anger and hostility. First, more of these patients are likely to drop out of treatment.[52] Second, anger and hostility are particularly associated with decreased cognitive flexibility. Also, anger and hostility are especially associated with self-referent schema closely tied to personal identity.[7] Because of this, more extensive cognitive restructuring is required to foster more functional self-beliefs. This requires that patients remain committed to engage in therapy despite experiencing relatively greater emotional distress, which results from cognitive dissonance and uncertainty that emerges as core beliefs essential to one's self of self are challenged.

As many, if not most of these dysfunctional core beliefs were established as a result of deconstructive experiences in early childhood, during stages in which theory of mind (and thus stable attributional styles) were also learned, it is especially challenging to foster social-cognitive skills that generate awareness of others' mind-frames,[7,57] and the presence of distorted cognitions that contribute to the erroneous attribution of hostile intent in the patient. Patients who also have impulse control and executive function deficits have an especially difficult time interrupting behavioral patterns to engage with the meta-cognition essential to behaviorally test alternate hypotheses for others' behavior interpreted as hostile by default.[1,7]

What are the Implications for US Security and Hostile Threats?

First, identification of risk factors favoring the development of hostile attribution bias also gives clues as to potential targets for intervention. Several factors in trauma survivors and refugees of the conflict in Iraq and Syria favor the failure to form a stable benign attribution style in childhood, or the development of a hostile attribution bias during or after adolescence. By now, there is a trans-generational experience of instability, violence, and trauma as a result of the conflict's long duration, which decreases the likelihood of forming stable and nurturing caregiver attachments to children.[58] Repeatedly experienced violence and trauma increases the effects of stress on cognition, favoring catastrophic thinking and increased perception of neutral stimuli as potentially threatening.[59] These cognitive-affective patterns are reinforced by engagement in "safety behaviors" that aim to escape or avoid the distress caused by situations in which acute vulnerability is felt. In many populations with high rates of PTSD, anger and reactive-aggression are frequently selected behavioral scripts in response to perceived threat or vulnerability. Regardless of the attributional style established in childhood, refugee experience of aversive conditions such as negative affect, frustration, pain and discomfort, social stress from prejudice-based rejection, and ambient violence in host countries can support a hostile attribution bias.[60] Because the resulting increased threat-perception reciprocally primes hostile

schema and aggressive scripts, the tendency is for these to mutually reinforce one another and intensify over time.

Second, our understanding of how hostile attributional styles form during development suggests that there will be practical limits placed on the cognitive restructuring possible in individuals through interventions. Ample sociological and psychological research indicates that the greatest effects of any such intervention for aggression are likely to be most effective for long-term decreases in hostility if these happen in childhood.[61] However, it is still necessary to enact strategies for mitigating hostility in adults as well as the ambient social environment. Reflecting that it is often family and social dynamics that give rise to hostile attribution biases and aggression, multisystemic therapy—a family-based social-cognitive behavioral therapy—has proven more effective than CBT-only approaches.[62] Cognitive-behavioral approaches that focus on constructing personal narratives for traumatic events may be useful adjuncts for other efforts aimed to empower local populations to reassert positive control over their life circumstances. These could be integrated with international support to develop alternative, non-violent movements through which individuals can experience the transcendent life purpose that Daesh so appealingly offers.

Given the difficulty in reshaping aggressive behavior in adults, this suggests that interventions should also target social environmental factors that strongly affect childrearing. Because stress and observation of violence in childhood are prime contributors to developing hostile and threat-attentive cognitive styles, cultivating regional stability and securing access to basic resources should be the highest priority. However, because the way that parents model hostile or benign attributions is critical for their development in children, fostering a stable and safe environment for childrearing will not be sufficient to encourage more widespread development of benign attribution styles. It will also be necessary to establish social frameworks in which children and young adults can experience self-efficacy and success in essential life tasks.[63] Success in cognitive behavioral therapy is dependent on the sense that one can control one's own experience of external events. This is not automatic; it takes caring support networks containing people who model emotional self-regulation and circumstances that support experiencing meaningful personal success.

This is as important for refugees as it is for local populations in conflict zones, but could require the commitment of substantial resources to establish the necessary social infrastructure to support effort in conflict regions or diaspora areas. However, such efforts should be valued as an essential component of re-stabilization and transfer of security enforcement back to the local population. Lasting stability may require establishing a framework for regional populations to provide such support for themselves. Moreover, it is critical to actively support the healthy cognitive development of children to mitigate the effects trans-generational transmission of

trauma.[58] Given that meta-cognitive "theory of mind" skills (being able to infer someone else's mental state and imagine someone else's beliefs, desires and attitudes) are a key aspect of emotional and behavioral self-regulation, focusing on theory of mind skills could be part of increasing the circle of friendly role models for children and may have a high payoff.[57]

An interesting possibility to consider is that just as US military forces currently train regional forces to enforce security, units could be deployed to train local populations, parents, and leaders in cognitive therapeutic principles and techniques that have been adapted for peer counseling.[64] These benefits could be magnified by also training US and regional security forces in such techniques, as the skills and self-insight fostered could mitigate against the effects of trauma. It is important that any such efforts in refugee or traumatized regional populations attend to the need to culturally adapt CBT approaches for specific sociocultural and religious contexts.[47-49] A volume of research (reviewed by Hinton et al., 2012) has explored methods for adapting CBT for traumatized refugees and diverse ethnicities.[48] Different approaches to decreasing hostility may be required when targeting foreign fighters versus local populations, given evidence that identity fusion and devoted actor models are more relevant to the motivations of foreign recruits.[65]

Conclusion

Inasmuch as bio-psychosocial processes that relate core beliefs to emotions and behaviors are essential for mediating the effect of messaging, it is critical to mission success that MISO commanders and operators understand the implications of cognitive theory when defining objectives and planning series. Traditional MISO and influence methodology recognizes three series-level objectives for messaging to access a population's hearts and minds—knowledge, belief, and behavior. It is important to understand the neuropsychological basis for why these blend together in practice, and how they interact to reinforce or counter one another. According to cognitive models, the way that individuals perceive and process reality will affect the way they feel and behave. Yet, it turns out that emotionally motivated *behavior* often has primacy over the way that individuals process and interpret new information. Successful influence operations therefore require an *integrated* understanding of these objectives. An advantage of such an integrated understanding of how knowledge, beliefs, and behavior are co-determinant is that it provides a framework for more comprehensive strategy to guide and integrate messaging campaigns with narrative maneuvers across the operational spectrum.

Footnotes

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Si Vis Pacem, Para Bellum: Applying Thematic Content Analysis To Anticipating Threats To US Security: Drs. Bradford H. Morrison[60] and Peter Suedfeld, University of British Columbia

This paper is a review of how methods of at-a-distance thematic content analysis (TCA), in particular the scoring of integrative complexity (IC) and motive imagery (MI), can be used to forecast if and when a political actor will carry out political violence against the United States.

Thematic content analysis (TCA) is a method by which aspects of the psychology of a subject can be measured through the analysis of texts (whether spoken or written) produced by the subject. An advantage of this method is that it uses evidence of the subject's thinking in the course of normal life, avoiding the artificiality that participating in a psychological study often imposes. TCA also allows researchers to study subjects whom they cannot access in person, including individuals such as national leaders and historical figures. TCA enables trained scorers, following a detailed manual, to represent relevant aspects of the text numerically, making it possible to calculate interscorer reliability as well as to represent the material in graph or table format, test for significant trends or differences, etc. Scoring manuals have been created for a dozen or more variables, among them personal values, coping strategies, psychological distance, and post-crisis changes. Although these and others have featured in the literature, two in particular have been often applied in the study of political matters. These are integrative complexity (IC) and motive imagery (MI).

Integrative complexity (IC) is a measure of the underlying structure, rather than the overt content, of the subject's cognition. It is the product of two aspects of thinking. Differentiation is the recognition of two or more dimensions or legitimate perspectives on an issue, and integration is the extent to which the subject recognizes interaction between the differentiated dimensions or perspectives. As integration must relate dimensions or perspectives, full differentiation is a necessary condition for integration. IC is sometimes also divided into dialectical complexity and elaborative complexity. Dialectical complexity focuses on the tension between competing perspectives, while elaborative complexity focuses on the elaboration of multiple dimensions of one perspective (Conway et al., 2008). These relate to other variables in different ways: e.g., attitude strength is negatively correlated with dialectical complexity, and positively correlated with elaborative complexity (Conway et al., 2008). IC being a measure of structure, not content, neither high nor low IC is universally preferable, more successful, or higher in morality than the other; these consequences vary depending on circumstances.

Political confrontations that are resolved through peaceful negotiation have been documented as characterized by high IC, which is generally associated with openness to information, flexible

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decision-making, recognition of diverse opinions, and wide information search. High IC, however, is also conducive to indecisiveness, lack of firm resolve, and distraction by tangential issues. Decreases in IC, by contrast, are associated with rapid decision-making, concentrated focus, and uncompromising principles; but also with closed-mindedness, inflexibility, and failure to see the legitimacy of differing perspectives. Generally, IC levels and stress are negatively correlated. Many studies have found that IC decreases among leaders and elites as contending nations approach the outbreak of war. The thinking of contenders for political power, whether in revolutions or elections, tends to be less complex than that of incumbents, and increased IC after winning the contest is associated with career success. Among extremist groups, IC decreases with the group's acceptance and practice of violence (Suedfeld, 2010; Suedfeld et al., 2013).

Turning to *motive imagery* (MI), a motive image is any reference to an action, wish, or concern that a source (speaker or writer) attributes to the self or to another person or person-like entity. The MI scoring manual has detailed instructions on when to score each of three categories of imagery described below. The scorer reads the text and follows the scoring instructions, generating a numerical value for each category. In order to standardize the measure for texts of different lengths, the count of each type of imagery is transformed by the following formula: (# of references / word count) * 1000, to give images per thousand words (Winter, 1991).

There are three motives or needs measured in MI scoring: need for achievement (nAch), which represents the motive to accomplish goals, compete successfully, set new personal bests, innovate new ideas or products; need for affiliation (nAff), which is the desire for close, warm personal relations with others; and need for Power (nPow), which is the drive for control or influence over other people or groups.

Like IC, MI is also related to international relations. In general, nPow and IC are negatively correlated with each other; thus, as events move toward the outbreak of war, nPow in the texts of one or both rivals tends to increase while IC decreases. The IC pattern is the more reliable of the two measures, but the assessment of both is useful. Political analyses usually find relatively low levels of nAff among leaders; however, patterns of nAch and nPow seem to be important. Among business leaders who have a high degree of control, such as entrepreneurs, high nAch is associated with success. But among politicians in democratic societies, it is high nPow that is associated with success, esteem, and historical respect. Winter hypothesizes that democratic politicians who concentrate on achieving their goals tend to pay insufficient attention to the need to recruit allies, appease opponents, persuade competing pressure groups, etc., and tend to find lack of control frustrating. In more autocratic societies, where the leader's control is assured by the system, this relationship may not hold (Winter, 2002 and 2010). A study of

outstanding political and military leaders showed references to nPow to be 1-1/2 times as frequent as nAch, and four times as high as nAff. nPow was particularly high among military leaders, who work in a more hierarchical system. As a group, outstanding military and political leaders showed an unusual ability to maintain a stable level of IC during periods of stress (Suedfeld, 2014).

In assessing potential threats, tracking IC and MI can help to detect when a potential adversary moves toward resolving an issue by violence. It can also be used to help to forecast if a cycle of confrontational moves will lead to war, as continued escalation is likely to be associated with low IC and high nPow. On the other hand, stable, high levels of IC in the statements of the leader or leadership group would be reassuring, as would a stable, high level of nAch as opposed to nPow. Thematic content analysis is not a panacea, for instance forecasting the form that violence may take requires a broader understanding of the strengths, resources, and interests of the relevant parties. In combination with this broader analysis, thematic content analysis can help to forecast the likelihood that an adversary will engage in violence, and the timing of that violence. The form of violence may vary, depending on the relative strengths and resources of the two sides, from a surprise attack to episodic outbreaks against a background of low-level proxy action; changes in IC have been found to precede both.

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Operational Perspectives

Bridging Research And Practice: Using Proactive Narratives: Drs. Pamela Rutledge[61] and Jerri Lynn Hogg,[62] Fielding Graduate University

Abstract

The proliferation of media platforms and increasingly sophisticated, yet accessible, media tools has unleashed an avalanche of messaging opportunities. Not only do consumers have unprecedented control over their media consumption, they are active media creators and distributors. The range of media choices and consumer behaviors raise many questions about harnessing their impact and influence for a given target audience (TA). Complex media environments demand equally responsive technical evaluations without loosing sight of the need to translate specialized knowledge and findings into usable models and applications for application in the field.

This chapter argues for an integrative approach to research and practice to better prepare the MISO operators in the field. While there is no doubt that expert knowledge and research contribute throughout the message development process, this is not always feasible. Providing MISO officers with a theoretical framework can facilitate the day-to-day needs and clarify where calling on experts adds significant value. The integration of theories enables a proactive approach to the narrative space by clarifying the meta-narrative and developing approved narrative threads to use or adapt to maintain visibility and coherence for the cultivation of trust.

- Networked communications influence user assumptions and impact perceptions of individual and collective strength.
- Integrating research and theoretical tools expands the ability to develop better media messaging.
- Narratives can model alternative behaviors, create new myths, and signal organizational change.
- Every touch point, online or on the ground, becomes part of the narrative space.

The Inherent Power of Social Connectivity

The media landscape has changed from a uni-directional to a peer-to-peer environment. The participatory nature of social networks, real time connectivity, and mobile devices have changed the psychological assumptions and actions of media users—they are not just consumers, they are also producers and distributers. The power of social networks and mobile

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connectivity creates myriad opportunities that facilitate motivation and encourage persistence, such opportunities foster empowerment, agency, social validation, affiliation, and a sense of mastery (Deci & Ryan, 2000).

The message space is fluid, moving on and offline, amplifying voices and changing perceptions of individual and collective strength, and enabling expression of bio-spycholol gical factors and content into an expanded and highly accessible social space. In this way, social media allows an organization like ISIL to not only recruit, but also provides a nexus for current and potential members to engage, creating a relationship independent of geography, crafting connections that create social validation and psychological attachment. When people believe they can produce desired effects through their own sense of agency or by observing the agentic actions of others, they have incentive to take action (Bandura, 2001). Similarly, potential recruits or members acting on behalf of ISIL receive positive feedback from within the group, enhancing esteem and purpose. The halo effect of positive emotions reflects back on the groups as the enabler of the experience (Nisbett & Wilson, 1977).

The Allure of New Tools

Humans are tool users, and engage tools to address and solve questions that impede our biological, psychological, and social desires and needs. The expansion of scientific tools and resulting knowledge has been instrumental to advancements both in the sciences and in wider aspects of the social milieu. The neurosciences have exploited the momentum of scientific and technological progress and heuristics to enable heretofore unparalleled capabilities in assessing and affecting the structure and function of the brain, and by extension, a host of human activities, inclusive of those that fall within interests and engagement of national security, intelligence, and defense. Critical to this latter dimension is an understanding of neuro-cognitive aspects and mechanisms of human communication.

To be sure, understanding the neural bases of interpersonal interactions is not solely of military or dual-use interest. The enthusiastic adoption of neuroscience-based tools to understand media influence and impact is understandable. Scientific techniques, such as eye tracking, facial recognition, and biometrics, offer great promise. Researchers, however, are not immune to the desire for cognitive certainty, particularly when facing challenges such as those posed by terrorist groups such as ISIL that employ various media in a complex and continually evolving digital landscape. Nevertheless, it's important to remember that there is no single magic formula for unraveling human cognition. Neuroscientific techniques and technologies, like all approaches, have limitations. Strength comes from learning how we can use techniques and theories together. Like the blind men and the elephant, each additional approach offers a fuller understanding of the same beast. As Giordano and Chen more suggest elsewhere in this

volume, neuroscience is most effective when integrated into a bio-psychosocial approach that is contextualized within a social ecology.

Motivation to Change

Human motivation is very complex. The carrot and stick perspective of the behaviorists has been replaced by an equally parsimonious theory that "emotion drives behavior," contributing to the appeal of techniques that claim to identify key aspects of these factors. Yet the singular role of emotion as the primary motivator of behavior change is a topic of disagreement. Measuring a specific emotion does not predict a specific behavior—fear, for example, might give rise to fight, flight, or freeze (Baumeister, DeWall, Vohs, & Alquist, 2010). An emotional reaction in the brain might activate other areas. Specific behaviors depend on psychosocial context and the configuration of opportunities, limitations, and affordances. Emotion has been consistently shown, however, to strengthen memory traces, increasing the impact and retention of information. Thus, we have to be mindful about what we say, where we say it, and how we say it. We need to know how to create and send messages that attract attention and engage emotion with strategic content and an authentic voice so that it supports the objectives at hand.

People Aren't Rational

The assumptions that humans react independently of context, and/or that individual behaviors can be aggregated into a whole simply do not work. Research shows a range of influences that change meaning and behavior, from innate cognitive biases, ego dissonance, and group membership, to social and cultural norms (e.g., Asch, 1955; Sherif, Harvey, White, Hood, & Sherif, 1954; Tajfel, 1974). Conscious and unconscious social influences, such as affiliation, affection, and esteem, not only change over the course of the lifespan, but are culturally dependent and vary across populations and personalities. Yet, all contribute to the social and cultural environment influencing human behavior. As Bandura (1999) argued, behavior is part of a co-evolving ecosystem that includes social and cultural environments. This ecosystem can radically impact core motivations as well as moral development. Recent work in social neuroscience has demonstrated that social processing—making sense of the social world—may, in fact, be the brain's 'default operating system (e.g., Rameson & Lieberman, 2009). This insight has implications for how we conceptualize motivations and goals and the relative emphasis we assign to social influence. Where Maslow (1954) reasoned that needs are a hierarchy, many now argue that social needs are at the core (e.g., Cosmides & Tooby, 1997; Lieberman, 2013; Rutledge, 2011). It also argues for the power of social context in behavior change.

Creating Meaning

Context is fundamentally about meaning. The theoretical foundations from cognitive and narrative psychologies and cultural expertise expand the effectiveness of empirical tools by providing insight into TA perceptions and meaning construction. Whereas cognitive psychology integrates the science of perception with the construction of meaning, narrative psychology views narrative as providing the core structure that allows meaning to evolve. Narrative psychology uses "the storied nature of life" to illuminate the primary drivers of human behavior and to construct narratives to influence change.

Proactive Narrative

There are many ways to tell a story within and around a larger narrative. ISIL's effectiveness in creating multiple narrative threads that target different populations, different needs, and different emotions, are all consistent with the larger story they tell. They have a foundational myth that frames all interactions. We can map the basic structure of ISIL's narrative to mythologist Joseph Campbell's "Hero's Journey": the saga of a mythic figure (or figures) in an epic struggle, with the potential for renewal through righteous conflict, victory, and mystic transformation. The mythic nature of the narrative means that historical events don't defuse logic. As Bruner (1991) notes, narratives are persuasive because they feel right, not because they are right. The willingness to suspend disbelief lowers the resistance to persuasion and makes people more amenable to attitudinal change. Indeed, narratives function at multiple levels—individual, community, and country. In this volume, and elsewhere (Casebeer and Russell, 2005), William Casebeer explicates the power and effect of narrative, and emphasizes the opportunities for narrative disruption as groups mature and their narratives shift to ensure survival.

Integrative Storytelling

Good stories need protagonists, antagonists, tests, the promise of redemption, and supporting characters. Disrupting the ISIL narrative means creating alternative myths and examples, metaphor shifts, and identity alternations that model ways to pursue and achieve sought-after goals through non-violent solutions.

Persuasive narratives rely on the ability of the storyteller to know the audience. Stories are a social exchange. Therefore, they depend on:

- Identifying and understanding the TA.
- Establishing credibility and trust.
- Providing emotional engagement through character relevance.
- Including key knowledge for audience empowerment.

Narratives must also compete in a multi-platform, multi-screen environment. Every touch point, from sophisticated digital media to social interactions on the ground, defines part of the narrative space. Therefore, equally critical are:

- Strategy for a fluid media environment.
- Multiple narrative threads.
- Narrative consistency across platforms.
- Platform selection for what it does best.
- Multiple stories, not repetitive messaging.
- Participatory and interactive design.

Creating Narratives for Change

Developed by Miguel Sabido in the 1970s, the Sabido Methodology is an example of an 'education-entertainment,' narrative developed as serial stories, or telenovelas, with a social agenda. For MISO personnel, it demonstrates how multiple theories can be effectively integrated into a media development process for the purpose of engagement and more specifically attitude change.

This approach has been effectively used to promote positive social change. It incorporates five theories of communication and behavior change:

1. An integration of Shannon and Weaver's 1949 communications model with Lazarsfeld's two-step model to account for the role of internal and external cognitive "noise" on message perception and the increased influence when messaging is shared among listeners, a common phenomenon with serial narratives.
2. Bentley's dramatic theory for melodrama to provide an exaggerated universe of good and evil. The stories include a transitional or 'uncertain' character who meets challenges yet serves as a guide to the desired behavior changes.
3. Jung's theory of mythic and archetypal elements to establish universal models for character development, such as "hero," "warrior," and "mother." The characters represent the characteristics of the archetypes, simplified to represent good and evil within the social and cultural norms of the audience.
4. Bandura's social cognitive theory establishes the rationale for the evolution of the transitional character and the rewards and punishments that reinforce desired behaviors.
5. Sabido's Theory of Tone, which asserted that actors could control their effect on their audiences by channeling their energy through different body zones: head, heart, and pubis. He coupled this with McLean's Triune Brain theory as a useful heuristic to address cognition, affect, and instinct in order to create the most persuasive balance of content.

The strength of the method is that it is not about sending messages; it is about creating an entry point into a narrative with emotional and personal salience. Population Media Center[xxxix] (PMC) applies the Sabido Methodology to impact social changed around the world with impressive results. Programs range from radio serials to multi-platform transmedia story strategies.

East Los High was a multiplatform transmedia strategy designed in response to the high rate of Latina pregnancies before the age of 20 in the US. It consisted of a series of 24 episodes broadcast on Hulu, a website, interactive forums, music, dance routines, downloadable videos, and opportunities to interact with several of the main characters via social media channels, such as Twitter and vlogs. During the first month on the air, more than 27,000 people used a planned parenthood widget on the main website.

Rebecca Myers (2015) created a transmedia storytelling strategy entitled *The Journey*. The project targeted potential ISIL recruits by engaging them on the journey of one young man, "Mo," through an emotional process of self-exploration and a search for purpose and spiritual meaning. Planned elements included conversations with real Islamic scholars, email exchanges with a cousin in Syria, and a vlog sharing thoughts, emotions, and plans as he traveled from the US to Syria and discovers a heroic alternative to violence.

These examples are complex applications of a simple process: creating an opportunity to engage an audience over time and develop an emotional connection and rapport. Myers' project is an excellent example of how MISO officers can apply theory at multiple stages of media development, looking for cognitive and affective meanings that provide multiple entry points into an ongoing story.

Conclusion

We are undertaking a difficult challenge. ISIL has claimed the narrative space through the strength of its story and the ability to create coherent, consistent, and frequent narrative threads. Counter-narratives strategies demand equipping MISO officers with skills to understand the theoretical underpinnings of narrative and neurocognitive psychologies to create media strategies. Advances in neuroscience assessment tools provide opportunities to test media and theories when laboratory situations or representative audiences are available. Neuromarketing can provide direction that can be linked effectively with core psychological concepts in motivation, identity, and meaning making to contextualize potential narrative threads. Providing MISO officers with a theoretical framework can facilitate the day-to-day needs and clarify where calling on experts adds significant value. At the core, however, the effort rests in large part on creating a vision of "what can be" to replace ISIL's narrative with a new one.

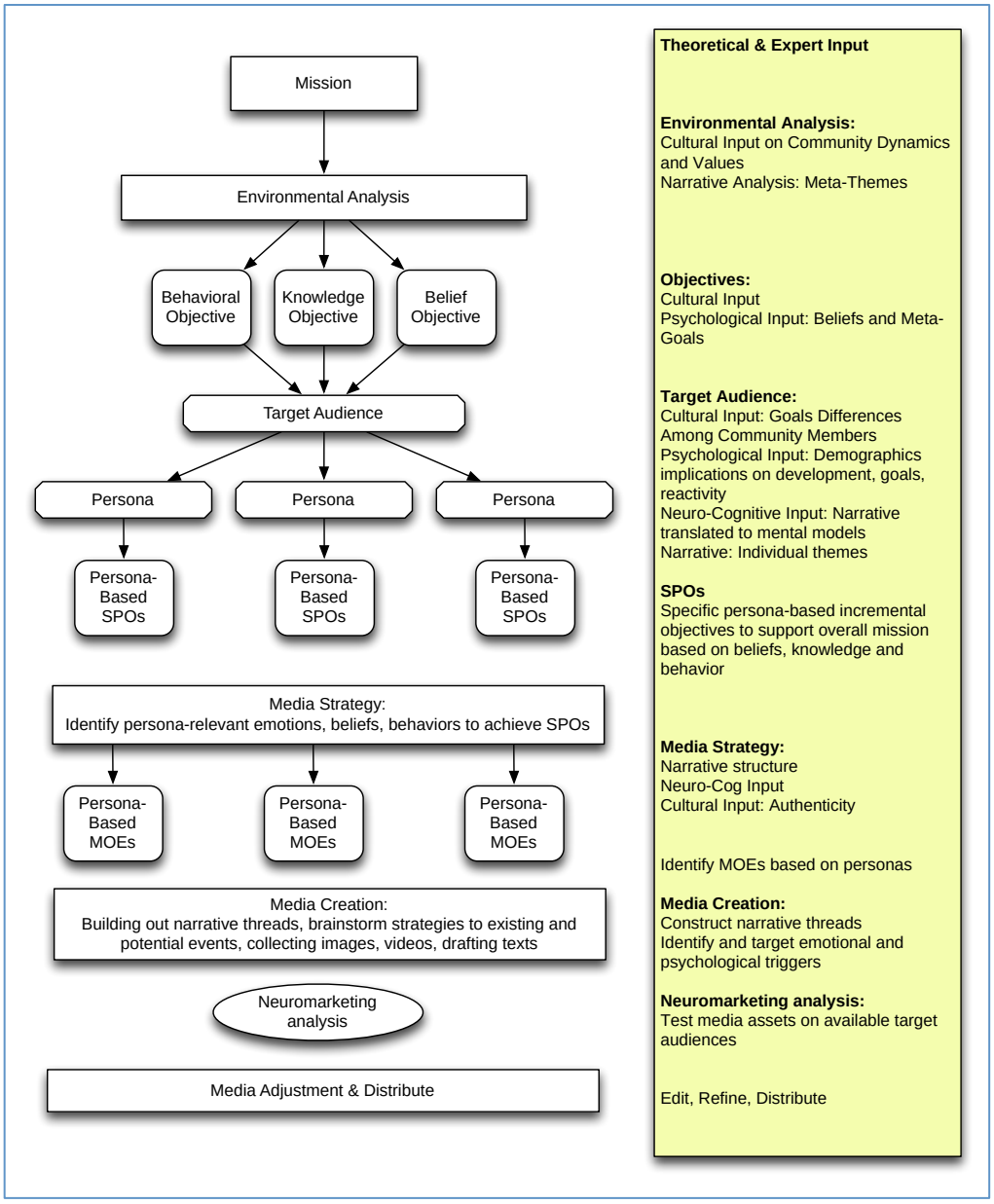

Figure 18: Injection points for theoretical and expert input

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The Urgency To Shift Paradigm On The War Against ISIS In The Narrative Space: Dr. Christophe Morin, Fielding Graduate University

Abstract

There is an urgent need to rethink and retool the war against ISIS in the narrative space. Recent reports on the progress of ISIS suggest that counter messaging strategies have not been successful overall. Worse, it is likely that many of the messages have had an opposite effect on potential recruits. This chapter provides an overview of the neuro-cognitive processes involved in persuasion, and posits that differing development and activity of neural networks may explain why certain narrative and messaging campaigns fail to exert strong persuasive effect on young(er) adults. New tools and technologies from brain sciences (e.g., EEG, GSR eye tracking, etc.) allow improved assessment of the ways that various types of messaging influence emotions, cognition, and behavior. Neuromarketers have used these methods successfully for over a decade. By employing these approaches, military strategists may obtain improved capability to leverage information and evoke desired effect(s) in the narrative space.

The Urgency

Winning the battle against ISIS in the narrative space has been clearly stated as a military priority. In his foreword of a recent SMA White Paper entitled "Maneuver and Engagement in the Narrative Space," Brig. Gen. Charles L. Moore states: "Discrediting ISIL's narrative will require a long-term effort by a team of experts. It will require: (1) developing an in-depth understanding of ISIL's narratives and why they resonate with target audiences, (2) building a whole of government team that can effectively counter and replace ISIL narratives with a strategic communications plan that directly supports our desired end states, (3) globally employing counter-narratives and replacement narratives, (4) gathering and collecting data to assess the effects of narratives (theirs and ours), and (5) continually refining the content and employment of our narratives based on an assessment of their effectiveness" (SMA, 2016).

According to another report published by the INSS (Natali, 2016), "...while D'ish [ISIS] financing has been weakened, it's messaging and recruitment continues to thrive." It is estimated that ISIS can generate as many as 1000 discrete pieces of propaganda in a one month period of time. These messages have multiple forms and are distributed mostly online. The recruits come from neighboring countries to Syria or Iraq, and also from European countries like France, the UK, Germany, and Belgium (Bouzar, 2015). It is also alarming that two thirds of these recruits are less than 25 years old, a fact that signals the potency of recruiting messages targeting vulnerable minds (Bouzar, 2015).

While it is clear that the geopolitical environment in which ISIS is now operating is caused by decades of tribal and religious tensions in the region, most terrorism experts continue to agree

that winning the battle in the narrative space is a serious and urgent matter to address (Stern, 2016). Multiple military briefings that addressing this issue stress the importance of creating effective counter-propaganda messages, but none have identified winning narrative strategies.

Why Are Current Counter Propaganda Messages Not Working?

It is my view that the seemingly simple reason Western countries have mostly failed in their counter-propaganda efforts is because they systematically develop campaigns that seek first and foremost to persuade targets with logic. Giordano claims that "The reaction of Western nations to ISIL tactics to date has tended to strengthen the narrative that ISIL uses to project itself at home and abroad" (Giordano, 2015). Jessica Stern believes that "the West sometimes plays right into the hands of terrorist ideologues, whose success depends not only on the appeal of the narrative they weave, but also their ability to illustrate it with facts, or at least pictures that appear to be facts" (Stern, 2006).

The use of counter-propaganda messages that appeal to reason is especially ineffective on young adults given what we currently know about the neurophysiological basis of persuasion on the teenage brain (Morin, 2015). Thus, I suggest that the best messages to fight ISIS in the narrative space should be developed and tested using insights and methods from the field of neuromarketing. We have the benefit of nearly a decade of media research that can assess and model the neurological effect of messages on the brains of many target groups around the world. According to Giordano (2015), "Successful deterrence and leveraging of power thus rests on an ability to craft a narrative of threat that effectively elicits certain neuropsychological responses within a larger ecology." Additionally, my research on the effect of public service announcements (PSA) on the neuro-cognitive functions of young adolescents, as well as the many commercial studies I have conducted in the field of advertising effectiveness, suggest that effective propaganda messages need to take into account the biological and neurodevelopmental context in which they are processed by the target individuals.

Messaging Strategy: Understanding The Effect Of ISIS Propaganda On The Brains Of Teenagers

According to Natali, "ISIS is very technologically proficient. It understands social media, can produce good video, generates excitement, and has solid networks to distribute its material" (Natali, 2016). There are two main themes commonly used by ISIS: (1) portray the utopian life of civilians in their territories, and (2) showcase the religious merit of joining the Jihadist movement to rid the world from Western persecution. One is designed to instill hope, the other to leverage anger. Both creative directions appear to be especially effective on young groups who have felt abandoned and disenfranchised by their own countries. Many French and Belgium adolescents are known to fit this psychological profile and this may explain why ISIS' recruiting efforts have been so successful in both countries.

As Casebeer, Casebeer and Wurzman, and Spitaletta note in this volume, and as Giordano, DiEuliis, and Casebeer have noted in prior SMA reports and in the scientific literature, it is also clear that the emotional resonance of the ISIS messaging has the power to evoke a cascade of neuro-cognitive processes that can drive hundreds of young people to join an army of criminals. A review of popular videos and visuals posted on social media confirms that ISIS messages first and foremost appeal to emotions not logic. There is an unmistakable irony in this scenario: the messaging strategy deployed by ISIS is using techniques that we know work best to influence and manipulate young adults. Stern and Berger call ISIS propaganda innovative and describe the multiple shocking videos produced by ISIS as "a media model that has been transformed, expanded, and refined to a science" (Stern & Berger, 2016). If ISIS is using propaganda science, we need to fight back by developing and systematically using a better scientific model of persuasion.

How Do Propaganda Messages Work On The Brains?

Given the many young lives that are at stake, reaching and persuading adolescents and young adults to reject ISIS propaganda is a critical priority. While more funds are now invested to understand and counter ISIS propaganda, most counter-messages have little effect, or worse, even opposite effects, especially on young populations. This is because of a failure to recognize and/or create effective propaganda campaigns that work by triggering strong emotional responses based upon the characteristics and susceptibility of the target audience (Morris, Woo, Geason, & Kim, 2002). Recent studies conducted by neuromarketers have confirmed that subconscious affective processes are indeed key drivers of intentions and behaviors (Breiter et al, 2015). Yet, until the early 1990s, most persuasion models consistently underplayed the influence of subconscious emotional factors (Johar, Maheswaran, & Peracchio, 2006). However, multiple studies conducted in cognitive and social neuroscience, neuroeconomics, and neuromarketing have solidly confirmed the existence of a dynamic relationship between, changes in neurophysiology, changes in emotional states, and changes in behavior (DeYoung et al., 2010; Gazzaniga, Ivry, & Mangun, 2009; Glimcher, 2009; Langleben et al., 2009; Tamietto & de Gelder, 2010). Multiple brain structures and networks are involved in this process but the subcortical limbic system is considered to be largely participatory in evoking and managing emotions. This also means that the path of persuasion is to go from emotions to logic, not the other way around.

Are There Key Age Differences In Emotional Systems Between Adolescents And Young Adults?

Persuasive messages have the power to activate reward circuits that may be more sensitive in adolescents' brains than they are in adult brains. Hence, a growing number of advertising researchers support the notion that adolescents are more vulnerable to the effect of advertising, and propaganda because of the varying nature of their subcortical structures

(Pechmann, Levine, Loughlin, & Leslie, 2005; Morin, 2015). Specifically, several studies have shown distinct patterns of brain activity between adolescents and adults when anticipating gains or losses. It appears that adolescents have biological predispositions to activating brain areas involved in short-term rewards when placed in emotional situations (Cauffman et al., 2010; Ernst et al., 2005; Figner, Mackinlay, Wilkening, & Weber, 2009; Galvan, Hare, Voss, Glover, & Casey, 2007; Lau et al., 2011).

Also, the risk-seeking behavior of adolescents appears to be anchored biologically not only in the heightened sensitivity of their brains to short-term rewards but also in the reduced sensitivity of their alert system, namely the amygdala. Studies show that there is a dynamic tension between the nucleus accumbens (reward-centric structure) and the amygdala during situations that involve gains or losses. It is believed that this tension is mainly mediated by the ventromedial prefrontal cortex (VmPFC), a critical brain area that is still considered in a maturation stage during adolescence. Additionally, adolescents tend to recruit the nucleus accumbens more than adults do, which makes them systematically underestimate the consequence of negative outcomes (Ernst et al., 2005). This important difference between adolescents and adults has been found to persist when responding to threats. Using *f*MRI, Lau and his colleagues confirmed that adults are better at engaging their prefrontal cortex regions during threats/safety discrimination learning tasks, while adolescents are more likely to recruit subcortical limbic areas (Lau et al., 2011). Basically, the growing PFC fails to assess the meaning of the valence of negative stimuli, undermining adolescents' ability to predict the consequences of risky behaviors (Crone & van der Molen, 2007; Dunn, Dalgleish, & Lawrence, 2006).

To sum up, adolescents have heightened sensitivity to rewards, reduced sensitivity to punishments, and inferior capacity to exercise cognitive control over impulsivity and risk. This may explain why they respond better and quicker to emotional appeals that target first and foremost the subcortical regions of their brains. All this points of course to the importance of using a bottom-up persuasion model to convince young targets.

The Power Of The Bottom-Up Effect

Clearly the emotional impact of a persuasive message occurs primarily below our level of conscious awareness. As a result, people are unable to report whether a message is persuasive or effective, let alone what aspect of a message has influenced them to make a decision. My research has demonstrated that emotional stimuli can motivate people to obtain information about ideas, products, or services and that such intention is correlated to the strength of their neurological engagement. More importantly, persuasive messages do not work unless they first and foremost influence the more caudal regions of the brain. These brain regions tend to be more engaged by and involved with response to emotional, visual, auditory, and tactile stimuli (Morin, 2002, 2007, 2011) and will typically amplify or abort any persuasive attempt. It is also

important to consider that persuasion radiates to the upper sections of the brain that is more involved with processing information in a more rational way, with somewhat lesser cognitive effort. The logic of the model is to suggest that persuasive messages *capture first*, *convince second,* and *ultimately lead to behavioral change*. The fundamentals of my theory are completely supported by the seminal work of Kahneman (System 1 and System 2), Eagleman, and Medina (see for example: Kahneman, 2011; Medina, 2008; Eagleman, 2011).

How Should Propaganda Messages Be Developed And Tested?

My research can help quantify, explain, and predict persuasive messages. We have performed most of our neuromarketing studies in partnership with Paul Zak, at Claremont Graduate University. Zak has shown that robust neurologic measures predict post-ad actions with accuracy ranging from 82%-95% (Zak et al, 2012). Together, Zak and I have also demonstrated that it is critical to use a combination of methods to provide accurate and valid measures of effect (e.g., electroencephalography (EEG), galvanic skin response (GSR), eye tracking, or facial imaging). The measures used in our studies specifically assess autonomic nervous system (ANS) function and cortical activity (e.g., EEG) in response to media stimuli. Overall, we measure vigilance, visual processing, attention, emotional salience, and valence, cognitive effort, distraction, and behavioral approach or avoidance. Electrocardiographic (ECG) and electrodermal arousal (EDA) data (from GSR) can be collected up to 15-20 times per second, while EEG data is typically collected 250 times per second. These high frequency data show when attention peaks or wanes, and when narrative transportation occurs. Additionally, eye tracking sensors are useful to generate heat maps, while fixation time data affords valuable insights to decode the visual effect of ads on the brain.

The key steps I would recommend for the neurological study and creation of effective counter-propaganda messages against ISIS are as follows:

1. Identify and test existing ISIS messages that capture attention and produce narrative transportation (ISIS messages). Such messages will typically produce emotions and trigger intention or action.
2. Create and test counter-messages using the methods defined herein. Such data will indicate neurological response patterns that will be useful to direct development of improved narratives to create effective messaging.

Conclusion

It is not only possible, but necessary to create and deploy more effective counter-propaganda messages. Winning the war in the narrative space requires a shift in the paradigm of persuasion guiding the creative and cognitive development of the campaigns. Persuasion involves distinct neuro-cognitive substrates and mechanisms, and as such, the timing and strength of the persuasive effect can be observed and measured by methods such EEG, GSR, eye tracking, and

others. The benefit of these techniques is that they enable a more finely-grained insight to underlying biological functions that are involved in, and which may engage distinct psychological effects and socio-behavioral actions. There is a science to understanding propaganda and developing an effective strategy in the narrative space. ISIS is using its own. We need to do better, and do it expediently.

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Winning The Battle In Narrative Space Using Applied Neuroscience—Enhancing And Modernizing The PSYOP Process: SFC Matthew Martin,[63] CPT Robby Otwell,[64] MAJ Gregory Seese,[65] MAJ Shawn Stangle,[66] LTC Rafael Linera,[67] USASOC

Abstract

Over the last decade, neuroscience has provided significant improvements in understanding human cognitive processes. Recent developments in the field of media neuroscience show that traditional information collection methods alone fail to provide holistically effective metrics to plan, assess, and engage with modern persuasive efforts. Media neuroscience techniques and methods that were once cost prohibitive and confined to the laboratory are now affordable, compact, and mobile. US Army Special Operations Command can capitalize on recent advancements in media neuroscience by investing in education for PSYOP practitioners to integrate the most current equipment, training, and techniques available into the force. This new technology can be leveraged to augment and enhance the social/behavioral science methods presently being used. This will contribute to an increased effectiveness of DoD influence campaigns, as it modernizes both the practices and equipment used within the PSYOP Operational Force.

- Often, during the conduct of the PSYOP process, there are numerous critical information gaps, due to resource and time limitations and practitioners' insufficient background in traditional social/behavioral science theory and methods.
- Recent advances in neuroscience tools and techniques now make it possible to identify, measure, and assess unconscious neuro-cognitive drivers of behavior.
- This provides invaluable information that was previously unavailable, and the media neuroscience tools to obtain it can be easily integrated into the PSYOP process.
- Media neuroscience education and tools would provide a wealth of data-driven objective and quantifiable information that could be used to fill critical information gaps, thereby strengthening the ability of the PSYOP practitioner to conduct analyses of the target audience and associated themes and messages that would enhance the effectiveness of the PSYOP process.

The United States Army Special Operations Command's (USASOC) Psychological Operations (PSYOP) units are one of the only elements within the Department of Defense (DoD) that are

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specially selected, trained, and equipped to influence foreign audiences on behalf of the US Government. These elements are charged with changing the behaviors of these audiences through a variety of influence methods.[68] This is often done without significant or objective feedback about the themes and messages obtained from the target audience; not because of flaws in doctrine, but because of reliance on traditional pre- and post-testing methods.

Over the last decade, neuroscience has provided significant improvements in understanding of human cognitive processes. Recent developments, particularly in the field of media neuroscience, show that traditional collection methods alone fail to provide holistically effective metrics to plan, engage, and assess modern persuasive efforts. However, media neuroscience techniques and methods that were once cost prohibitive and confined to the laboratory setting are now ever more affordable, compact, and mobile. USASOC can capitalize on recent advancements in media neuroscience by investing in education for PSYOP practitioners to integrate the most current equipment, training, and techniques available into the PSYOP force. These new techniques and technologies can be leveraged to augment and enhance the social/behavioral science methods presently in use. This will contribute to an increased effectiveness of DoD influence campaigns, as it modernizes both the practices and equipment used within the PSYOP Operational Force. To understand the magnitude of these upgrades, it is important to understand the current limits of the conducting PSYOP.

Limits Of PSYOP

During the conduct of the PSYOP process, there are often numerous critical information gaps that arise due to resource and time limitations and practitioners' insufficient backgrounds in traditional social/behavioral science theory and methods.[69] These information gaps are amplified when trying to develop a plan, test products, and disseminate those products to influence a foreign target audience. Media neuroscience education and tools would provide a wealth of data-driven, objective, and quantifiable information that could be used to fill those gaps, thereby bolstering the ability of the PSYOP practitioner to conduct analyses of target audiences, strengthening the associated themes and messages, and enhancing the effectiveness of the PSYOP process.

[68] FM 3-53, Military Information Support Operations, January 2013 show a "Continuum of Influence" that ranges from information/education, persuasion, and compliance gaining.

[69] A recent Naval Postgraduate School thesis highlighted the data collected by the US Army John F. Kennedy Special Warfare Center and School "regarding [PSYOP] officer academic background" with a total of "three cohorts of PSYOP officer students for a total of 90 officers" (Horvath, B., & Sharpe, J., 2013, p. 60). Here, only 5.56 % of officers in the community held degrees with a psychological background and if expanded, only 28.89% held degrees related to social sciences.

The PSYOP Process

The seven-step PSYOP process is a nonlinear framework that guides the development, execution, and assessment of all DoD influence operations (see Figure below). It encompasses the following phases:

- planning,
- target audience analysis,
- series development,
- product development and design,
- approval,
- distribution and dissemination,
- evaluation.[70]

The end-state of this process is to direct a well-crafted and precise persuasive narrative to elicit behavior favorable to US national objectives.

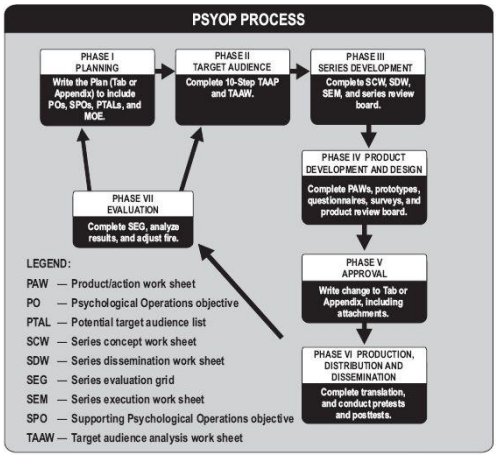

Figure 19: Overview of the PSYOP process

During phases three and four of the process, PSYOP messages and products are pre-tested for effectiveness. Many times, this step is skipped or overlooked as it is time consuming, resource intensive, and the target audience isn't always readily accessible. Furthermore, many of the traditional tools used such as polls, surveys, interviews, and focus groups are subject to response error, social desirability, and cultural bias. Combined with sampling problems and survey validity errors,[71] this makes achieving accurate results difficult and expensive. In addition, research has shown that neuro-cognitive responses to particular stimuli are often

[70] US Army. (2007) (FM 3-05.301) Psychological Operations Process, Tactics, Techniques, and Procedures (Headquarter, Department of the Army) Washington, DC.
[71] Myers, D. (2012). Social Psychology (11th edition). New York: Mcgraw-Hill College.

contradictory to the individual's stated reaction.[72] Weaknesses arising in these phases of the PSYOP process can lead to unpredictable results and diminished effectiveness.

Integrating Media Neuroscience To The PSYOP Process

Recent advances in neuroscience now make it possible to empirically identify, measure, and assess unconscious cognitive drivers of behavior. This enables acquisition of invaluable information that was previously unavailable, and media neuroscience tools necessary to obtain this type and level of information can be easily integrated to the PSYOP process.

Media neuroscience relies on two major advancements. The first is the development of sophisticated tools that have been studied and developed to assess human responses to various stimuli and conditions. With proper training, these tools can facilitate PSYOP practitioners' need to modernize their methods and therefore more effectively influence foreign target audiences. This includes a collection of neuroscience techniques that have been shown to be effective at assessing cognitive, emotional, and behavioral responses.

The second advancement is the confirmation that human decision-making is not inherently rational or even completely conscious in nature. Research shows that even though a person feels s/he is making controlled, conscious, and fully informed decisions, the reality is that such choices are often based on unconscious processes, emotions, and influences. Media neuroscience focuses on the unconscious processes that drive human behavior that are not reflected by conscious feedback. These neuroscience models can analyze unconscious processes by measuring physiological and cognitive responses (i.e., via imaging brain function) while decisions are being made. Providing the PSYOP practitioner with media neuroscience tools would impart an ability to explore the unconscious paradigm of target audiences' thought and behavior choices, leading to the development of better narratives and ultimately more effective influence capability.

These tools can also help understand underlying neuro-cognitive processes and patterns influential to why member(s) of a target audience made particular choices, rather than simply relying upon the target(s) telling the practitioner why they "think" certain choices were made. An individual may believe that s/he has made a fully informed decision, but neuro-cognitive mechanisms appear to precede the "conscious" recognition, realization, and/or expression of the decision. In a manner of speaking, consciousness of the decision is the last element of the hierarchical neuro-cognitive activity responsible for, and engaged in, making a decision. Such information is important to developing more effective approaches to decision analysis and influence.

[72] Ramsoy, T., (2014). Introduction to Neuromarketing & Consumer Neuroscience. (1st Edition Ed.). Denmark, Rorvig: Neurons Inc Aps.

Media Neuroscience Tools

Some of the most valuable and economical neuroscience tools include eye tracking (ET) and various forms of electroencephalography (EEG). ET is used for the analysis of visual attention that can be correlated to cognitive and emotional responses. ET measures where a person is looking (fixation point), the length of time a person looked at a specific point, the movement of the eyes in relation to the head, the number of blinks, and pupil dilation. Each of these metrics provides insight to cognitive patterns of stimulus interaction. ET tools can also provide enhanced and clandestine insight to a person's habits without obtrusive methods of observation.[73]

EEG measurements are recorded passively and non-invasively through an electrode array that is worn in a cap-like garment. Current systems require only a few dry contact sensors. EEG measures two kinds of brain activity: spontaneous and continuous electrical signals, and evoked potentials (in response to specific stimuli). The EEG can be compared to other brain-recording techniques, but is more economical, less intrusive, less time consuming, and requires less training to use, versus other neurotechnological assessment approaches, such as functional Magnetic Resonance Imaging (fMRI).[74] This cost-effective technology has become a relatively widely-used tool for assessing attention, motivation, and cognitive activity.

The usefulness of EEG and ET has been tested and proven in research studies. Additionally, the international commercial marketplace (along with many other organizations) is turning to these tools to reduce costs and increase their effectiveness in advertising. PSYOP practitioners could arguably benefit from these advances in technology by exploiting the following strategic impacts:

1. Conservation of monetary and manpower resources for use on more effective product development and more relevant critical tasks.
2. Provision of improved predictive analysis from product pretesting on sample target audiences that could expedite future approval timelines and prevent unsolicited feedback from approving officials not involved in the process.
3. Achievement of significantly enhanced footing in the information war to allow proactive versus (a predominantly) reactive messaging battle against foreign oppositions to US goals and objectives.

The use of these tools in conjunction with expert interpretation of the data they yield could provide a psychographic map of potential target audiences that heretofore has remained

[73] Santos, R., Oliveira, J., Rocha, J., & Giraldi, J. (2015). Eye Tracking in Neuromarketing: A Research Agenda for Marketing Studies. International Journal of Psychological Studies, Vol 7, No 1.
[74] Ramsoy, T., (2014). Introduction to Neuromarketing & Consumer Neuroscience. (1st Edition Ed.). Denmark, Rorvig: Neurons Inc Aps.

difficult, if not impossible to achieve. Additionally, being able to identify the cognitive and physiological differences in decision-making abilities and patterns within and between individuals, and among and between various groups, would provide a significant advantage to the PSYOP community and the Department of Defense.

Limitations

Adding media neuroscience tools and techniques to both pre- and post-testing could enable a tremendous gain in both capability and effectiveness. Many of the tools can be added to the existing framework with relative ease, and educating practitioners would be merely a matter of developing and providing additional training. However, some of the same limitations of the PSYOP process would still apply: PSYOP practitioners would still need to obtain scientifically valid/reliable sample groups (particularly when using neuroscientific techniques) to aggregate responses to apply/compare to a much larger group, despite often having limited access to an appreciable number of members of their target audiences. Another limitation is that even with the best response tools, practitioners need to develop a defined media product to test. This situates the creative process of media design as being just as important as the ability to "measure" media outcomes. Lastly, the application of neuroscience theories to the battlespace—particularly, within the narrative space—must be articulated through direct communication, and coordination and collaboration with scientists who are actively working in the field, and who have both subject matter expertise, as well as insight into the needs and constraints of the operational environment.

Conclusion

Research has shown that a significant amount of the neuro-cognitive process of decision-making is unconscious in nature and that the overt cognitive output is often incorrect or misleading. In addition, traditional models of influence and behavior explain only limited aspects of the biological and psychosocial drivers of human behavior. With the inclusion of the media neuroscience techniques and tools discussed herein, PSYOP practitioners may be able to scientifically monitor and assess the neuro-cognitive processes of human decision-making that are associated with exposure to products and messages. Instead of relying on the target audiences to self-report the ways and extent to which products evoke certain cognitive and emotional reactions during pre-testing, media neuroscience tools enable direct assessment of neurophysiological substrates of response, thereby bypassing, if not overcoming many of the problems and biases associated with traditional assessment methods. Furthermore, by combining traditional collection methods with the neuroscientific approaches (and the data and information these techniques yield) it may be possible to achieve significantly more reliable assessment of the effectiveness of defined products and campaigns. Through the use of these data, PSYOP practitioners could empirically assess a subject's willingness to perform behaviors that the product or series is attempting to elicit. This application and use of neuroscientific

techniques and technologies has been evaluated and validated in a number of consumer behavior studies. The integration of media neuroscience tools and techniques throughout the traditional PSYOP process could empower the DoD to more effectively and efficiently assess and quantify influence efforts based upon empirically-derived data.

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U.S. Army. (2007) (FM 3-05.301) *Psychological Operations Process, Tactics, Techniques, and Procedures* (Headquarter, Department of the Army) Washington, DC

U.S. Army. (2013) (FM 3-53, C1) *Military Information in Special Operations* (Headquarter, Department of the Army) Washington, DC

Additional Footnotes/References

[i] SMA is accepted and synchronized by Joint Staff/J-39 DDGO and executed by ASD(R&E)/EC&P/RRTO.
[ii] For a complete list of SMA white papers, please contact Mr. Sam Rhem at samuel.d.rhem.ctr@mail.mil.
[iii] (Casebeer, 10; Gazzaniga, 10; Montague, 10; Zak, 10; Desjardins & Orlina, 8; Sapolsky, 6; Hatemi, 6; Lopez, 6; Zak, 6; Desjarinds, 5; Falk, 4; Barraza, 4; Giordano & DiEuliis, 3; Romero, 1; Morin, 1)
[iv] (Casebeer, 10; Zalman, 10; Chiao, 10; Hibbing, 10; Harris, 10; Matsumoto, 10; Rate & Neff, 10; Bruneau, 9; Desjardins & Orlina, 8; Canna et al., 7; McDermott & Hatemi, 6; Desjardins, 5; McCauley, 4; Spitaletta, 4; Giordano, 3; Shook, 3; McCauley & Moskalenko, 1; Romero, 1; Giordano, DiEuliis, & Casebeer, 1; Spitaletta, 1a; Spitaletta, 1c; Wright, 1; Morin, 1)
[v] (O'Connor, 11; Casebeer, 10; Kruglanski, 10; Bruneau, 10; Weber, 10; Hatemi, 10; Pyszczynski, 10; Zak, 10; Adelman & Chapman, 9; Dejardins & Orlina, 8; Canna et al., 7; Grafman, 6; Hatemi, 6; Zak, 6; Desjardins, 5; Cooper, 4; Giordano, 3; Giordano & DiEuliis, 3; Wright, 3; Casebeer, 3; Spitaletta, 1a; Spitaletta, 1b; Spitaletta, 1c; Kuznar, 1)
[vi] (Gazzaniga, 10; Chiao, 10; Hatemi, 10; Chiao, 9; Hatemi & McDermott, 9; Desjardins & Orlina, 8; Sapolsky, 6; Grafman, 6; Hatemi, 6; Zak, 6; Desjardins, 5; Giordano & DiEuliis, 3; Casebeer, 3)
[vii] (Casebeer, 10; Chaio, 10; Bruneau, 10; Adelman & Chapman, 9; Bruneau, 9; Desjardins & Orlina, 8; Hatemi, 6; Barazza, 4; McCauley, 4; Wright, 3; Spitaletta, 1c)
[viii] (Casebeer, 10; Zalman, 10; Kruglanski, 10; Weber, 10; Pyszczynski, 10; Adelman & Chapman, 9; Chiao, 9; Desjardins & Orlina, 8; Desjardins & Orlina, 8; Canna et al., 7; Blair, 5; Desjardins, 5; Wright, 3; Romero, 1)
[ix] (O'Connor, 11; Sapolsky, 6; Siegel, 6; Grafman, 6; Zak, 6; Cooper, 4; Falk, 4; Barraza, 4; Giordano, 3; Giordano & DiEuliis, 3; Casebeer, 3; Romero, 1; Giordano, DiEuliis, & Casebeer, 1; Morin, 1)
[x] (Casebeer, 10; Desjardins & Orlina, 8; Canna et al., 7; Desjardins, 5; Romero, 4; Giordano, 3; Casebeer, 3; Munch, 2; Steed, 2; McCulloh, 2; Spitaletta, 1b; Rutledge & Hogg, 1; Morin, 1)
[xi] (Casebeer, 10; Kruglanski, 10; Chiao, 10; Romero, 10; Berns, 10; Berns, 9; Canna et al., 7; McDermott & Hatemi, 6; Giordano, 3; Shook, 3; Desjardins & Orlina, 8)
[xii] (Giordano, 9; Giordano & Benedikter, 6; DiEuliis, 4; Giordano, 3; Giordano & Chen, 1)
[xiii] (Casebeer, 10; Weber, 10; Desjardins & Orlina, 8; Canna et al., 7; Desjardins, 5; Falk, 4)
[xiv] (Kruglanski, 10; Desjardins & Orlina, 8; Canna et al., 7; Lopez, 6; Blair, 5; Desjardins, 5; Huettel, 4; Falk, 4; Munch, 2; Rutledge & Hogg, 1)
[xv] (O'Connor, 11; Sapolsky, 6)
[xvi] (Casebeer, 10; Kruglanski, 10; Chiao, 9)
[xvii] (Siegel, 6; McDermott & Hatemi, 6)
[xviii] (Weber, 10; Canna et al., 7)
[xix] (Casebeer, 10; Harris, 10; Canna et al., 7)
[xx] (Matsumoto, 10)
[xxi] (Desjardins, 8; Desjardins 5)
[xxii] (Chiao, 10; Bruneau, 9; Chiao, 9)
[xxiii] (Wright, 3)
[xxiv] (Sapolsky, 6; McDermott, 4)
[xxv] (Gazzaniga, 10; Giordano, 3; Desjardins & Orlina, 8)
[xxvi] (Wright, 3)
[xxvii] (Zak, 6)
[xxviii] (Weber, 10; Cooper, 4; Suedfeld, 10; Casebeer, 10; Morrison & Suedfeld, 1)
[xxix] (Cooper, 4)
[xxx] (Wright, 4; Wright, 3, Wright, 1)

[xxxi] (Hibbing, 10; Spitaletta, 1)
[xxxii] (Cooper, 4; Falk, 4)
[xxxiii] (Huettel 4, Cooper, 4)
[xxxiv] (Gazzaniga, 10)
[xxxv] (Weber, 10)
[xxxvi] (Ligon & McRoberts, 1)
[xxxvii] Much of the cognitive psychology literature dealing with IU does not deal with sever psychopathological manifestations but rather with those cases of psychologically healthy individuals or those with minor GAD. The proclivity for worry amongst high IU individuals often manifests in the form of anxiety symptoms among nonclinical populations and those receiving treatment for generalized anxiety disorder (GAD) patients (Buhr & Dugas, 2002).
[xxxviii] Variations in individual uncertainty tolerance may be related to the degree to which one worries about and experiences emotional distress in response to life uncertainties (Buhr & Dugas, 2002).
[xxxix] Population Media Center https://www.populationmedia.org/