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RISK IN THE WILD: REASSESSING TERRORIST THREATS FROM THE FIELD[1]

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Intelligence estimates based on models keyed to frequency and recency of past occurrences make us less secure even if they predict most harmful events. The U.S. presidential commission on WMDs, the 9/11 commission and Spain's comisión 11-M have condemned the *status quo* mentality of the intelligence community, which they see as being preoccupied with today's "current operations" and tactical requirements, and inattentive to tomorrow's far-ranging problems and strategic solutions. But the overriding emphasis in these commissions' reports is on further vertically integrating intelligence collection, analysis, and operations. Such proposals to centralize intelligence and unify command and control are not promising given recent transformations in jihadi networks to a somewhat "leaderless resistance" in the wake of Al-Qaeda's operational demise. Britain's WWII experience provides salutary lessons for thinking "outside the box" with decentralized, partially autonomous expertise.

Avoiding the Curve, Eyeing the Oddball: Conjectures and Refutations. Perhaps the most damning aspect of the presidential commission on intelligence regarding weapons of mass destruction, at least on the issue of biological weapons, was "the Intelligence Community's heavy reliance on a human source – codenamed "Curveball" – whose information later proved to be unreliable."[2] German intelligence first interviewed Curveball, an Iraqi chemical engineer living in Germany, and informed the Pentagon's Defense Intelligence Agency (DIA). The DIA passed along the information to the CIA. When the CIA sought to interview Curveball, German intelligence told the CIA it was a waste of time because Curveball was "a fabricator and crazy."[3] Tyler Drumheller, former head of the CIA European Division, told reporters that in 2002 he saw "dozens and dozens of e-mails and memos" impugning Curveball's credibility. Nevertheless, former CIA director George Tenet claimed that there was never a "formal memo" questioning Curveball's reliability until after then-Secretary of State Colin Powell proffered Curveball's fantasies as "facts and conclusions based on solid intelligence" in a speech to the U.N. on February 5, 2003.[4]

Forgotten or ignored in the fiasco were at least three hard lessons, which Reginald V. Jones, Britain's Head of Scientific Intelligence in WWII, summarized years ago:[5] (1) It is necessary to avoid "the steady and immediate broadcasting of each… uncollated fact," and to withhold such information from political decision makers until checked because "to spread half-truth is often to precipitate erroneous action." (2) The intelligence community must provide an "independent voice" that takes no consideration of what political decision makers may want to hear because this, as Winston Churchill concurred, is "vital" to "the leader on whose decisions fateful events depend." (3) Information from disaffected nationals is usually the most unreliable source on weapons or methods available to actual or potential enemies and "must always be checked." As Machiavelli noted long ago:

> "How dangerous it is to trust the representatives of exiles… such is their extreme desire to return to their homes that they naturally believe many things that are not true, and add many others on purpose…. A prince therefore should be slow in undertaking any

enterprise upon the representations of exiles, for he will generally gain nothing by it but shame and serious injury."[6]

The presidential commission cites over-reliance on conjecture and lack of concrete evidence as critical to the intelligence failure over Iraq's WMDs. But General Isaac Ben Israel, one of Israel's top military strategists, explained why he sees matters differently.[7] It is not too much conjecture, but too little that's at fault. All intelligence reports – including those of U.S. allies - noted past attempts by Iraq to build and hide chemical, biological and nuclear weapons or weapons-grade materials. But no one really bothered to ask if Iraq had the operational capability to still use them, and if there is no such capacity, then either there are no weapons and materials or they are useless. Observes Ben Israel: "Surely one shouldn't expect to dig hidden missiles or production facilities out of the sand or some other hiding place, twelve years after they had been buried there, and launch them without all sorts of training and equipment. There was not even one report on these subjects. And that's why I concluded that Iraq posed no real threat, at least with WMDs."

As in science or business, only bold attempts at both conjecture and refutation can significantly reduce uncertainty. For Ben Israel, that is one key lesson of the R.V. Jones brand of "scientific intelligence." Without concerted effort to hypothesize *novel* scenarios, and equal effort to *reject* such creative hypotheses, no true advance in knowledge is possible. This is not to deny that history and its mistakes can teach us many valuable things in preparation for the future. For without knowledge of history, we are altogether blind.

The failure of Israeli Military Intelligence in the October 1973 "Yom-Kippur" War is a good illustration of how historical examples can cut both ways. On the one hand, pre-occupation with the recent and familiar can lead to erroneous conclusions – philosopher Karl Popper has deemed this "the fallacy of induction" - but more significantly it can lead to operational or policy disasters.[8] For example, preparations for a surprise attack by Egypt and Syria took place under cover of a series of military exercises called "Tahrir 41." After careful scrutiny of the previous 40 exercises, Israeli Intelligence learned the Tahrir pattern all too well. "When the 41st began, we immediately recognized the pattern and assessed it to be another exercise in the series," says Ben Israel, "only this time the Egyptians deviated from the pattern and crossed the canal." On the other hand, this acknowledgement is itself an enlightening use of historical example to gain insight. But this kind of example should not be taken as an indication or suggestion of a historical pattern that can be projected into the future.

The coaches and players of successful sports teams seem to intuitively understand the point. Once a rival team runs a trick play, shame on you if they get away with it again. So, teams prepare for trick plays. But how does a team prepare for a new trick play? What local information can lead to a global (or team) response that something strange is a foot? Certainly not just by re-reading the play book. True, the past is all we have as a guide to the future, but fixing on what is most frequent and near in time can miss the blindside, and may be worse than random because the other side may be (mis)training you. Intelligence estimates that continue to be based primarily on models keyed to frequency and recency of past occurrences, make us less secure even if they predict most terrorist events.[9] The more we fix on box-cutters or scissors and airport security, the more vulnerable we may become.

R.V. Jones, the father of "scientific intelligence," implicitly knew much of this, telling his staffers and collaborators to concentrate on new and unusual information, such as a seemingly inexplicable transfer of some crack German signal corps unit to a place far from the front lines. With the Battle of Britain in full swing and his country's back to the wall, this junior staffer

networked a hodge-podge of thinkers to deal with national survival, from actor Leslie Howard (of *Gone with the Wind* fame) to the Bletchley cryptographers, such as the unconventional mathematical wizard and sometimes biological theorist, Alan Turing, who founded computer science. They blocked the Luftwaffe to prevent the invasion of Britain (by "bending" guidance beacons so that bombs fell off target), and capped the missile menace that represented the Nazis' last hope of survival (by tracking that signal corps unit to the Baltic and focusing decryption efforts not on immediate operations but on V-1 and V-2 trails in Poland). All in all, they were enormously successful in breaking Nazi codes, anticipating attacks and keeping one step ahead of a bewildering array of ingenious German weapons systems that were recognized – as early as September 1944 - as having the potential to take men to the moon and deliver atomic bombs from the stratosphere.

Decentralizing Responses to Terrorism: A 'Paradigm Change'. A key factor in the success of any intelligence effort is the realization that strategies to defeat an enemy must change with changes in scale. It may take distributed intelligence networks to fight globally-connected networks of local terrorist cells. The very framework for formulating hypotheses and operationalizing ways to test them may require what philosopher Thomas Kuhn has called a "paradigm shift" in thinking that fundamentally alters the relation between figure and ground.[10] Defense against national armies and so-called "rogue states," where classical measures of deterrence and threats of massive retaliation against readily identifiable populations and infrastructure are still likely to prove effective, may have to be decoupled from defense against transnational terrorist networks, where such measures may be counter-productive.

Despite claims to the contrary, there is no longer the controlling agency of the Al-Qaeda leadership to target, which seems to be operationally near dead: remnants of the mostly Egyptian hardcore around Bin Laden haven't managed a successful attack in 3 years (since Djerba, Tunisia in October 2002), don't know who many of the new terrorists are, and can't reliably communicate with those they do know in order to direct them.

But "Al-Qaeda" terrorist actions are now chiefly executed by self-forming cells of friends that swarm for attack, then disappear or disperse to form new swarms. Independent studies by the Nixon' Center's Robert Leiken[11] and by Marc Sageman show that over 80 percent of known jihadis currently live in diaspora communities, which are often marginalized from the host society. As with the decentralized anarchist movement (including suicide attackers) that terrorized the world a century ago, killing US president William McKinley and the Archduke of Austria to spark WWI, most jihadis follow who they like more than orders. Their hard-to-penetrate social networks consist of about 70 percent friends and 20 percent family.

Seeking a sense of community and a deeper meaning in life, small groups of friends and family from the same area "back home" bond as they surf Islamist websites to find direction from Al-Qaeda´s inspiration. In five years, websites carrying Islamist messages have increased from under 20 to over 3000,[12] with about 70 avowedly militant sites collectively forming a virtual jihadi university.[13] A new and vibrant Jihadi "market" is emerging: a deeply faith-inspired, decentralized and self-adjusting global jihadi "market," where any small group of friends can freely shop for ideas and even for personnel and materials, much as a group of film producers today might shop for screenplays, directors and cameras.

How do we deal with the "virtual hand" that regulates this growing world exchange? Raw police force and military power likely won't do the trick but only generate more varied and insidious forms of the Jihadi hydra. Responses from the intelligence community are also not encouraging.

The CIA's new director Porter Goss, in his inaugural appearance before Congress,[14] simply reaffirmed the misleading impression that some specific group called "Al Qaeda" is out there planning bigger and better attacks, with the inference that hammering Al Qaeda should remain the principal occupation of America's "war on terror." And the best that people who advise the intelligence community seem to come up with for preventing another 9/11 or Madrid attack is to better combine "the three methodologies" that are almost guaranteed failures for anticipating catastrophic events: pattern projection, frequency and probability.[15] Tinkering with broken pots is not the answer.

Traditionally hierarchical forms of military and intelligence "command and control" were suitable for large scale operations against the Taliban and Al-Qaeda's global organization, but are patently less so now (though classical means are still needed to prevent sanctuaries from re-emerging). Informal bonds may need to grow among diverse experts with idiosyncratic personal skills and the operational branches fighting terrorism, so that a phone call from an expert or operator in one country to another country can trigger specific responses without plodding through official channels - much the way globally networked Jihadis now operate. This would help to convert fairly static modes of attack-response into a dynamic and evolving system of "predator-prey" relations between intelligence networks and Jihadi networks, and throw open the flow of information that would allow the intelligence and military communities' technological advantages to keep ahead of Jihadi innovations in the arms race between the networks.

Todd Laporte of the University of California at Berkeley finds in a review of U.S. nuclear facilities the best way to ward off unexpected catastrophe is to have decentralized networks with specialized teams of technically competent people whose culture rewards them for revealing their own errors.[16] This tact contrasts markedly with recommendations for further directorial control of security services. Even now there is no institutional means for intelligence case officers who may know better to challenge information once it is passed on by "the 7th floor" (the inside name for the political directorship).

General evolutionary theory teaches us that many small and energetic creatures or systems – for example, bacteria or decentralized Jihadi networks – often are able to overwhelm and out compete larger and more ponderous ones – for example, whole bodies or the armies and police forces of nation states.[17] The allied theory of complex adaptive systems conveys a parallel lesson: if you want to solve a novel problem in an applied field – say, a mathematical puzzle in economics – you're more likely to succeed by consulting a decentralized group of problem solvers with diverse skills and expertise rather than a hierarchically-organized group of like-minded experts who seek consensus, even if they are the best in the field.[18]

"It won't help matters to have a National Intelligence Director whose job is to prepare briefs to bring to the President every day or simply to coordinate intelligence products," former Attorney General Edwin Meese recently commented; "what we could use is a facilitator to bring people and ideas together, not another operative. But it's not clear to me that's what's being proposed."[19] Indeed, given the novel and peculiar nature of the threat before us, what has been proposed and is currently being implemented – ever more hierarchical command and control - may be precisely the wrong way to go. *People don't repeat history's catastrophes just because they forget; people build self-destructive ideologies and behaviors that continue history's catastrophic path because they may remember the past too well.*

Although the U.S. Department of Homeland Security has recently shifted its terrorism focus to low probability, high impact events, such as detonation of a nuclear device in an American city, reports of planning scenarios currently available on the internet suggest

that these scenarios may be unduly devoid of direct input from, and ground truthing with, terrorist operations in the field. Using "red" and "blue" teams drawn exclusively from America's own technical expertise, to parry a "universal adversary" armed with a 10 kiloton "mini nuke" that is part of the current U.S. arsenal, may not distinguish in principle between possibilities within range of the old, partially centralized Al-Qaeda command and control organization and newer internet-based networks of relatively small and autonomous groups, and so may not adequately assess real-world risks of attack or prospects for appropriate response. Thus, from the old Al-Qaeda we might expect very different modes of planning (large-scale financial and logistical) and operations (multinational sourcing and multiple, coordinated attacks) versus planning (small-scale) and operations (single attack) from one of the newer groups emerging. Moreover, it is possible to have jihadis, or those from milieux that produce or support jihadis, to unwittingly or wittingly provide their own assessments of a plausible scenario for attack. An example from Pakistan is provided that is realistic and very cost effective.

Facing Catastrophe. It is not frequent or familiar events, but large and rare ones that are responsible for most of the cataclysmic and cascading consequences that shape history, be they climatic and biological disasters, major financial and health crises, political and cultural revolutions, increasingly destructive wars or terrorism. Mathematicians call this trend of events a "power law distribution" and natural scientists call the resulting shake up in the structure of the world a "phase shift." Applied to terrorism, this anticipates future terrorist events with ever broader political, economic and social effects, and points toward ever more massive attack.

Terrorist attacks over the last few decades,[20] like wars over the last few centuries,[21] follow a non-obvious trend in which a very few events are responsible for the vast majority of casualties and most of the wrenching changes in recent world history. Such low-probability, catastrophic events are inherently unpredictable but not inconceivable. An overriding reason for these avalanching effects is lack of preparation owing to a failure of imagination, in addition to over-reliance on what is most usual, obvious and immediately relevant.

If the power–law distribution and phase shifts that seem to characterize war also kick in, then the world might expect hundreds of millions of casualties if a nuclear device were exploded on U.S. soil. (Unless there was specific information to the contrary, U.S. intelligence would simply assume that a small-scale nuclear attack was carried out by jihadis and the U.S. political leadership might very well order the military to retaliate disproportionately and massively against any group, government or society perceived to be hostile to the U.S. and tolerant of a jihadi presence).[22] Whatever one's sentiment towards the U.S., preventing a catastrophic terrorist attack on American soil merits the entire world's immediate and sustained concern even if the likelihood of such an attack appears low.

Physicist Richard Garwin, a former U.S. presidential adviser and recipient of the National Medal of Science, sees suicide terrorists more likely to explode a small nuclear device at ground level, rather than in the air by missile or plane, because it is easier to deliver. "If such a device were delivered by truck or train and detonated in a densely populated area," Garwin remarked, "more people would be killed by radiation than in the Hiroshima air burst."[23] Garwin is concerned that not enough is being done to prevent theft of Highly Enriched Uranium (HEU).[24] He notes that U.S. and Soviet Union made an agreement some years back that the United States would provide 20 billion dollars to take 500 tons of HEU - enough for some 8 to 20 thousand nuclear bombs—and reduce them from about 94% weapons uranium to about 4% nuclear grade that can only be used in nuclear reactors. This process is now a little more than half way through. But there are still hundreds more tons of uranium in the former Soviet Union that have not been

reprocessed. The additional cost of early reprocessing that, not down to 4% but just down to 19%, would be in the tens of millions rather than billions of dollars. Garwin believes that the risk of a nuclear attack is substantially greater than during most years of the Cold War – about ten percent per year.[25]

Pakistani physicist Pervez Hoodbhoy, who presently devotes much of his life to easing tensions between Pakistan and India,[26] and who was one of the first to publicly warn against the rogue nuclear operations of fellow countryman Abdul Qader Khan, does not fear so much that terrorists could manufacture a plutonium device like North Korea now says it has (which can only be used in an implosion mode that is hard for non-state actors to engineer because it requires highly sophisticated technology to achieve exact spherical symmetry and extremely precise timing) or even steal a HEU device (because of sophisticated locks that render the weapon useless if tampered with). But he is concerned that HEU can be mined from existing stockpiles for use in a gun-type weapon. It would probably have to be built on location from smuggled parts because fabrication would require a bit of room, at least an apartment.[27]

A main worry is that well-educated and motivated jihadi sympathizers - like the anarchist student bomb-makers a century ago – know as much about what is needed as those trying to stop them.[28] "Any graduate student of mine who couldn't design a workable nuclear bomb," Hoodbhoy said without boast, "doesn't deserve a Ph.D." (The basic principles for an A-bomb design, though not for an H-bomb, can be had from the declassified Serber lectures).[29]

Natural Games. Recent efforts by the U.S. Department of Homeland Security rightly focus on preventing such catastrophic events (despite heavy pressure from some members of Congress and the press to remain focused on scissors and shopping malls). Nevertheless, DHS, which is currently spending millions of dollars on imaginary scenarios that deal with a "universal adversary" armed with a 10 kiloton "mini nuke" that is part of the current U.S. arsenal, may not distinguish in principle between possibilities within range of the old, partially centralized Al-Qaeda command and control organization and newer internet-based networks of relatively small and autonomous groups, and so may not adequately assess real-world risks of attack or prospects for recovery. Without some sort of ground truthing from terrorist operations in this may prove cost-ineffective, intellectually misleading and potentially disastrous in terms of policy implications. The alternative is to 'ground-truth' plausible scenarios against actions by culturally-relevant actors, applying systematic social science techniques to control for response biases: for example, structured questionnaires using abstract propositions that respondents have never contemplated before (thus disallowing 'party line' responses). Statistical regularity across heterogeneous populations can nearly rule out "lying" and "deception" as likely factors.

In addition, instead of just relying on in-house imagination and expertise – for example, pitting "red" against " blue" teams – one could involve cultural agents more attuned to jihadis. For example, the following question was posed to native Pakistanis familiar with the nuclear industry in that country: *"Suppose, for whatever reason, a group of mujahedin and their supporters wanted to be able to place a workable nuclear device (or several devices) that could be exploded in a foreign country on another continent (that could only be reached by sea or air), even if only to scare that country into changing its foreign policy. What's the best way you think they might go about doing this in such a way that it would not really be possible to trace where the materials for that device came from or to identify for retaliation the group or country responsible."*

Respondents ruled out:

- Manufacturing a plutonium device like North Korea now says it has (which can only be used in an implosion mode that is hard for those operating outside of the government to engineer because it requires highly sophisticated technology to achieve exact spherical symmetry and extremely precise timing),
- Stealing a HEU device (because of sophisticated locks that render the weapon useless if tampered with).
- Rejection also of smuggling in a ready-made bomb by ship under the control of others.
- Preferred approach: HEU can be mined from existing stockpiles for use in a gun-type weapon. It would probably have to be built on location from smuggled parts because fabrication would require a bit of room, at least an apartment

Building a "gun-type" device, weighing 500-1000 kg, would require engineering four elements: a "gun" that shoots a "uranium bullet" from one end of a "rail" to a "uranium target" at the other end. Neither the bullet nor target have enough Uranium-235 to generate a chain reaction, but when slammed together a "critical mass" is achieved sufficient for a nuclear explosion. Respondents estimated the minimum "fizzle bomb" needed to do serious damage as at least one kiloton.

- According to respondents, Pakistan has about 80 "grapefruits," that is HEU cores (U-235) that could be used for an atomic weapon.
- Jihadi sympathy within Pakistani Intelligence service has declined through purging under Musharraf, but Jihadi support remains about 20% in Atomic Energy circles (according to respondents).
- Proposal: To infiltrate Pakistan's Atomic Energy Agency, in particular the grapefruit storage facility.
- Irradiate two U-238 "dummy" grapefruits and substitute these for U-235 grapefruits

Requirements (according to respondents):

- 15 – 20 people, handling or fabricating 1500-2000 parts over 2-3 years; ideally 2 completely independent teams of following sub-teams (minimally related on "need to know" basis:
- Nuclear engineers (1 designer, 1 backup)
- Technical engineers (machine precision, rail, bullet, target)
- Procurement team
- Transportation team (perhaps redundant with procurement team)
- Assembly team (in countryside) – keep to minimum number
- Delivery, pickup truck to target in the city
- Detonation, suicide bomber (more reliable than remote detonation)

The total cost for this war game exercise was zero dollars. Of course, such information can only be used to check and supplement in-house analyses if reliably controlled and replicated – not always an easy task, but almost certainly one worth the effort.

In sum, going outside the house may accomplish two critically interrelated objectives: 1) by accessing people who really know about, are sympathetic to, or are part of adversary cultures, new tactics, operational procedures and strategies may be brought to light; and 2) there can be more realistic assessments of risks and probabilities associated with these actors (e.g., nuclear engineers and defense experts may overestimate the probability of an attack by implicitly assuming that because it's easy for them to conceive how to make a bomb, then it's easy for others).

Finally, current risk management approaches to countering terrorism often assume that adversaries model the world on the basis of rational choices that are commensurable across cultures. But our research suggests that culturally distinct value frameworks constrain preferences and choices in ways not readily translatable (fungible, substitutable) across frameworks. Planning and acting in ignorance or disregard of different value frameworks may exacerbate conflict, with grievous loss of national treasure and lives. From interviewing terrorists and those who inspire and care for them, we have learned that individuals who join the jihad, especially would-be martyrs (suicide bombers), often seem motivated by non-instrumental values and small-group dynamics that trump rational self-interest. Field surveys show that such values do not generate standard calculations regarding cost and benefit, sensitivity to quantity, tradeoffs across moral categories (e.g., family vs. God), or commensuration between different cultural frames. This means that traditional calculations of how to defeat or deter an enemy - for example, by providing material incentives to defect or threatening massive retaliation against supporting populations - might not succeed. For negotiators, policy makers and others who must interact with unfamiliar cultures, it is important to understand sacred values in order to know which social transgressions and offers for tradeoffs are likely to remain morally taboo. Recent studies of Palestinians and Israeli settlers in the West Bank and Gaza illustrate the point.

The 2005 London bombings, a second round of tourist bombings in Sinai and Bali, coordinated hotel bombings in Jordan, the coming of suicide bombing to Bangladesh, and the more than daily suicide attacks in Iraq have spurred renewed interest in suicide terrorism, with recent analyses stressing the "strategic logic," organizational structure, and rational calculation involved.[30] Although these factors may be important, they are not sufficient to explain the near-exponential growth in suicide attack worldwide (*Figures 1*and *2)*.

Do suicide attacks mainly stem from a political cause, such as military occupation? Do they need a strong organization, like Bin Laden's Al-Qaeda? Recent trends suggest that the answer to both questions is "no." Ironically, the near decapitation of the Al-Qaeda organization has made the acephalous terrorist network far more difficult to fight. Today, small suicide cells can pop up anywhere, even in western cities. Like a traditional virus, jihadi operations spread through social contacts. But like a computer virus, jihadi martyrdom culture infects a growing virtual community, from which mostly young people increasingly seek meaning to their lives.

Suicide terrorism accounts for less than five percent of all terrorist events but about half of all casualties. RAND´s Bruce Hoffman finds that about eighty percent of suicide attacks since 1968 occurred after 9/11, 31 of 35 groups responsible being jihadi.[31] From 2000-2004 there were 472 suicide attacks in 22 countries, killing over 7000 and wounding tens of thousands. Most have been carried out by Islamist groups claiming religious motivation for the attack (not counting publicly unclaimed Iraqi attacks, and attacks by nationalist Palestinian groups, such as Al-Aqsa' Martyrs Brigades and the PFLP, whose websites regularly post religious praises of their "martyrs"). More attacks occurred in 2004 (158) than any previous year, most in Iraq (104) but also in 13 other countries.[32] But 2005 has proven even more deadly, with attacks in Iraq alone averaging more than one per day according to data gathered by the US military.[33]

Why are so many enraptured by the jihadi message of martyrdom? Readiness to listen comes with the global media's showing of virtually infinite opportunities coupled with ubiquitous images of social injustice and political repression that much of the Muslim world's bulging immigrant and

youth populations can intimately identify with. Mobilization comes when small groups of friends and family must go out in search of a sense of community that gives meaning to their lives. Radicalization comes when they find a clear message and call to action. Al-Qaeda's acolytes understand and play to this, on Al-Jazeera and countless internet sound and light shows that appeal especially to those ages most attuned to the web.

From Paris suburbs to the jungles of Indonesia, culturally uprooted and politically restless youth I have interviewed echo a stunningly simplified and decontextualized message of martyrdom for the sake of global jihad as life's noblest cause. For the most part they do so sincerely, and increasingly many are willing, even eager, to die as they are to kill.

Seeking a sense of community through the power of faith is something the current US administration, and much of the public, seems to take to heart at home but not abroad. Not only in Muslim countries, but in nearly every western European city, bright and idealistic Muslim youth, even more than the marginalized and dispossessed, take in the jihadi story. It is they who most keenly feel their swelling, media-fed aspirations lanced by the impoverished reality of their own neighborhoods reduced through the imagery of global jihad.

Sacred Values in Religiously-Inspired Decisions and Actions. Religious behavior often seems to be motivated by _Sacred Values_ (SVs). A sacred value is a value that incorporates moral and ethical beliefs and is "independently of its prospect of success." Max Weber, a leading scholar and founder of modern sociology and political economics, distinguished the non-instrumental "value rationality" of religions and transcendent political ideologies from the "instrumental rationality" of realpolitik and the marketplace.[34] Instrumental rationality involves strict cost-benefit calculations regarding goals, and entails abandoning or adjusting goals if costs for realizing them are too high. For Immanuel Kant, one of history's great philosophers of reason, virtuous religious behavior is its own reward and attempts to base it on utility nullifies its moral worth.[35]

High cost personal sacrifices to (non-kin) others in society seem to be typically motivated by, and framed in terms of, non-instrumental values. This includes jihadi conceptions of martyrdom, which also involves moral commitment to kill infidels for the sake of God. One review finds that "only a minority of human violence can be understood as rational, instrumental behavior aimed at securing or protecting material rewards.[36] Historically, religiously-motivated violence tends to underpin the most intractable and enduring conflicts between within and between cultures[37] and civilizations.[38]

Political scientists and economists acknowledge the role of religious values in coordinating groups for economic, social and political activities, and in providing people with immunity that goes with action in large numbers.[39] From a rational-choice perspective, such values operate instrumentally to form convergent trust among masses of people with disparate interests and preferences.[40] thus reducing "transaction costs" that would otherwise be needed to mobilize them.[41] Others grant the instrumental value of "ethnicity" – and values rooted in other ascriptive (birth-based) identities such as religion and language – but ask: "why would ethnicity be the basis for mobilization at all?"[42] And why does the mobilization of these values energize the most enduring and intractable conflicts between groups? This suggests that non-instrumental values possess inherent qualities that instrumental values may lack (passion, obligation), and that these two sorts of values can interact in intricate ways. (Of course, one can always recast non-instrumental values in instrumental terms, just as one can always frame any perceptual or

conceptual relationship in terms of "similarity"; but the issue is whether in doing so explanatory power to predict further judgments and decisions is helped or hindered.)

Psychologists have recently developed controlled ways of testing ideas about allied notions of "protected values" and "taboo trade offs."[43] Psychologist Phil Tetlock and colleagues describe a protected value as "any value that a moral community implicitly or explicitly treats as possessing infinite or transcendental significance that precludes comparisons, tradeoffs… with bounded or secular values."[44] Despite more than a decade of research on protected values and decision making, however, knowledge of their influence is quite limited. What is clear is that sacred or protected values have a privileged link to moral outrage and other emotions , especially when a person holding a sacred value is offered a secular value or tradeoff such as selling one's child or selling futures betting on acts of terrorism.[45]

One claim is that SVs are associated with considerations of moral obligation ("deontological rules") rather than calculations that strictly weigh benefits against costs or link means to ends ("consequentialist rules"). People with SVs often say that one has a moral obligation to act, independent of likelihood of success, "because I couldn't live with myself if I didn't." But there is little analysis of the mental accounting involved in quantity insensitivity or of the stability of values across decision frames:[46] for example, a medical decision framed as one of survival may be insensitive to cost, but not when couched in terms of a marginal increase in prospects for survival.[47] Recent researchers find protected values to be associated with elimination of otherwise robust framing effects such as favoring choices framed as gains over those framed as losses.[48] Beyond this, there is little consensus. Moreover, analyses that have been carried out are primarily with "standard" laboratory populations of university students, using fictional scenarios – a practice that sometimes produces results that do not readily generalize to other populations and methods,[49] no matter how statistically reliable the results turn out to be.[50]

There are some tentative new studies that couple with world events where people with SVs engage in heroism or suicide terrorism to underline the importance of morally-motivated decision making.[51] But significant empirical and theoretical challenges remain. For example, researchers note that although people who ostensibly hold SVs sometimes seem to treat them as having infinite utility (e.g., in refusing to consider tradeoffs), this implies that people with such values should spend literally all their time and effort protecting and promoting that value.[52] Moreover infinite utility is incompatible with any sort of "preference schedule": expected utilities are weighted averages, which makes little sense when one of the terms is infinite.

Thus, some have suggested these values are only pseudo-sacred;[53] others have noted that people with SVs may nonetheless engage in indirect tradeoffs.[54] One may be tempted to think of sacred values as self-serving "posturing," but the reality of acts such as suicide bombings and a monk's self-immolation undermines this stance.[55] Moreover, sacred values necessary to an individual's identity may take on truly absolute value only when value-related identity seems gravely threatened (e.g., via humiliation) just as food may take on absolute value only when sustenance for life is threatened.

Although the field of judgment and decision making has made enormous progress,[56] much more is known about various facets of economic decision making than about morally-motivated decision making. In particular, there is little knowledge or study of so-called sacred or protected values, that is, values which a moral community implicitly or explicitly treats as possessing infinite or transcendental significance that precludes comparisons, tradeoffs, or indeed any other mingling with bounded or secular values. What little research there is suggests that standard political and economic proposals (such as a democratic vote in favor of majority interests with

just material compensation for the minority) rarely succeed in resolving conflicts of over sacred values.

For example, during December 2005 - January 2006, we conducted a survey in the West Bank and Gaza with a representative sample of over 1200 Palestinian refugees and non-refugees on the relationship between sacred values and support for political violence or peace with the Palestinian Center for Policy and Survey Research, under the direction of Khalil Shikaki. Participants were randomly assigned first to two scenarios - "recognize" or "relinquish" - and then to one of three types of trade-offs, namely, taboo", "taboo+", or "tragic":

TABOO - SUPPOSE THE UNITED NATIONS ORGANIZED A PEACE TREATY BETWEEN ISRAEL AND THE PALESTINIANS. UNDER THIS TREATY:

A)   PALESTINIANS WOULD BE REQUIRED TO GIVE UP THEIR RIGHT TO RETURN TO THEIR HOMES IN ISRAEL.

B)   THERE WOULD BE TWO STATES – A JEWISH STATE OF ISRAEL AND A PALESTINIAN STATE IN THE WEST BANK AND GAZA.

TABOO+ - ADDITIONAL CLAUSE:

IN RETURN, THE UNITED STATES AND THE EUROPEAN UNION WOULD GIVE PALESTINE 10 BILLION DOLLARS A YEAR FOR 100 YEARS.

TRAGIC - ADDITIONAL CLAUSE:

ON THEIR PART, ISRAEL WOULD GIVE UP WHAT THEY BELIEVE IS THEIR SACRED RIGHT TO THE WEST BANK.

RECOGNIZE SCENARIO

TABOO - AS YOU KNOW, ISRAELIS BELIEVE THAT THEY HAVE A SACRED, HISTORIC AND LEGITIMATE RIGHT TO A JEWISH STATE IN ISRAEL. SUPPOSE THE UNITED NATIONS ORGANIZED A PEACE TREATY BETWEEN ISRAEL AND THE PALESTINIANS. UNDER THIS TREATY:

A)   PALESTINIANS WOULD RECOGNIZE THE HISTORIC AND LEGITIMATE RIGHT OF THE JEWISH PEOPLE TO ISRAEL [UNDER THE "RELINQUISH" SCENARIO, "PALESTINIANS WOULD BE REQUIRED TO GIVE UP THEIR RIGHT TO RETURN TO THEIR HOMES IN ISRAEL."]

B)   THERE WOULD BE TWO STATES – A JEWISH STATE OF ISRAEL AND A PALESTINIAN STATE.

C)   PALESTINIAN REFUGEES WOULD ONLY BE ALLOWED TO SETTLE IN THE NEW STATE OF PALESTINE, NOT INSIDE ISRAEL.

TABOO + - ADDITIONAL CLAUSE:

IN RETURN, THE PALESTINIAN PEOPLE WOULD BE ABLE TO LIVE IN PEACE AND PROSPERITY, FREE OF THE FEAR OF ISRAELI VIOLENCE AND AGGRESSION.

TRAGIC – ADDITIONAL CLAUSE:

ON THEIR PART, ISRAEL WOULD BE REQUIRED TO SYMBOLICALLY RECOGNIZE THE HISTORIC LEGITIMACY OF THE RIGHT OF PALESTINIAN REFUGEES TO RETURN. [IN THE "RELINQUISH" SCENARIO, "ON THEIR PART, ISRAEL WOULD GIVE UP WHAT THEY BELIEVE IS THEIR SACRED RIGHT TO THE WEST BANK.]

Participants were asked to predict the percentage of the Palestinian population that would respond with violence to each type of tradeoff. There was no interaction between trade-off type and whether the trade off described a "relinquish" or "recognize" scenario, so the results from both scenario types were combined. For Palestinian refugees who indicated that the "right of return" and "Palestinian land" are sacred values, those judging the "taboo+" trade-off , which provided added instrumental incentive for a peace settlement, predicted more violence than those who judged the "taboo" trade-off. And, in turn, those who judged the "taboo" trade-off predicted more violence than those judging the "tragic" trade off that involved recognition of the adversary's willingness to compromise on sacred values but no added instrumental incentive for a peace settlement (see Figure 3). There was no impact of trade-off type on belief that the agreements described could be successfully and peacefully implemented.

In addition, we found that as the proposed monetary compensation/reward to suicide bomber's families increases, so does disapproval of the compensation/reward. This "non-monotinicity" effect (i.e., the greater the instrumental incentive for a behavior, the less the likelihood of that behavior) suggests that support for suicide bombing is somewhat contingent on its perceived altruism. These results go precisely in the opposite direction of what one would expect if calculations were based on straightforward notions of economic or political utility.[57]

These findings replicate and broaden the significance of our previous study of similar issues among Israeli settlers, run by Jeremy Ginges. The settler survey was given out to 600 Jewish residents of the West Bank and Gaza on August 11, 2005, only hours before Jewish settlers were forced to leave Gaza. About half of those surveyed disagreed with the following statement: "There are extreme circumstances where it would be permissible for the Jewish people to give away some part of Eretz Israel [The Land of Israel]."

As in the Palestinian study, Israeli participants were randomly assigned first to two scenarios ("recognize" or "relinquish") and then to one of three types of trade-offs ("taboo", "taboo+", or "tragic"). In the "recognize" scenario, participants responded to the following "taboo" trade-off:

SUPPOSE THE UNITED STATES ORGANIZED A PEACE TREATY BETWEEN ISRAEL AND THE PALESTINIANS. UNDER THIS TREATY:

A) ISRAEL WOULD BE REQUIRED TO SYMBOLICALLY RECOGNIZE THE HISTORIC LEGITIMACY OF THE RIGHT OF PALESTINIAN REFUGEES TO RETURN. HOWEVER, ISRAEL WOULD NOT BE REQUIRED TO ABSORB ANY PALESTINIAN REFUGEES. [In the "relinquish" scenario: "Israel would give up its sacred right to certain parts of Eretz Israel by giving up 99% of Judea, Samaria and Gaza. Israel would not be required to absorb any Palestinian refugees."]

B) THIS TREATY WOULD RESULT IN TWO STATES – A JEWISH STATE OF ISRAEL AND A PALESTINIAN STATE THAT WOULD TAKE UP 99% OF JUDEA AND SAMARIA [BIBLICAL NAMES FOR THE WEST BANK] AND GAZA.

In the "taboo+" condition, clause "C", an instrumental incentive, was added: "In return, the people of the Jewish state of Israel would be able to live in peace and prosperity, free of the threat of war or terrorism". In the "tragic" condition clause "C" instead included a parallel

Palestinian sacred trade-off: "On their part, Palestinians would be required to recognize the historic and legitimate right of the Jewish people to Eretz Israel."

For both scenarios, participants in the "taboo+" condition (added instrumental utility) showed greater hostility to the trade off than those in the "taboo" condition, who in turn showed greater hostility to the trade-off than participants in the "tragic" condition (additional recognition of sacred values) (see Figure 4).[58] Indirect measures of hostility (prediction of the percentage of the settler population that would oppose the tradeoff) correlated very strongly with expressions of negative affect (anger, disgust) over the proposed tradeoff. In sum, understandings, decisions and, ultimately behaviors, in some of the most enduring and intractable adversarial situations may be driven by moral commitments to non-instrumental values that are somewhat insensitive to standard thinking about rational choice.

Let's get back to religiously-motivated terrorism. Most terrorists who have been studied - including would-be or captured suicide bombers – fail to show any psychopathology or sociopathy (at least in other parts of their lives), and are generally at least as educated and economically well off as their surrounding populations.[59] Such findings are often taken to support the idea that terrorist action – including self-destruction - derives from rational decisions to optimize strategies for attaining sociopolitical goals:[60] the religious "bargain" of mostly young men dying for a promising afterlife;[61] ultimate sacrifice as maximizing the goal of improving lives of family or compatriots, which offsets the "opportunity cost" of an educated life lost prematurely;[62] "trading life" for a social identity that is affirmed in death but devalued by continued living. [63]

These speculations are theoretically plausible; however, no empirical study involving structured interviews or experiments with religious suicide terrorists has ever put these speculations to empirical test. Rather than obey a utilitarian "logic of rational consequence" these actors perhaps more closely follow a "logic of moral appropriateness."[64] Consider, for example, our recent interviews with a number of self-identified recruits for martyr attack from the Hamas Block at al-Najah University in Nablus (which provides more suicide bombers than any other demographic group of Palestinians) as well as a number of active fighters in Indonesia from Jemaah Islamiyah, Al-Qeda's main ally in southeast Asia, trained in Afghanistan, the southern Philippines, Sulawesi and the Mollucas. All were asked questions of the sort, *"So what if your family were to be killed in retaliation for your action?" or "What if your father were dying and your mother found out your plans for a martyrdom attack and asked you to delay until the family could get back on its feet?"* To a person they answered along lines that there is duty to family but duty to God cannot be postponed. *"And what if your action resulted in no one's death but your own?" The typical response is, "God will love you just the same."* For example, when these questions were posed to the alleged Emir of Jemaah Islamiyah, Abu Bakr Ba'asyir, in Jakarta's Cipinang prison in August 2005*,* he responded that martyrdom for the sake of jihad is the ultimate <u>fardh 'ain</u>, an inescapable individual obligation that trumps all others, including the five pillars of Islam. What matters for him as for most would-be martyrs and their sponsors I have interviewed is the martyr's intention and commitment to God, so that blowing up only oneself has the same value and reward as killing however many of the enemy.[65]

Such answers suggest that sacred values are not very sensitive to standard calculations regarding cost and benefit, to quantity,[66] to tradeoffs across moral categories (e.g., family vs. God) or to commensuration between different cultural frames.[67] This means that traditional calculations of how to defeat or deter an enemy - for example, by providing material incentives to defect or threatening massive retaliation against supporting populations - might not succeed.

More innovative approaches may be required to avoid a direct clash of culturally important values. In the well known case of "ping-pong" diplomacy between the USA and China, the sacrifice of something of marginal value to one side (losing a ping-pong match where, ping-pong was considered a "basement sport" by most of the U.S. population) was amplified by its value-differential into producing something of great symbolic value for the other side (ping-pong was a sport of national prestige to China). This exchange contributed to a world-historic breakthrough during the Cold War. (Note that cricket matches between India and Pakistan are not likely to have such an effect because cricket has more or less equal value for both countries, so that game becomes zero-sum, with only a loser and a winner).

Perhaps were France to yield on the issue of allowing Muslim women to wear headscarves in public schools, the effects would now reverberate throughout the Muslim world to the good. The problem, however, is that France, unlike, the USA considers signs pf physical and religious distinction in school an affront to the symbolically defining value of French political culture ever since the French Revolution, namely, a universal and uniform sense of social equality (however lacking in practice). "The only community is the nation," declared French Prime Minister Dominique de Villepin.[68] Indeed, the American ideal of cultural diversity is perceived by the entire political spectrum in France as an attempt to force an alien notion of community and identity between the only two moral entities recognized in that country – the individual and the state.[69] But recall the results of "tragic tradeoff" experiment with Palestinian refugees and Israeli settlers: even a token sacrifice of one side's symbolically held position may weaken the other side's rigid adherence to its own adversarial position.[70]

Battling Values and Virtual Jihad. In targeting potential recruits for suicide terrorism, it must be understood that terrorist attacks will not be prevented by trying to profile terrorists; they're too much like everyone else. Insights into homegrown jiahdi attacks will have to come from understanding group dynamics, not individual psychology. Small group dynamics can trump individual personality to produce horrific behavior in otherwise ordinary people, whether with terrorists or those who fight or jail them.[71]

Most jihadi cells are small in number, with eight members being most common.[72] Although the members of each cell usually show remarkable homogeneity within the group (age, place of origin, residence, educational background, socioeconomic status, dietary preferences, etc.), there is little homogeneity across the jihadi diaspora. This renders attempts at profiling practically worthless. Cells are often spontaneously formed and self-mobilizing, with few direct physical contacts to other cells. Radicalization usually requires outside input from, and interaction with, the larger jihadi community. The Internet is taking over from the hands-on gurus of global jihad in radicalizing friends into pseudo-families for whom they will give their lives. Without the Internet, the extreme fragmenting and decentralization of the jihadi movement into a still functioning global network might not be possible.

This requires the careful monitoring rather than simple removal of existing jihadi Web sites. What is needed is a subtle infiltration of opportunities to create chat rooms, as well as physical support groups, which advance causes that can play to jihadi sentiments but that are not destructive, such as providing faith-based social services. The key is *not* to try to undermine the sacred values that inspire people to radical action, or attempt to substitute one's own preferred values by forceful imposition or through propaganda: Experiments in cognitive and social psychology repeatedly show that such tactics usually only incite further moral outrage and extreme behavior.[73] Rather, the aim should be to show how deeply held sacred values can be channeled into less belligerent paths. What has struck me in my interviews with mujahedin who have rejected suicide bombing is that they remain very committed to Salafism, a contemporary

movement of Sunni Islam which holds that literal readings of the <u>Qur'an</u> and the <u>hadith</u> - or oral traditions – should guide everyday life for the believing Muslim. Those who seem to best succeed in convincing their brethren to forsake wanton killing of civilians do so by promoting alternative interpretations of Islamic principles that need not directly oppose Salafi teachings.

In his recent book, *Unveiling Jemaah Islamiyah*, one of JI's former top leaders, Nasir Abas, refutes what he believes to be a tendentious use of the Koran and Hadith to justify suicide bombing and violence against fellow Muslims and civilians. (JI, similar to many of the militant Salafi groups that are sympathetic to Al Qaeda, is riddled with internal divisions over the wisdom of killing fellow Muslims and civilians.) "Not one verse in the [Koran] contains an order for Muslims to make war on people of another religion," Abas writes, "or that killing women, children and civilians can ever be proper, just or balanced. [The contrary belief] has only created discord in the Muslim community and has led non-Muslims to regard Islam as sadistic and cruel."[74] He reasons that the best way to turn altruistic suicide bombers who believe that what they are doing is sacred away from violence may be by religiously promoting competing sacred values, such as spreading the faith and promoting equal economic opportunity, as well as social and political advancement, through educational achievement and personal piety. Sincere alternative appeals to sacred values could undermine consensus for violent jihad. But it is not evident that the United States and its allies would or could embrace this process without strangling it.

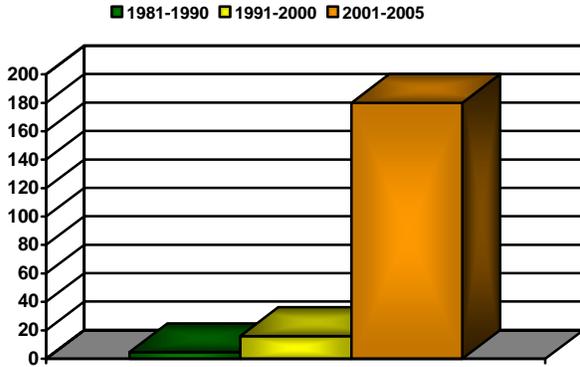**Figure 1 legend**

Suicide attacks worldwide, annualized by decade

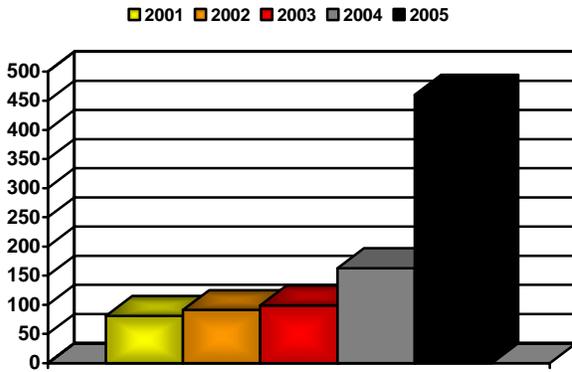**Figure 2 legend**

Suicide attacks worldwide, 2001-2005

Figure 3 legend

Predictions by Palestinian refugees (N=421) who hold "the right of return" and "Palestinian land" as sacred values of the percentage of the Palestinian population that would respond with violence to tradeoffs for peace. Linear trend: taboo+ > taboo > tragic (p = .01).
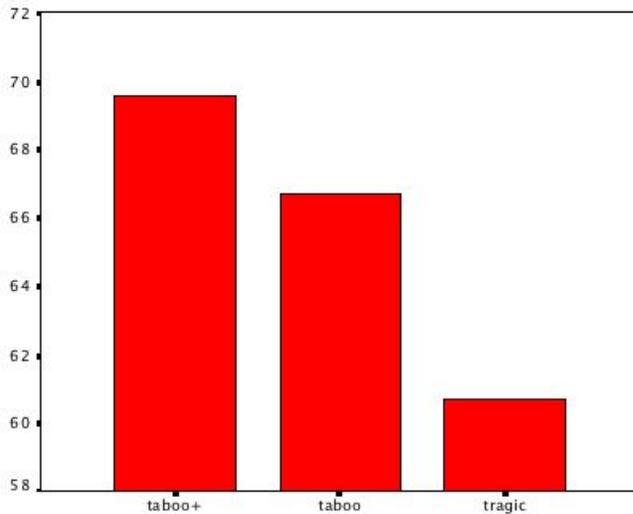

Figure 4 legend

Emotional reactions of ANGER / DISGUST to tradeoffs for peace by Israeli settlers (N=278) who hold "The Land of Israel" as a sacred value. Participants chose which "of the following words best described your reaction to an Israeli leader who would sign such an agreement: pity, anger, approval, disgust, or none." Responses were recoded as "1" (for anger or disgust reactions), -1 (for approval or pity), and "0" (for "don't know" or "none") to form an aversive affective response scale where higher scores indicated more negative emotional responses (disgust or anger) to the three different types of trade-offs. Linear trend: taboo+ > taboo > tragic (p = .04).
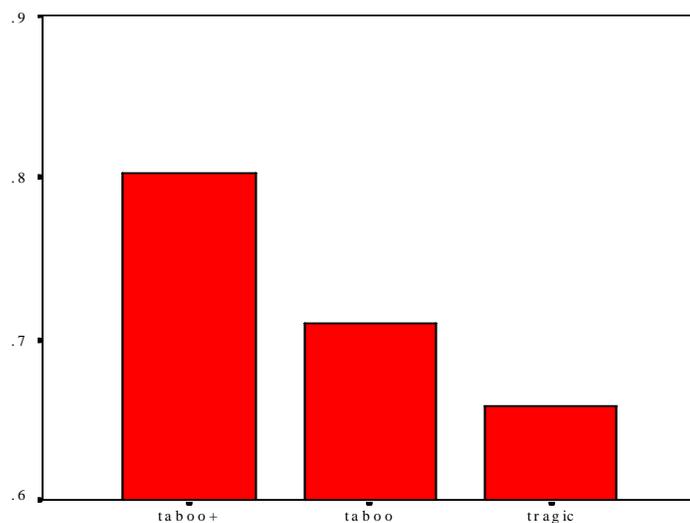
[1]   This research is supported by the National Science Foundation (BCS-0446738, SES-0527396) and the U.S. Air Force Office of Scientific Research (MURI program). Thanks to Robert Axelrod, Richard Garwin, Pervez Hoodbhoy, Edwin Meese and Isaac Ben Israel for thoughts and commentary.

[2]   *Commission on the Intelligence Capabilities of the United States Regarding Weapons of Mass Destruction*, online release 29 March 2005, p. 37; available at www.wmd.gov/report (herein "Presidential Commission").

[3]   B. Grogin, G. Miller, "'Cureveball' Debacle reignites CIA Feud," *Los Angeles Times*, April 2, 2005.

[4]   *Remarks to the U.N. Security Council*. Secretary Colin Powell, New York City, February 5, 2003; available at www.state.gov/secretary/former/powell/remarks/2003/17300.htm.

[5]   R. V. Jones, *The Wizard War: British Scientific Intelligence, 1939-1945* (Cowan, McCann & Geoghegan, 1978), pp. 74, 161, 334.

[6]   N. Machiavelli, *The Prince and the Discourses* (Random House, New York, 1950), *Discourses*, ch. 31.

[7]   I. Ben-Israël, *Philosophie du renseignement, Logique et morale de l'espionnage* (Éditions de l'éclat, Paris, 2004), and personal communication, February 14, 2005.

[8]   K. Popper, *Conjectures and Refutations: The Growth of Scientific Knowledge* (Harper, New York, 1968). For an interesting discussion of intelligence failures as going beyond mere induction fallacy and involving, more critically, a failure of imagination, see I. Ben Israel, "Philosophy and Methodology of Military Intelligence: Correspondence with Paul Feyeraband," *Philosophia* 28(2001): 71-102.

[9]   R. Axelrod, *Risk in Networked Systems*, Prepared for the Office Assistant Secretary of Defense for Networks and Information Integration, October 20, 2003, available at www-personal.umich.edu/~axe/.

[10]   T. Kuhn, *The Structure of Scientific Revolutions* (University of Chicago Press, Chicago, 1966). The notion of "paradigm change" has, of course, become hackneyed through popular misuse, but still applies here in many of its core philosophical senses.

[11]   R. Leiken, "Bearers of Global Jihad? Immigration and National Security after 9/11," March 25, 2004, www.nixoncenter.org/publications/monographs/Leiken_Bearers_of_Global_Jihad.pdf.

[12]   S. Atran, J. Stern, "Small Groups Find Fatal Purpose Through the Web," *Nature* **437**, 620 (2005); available at www.nature.com/nature/journal/v437/n7059/full/437620a.html. There are about 4700 websites conveying religiously-inspired calls for violent and militant actions, about 70 percent of which carry jihadi messages.

[13]   According to the European Interactive Advertising Association, the internet increasingly represents the essential media for the 15-24 age group, which is "the holy grail" for most advertisers: "European Youth Ditching TV and Radio for Web," *European Tech Wire,* June 24, 2005, www.europeantechwire.com/etw/2005/06/24/. Personal bonds formed online without physical contact appear to generate solid reputations for trustworthiness and all the deep commitment that physical intimacy does, but often faster and over a wider set of personal relations: P. Resnick, R. Zeckhauser, "Trust among Strangers in Internet Interactions," In Michael Baye (ed.), *Advances in Applied Microeconomics, Vol. 11* (Amsterdam: Elsevier Science, 2002). A recent study of online dating by researchers at the University of Bath indicates that internet allows men to manifest emotions that cement durable relationships in ways easier than from face-to-face contact: "Internet Dating Much More Successful than Thought," online press release, University of Bath, February 2005, www.eurekalert.org/pub_releases/2005-02/uob-idm021305.php. The web also lets women enter into chat rooms with men who would otherwise shun female contact, and it empowers a minority of two in dialogue with the sentiment that they can span the world.

[14]   *Global Intelligence Challenges 2005: Meeting Long-Term Challenges with a Long-Term Strategy*. Testimony of Director of Central Intelligence Porter J. Goss before the Senate Select Committee on Intelligence, Washington DC, February 16, 2005; available at www.cia.gov/cia/public_affairs/speeches/2004/Goss_testimony_02162005.html.

[15]   G. Segell, "Intelligence Methodologies Applicable to the Madrid Train Bombings, 2004," *International Journal of Intelligence and Counterintelligence*, vol. 18, pp. 221-238 (2005). The author's discussion of the respective shortcomings of the three methodologies is good, but not the combination.

[16]   T. Laporte, Paper presented to the Critical Incident Analysis Group (CIAG), University of Virginia, Charlottlesville, April 6, 2004.

[17]   G. Vermeij, *Nature: An Economic History* (Princeton University Press, Princeton, 2004).

[18]   L. Hong, S. Page, "Problem Solving by Heterogeneous Agents," *Journal of Economic Theory* **97**, 123 (2001).

[19]   E. Meese, Remarks to the Critical Incident Analysis Group (CIAG), University of Virginia, Charlottesville, April 3, 2005; and personal communication, April 6, 2005.

[20]   A. Clauset, M. Young, "Scale Invariance in Global Terrorism," *Physics and Society*, online release 3 February 2005; available at http://arxiv.org/abs/physics/0502014.

[21]   L. Cederman, "Modeling the Size of Wars: From Billiard Balls to Sand Piles," *American Political Science Review* **97**, 135(2003).

[22]   For an unofficial but widely current view in defense and intelligence circles, see LTC Joseph Myers, "Proliferation Terror: Time for a New Deterrence Strategy," online release at *World Tribune.Com*, March 9, 2005; accessed at www.worldtribune.com/worldtribune/05/breaking2453439.html: "Needless to say a nuclear detonation in a major U.S. city would have incalculable far-ranging global reverberations …. If you are a state sponsor of terror, with or without a WMD research base; or are an avowed enemy of the U.S., and you have a public policy that espouses the hope and bent for the destruction of the U.S.; you clandestinely proliferate (buy or sell) WMD technologies outside international arrangements and inspection regimes, then you are subject to immediately being held strategically culpable should there be a catastrophic WMD event inside the U.S."

[23]   According to Harvard physicist Richard Wilson, the Hiroshima and Nagasaki bombs were deliberately exploded at 500 feet to avoid radiation, so that 99% of the 300,000 or so casualties came directly from the bomb blasts (personal communication, February 10, 2005).

[24]   R. Garwin, Paper presented to 32nd Session, International Seminars on Planetary Emergencies, World Federation of Scientists, Erice, Sicily, August 20, 2004; available at www.fas.org/rlg/040820-sani.pdf (and personal communication May 8, 2005).

[25]   Former Defense Secretary William Perry estimates at 50 percent the probability of a catastrophic nuclear terror attack on American soil in the next 10 years, P. Bleek, A. Corr, M. Zenko, "Nuclear 9/11: What if Port is Ground Zero?" *The Houston Chronicle*, May 1, 2005.

[26]   See P. Hoodbhoy, "Can Pakistan Work? A Country in Search of Itself," *Foreign Affairs*, November/December 2004; available at www.foreignaffairs.org/20041101fareviewessay83611/pervez-hoodbhoy/can-pakistan-work-a-country-in-search-of-itself.html..

[27]   Such a "gun-type" device, weighing over 500 kg, consists of four elements: a "gun" that shoots a "uranium bullet" from one end of a "rail" to a "uranium target" at the other end. Neither the bullet nor target have enough Uranium-235 to generate a chain reaction, but when slammed together a "critical mass" is achieved sufficient for a nuclear explosion. The minimum "fizzle bomb" needed to do serious damage is estimated to be about one kiloton. According to Richard Garwin, the effective distances within which (roughly speaking) all the people die and all those outside survive are shown in the following table,

Summary of ranges for significant effects (in meters).				
Yield (kt)	(a)*	(b)*	(c)*	(d)*
1	275	610	790	5500
10	590	1800	1200	9600

a* Range for 50% mortality from air blast (m)
b* Range for 50% mortality from thermal burns (m)
c* Range for 4 Gy initial nuclear radiation (m)
d* Range for 4 Gy fallout in first hour after blast (m) (downwind)

Although a country would not be destroyed by such an explosion, it could ruin itself by its reaction.

[28]   For a fictional portrayal – but realistic summary - of anarchist suicide bombers in 1905, see J. Conrad, *Secret Agent* (Penguin, London, 1983). Beginning in the late 1870s, a loosely-connected worldwide terrorist movement arose, egalitarian in principle and dedicated to elimination of the power of the state and international capital. State reaction to anarchism played a formative role in creating national police and intelligence (FBI, Scotland Yard, Russian Okhrana, see D. Rapoport, "The 4 Waves of Terror," *Anthropoetics* 8, Spring /Summer 2002). The world community of nations considered anarchism to pose the greatest threat to the internal political and economic order, and to international stability. While policies of the U.S. and European states to combat anarchism were often based on the assumption of fighting a well-organized international terrorist network, in fact there was little international or centralized terrorist

planning (and in the case of U.S. President McKinley's assassination, no organized plot at all). Rather, as with current Jihadi operations, anarchist attacks were usually carried out by peer groups (mostly friends, sometimes kin) who organized themselves in operational cells of a few people. As with Jihadism, anarchist ideology and operations often parasitized pre-existing local ethnic and national aspirations and organizations, such as the Serbian "Black Hand," which plotted the assassination of Austria's Archduke Ferdinand, sparking WWI. Following WWI, Bolshevism co-opted militant anarchism as a world political force – a process that culminated with Stalin undermining the anarchist role on the Republican side during the Spanish Civil War. Then, with Communism's demise, came Jihadism's rise.

[29]   Hoodbhoy does not restrict his concern to the former Soviet Union or to Jihadi students; "I have had the opportunity of meeting top people associated with nuclear weapons in Pakistan and India. These include retired and serving generals, air marshals, senior defence analysts, and also the current president of India. I am always struck by their blanket denial of risks, not just of an intentional or accidental use of nukes against the other but also of any kind of leakage or theft of materials. One could call this posturing, but these people have assiduously worked to lull themselves, as well as others, into this supremely comfortable position. This is really disturbing." [Personal communication, March 10, 2005.]

[30]   J. Giles, M. Hopkin, "Psychologists warn of more suicide attacks in the wake of London bombs," *Nature* **436**, 308 (2005).

[31]   B. Hoffman, *Inside Terrorism* (Columbia University Press, New York, new edition forthcoming).

[32]   S. Atran, "Individual Factors in Suicide Terrorism," *Science* **304**, 47 (2004), supplementary online material, www.sciencemag.org/cgi/data/304/5667/47/DC/1, updated with data presented to the "Technical Experts Workshop on Suicide Terrorism," Organization for Security and Cooperation in Europe, Vienna, May 20, 2005.

[33]   N. Macdonald, "Suicide attack every day in the new Iraq," *Financial Times*, July 14, 2005.The worst single attack was on February 28 (125 dead), the worst day was September 14 (4 attacks, killing 152), the worst week was July 10-17 (31 suicide bombers, killing 275), and the worst month was May (90 suicide attacks killing more than 500), Attacks declined to average just over one per day in August, rising to over 50 in October before dropping again to 23 attacks in November. With each temporary drop, military spokesman claim the tide may be turning: "Briefing by Maj Gen Rich Lynch, Deputy Chief of Staff, Multinational Force Iraq," August 18, 2005, available at www.mnf-iraq.com/transcripts/050818a.htm; Chris Tomlinson, "Fewer Suicide Bombings in Iraq in November," *Associated Press Wire*, December 1, 2005.

[34]   M. Weber, *Economy and Society* (Berkeley: University of California Press, 1978), v. 1, p. 24.

[35]   I. Kant, *Critique of Practical Reason* (Cambridge: Cambridge University Press, 1997, originally published in 1788).

[36]   R. Baumeister, L. Smart, J. Boden, "Relation of threatened egotism to violence and aggression," *Psychological Review* **103,** 5 (1996).

[37]   G. Allport, *The Nature of Prejudice* (Harvard University Press, Cambridge, MA, 1956).

[38]   S. Huntington, *The Clash of Civilizations* (Simon and Schuster, New York, 1997).

[39]   T. Schelling, *The Strategy of Conflict,* (Oxford University Press, New York, 1963).

[40]   R. Hardin, *One for All: The Logic of Group Conflict* (Princeton University Press, Princeton, 1995).

[41]   F. Fukuyama, *Trust* (Free Press, New York, 1995).

[42]   A. Varshney, "Nationalism, ethnic conflict and rationality," *Perspectives on Politics* **1**, 85 (2003).

[43]   A. Fiske, P. Tetlock, "Taboo tradeoffs: Reactions to transactions that transgress the spheres of justice," *Political Psychology* **18**, 255 (1997).

[44]   P. Tetlock, 'Coping with trade-offs: Psychological constraints and political implications," in S. Lupia, M. McCubbins, S. Popkin (eds.) *Political reasoning and choice*, (University of California Press, Berkeley, CA, 2000).

[45]   D. Medin, H. Schwartz, S. Blok, L. Birnbaum, "The semantic side of decision making," *Psychonomic Bulletin and Review* **6**, 562 (1999).

[46]   B. Fischoff, P. Slovic, S. Lichtenstein, "Knowing what you want: Measuring labile variables," in T. Wallstein (ed.) *Cognitive processes in choice and decision behavior.* (illsdale, NJ: Erlbaum, 1980).

[47]   A. Tversky, P. Slovic, S. Sattath, "Contingent weighting in judgment and choice," *Psychological Review* **95**, 371 (1988).

[48]   C. Tanner, D. Medin, "Protected values: No omission bias and no framing effects," *Psychonomic Bulletin & Review* **11**, 185 (2004).

⁴⁹ J. Henrich, R. Boyd, S. Bowles, C. Camerer, E. Fehr, H. Gintis, "In search of *Homo economicus*: Behavioral experiments in 15 small-scale societies," *American Economic Review* **91**, 73 (2001).

⁵⁰ D. Medin, S. Atran, "The Native Mind," *Psychological Review* **111**, 960 (2004).

⁵¹ L. Skitka, E. Mullen, "The dark side of moral conviction," *Analyses of Social Issues and Public Policy* **2**, 35 (2002); S. Atran, Mishandling Suicide Terrorism, *The Washington Quarterly* summer (2004).

⁵² J. Baron, M. Spranca, "Protected values," *Organizational Behavior and Human Decision Processes* **70**:1 (1997).

⁵³ J. Baron, S. Leshner, "How serious are expressions of protected values?" *Journal of Experimental Psychology: Applied* **6**,183 (2000).

⁵⁴ P. Tetlock, "Thinking the unthinkable: Sacred values and taboo cognitions," *Trends in Cognitive Sciences* **7**,320 (2003).

⁵⁵ D. Gambetta, *Making sense of suicide missions*, (Oxford University Press, New York, 2005).

⁵⁶ For a review, see D. Kahneman, "Maps of bounded rationality: Psychology for behavioral economics," *American Economic Review* **93**, 1449 (2003).

⁵⁷ See R. Titmuss, *The Gift Relationship: From Human Blood to Social Policy* (The New Press, New York, 1997). Titmuss contrasted the American practice, in which recipients paid for blood, some purchased from donors, with British practice, in which blood was freely given to patients and received from altruistic donors. He found that more blood was wasted in America than in Britain, that American hospitals frequently ran short of blood, and that UK blood donations went down when money was offered.

⁵⁸ One alternative interpretation of the data is to argue that the Settler "sacred value" trade-offs in the tragic condition signaled greater willingness to compromise on their part. If that were the case, the "tragic" condition might be superior *instrumentally* to the other two conditions because participants could find it easier to believe that the peace deal would be peacefully and successfully implemented. To test this interpretation, participants were asked whether they believed that the deal they had been presented with would be "peacefully and successfully implemented". Responses were scored 1 for "yes", .5 for "not sure" and 0 for "no". The data showed that this alternative interpretation did not hold.

⁵⁹ See A. Krueger, J. Malecková, J. Seeking the roots of terror. *Chronicle of Higher Education,* June, 6, 2003, available at http://chronicle.com/free/v49/i39/39b01001.htm; S. Atran, Genesis of suicide terrorism. *Science* **299**, 1534 (2003); M. Sageman, *Understanding Terror Networks* (University of Pennsylvania Press, Philadelphia, 2004); A. Merari, "Social, organization, and psychological factors in suicide terrorism." in T. Bjorgo (ed.) *Root causes of suicide terrorism* (Routledge, New York,in press).

⁶⁰ See R. Pape, *Dying to Win: The Strategic Logic of Suicide Terrorism* (Random House, New York, 2005); M. Bloom, *Dying to Killl* (Columbia University Press, New York, 2005); J. Madsen, "The rationale of suicide attack," *Risq* (online), September 2004, available at www.risq.org/modules.php?name=News&file=print&sid=367.

⁶¹ R. Stark, *The Rise of Christianity* (Princeton University Press, Princeton, 2000).

⁶² See J.-P. Azzam, "Suicide-bombing as intergenerational investment," *Public Choice* (in press); G. Becker, "Crime and Punishment: An Economic Approach," *Journal of Political Economy* **76**, 169 (1968).

⁶³ See M. Harrison, "An economist looks at suicide terrorism," in C. Ankersen (ed.) *Terrorism: Challenge for the 21st Century? Understandings and responses* (Polity Press, London, in press); G. Akerloff, R. Kranton, "Economics and identity," *The Quarterly Journal of Economics* **115**, 715 (2000).

⁶⁴ B. Hoffman, G. McCormick, "Terrorism, signaling, and suicide attack," *Studies in Conflict & Terrorism* **27**, 243(2004).

⁶⁵ S. Atran, "The Emir," *Spotlight on Terrorism* (Jamestown Foundation), September 15, 2005; available at http://jamestown.org/terrorism/news/article.php?articleid=2369782.

⁶⁶ Sensitivity to quantity depends on whether the focus is on the moral impulse of the act, where there seems to be little or no sensitivity (e.g., Does God love less the martyr who dies killing 1 enemy versus the martyr who dies killing 10 of the enemy? Answer: "No") or on the consequences, which appears to heighten sensitivity ("Does God approve more a mujahid's action that kills 10 of the enemy versus a mujahid's action that kills 9 of the enemy?" Answer: "Yes").

⁶⁷ Granted, instrumental cost-benefit calculations often prevail within a moral frame. Most would-be martyrs and jihadi religious leaders we've interviewed also say that if a roadside bomb can produce the same damage without causing the deaths of any members of the group, then it is preferable.

⁶⁸ Interview with Dominique de Villepin in *La Vie* (Paris), no. 314, February 24, 2005, p. 16 : « Il n'ya de communauté que nationale ». But arguably the greatest potential terrorist threat in the world

today lies with uprooted and egalitarian Muslim young adults in European cities, who provided the manpower for the 9/11, Madrid and London attacks. Immigrant integration into European societies has always been more difficult than in America, being more state-driven and top down than community-based and bottom up. There is no indication that any rival to Jihadism's uncompromising vision of a fair and just society is being conveyed to would-be jiahdi youth in Europe. Secular education and open elections do not by themselves speak sufficiently to the spiritual and cultural needs their rootlessness generates. The European Union's increasingly open society is currently more favorable to far-flung networking among Jihadis than to an efficient coordination among different government services that remain hidebound to national territories and politics, and to professional hierarchies and traditional languages. Rejection of the European constitution and its idea of further political integration will fix these trends into the foreseeable future. The steep decline in birth rate among native Europeans, which is highest in southern European countries most accessible to immigration from North Africa and the Middle East, and rising need for immigrant labor can only aggravate the problem. Neither Europe nor the U.S. can deal with this alone. The autumn 2005 riots in the immigrant suburbs of Paris, which spread to France's other major urban centers, should have been the wake up call that galvanized attention and action. Instead, France's political groups have used the events mostly to try and gain leverage over rivals (including within one's own party), and U.S. reaction has mostly been to point a finger at what the French are doing wrong.

[69]   O. Roy, *Globalized Islam* (Columbia University Press, New York, 2004).

[70]   In the well known case of "ping-pong" diplomacy between the USA and China, the sacrifice of something of marginal value to one side (losing a ping-pong match where, ping-pong was considered a "basement sport" by most of the U.S. population) was amplified by its value-differential into producing something of great symbolic value for the other side (ping-pong was a sport of national prestige to China). This exchange contributed to a world-historic breakthrough during the Cold War. (Note that cricket matches between India and Pakistan are not likely to have such an effect because cricket has more or less equal value for both countries, so that game becomes zero-sum, with only a loser and a winner). Contrast this with the efforts of Japan to conciliate China in 2005, which were destroyed by the Japanese Prime Minister's symbolic attendance at a World War II shrine. Also, much of the back-and-forth between the American colonies and Britain in the lead up to the revolutionary war concerned the validity of a tax that Britain set deliberately at a low level to make the symbolic point that it had the right to tax the colonies as it chose.

[71]   S. Fiske, L. Harris, A. Cuddy, "Why ordinary people torture enemy prisoners," *Science* **306**, 1482 (2004).

[72]   M. Sageman, Data presented to World Federation of Scientists, Erice, Sicily, May 8, 2005

[73]   L. Ross, C. Stillinger, "Psychological factors in conflict resolution," *Negotiation Journal* **7**, 389 (1991). One reason pro-American news and broadcasts worked in Eastern Europe to undermine communism was that the great majority of Eastern Europeans never wanted to be communists, and there was also varying degrees of familiarity with democratic processes before imposition of communist rule. But most Muslims are more attuned to messages that will help them become *better* Muslims.

[74]   Nasir Abas, *Membongkar Jamaah Islamiyah* (*Unveiling Jemmah Islamiyah)* (Grafindo Khazanah Ilmu, Jakarta, 2005).