Using Research on the Psychology of Terrorism to Examine Decisions to Acquire and Use Weapons of Mass Destruction

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Executive Summary

This report reviews and discusses literature that has the potential to shed light on the psychological factors most likely to be relevant to terrorists’ decisions to seek, acquire, and use weapons of mass destruction (WMD), in particular nuclear weapons. Relatively little research currently deals directly with this set of questions, and as a result, what knowledge and understanding that does exist is both sparse and underdeveloped. However, there have been greater signs of progress on research on related issues that may contribute significantly to an understanding of the issues at hand (e.g. research on terrorists’ decision to change tactics or their assessments of risks). In particular, psychological research has the potential to contribute substantially to our understanding of the factors that motivate terrorists to seek WMD, the capabilities and inhibitors that might prevent them from success in this area, the effects of changing organizational structures of terrorist groups on decisions regarding WMD acquisition and use and the use of bounded rationality principles in assessing the threat of WMD terrorism.

This report identifies relevant research and presents a variety of conclusions that can be drawn from that research. A particular feature of this report is that we devote extensive effort towards identifying critical gaps in the existing research base as well as suggesting ways of redressing those deficiencies.
Background and Context

“The future may see a time when such a [nuclear] weapon may be constructed in secret and used suddenly and effectively with devastating power by a wilful nation or group against an unsuspecting nation or group of much greater size and material power”

Henry Stimson to Harry Truman, 25 April 1945 [1].

On 20 March 1995, a group known as Aum Shinrikyo (Supreme Truth) released deadly sarin nerve gas into the Tokyo Subway system, killing 12 people and injuring more than 5,000. The attack came at the peak of the Monday morning rush hour in one of the most hectic commuter systems in the world. The attack represented the most serious of its kind in Japan’s modern history, causing substantial disruption and extensive fear in a society relatively free of crime [2]. However the subway attack also proved just how easy it was for a small cult or group of terrorists with restricted means to engage in chemical warfare. Although the number of fatalities from the attack could have been substantially higher, the broader significance of the Aum incident was that it represented a fundamental shift in the nature and scope of the dangers posed by terrorist groups. Preceding this event, terrorists had seldom crossed the verge of using toxic chemicals as weapons, but Aum’s attack demonstrated that not only was this possible, but that movements were willing to put such weaponry into activity.

Despite substantial concern that other terrorist groups would replicate Aum’s efforts to develop a weapon of mass destruction (WMD) or seek such capabilities, none have done so with the same level of success. In fact, less that one percent of the recorded terrorist incidents since 1968 have been linked any credible evidence of active plans to acquire or use WMD [3]. Indeed, detailed analyses of groups such as the Palestine Liberation Organization suggest that many groups have little real interest in pursuing WMDs, in part because conventional weapons appears to be more than sufficient to allow these groups to pursue their goals. Yet the threat remains apparent and foremost in the minds of scholars and public alike, predominantly a result of the ubiquitous threat posed by groups such as al-Qaeda and the global jihadist movement. The question then remains, what would
motivate a group to use WMD, inflicting large-scale damage and destruction? What is the likelihood of this ever happening? And who is most likely to employ such weapons?

This report attempts to address and engage these questions by reviewing research literature that has the potential to shed light on the psychological factors most likely to be relevant to terrorists’ decisions to seek, acquire and use weapons of mass destruction (WMD), in particular nuclear weapons. Amidst the stream of media commentary on the Tokyo attacks, hyperbole was an all too common facet; thorough understanding far less prominent. An efficient response to the challenge of terrorists acquiring and using WMD is more likely if we can develop a more transparent understanding of the issues involved [4].

Before proceeding to shed light on some of these issues, some basic issues require clarification. Weapons of Mass Destruction are referred to here as chemical, biological, radiological, and nuclear (CBRN) weapons. While this term is generally enlarged to incorporate any weapon or device that is intended, or has the capability, to cause death or serious bodily injury to a significant number of people, this report deals exclusively with nuclear, biological, chemical and radiological weapons. Historically, as new and more destructive weapons have developed over time, these have usually filtered down to terrorists at some point [5, 6]. Given the destructive potential of existing WMD, it is critically important to understand the factors that might increase or decrease the likelihood that these weapons will be acquired by terrorists.

Organization of the Report

This report will be organized into three sections. The first section will attempt to leverage knowledge in relation to psychology of terrorism as it relates to understanding terrorist motivations and inhibitions to acquire and use WMD. Based on our review of this literature, the second section will identify and assess the possible uses and limits in applying this academic knowledge to assessing the threat that terrorists will acquire or use WMD. The third section will then identify the gaps in knowledge and areas for
further research to better understand the psychological dimensions of terrorist WMD acquisition and use.

Throughout the report will highlight a number of key conclusions and recommendations. These represent principles and inferences that can be drawn from the literature reviewed in producing this report and that appear to be uniquely relevant to understanding the most important aspects of the psychology of terrorism. In the final sections of this report, we longer-term needs and opportunities in developing psychological theory and perspectives that can be applied to help understand and combat terrorism.

**Identifying the Potential Contributions of Psychology of Terrorism Research**

The past decade has witnessed a surge in the academic literature devoted to the study of WMD terrorism. While the literature relating to WMD is substantial, its direct relation to psychological contributions to understanding motivations to acquire and use WMD is scarce, and even more so in relation to nuclear weapons. Our review uncovered a relative handful of studies in the open-source literature that were directly relevant to understanding WMD terrorism in this regard. The literature that is available tends to be heavily laden with inferences and replete with rather vague hypotheses relating to possible acquisition of WMD and the possible dangers to states, underlining what might possibly be the most effective responses and deterrents. Most of the commentaries lack any solid empirical foundation and are based on authors’ increasingly subjective interpretations of the possible dangers and threats, as opposed to being informed by or based on any sound theoretical or conceptual frameworks.

As Stern explains, a concern with this pattern of analytical thinking among security specialists has been that “a great deal of reporting on the subject has been careless and exaggerated, creating a mood of political paranoia” [4]. This has been further exacerbated by the dominant view among policy elites and much of the academic community that large-scale terrorist attacks using WMD are merely “a matter of time” [4]. The concern is
partly sustained by the fact that insufficient attention has been devoted to analysing whether hypothetical scenarios are likely to be transformed into reality, and this is further highlighted by the lack of serious research devoted to understanding the psychological motivations of terrorists to acquire and use WMD [7].

To develop this argument further, we ought to note that Asal and Ackerman [8] have argued that a vast majority of the work on CBRN Terrorism has relied upon either hypotheses derived from the general secondary literature on terrorism or anecdotal evidence provided by a handful of prominent cases. A recent survey [9] conducted by the present authors, of over 120 books, journal articles, monographs and government reports dealing with CBRN terrorism revealed that the closest thing to a consensus amongst scholars is the following set of assertions:

- A distinction should be drawn between the use of CBRN materials to cause mass-casualties (i.e. what is traditionally referred to WMD) and smaller-scale uses of CBRN agents as weapons. Generally speaking, the larger the intended scale of the attack, the more difficult it is to perpetrate, and hence the lower the probability of a terrorist group successfully perpetrating the attack.
- There are significant differences associated with the difficulty of terrorist acquisition and/or use between chemical, biological, radiological and nuclear weapons, as well as their potential effects. For example, nuclear weapons are unequivocally WMD and a nuclear weapons capability is the most difficult to achieve, whereas radiological weapons are mostly weapons of social and economic disruption with limited capacity for causing casualties. The public health and economic consequences of both chemical and biological terrorism can vary dramatically.
- There exists at least a minimal possibility that a technologically and organizationally adept terrorist organization will succeed in acquiring a CBRN weapon capable of causing mass casualties.
- There are a wide variety of motivational incentives that could make the use of CBRN weapons attractive to terrorists, from ideological traits such has an apocalyptic worldview or technological fetishism, to operational concerns such as the ability to
create mass casualties, or, most importantly, the singularly tremendous psychological impact exerted by CBRN agents.

- There are a host of corresponding disincentives to using these weapons, ranging from possible alienation of supporters to the lack of certainty in the scope of consequences relative to conventional weapons such as high explosives.

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**Key Conclusions – State of the Science**

- There are few studies of the psychological variables affecting decisions to acquire or use weapons of mass destruction that combine sound psychological theory with credible data. Conclusions about the psychology of terrorism and WMD must at present be based on indirect rather than direct evidence regarding the causes and determinants of the decisions and choices of individual terrorists and terrorist groups.

- There appear to be no psychological studies in the current open-source literature studies dealing specifically with terrorists’ decisions to acquire nuclear weapons.

- The majority of existing work tends to conceptualise “WMD terrorism” as a unitary concept, and little or no distinction is made between components or expressions of WMD (e.g. biological, nuclear etc).

- Very little advantage has been taken of what psychology has to offer an understanding of terrorist use of WMD, particularly in highly relevant areas like the construction of threat assessments.

**Recommendations**

- Develop a transparent, verifiable, empirical base of information that will support the translation of assumptions and conclusions from the social science of terrorism into empirically-supported action steps.

- Develop, where appropriate, mechanisms that will encourage and support the exchange of information and data between social scientists and intelligence agencies, with the objective of enhancing the scientific credibility and reliability of the social science of terrorism.

- Use these mechanisms to clarify expectations and assumptions on the part of the producers and consumers of social science research, to establish priorities and programmatic focus for this research and to improve the link between research and public policy.
The prevailing literature relating to motivations of terrorists to acquire WMD appears to be based much less on a sound psychological understanding of terrorism than on a critical, empirically-informed analysis of the capabilities and reasons for certain movements such as al-Qaeda attempting to acquire such weapons. Perhaps with the exception of Jerrold Post, virtually all of the commentaries relating to motivations are written by political scientists or by researchers with limited access to or interest in psychological theories or the relevant data that might be used to test the validity of such theories. While experienced scholars such as Bruce Hoffman have claimed that the constraints to acquiring and using WMD are eroding, we still lack the appropriate evidence to determine whether this argument is both valid and reliable. Another major area of concern is in learning much more about the possible repercussions of a move towards WMD for the terrorists support base, and how their constituencies would react to such a move, in essence understanding the possible inhibitions and disinhibitions may provide more accurate analyses of the likelihood towards such a move.

Four Potential Applications of Psychology of Terrorism Research

Research on the psychology of terrorism has the potential to contribute to many aspects of the current debate about the risk of nuclear terrorism. Psychological research and theory can help in understanding and predicting the behavior of individuals and groups, and thus can help define the conditions under which terrorists might attempt to acquire WMD. In particular, this body of research can contribute meaningfully to accomplishing four key goals in understanding and combating terrorism:

- Clarifying and focusing issues of motivation and their significance;
- Identifying capacities and inhibitors that influence terrorist groups’ decisions to seek to procure and use WMD (these two decisions are often viewed as necessarily related, but we ought not to assume that one necessarily follows the other);
- Understanding how processes of innovation and change in terrorist groups may influence the desire to seek out WMD;
- Clarifying the psychological variables that are relevant to how threat assessments are or should be constructed and developed.
Motivation

Before proceeding to discuss disparate motivational qualities it is important to make a distinction between different types of terrorists. Although it might appear obvious, the implications of stressing that terrorists do not represent a homogenous group are critical. Terrorist movements differ substantially in their political aims, their strategic and geopolitical backgrounds and aspirations, their technical competence and in the psychological and strategic dimensions of frequently varied and complex motivations. While some terrorists may seek casualties and WMD as a desirable form of action, others would certainly not. This not only applied to comparisons between terrorist groups, but also within specific movements. We can of course make the distinction here between different types of terrorists based on typologies adopted by Post [10]. These include nationalist-separatists, social revolutionary terrorists, right-wing terrorists and religious extremists. This is a useful initial point of departure since motivations most commonly attributed to proclivity to WMD use are “religious”. While “religious terrorism” is sometimes synonymous with trite and simplistic categorisation, it generally refers to groups inclined to foster and proselytise religious and millenarian ideologies. In the context of potential WMD use, a common perception is that such movements represent more likely candidates for use of mass casualty acts involving WMD [3, 11-17].

Terrorist Goals

One of the key conclusions reached at a recent Advanced Research Workshop sponsored by the International Center for the Study of Terrorism (October 7-9, 2006; Pennsylvania State University) was that terrorism is best understood as goal-directed behavior. That is, the behavior of terrorist and of terrorist groups can be understood in terms of a mix of political, social, ideological, individual and organizational goals. Thus, a logical starting point for the analysis of terrorism is to examine the goals terrorists pursue.
Goals are central to most psychological theories of motivation [18]; assessments of the goals pursued by terrorist groups provides a useful basis for drawing inferences about their motivation to acquire and use WMD. For example Lesser and colleagues [19] suggest that very different weapons and tactics will be used by groups who view their action as part of an ongoing war than by groups who pursue a coercive-diplomacy paradigm, in which terrorists aim to persuade others. Post [17, 20] presents a terrorist group typology with different groups having different likelihoods of using chemical and/or biological warfare:

- Social revolutionaries: Because these groups seek to influence society, they will be significantly constrained from acts that cause significant casualties (especially if among their own countrymen)
- Nationalists-Separatists: It is assumed that these actors are likely to be constrained from inflicting mass casualties that would negatively influence the group’s reputation with their constituents and/or international audience
- Religious Extremists (2 types):
  - Religious fundamentalist terrorism: These groups are particularly dangerous because they are not constrained by Western reaction (in fact, they are motivated and seek sustenance from it);
  - Non-traditional religious extremists (e.g., Aum Shinrikyo): such groups are sometimes seeking to precipitate the apocalypse
- Right-wing groups: Such groups may be a significant threat in terms of low-level WMD attacks, but are unlikely to use mass casualty weapons due to resource limitations

Ganor [21] notes that while goals are indeed critical for understanding issues that may determine (or at least heavily influence) terrorists’ decisions, these decisions are also affected by external pressures, state responses, irrational-emotional motives (e.g., desire for revenge) and a host of complex factors [13, 22]. Because the decision to acquire and use WMD usually requires a terrorist group to commit significant resources and to run increased risks (the intensity of efforts to locate and neutralize terrorists is likely to
increase as WMD risks increase), it is likely that decisions regarding these weapons will be more deliberate (or “strategic”) than emotional (or “psychological”), and that the relationship between WMD and the long-term goals of the terrorist organization will weigh more heavily in these decisions than in smaller, tactical decisions that essentially relate to day-to-day issues.

**Religious, apocalyptic and political goals**

The literature converges significantly on the belief that the ‘holy war’ mindset of the religious extremist makes them prone to wholesale violence and large-scale WMD use [13, 23], although empirical support for this proposition is somewhat tenuous [23]. Many of the constraints that have previously prevented terrorists’ use of WMD are felt to have eroded [24], since religiously inspired terrorists are concerned less with legitimacy and condemnation. This is argued by Hoffman who notes that “terrorism motivated in whole or in part by a religious imperative, where violence is regarded by its practitioners as a divine duty or sacramental act, embraces markedly different means of legitimation and justification than that committed by secular terrorists, and these distinguishing features lead, in turn, to yet greater bloodshed and destruction”. The terrorist may view himself as God’s instrument, implementing divinely enthused or demanded punishment for real or professed infractions.

History provides a useful context in supporting this view. Jenkins [4] alludes to four incidents where the indiscriminate and large-scale use of chemical and biological agents was either plotted or carried out. These include Jonestown in 1978, the Rajneesh cult in 1985 in Oregon, the 1993 bombing of the World Trade Centre, and the 1995 Tokyo subway attacks. In all four incidents religious ideological content was implicated at some level.

It is also this quality of religious motivation linked with apocalyptic imagery that appears to make a group or individual more vulnerable to accepting WMD violence as a suitable and sometimes necessary mechanism for action. Apocalyptic orientations may guide the terrorist into believing that the end times are imminent, and attacks are often perceived to
echo the Deity’s wishes or function to hasten the impending apocalypse and consequent establishment of God’s kingdom on earth, or similar envisaged paradise [25]. This is evident in an account by a member of the millenarian group known as the Covenant, The Sword, and the Arm of the Lord, who explains in an interview why his group had planned to poison city water supplies with cyanide in the 1980s; “We thought there were signs of Armageddon, and we believed that once those signs were there it was time for us to act, to make judgements against those who were doing wrong or who refused to repent. We felt you could kill those people, that God wanted us to kill those people. The original timetable was up to God, but God could use us in creating Armageddon. That if we stepped out things might be hurried along. You get tired of waiting for what you think God is planning” [26].

The notion that a religious imperative provides a greater tendency for violence and a greater likelihood of WMD is not unproblematic, however. As Gressang [25] notes, religious motivation explanations may not explore the relevant dynamics with appropriate depth, and there may well be a danger in over generalizing or stereotyping motivations. Stressing the religious imperative may also, in Gressang’s view, lead to unintentional incorporation of biases against distinct religious orientations. Clearly, a religious imperative in isolation is not sufficient to account for terrorist motivation to use WMD. While it is useful to have a clearer sense of the type of motivations that may inspire acquisition and use of WMD, we must not discount the possibility that other motivations or types of terrorists may see this as a desirable option.

There are risks that aspirations to use nuclear terrorism may emerge from the right wing underground, particularly in cult-like groups in North America. Given these inherently racist and conspiratorial ideologies the symbolic qualities of WMD could be attractive to such groups, placing them on a par with government enemies and confirming their own sense of self-importance. Revolutionary movements may also consider the use of nuclear terrorism, since the constraints that may withhold militant separatists such as fear of alienating constituencies and losing broader international support may not be present.
The constraints for such groups may be more technical than ideological and based on whether such weapons could be built and delivered effectively. Hence, while religion may partly orient a group towards extreme violence it is not the only relevant impinging motivation nor does it unavoidably lead groups to use poison, disease, or other destructive materials as weapons.

While terrorists may have been deterred by the perceived alienation of supporters in the past, a nebulous constituency may be supportive of a WMD attack, given shared ideological understandings [27]. A desensitisation to violence may also loosen the constraints of possible WMD use. Violent acts that were viewed as excessive ten years ago may now be seen as acceptable (or even necessary to gain credibility) and this rise in tolerance may eventually lead terrorists to use WMD without its use being considered necessarily legitimate [28].

**Key Conclusion – Identifying Goals**

- Terrorists pursue multiple goals, and it is an oversimplification to assume that any terrorist group is interested solely in one type of goal or that this goal does not change over time. It is also an oversimplification to assume that all members of terrorist groups have the same understanding of and attribute the same meaning to specific events, goals and tactics.

**Recommendations**

- Create a systematic strategy and set of methods for developing knowledge and understanding of the complex relationships between terrorists’ tactics and goals.
- Develop empirically-supported knowledge of the goals and objectives pursued by the leaders, members and potential members of terrorist groups and the meanings attributed to these goals by the various actors.
- Develop an understanding of how goals and their meanings and significance develop and are sustained within groups and how these goals are translated into action by members of these groups.
Non-ideological motives

We also need to consider other non-ideological dimensions in defining the goals pursued by terrorist. Falkenrath and colleagues [29], for example, consider some factors affecting non-state actors’ potential employment of WMD rather than a less complex conventional weapon. They propose five reasons why terrorists might choose to use WMD:

(1) An interest in producing casualty levels high enough such that they could not be caused by a solitary conventional attack. Given the changing nature of terrorism this desire to inflict greater lethality and escalate towards the use of WMD may stem from the religious imperative [24]. Inflicting ‘macroterrorism’ [26] may fulfil the broader ideological tenets of a group. Since terrorist attacks have tended to become more spectacular over time there may be an “escalation spiral” [12] that may lead terrorists to use WMD in order to capture world headlines and elicit dramatic government responses. In order to secure the attention they need terrorists may feel compelled to use WMD.

(2) A desire to create and possibly manipulate terror of unparalleled scale and intensity. Terrorists may be motivated by a desire to create a psychological impact that resonates fear throughout a populace [11], for e.g. poisons such as radiation produced in nuclear explosions may evoke a fear that is disproportionate to the actual dangers posed;

(3) A desire to imitate the functions and trappings of a state, and hence help create a sense of legitimacy for the non-state actor’s assertion of sovereignty. Terrorists in this instance may be motivated to use nuclear weapons as a bargaining tool to coerce states to make concessions vis-a-vis the release of prisoners or other political concessions [30-32]. This may be considered more as a gesture than an actual threat to detonate [30];

(4) An innate curiosity or interest in exotic weapons. Certain groups may show a strong interest in technology or some other idiosyncratic predisposition to exotic weaponry. Shoko Asahara for instance, the leader of the apocalyptic cult, Aum Shinrikyo was
known to have expressed an obsession with poison. He also believed that technology would give him and the group an extra edge [26];

(5) A desire to equal the precedent set by Aum or a previous chemical, nuclear, biological or radiological incident, including that perpetrated by states. Terrorists may be influenced in part by the copycat phenomenon [26] and look to imitate predecessors. For instance, a significant factor which impacted on the Tamil Tigers use of suicide bombing tactics was the use of this method by Hezbollah forcing US troops out of Lebanon in 1983. Nevertheless the lack of a robust precedent with respect to WMD may rule this method of terrorist learning more problematic. There may also be a sense of terrorists looking to ‘outbid’ or ‘outgun’ each other [33]. The ambition to surpass the 9/11 attacks, which set a new benchmark for future terrorist attacks, may be strong among terrorists [34].

The motivational considerations discussed most frequently in the literature on terrorism are heavily based on the role of ideological factors. Gressang [25] suggests that addressing the issue of terrorist WMD use requires challenging such conventional frameworks, and instead uncovering terrorist motives in a more systematic way. In this respect words and deeds are thought to provide a unique insight into the cognitive decision making processes of the terrorist. Gressang contends that understanding the link between motive and action entails understanding and predicting the perspective of the terrorist.

Who do terrorists hope to influence?

The identification of the terrorist’s audience needs to be undertaken. This should be based on an analysis of the terrorist’s own understanding of audience, and who their message is directed at. Since it is from this audience that the group expects to gain satisfaction of demands, positively or negatively, or gain additional support and sympathy, this audience is thought to play a crucial role in determining the degree and scope of violence that is acceptable [25]. Equally the content and context of the terrorist’s message to his primary audience is a key component for interpreting the link between motive and action. As Gressang points out, “Since the terrorist exists and functions within the larger society, the
means by which terrorists interact – and sees himself and his organization interacting – with society speaks to the role the terrorist sees for himself and his organization”. In sum, Gressang’s view is that the confluence of relationship qualities, audience identification and message content enables one to envisage a convergence of factors indicative of motivations and disposition to use of WMD.

**Key Conclusion – Understanding the Audience**

- It is important to understand the perspectives of both the terrorists and the audiences these terrorists are trying to influence. The goal of terrorists is usually to compel or motivate some powerful party (e.g., the government, foreign governments) to take actions that it would not otherwise take, and it is important to gain knowledge about the terrorists’ understanding of and beliefs about their adversaries and about their various constituencies. This understanding and these beliefs are likely to affect the choice of tactics pursued by terrorists.

**Recommendation**

- Develop an understanding of the audiences terrorist groups hope to influence with their actions and their beliefs about how those actions will affect each audience.

Other motivational considerations that should be accounted for include terrorists’ need to inflict economic damage [26]. Unlike conventional weapons, radiological, chemical and biological agents could be used to destroy crops, poison foods or contaminate pharmaceuticals. They could also be used to kill livestock. Such acts, essentially representing psychological warfare at its potentially most devastating, could wreak significant economic and political costs on the target country. For this reason the possibility of single-issue groups acquiring and using WMD for these very purposes is one deserving consideration. While such an event is unlikely given the technical complexities thinking about such issues opens up a need to consider the myriad possibilities and motivational qualities that may be tied to the use and acquisition of WMD.
Desire to gain notice and legitimacy

Terrorist motivation may be entrenched in frustration and desperation that builds until mass-casualty weapons are viewed as preferable alternatives. One possibility is that terrorists may view themselves as faced with insuperable odds, with few available options [25]. A lack of success with conventional weapons or a need to engage in more dramatic activity may be linked to the internal consideration by terrorists of such responses. These responses may derive from the erosion of popular support, a decreased ability to attract support or a need to consider extreme measures arising from a sense of imminent defeat [4, 22]. On the other hand, attacks of this nature may crudely serve to rally forces and create huge recruitment potential, primarily due to the level of ‘street credibility’ that would be associated with any movement realistically associated with the potential for launching such an attack. The more the group believes in bringing about a ‘new world order’ the more likely they may be to use WMD.

Key Conclusion – External Images

- The external image of a terrorist group will influence the goals and the methods that group pursues. Groups such as al-Qaeda are likely to feel pressure to maintain an image as a strong and dangerous adversary, and thus may be most attracted to actions that enhance that image.

Recommendation

- Develop and ascertain the feasibility of systematic strategies for undermining the image of specific terrorist groups.
- Develop an understanding of how governmental responses to terrorism may inadvertently reinforce or sustain the image and legitimacy of a terrorist group.

Finally, it has been argued [13] that al-Qaeda considers WMD to be a deterrent to repel attacks from superior enemy forces. In addition, displays of strength attract recruits more than any other form of propaganda; WMD use could serve to rally support from within
the Muslim community. Since 9/11, the disrupted plots of al-Qaeda have proven to be on a similar scale to 9/11 – attempted attacks of any less of an impact could lead to perceptions that the group has been weakened (thus making large scale attacks including WMD use more attractive).

At this point, it may be useful to reflect on the literature presented thus far. It is clear from this literature that terrorist motivations for engaging in unconventional attacks span a range of objectives. Although terrorist ideology dominated by religion is frequently linked with a greater proclivity to engage in WMD terrorism, in particular nuclear terrorism, this is among a confluence of factors that must be discerned before asserting a predisposition to use WMD [11].

We now turn to examine the capabilities of terrorists. One of the more prevalent discussions in mainstream discourse concerning WMD terrorism is the conflation between motive and capability. Observers all too often assume that because terrorists are motivated to acquire WMD they will be successful in their pursuit [34]. Accordingly a clear distinction here is made between motivations, as examined above and actual capabilities that are examined in this section. An assessment of terrorist capabilities must necessarily vouch both for the qualities that may increase the probability of terrorist acquisition and use, as well as the inhibiting factors and conditions explaining why such a move has not been forthcoming and may not be in the future.

**Capabilities and Inhibitors**

In light of the kinds of literature discussed thus far, a major competing (and perhaps more vociferous) paradigm contends that despite the prevailing fears and shifts in patterns of terrorism over the years, the likelihood of WMD terrorism is not widespread and that even if issues around availability were clarified and focused, the use of WMD may never be as common as the use of conventional weapons [4, 34, 35]. Numerous factors restrain terrorists and insurgency movements from acquiring WMD weapons as their means of violence. Accounting for and understanding the impact of these restraints to terrorist’s
acquisition and use of WMD is crucial. Strengthening the appropriate disincentives or restraints may serve as a decisive component to a counter-terrorism campaign.

Will a Terrorist Group Commit the Necessary Resources?

The literature relating to terrorism and WMD is marked by a tendency to assume the reality of the scope of the threat and assume that large-scale terrorist attacks involving WMD are merely a matter of time. This view has been expressed by Defense Secretary William Cohen who once commented in relation to WMD; “The question is no longer if this will happen, but when” [36]. In fact this is a view shared by many commentators and highlights a tendency among observers to converge on parallel assessments at the higher end of the threat continuum [34]. As Sprinzak notes, while such calamitous predictions may make for fascinating “press briefings, movies and bestsellers” they do not make for suitable policy [cf. 4]. While the prospects may be alarming, however, the relatively low risk of such an event, argues Sprinzak, does not justify the high costs considered to defend against it. Clearly, “simply accepting at face value the hypothesis that WMD terrorism is only ‘a matter of time’ is no substitute for detailed and measured threat assessment” [34].

Given this analysis, it is worth considering what the likelihood is of terrorists acquiring and using WMD, and what the factors are that may impinge on the relevant decision-making processes. In particular, few analyses have seriously considered whether terrorist groups would be willing and able to devote the resources necessary to acquire WMD, and whether they would be willing to accept the numerous downsides that might accompany WMD status. The decision to seek WMD entails both costs (e.g., cost of acquiring materials, producing device) and risks (e.g., numerous governments may move aggressively to prevent WMD acquisition), and it is reasonable to assume that this decision will not be taken lightly.

Accounts concerning the ease with which terrorists could acquire WMD are at best unclear and contradictory [34]. One argument is that non-state actors are growing more capable of acquiring and using WMD weapons. Falkenrath and colleagues [29] contend
Key Conclusions – The Attraction of WMD

- The motivations of terrorists to acquire or attempting to acquire WMD are not well understood. WMD are likely to have a variety of attractions to terrorist groups, even if the groups have no intention of using them as offensive weapons.
- WMD may have important symbolic functions for terrorist groups. The widespread belief that a particular group has the capacity, will, or intention to acquire WMD may serve to reinforce the group’s image as a potent and legitimate force. The belief among members and potential members of terrorist groups that they are engaged in the pursuit of WMD may enhance the solidarity and credibility of the group.

Recommendation

- Develop a systematic strategy for obtaining information about the motivations of terrorist groups to pursue WMD (e.g., through interrogations, surveys of chat rooms, assessments of public statements of groups, materials used to recruit new members).

that while constructing or stealing a WMD is difficult, complex, risky and often an expensive venture, the basic technical requirements for building such weapons are established and not becoming more difficult. In fact they go further in suggesting that the acquisition of numerous types of improvised WMD weapons is actually becoming easier, as the materials, equipment, and expertise necessary for a successful acquisition effort become more readily available to non-state actors. They assert that the technical barriers to WMD acquisition are fixed at best and possibly declining [29]. A supporting argument concerns the growth of information capability. Gressang [25] suggests that the dispersal of knowledge has made it easier for radical groups to acquire the information needed to develop and carry out their own WMD capability.
Similarly Campbell [12] acknowledges that constraints are weakening and that there are certain factors that increase the potential for non-state terrorist use of WMD. These are labelled as *permissive* factors, which are technical and social variables that allow or encourage a terrorist group to engage in violent activity. Among these are improved education, global communication, the media, industrialisation and urbanisation, which all play some role in facilitating terrorists. Also technological advances have made WMD terrorism easier to implement, for example, the Internet facilitates recruitment and communication processes [26]. Other interconnected developments include the disintegration of the Soviet Union. Weak access-control safeguards for nuclear bomb-making resources in numerous regions throughout the territories of the former Soviet Union and technical developments in constructing processes for the miniaturization of nuclear weapons have made such an event progressively more possible [32].

**Key Conclusions – Motivation vs. Capacity**

- The motivation to acquire WMD does not necessarily translate into the capacity to acquire them. There are technical, financial, and security-related barriers to WMD acquisition (particularly nuclear weapons) that may be difficult for all but a few terrorist groups to surmount.
- The acquisition of WMD could entail substantial opportunity costs for terrorists; resources that are devoted to WMD must necessarily not be devoted to more conventional (and often proven) tactics.

**Recommendations**

- Develop a systematic strategy for assessing and modelling the risk-benefit calculus that underlies decisions to devote substantial resources to the acquisition of WMD.
- Assess the perceptions of members of terrorist groups about the risks and benefits of WMD acquisition.

Assessments of the capability of different terrorist groups have usually pointed to al-Qaeda as the group most likely to have the resources and the desire to acquire WMD. However, recent reviews [13, 37] that have examined al-Qaeda’s progress toward
acquiring WMD suggest that this group possesses the capability to make dangerous chemical and biological agents, but it has not demonstrated its ability to weaponize these agents into WMD.

**State sponsorship**

A related concern is that chemical and biological weapons are proliferating in states known to sponsor terrorism [38]. Experts cite such weapons as more realistic threats and far less restrictive than nuclear weapons [4, 34]. Chemical and biological weapons are considered easier to produce than nuclear weapons, particularly for groups that acquire not just production technologies but also precursor materials in addition to the requisite expertise. Also the extensive capability of the fundamental recipes for chemical and biological weapons are promptly available, not least on the Internet, and the ongoing dispersal of dual-use commercial technologies suited also to the production of chemical and biological warfare agents merely enlarges this problem. The menacing nature of biological and chemical agents has the prospect to use O’Neil’s phrase to psychologically ‘unhinge’ target populations [34]. Maerli and colleagues [39] contend that the obstacles to producing nuclear weapons are lower than thought and that technical barriers should not be considered as significant to avoid nuclear terrorism.

Hoffman [24] claims that because state-sponsored terrorists are less likely to depend on local support from the population, they may not be as concerned with the risk of alienating the public. He also notes that state-sponsored attacks in the 1980’s were eight times more lethal than attacks carried out by non-state sponsored groups, suggesting that terrorists might be willing to take advantage of the enhanced capabilities state sponsorship might provide. A common argument is that state sponsorship is likely to make WMD terrorism more realistic and likely given that states possess the resources terrorists lack, namely funding, technical expertise, intelligence and sophisticated weaponry. It may also provide terrorists with a sense of protection, imbuing them with the belief that they are serving a higher cause [4]. It is also possible that organized crime could facilitate the acquisition of WMD [40].
There is little evidence of significant state sponsorship for WMD acquisition and use to date [8]. State sponsorship most likely when significant portion of population supports terrorist goals and when survival of regime is threatened [41], but even in these circumstances, most commentators appear to agree that the detonation of a nuclear device is the least likely form of terrorism involving WMD. Nevertheless terrorists would be capable of using radiological material, which although unlikely to have the same impact in terms of lethality as a true fission device, could inflict heavy financial and psychological costs on the targeted government and populace [26]. There have been several claims for instance that al-Qaeda have tried to acquire such material on the Russian black market for the construction of a ‘dirty bomb’ [34].

Constraints on the Acquisition and Use of WMD

Many commentators [e.g., 4, 12, 29] concur that the technical barriers and risky nature of WMD development may mean that conventional explosives are the favoured means to the desired ends for some time. The picture emerges of terrorists as much more comfortable with proven and predictable weapons [35]. The traditional tools of terrorism such as bombings, hostage takings have only till relatively recently been expanded to include suicide bombings, and even these are more a variation of an old theme. Terrorists perhaps share the fears of WMD prevalent in the broader population and see perhaps see little reason to turn to the unknown, possibly unpredictable and certainly dangerous substances and methods when the older tactics have proved to be reliable, simple, and cheap. Using both rational choice theory and minimum force principle, Jacobs [42] summarises these arguments and proposes three reasons why terrorists have not deployed nuclear weapons and why it may be improbable; (1) more conventional means will accomplish terrorist objectives, (2) more conventional means use devices or materials easier to acquire, safer to use and with predictable consequences, (3) conventional means have consequences and outcomes that have a ‘history’ in terms of damage inflicted and public reaction.
The technical barriers seem to exacerbate the difficulties in terms of acquisition and use of WMD and make conventional weapons a more attractive option. Attaining devastating outcomes with unconventional weapons requires a considerable scale of operations. Only in very few cases have groups been able to accumulate the skills, knowledge and material to perpetrate attacks with unconventional weapons on scale that comes close to the danger posed by terrorist attacks with conventional explosives. These technicalities can be discerned on the basis of the weapon one is discussing [4];

Nuclear – nuclear weapons development and manufacture would require a great deal of capital, significant high technology machining equipment, facilitating infrastructures, and spatial presence. It would necessitate state-level resources invested over many years, imposing significant constraints on a non-state group [25]. Even if enough fissile material was acquired through theft or the black market, the theoretical knowledge and practical skills required to design and build a nuclear weapon are high, setting up, equipping, and successfully operating an undetectable clandestine weapons laboratory would be difficult and expensive even for the most organized and best-funded terrorist movement, not to mention the difficulties in storing and transporting the weapon to the desired target [34]. Also the requisite ingredients of weapons grade fissile material – highly enriched uranium and plutonium are sparse and expensive to produce. Nevertheless, while the risk of nuclear terrorism may be small, the risk of fatalities and destruction is so large in and of itself that the possibility of terrorist acquisition and use of nuclear weapons merits serious consideration [39]. It is thought that a nuclear bomb could be made for around $100 million [43], a sum that is daunting but not necessarily beyond the reach of some terrorist groups.

Biological – the production of biological agents can be undertaken in a small facility with no unique qualities or signatures, with only small quantities of agents required [4]. The greatest technical barrier is possibly the unpredictability of the effect and the occurrence of a long time lag lasting from hours to weeks before any significant effect materialises. Controlling the agent following its release may present a significant hazard for many
Key Conclusion – Bounded Rationality

- Rational choice models have considerable value for understanding terrorism, but it is important that non-rational and emotional factors that affect decisions be considered as well. In particular, groups of all sorts (both terrorist and non-terrorist groups) often make choices that seem to defy rational analysis (e.g., risky shifts, continuing to pursue failing courses of action), and analyses of terrorist behavior must take these factors into account.

Recommendation

- Identify the strengths and the limitations of rational choice models for predicting terrorist behavior.
- Develop and apply bounded rationality models for predicting terrorist behavior that incorporate a wider range of psychological, social, contextual, and organizational forces as factors affecting the decisions made by terrorists.

Chemical – chemical agents can be manufactured in labs or productions plants with comparative ease under sub-optimal conditions. The technical barriers for this are that dissemination is low, and such weapons are still relatively risky in relation to conventional weapons. A breadth of expertise remains a necessary condition, as well as capacity to test unnoticed [4].

Inhibitors

In addition to the technical barriers, political considerations seem to have inhibited terrorists from acts of mass destruction using nuclear weapons or materials [4]. The terrorists themselves may see killing indiscriminately or on the scale of mass destruction
as endangering perceptions of their legitimacy, particularly among their own supporters. While commentators post 9/11 have argued that political constraints are eroding it is still likely to be a key factor in the terrorist’s decisional calculus. Browne [44] for instance argues that al-Qaeda do seek the support of a constituency despite conventional assumptions that this group is immune to political pressure. Browne asserts, contrary to western assumptions, the constituencies al-Qaeda rely on do not support large-scale attacks and would not support a WMD attacks. Browne suggests that al-Qaeda is conscious of this fact and would not conduct such an attack for fear of alienating their supporters. Similarly the IRA is thought to have resisted the use of such weapons due to the risk of losing all support. This sentiment is consistent with Jenkins’ assertion some time ago that ‘terrorists want a lot of people watching, not a lot of people dead’, and considers the WMD threat as one that is inflated due to the lack of evidence for terrorists having actively acquired such a capability. Nevertheless, as O’Neil [45] rightly claims, the only assurance we have that terrorists will not use such a weapon, is that they so far have not.

This school of thought also maintains that no group would risk international condemnation that would be observed following such an incident and that terrorists while violent, are rational actors, hence they are fully aware a mass casualty attack using WMD would serve no purpose in propagating their ideology and objectives. O’Neil [34], contends however that this argument neglects certain key elements, namely that non-state actors do not function according to the same normative restraints that state actors do. Terrorist groups tend to be adept at flouting international laws, which necessarily imbues their activity with the ‘shock value’ required to provoke a reaction. In addition, O’Neil suggests that the perceived strategic benefits associated with WMD use might extend beyond the normative considerations for many terrorists. The mass casualty ratio that could be attained would be consistent with the asymmetric warfare strategy entailed in many terrorist operations.
Key conclusion – Social Support

- Terrorist groups cannot totally isolate themselves from the surrounding community, and they rely on several segments of the broader community for sustenance and support.

Recommendation

- Heighten the awareness of members of these communities of the indirect support they provide for terrorists and of risks and costs to their communities that result with providing this support.

There are several variables that might reduce the value of political and social factors, such as the opinions of important constituencies. As Hoffman [3, 46] notes, terrorism based on religion might not be so easily controlled through the use of social pressure or through withholding political support. Hoffman claims that religious terrorism is likely to be committed by individuals who do not care very much what their constituents think, and who therefore are less vulnerable to attacks carried out in normal social settings. Other characteristics of terrorist groups might also reduce the effectiveness of social or political inhibitors. For example, there is evidence that as groups become more isolated, tolerance for extreme violence grows [22].

Key Conclusion – Deterrence

- There is a substantial body of research and experience involving efforts to deter states from acquiring WMD. The relevance of this work to non-state actors has not yet been established; it is likely that some deterrents that are effective at the state level will not be effective when used against terrorist groups.

Recommendation

- Develop methods for testing the reliability and applicability of these state-based deterrence models when applied to non-state actors.
Alternatively, Pilat [4] suggests that with the exception of Aum, terrorists may not have engaged in WMD terrorism because there was minimal or no advantage to gain from such an act. Some of the other political risks that may be summarised as large enough inhibitors include the stimulation of world revulsion, severe government retaliation or ‘backlash’ [47], retaliation against the domestic and international supporters of the terrorists, and their bases of operations, and finally a division of the group making it open to betrayal and demise [27].

In addition to the political and technical restraints there are also other inhibitors which may be worth considering. Jenkins [4] argues that self-imposed constraints are more significant than political or technical constraints. In his view, personal accounts are revealing, since they unearth many operations that were thought about but not implemented since violence was considered counter-productive to the intended goal. Jenkins also adds that morality has played a crucial role in the terrorists calculations of the forms and degrees of violence to apply – however morality of a specific nature. Terrorists tend to see themselves, asserts Jenkins, as being held to a higher moral standard than their targets. They see themselves as warriors for a just cause, whose goals necessitate violence, be used in discriminate and proportionate ways. The validity of this argument remains questionable, however given the changing qualities of terrorism.

Other factors which may help shed light on the minimal use of WMD thus far is the supposed lack of interest [29]. With the exception of al-Qaeda, there have been few reports linking established terrorist groups such as ETA, Hezbollah, Red Brigades, or others with serious interest in WMD. In some cases described by Parachini [16], group leaders indicated to their members that the use of chemical or biological weapons would not be legitimate to their struggle, for example, Abu Shannab, the Hamas leader declared that the use of poison was contrary to Islamic teaching. FARC, on the other hand, deemed no value from the use of chemical agents in their struggle; they deemed explosive firepower as more important.
Clearly, however, attempting to address the question of whether terrorists are likely to be able to go nuclear or use any form of WMD is all but an impracticable task. While it may be possible to interpret, even empathize with, terrorists to arrive at a roughly plausible approximation of their moral, strategic and political beliefs, we are in the end confined to ‘what if’ and ‘best guess’ thinking or conjecture. Nevertheless some points within the literature do seem to converge; namely that while the technical constraints to developing WMD are complex, they are not entirely insurmountable, particularly for a motivated and determined movement. The second point is that nuclear weapons are harder to acquire and produce than chemical and biological weapons, and are hence considered the least likely form of mass destruction. Radiological devices are considered perhaps the easiest but would likely inflict only minute damage; hence chemical and biological weapons may be seen as more realistic alternatives should this scale of weaponry be considered at all.

**Evolution and Change in Terrorist Groups**

The nature and structure of terrorist groups is changing, and these changes could affect the likelihood of acquiring and using WMD. Hoffman [24] notes that the structure of terrorist groups is morphing: the hierarchical structures that were dominant in the 70s and 80s are being replaced with more linear, amorphous, and loosely connected structures. The absence of a central command authority in this new structure may remove inhibitions about inflicting widespread, indiscriminate casualties. On the other hand absence of central organization might undermine a group’s capability for technologically sophisticated attacks

Lesser and colleagues [19] note the increase of amateurs in the terrorist arena – “terrorism has become accessible to anyone with a grievance, an agenda, a purpose, or any idiosyncratic combination of the above”. The absence of an authority figure for these “amateurs” may allow for fewer constraints and inhibitions about operations or targets. Also, this more amorphous type of terrorist group doesn’t have the “footprints” of a more formal terrorist organization, and thus may be more difficult for law enforcement to investigate.
Centralized, isolated networks are the best structures for generating and transmitting justification for WMD use. In such structures, leaders tend to have a high level of credibility and influence and if these leaders are committed to WMD acquisition, their followers are likely to show similar levels of commitment. Centralized, isolated networks are also effective for centralizing/consolidating financial resources (i.e. they can allocate all available resources to the justification and acquisition of WMD). It can be argued that terrorist groups are moving away from these structures to form loosely organized virtual networks, in part because of the increases international pressure mounted against the more centralized and visible structures.

When groups are decentralized/have multiple groups operating independently, it is more difficult to reach consensus regarding the credibility of leaders and whether or not the current strategy has failed. Because of this, decentralized networks might require longer time to transmit justification and consolidate resources. However, these decentralized groups are more robust to internal and external attacks, including counterterrorism activities. Lesser and colleagues [19] suggest that future research should look at how social networks influence technical training and resource availability, how type and strength of ties to international criminal networks or other non-state actors influence WMD acquisition, and how different types of networks influence the justification and access to WMD.

Gurr and Cole [14] note that decision making processes may be one of the primary factors influencing terrorists’ choice of weapons and tactics. Groups that employ shared decision making structures may be less likely to use WMD because they will only do so if the majority of the leadership in the group is in favor of WMD use. However, distributing power and decision making authority broadly is not necessarily a barrier to WMD use. Group decisions often show a risky shift – i.e., a higher level of approval for risky solutions. In an authoritarian decision making structure, decisions to use WMD come from the attitude of the leader, which may make their decisions easier to predict.
Shared decisions are slower, are more easily blocked by the opposition of influential group members, but are also more vulnerable to the tendency of groups to escalate risks.

Ad hoc groups (such as that which committed the World Trade Center bombing in 1993) may pose a greater threat of WMD use because their members are not psychologically reliant on group membership, and therefore they are not concerned with preserving the group. Divisions and rivalries within terrorist groups might lead to competition and an escalation of violence that could lead to WMD use. Finally, groups that are on the defensive or facing the possibility of extinction might be more likely to undertake riskier attacks.

Role of Leaders in Terrorist Groups

Parachini [48] notes that groups that seek to use unconventional weapons often reflect the orientations of key leaders, particularly when these leaders show a religious or apocalyptic mindset. Leaders can motivate members to take actions they wouldn’t do on their own and that are outside of societal norms (e.g., Asahara, bin Laden). One of the key findings in research on charismatic leaders is that their credibility is strongly tied to the success of the group; charismatic leaders are reinforced by the success of the group, but their ability to influence group members is undercut when the group is seen as failing. Lesser and colleagues [19] note that charismatic leaders are most likely to persuade group members to engage in high-risk activities.

Key conclusion – Charismatic leaders

- The presence of a charismatic leader can be a substantial benefit to any group, but can also be a point of vulnerability. The greater the importance and influence of a charismatic leader, the more likely it is that efforts to undermine that leader and destroy his or her appeal will also affect the ability of the group to function effectively.

Recommendation

- Develop and apply systematic methods of undermining credibility and appeal of leaders of terrorist groups.
members to pursue WMD when there are strong bonds between the perceived goals of the leader and the perceived goals of the group (leaders who appear to act in self-interest lose influence) or when the group is under threat and WMD are seen as a possible solution of the threat.

**Threat Assessment**

To employ WMD successfully in any form however, terrorists need to be technically proficient, be able to avoid detection, and be free from moral constraints. More than anything, they must want to acquire and use these weapons in spite of considerable political risks. The number of groups meeting these requirements is likely to be small; nevertheless it remains important to assess where the threat may lie.

A strident assumption voiced within the literature is that apocalyptic religious or cultist terrorists are the most dangerous from a motivational and strategic viewpoint of acquiring and using WMD. Members of these movements believe they have a direct mandate and they recognize no legal, moral or secular constraints. Hence, they are thought to be more likely to engage in WMD terrorism, particularly of the nuclear variation, more so than nationalist or revolutionary terrorists. Is there support for these assertions in the present context? The evidence again, is unfortunately mixed; a blend of fact and fiction, which means assertions must necessarily remain speculative.

Cragin and Daly [49] propose a variety of metrics for assessing intentions and capability:

- Indicators of Intentions
  - Rhetoric and stated goals
  - Associations with other terrorist groups
  - Ideology
- Capability Metrics
  - Ability to stage attacks that kill 50+
  - Intention to target foreign nationals
  - Intent and capability to kill 150+
o Intent to strike guarded targets

o Ability to coordinate multiple attacks

On the basis of these metrics, Cragin and Daly suggest that three groups (al-Qaeda, FARC and Hizballah) all have high intent and capability to acquire WMD.

Paz [50] and Dunn [51] contend there has been no substantive evidence that al-Qaeda or affiliated movements plan to use WMD in the near future, particularly nuclear weapons. There are certain developments, however, which do raise cause for concern. For one, the testimony of the former al-Qaeda member turned US government informant, Jamal Ahmad al-Fadl, supposedly revealed that al-Qaeda sought to buy uranium in Sudan in the early 1990’s. According to Spyer [52] this is the most solid evidence of al-Qaeda’s nuclear ambitions in the public domain. There has also been at least one fairly prominent case of an al-Qaeda directed and funded plot to attack the United States with a “dirty” bomb. The plot was based around Jose Padilla, a U.S. citizen of Puerto Rican origin who was detained by U.S. federal agents at Chicago’s O’Hare airport in May 2002. Padilla was supposedly flying into Chicago from Pakistan to carry out a scouting operation for the benefit of his al-Qaeda commanders in Karachi. A great deal of ambiguity encircles the Padilla case, however it has been frequently asserted that the operation had been initially commissioned by Abu Zubaydah, al-Qaeda’s former senior operational planner, who was detained in March 2002. It is uncertain if information assembled from Abu Zubaydah’s interrogation directly led to the hasty disruption of Padilla’s mission.

Materials collected in Afghanistan, as well as chemical and biological agents, have been used as further supportive evidence. In Europe, thwarted plots to use biological and chemical weapons have been exposed. In January 2003, an alleged plot by an Algerian group to use ricin was revealed in a London apartment. Similarly, a group of North African immigrants were discovered plotting to use ricin in Paris in March 2003. These suggestions have been corroborated in a confidential report written for the UN in 2004 by a panel of experts led by Michael Chandler, they concluded; “The al-Qaeda terror network is determined to use chemical and biological weapons and is restrained only by
the technical difficulties of doing so.” The experts also noted that, “The risk of al-Qaeda acquiring and using weapons of mass destruction also continues to grow … Undoubtedly al-Qaeda is still considering the use of chemical or bio-weapons to perpetrate its terrorist actions…” Nevertheless, what al-Qaeda is still lacking at present “is the technical complexity to operate (WMD) properly and effectively.” “They want to (acquire and use WMD), but have difficulties in dealing with it.” [50]

Key conclusion – Public Statements

- Public statements of intent are not necessarily good indicators of the full range of goals being pursued by a terrorist group, but they should be taken quite seriously. These statements almost certainly affect the recruitment of new members into a group and the choices of tactics and objectives made by group members.

Recommendation

- Determine what terrorists themselves, and their supporters, think and say about WMD use. This information can be gained from a variety of sources, including but not limited to interviews with captured terrorists and content and other analyses of statements, communiqués, web chatter, etc.

Reports of acquisition and use have also been matched by statements of intent. Indeed, the 11th volume of al-Qaeda’s *Encyclopaedia of Jihad* discusses how to construct chemical and biological weapons. In addition bin Laden has himself said that acquiring weapons including nuclear and chemical weapons is a Muslim “religious duty” [53]. Also in December 2004, Abu Musab al-Suri, a former leader and trainer of al-Qaeda published a 1600 page book promoting a new movement of Global Jihad named “the Islamists Global Resistance” and sketched his strategy of Global Jihad. In this document, he called for the use of WMD and admonished bin Laden for not having utilized this tactic. Opinions from religious clerics also seem to favor the use of WMD as issued by Sheikh Nasser Bin Hamad al Fahd. He argued that it is permissible to use WMD to make it a fair fight given the nature of weapons at the disposal of the enemy. His ruling was apparently
accepted in Islamic circles with minimal dissent [50]. This sense of clerical support is thought to be a key quality in religiously oriented terrorism since it provides an important dimension of legitimation. Al Suri also makes the ideological call for the use of such weapons as a means of levelling the playing field.

It is important to note however that statements of intent do not level capability. In addition, as Dunn [51] recognizes the assumption that acquisition equals employment also needs to be challenged. There has been a mixture of reports concerning whether al-Qaeda has actually acquired or attempted to acquire WMD. Among reports however has been a lack of hard evidence, with most reports fuelled by rumours and suggestions. Those reports that do seem to suggest some link acknowledge the difficulties faced by al-Qaeda in terms of technicalities in deploying chemical and biological weapons. Given these difficulties, it is likely acquisition and employment of nuclear weapons would be even more problematic. Although we must not rule out the possibility of this development given the dynamic and diffuse nature of this movement, at least for now it appears al-Qaeda may be more content in employing conventional weapons, where the risks and costs are much lower.

**Integrating Psychological Research and Theory into Threat Assessments**

Given the lack of directly relevant literature pertaining to the main issue of this report, the question is one of how we use the knowledge and information we have in a practical way? How can psychological research contribute to understanding terrorist acquisition of WMD and its potential use, and can this knowledge be used to devise effective deterrents to WMD use? This section of the report will attempt to shed light on some of these complex questions.

Before considering specific deterrent strategies, it is important that we gauge some understanding of how we can use some of the knowledge to inform analytically more useful efforts that may enlarge our understanding and capabilities to respond to the
prevailing threat. Ackerman [11] highlights a particularly salient concern. While some insight has been accrued in the exploration of non-state actors’ motivations for using WMD, the overwhelming majority of threat assessment models and tools utilized by numerous government agencies remain focused on the vulnerability and consequence qualities of risk, sometimes including discussion of terrorist capability but very rarely accounting for terrorist motivations in any significant depth. Prevailing threat assessments tend to focus exclusively on one or two elements and inherently miss synergies that can reduce the threat. One means of integrating knowledge concerning motivations into threat assessment methodologies is to develop standardized methodologies for conducting in-depth qualitative studies of certain radical groups so that threat assessment models vouch for factors such as groups’ history, ideology, life-cycle status, organizational structure/dynamics, resources, operational capabilities, environmental factors, cognitive or affect based distortions to perception and information processing and operational objectives, to name but a few.

**Key conclusion – Psychological Factors in Risk Assessment**

- Threat and risk models currently used to address WMD terrorism do not take psychological factors sufficiently into account. The psychology of individual and group behavior provides a rich resource for information relevant to threat assessments.

**Recommendation**

- Develop more sophisticated ways of conceptualizing risk by incorporating individual, social and organizational factors that affect the decisions of terrorist groups and their members.
- Incorporate research on cognition and individual and group decision-making processes into formal risk assessments.
This point is in fact echoed by Badey [7] who proposes that we look to employ qualitative analysis to identify factors and to measure the potential for the use of nuclear devices by non-state actors. He identifies six threat categories which comprise the foundation for a threat assessment scale for nuclear terrorism. Some qualities are identified by other authors, however the combination of these variables is what strengthens analytical strategies.

These variables include:

(1) *access* - this entails access to fissile material, a nuclear device, weapons grade uranium or plutonium, financial resources, clandestine support and shipping capability, nuclear related technologies including weapons equipment, delivery systems or detonators, processing technologies and measuring equipment;

(2) *personnel* – it is important to be cognizant of access to personnel who may be willing to work for non-state actors, since a team is inherently necessary, particularly as it relates to specialist skills. The successful acquisition and use of nuclear material would entail extensive knowledge of nuclear technology skills, explosives and weapons designs skills, and operational and planning design skills. Specialist skills are critical for the production and use of nuclear material;

(3) *organizational* – the pursuit of nuclear terrorism poses significant organizational challenges for potential non-state actors. Threat indicators may include; covert organizational structure, significant infrastructure and the established logistics capability, and operational experience;

(4) *geographic factors* – these include the presence of an extraterritorial enemy, the proximity relative to a source of materials and to the target, and the geographic identity of the perpetrator.
The final factors that should be considered in a threat assessment for nuclear terrorism in Badey’s view are the (5) psychological and (6) ideological factors. These factors include the perception of victimization and of a historic struggle, ideological and psychological acceptance of mass and/or self-destruction, and evidence of ideation.

Another method Ackerman [11] identifies is to amalgamate empirical research on terrorist motivation and capability with the existing corpus of literature related to terrorist decision making in order to generate usable and more useful analytical tools. Ackerman has adopted this approach by developing what he terms the DECIDE (Determinant Effecting Critical Infrastructure Decision) framework, the objective of which is to help analysts in the evaluation of whether a certain terrorist group is more or less inclined to attack critical infrastructure as opposed to some other target. Ackerman suggest that this framework could be applied to the question of terrorist decisions to use WMD.

Perhaps unsurprisingly, a synthesis of both quantitative and qualitative approaches may be necessary to understand WMD terrorism [11, 27]. Ackerman maintains that to better understand the behaviour of existing terrorists we need to conduct detailed qualitative studies of a diverse range of extremist and terrorist groups, studies focusing on a group’s modus operandi, in terms of their tactics, how they operate, their routine, in addition to their historical origins, development over time, organisational structure, membership, ideology, technical capability, and actual attacks. Ackerman asserts that these should then be amalgamated with a novel set of empirical tools either statistical or heuristic to reach a level of understanding that is both specific to the dangers of the group under consideration and comparative enough to decipher useful trends and indicators normally unnoticed.

There are certain promising developments in this direction. A succession of case studies sponsored by the Monterey Institute’s Center for Non Proliferation Studies, across the last 50 years and accumulated by more than a dozen researchers provides empirical bases to examine the motivations, behaviour and patterns associated with terrorist interest, or supposed interest, in WMD [16]. The authors relied on triangulation of multiple sources
which included court documents, interviews, and terrorist writings. They provided three interpretations which offer a conceptual framework for examining the phenomena of terrorist acquisition and use of WMD. They asserted that several of the empirical cases regularly alluded to in the media and scholarly literatures were in fact mythical. Based on the data, they assessed that:

(1) groups that look to obtain and use WMD have certain qualities in common including; the mindset of the group leaders, the opportunities they seized and the technical capabilities they seized;

(2) exogenous and internal restraints deter some groups looking to engage in mass violence;

(3) religion is only partly responsible for orientations to WMD use.

Studies such as this should be encouraged more since they help focus on deterrent strategies, for e.g. restricting opportunities, and increasing technical complexities.

Another tool that should be exploited more thoroughly in our efforts to more fully appreciate motives relating to terrorist use of WMD is interviews. There is little substitute for talking to former radicals and acquiring a more thorough understanding of decision-making processes, how strategy and tactics are implemented, in addition to the consideration and inhibitions that such movements may consider. Speaking to terrorists may open up a wealth of data that is not possible through other means, and is an avenue worthy of pursuit. Post and colleagues [54] interviewed 35 incarcerated Middle Eastern terrorists with the purpose to understand the psychology and decision-making, particularly with respect to propensity to WMD use. Although little reference was made in the interviews to WMD use, the possibilities for focused research aimed at uncovering more about the relevant processes are significant.
There are limitations, however, to the application of such knowledge. Even with the best intentions to produce reliable and scientific analyses it ought to be made explicit what kinds of limitations would be associated with such knowledge. Further exploration of these processes could not be expected to reveal much by way of prediction of timing, nature or location of future WMD attacks, with any degree of scientific assuredness. As Ackerman [11] acknowledges there is no “magic bullet” in the form of a complex model that can be formulated that will enable Western security agencies to reliably predict when certain terrorist groups are likely to carry out such attacks. While significant finances are currently devoted to subsidizing mathematical modelling projects that claim to be able to quantify and predict terrorist behaviour, a sole focus on these types of models reflects a naïve and largely misplaced faith in the ability of such models to be able to forecast the development and direction of complex human behaviour patterns at both a group and individual level. Furthermore, threat or risk assessment models must be careful not to rely solely on past activity or behavior. Terrorists are dynamic actors, and they are adept at learning from past campaigns, mistakes etc. Hence, new and innovative tactics should be anticipated [27].

**Key conclusion – Self Perceptions**

- It is important to know how terrorists justify their actions to themselves, to fellow group members and to non-terrorists, with whom they interact.

**Recommendation**

- Where appropriate, psychologists and other social scientists should be given access to information and data beyond what is currently available in open source material about the beliefs and perceptions of terrorists and about the way they justify their actions to other group members and to non-members.
**Deterring terrorists**

Having looked at how knowledge pertaining to motivational capabilities can be used in an analytically more useful way helping produce more reliable and better-informed threat assessment models, what is the practical usefulness of such knowledge in the implementation of deterrent strategies? What can we usefully discern from such knowledge in deterring terrorist from acquiring and using WMD?

Deterring extremist groups from attaining their goals of large-scale nuclear violence should focus on the opportunity component. This entails denying them access to highly enriched uranium or plutonium, the necessary ingredients in any nuclear device. Indeed, denying access to technology, safeguarding WMD facilities, and conducting inspections at borders and ports should be viewed as crucial tools to lower the likelihood of successful WMD acquisition and attack by terrorists. Another important means of deterring non-state actors from acquiring and using WMD is through focusing on state sponsorship of WMD attacks. States have a long history of creating, facilitating, manipulating and directing insurgent and other violent groups to further their regime’s foreign or domestic policy interests. A matter of growing concern to many analysts is the possibility of state support for terrorism extending into the arena of unconventional weapons. The degree to which this is likely is very much a divisive issue. A more thorough analysis of past terrorist incidents where WMD may have been implicated or involved can offer a useful historical context and empirical foundation for the implementation of deterrent strategies. Also, designing and implementing effective deterrents first requires a clearer sense of the adversary’s motivation and capabilities. Some effort has been invested in this report to bring together our understanding and knowledge in this area, however clearly more work is required.

A more accurate form of analyses couched in psychological understanding would be to examine some of the possible antecedents and trigger events that may initiate the development of WMD. Examining what led to groups such as Aum developing such capabilities may provide broader insight into the factors that may lead modern day movements to adopt such a move. It is important, however, that motivations are
distinguished from capabilities. While a lot of the literature appears to converge on the point that terrorists today are motivated to acquire WMD this isn’t an indicator of risk since their actual capability may not be very high or strong. That is motivational ability should be differentiated from operational and strategic capability. The difficulties in acquiring, developing and then using WMD, including nuclear weapons, are enormous as Parachini alludes in his discussion on the group Aum. Even if a group does manage to acquire such weapons, the technicalities involved in developing them, and then having some means of testing them without detection would require enormous logistical capability as well as a large support base. Hence, we should not be fooled into making indicators of risk based on motivations, which much of the literature appears to be based on. This leads to an inflated and exaggerated sense of risk that is not accurately based on capability, operational and technical impediments.

Gaps and Opportunities in Research on the Psychology of Terrorism

It has been stressed several times in this report that psychological contributions to understanding terrorists WMD acquisition and use are relatively limited. It seems clear that there is potential for psychological understanding to help inform this area. In particular, it is important to progressively construct a body of knowledge that can in the long term inform more useful practical efforts to deter non-state use of WMD. Throughout the report, we have noted key conclusions that result from our review of research on the psychology of terrorism and the recommendations that flow from these conclusions. The final section of this report looks more generally at the medium and long-term research needs as we attempt to use knowledge about the psychology of terrorism to help understand the conditions under which terrorists might attempt to acquire nuclear weapons or other WMD.
Risk Assessment

One major avenue for future exploitation is the use of psychological risk assessments. Within forensic psychology risk assessments are commonly used to assess the risk of recidivism or repeat offending in criminals. This is often based on actuarial and clinical assessments. Given that we cannot study terrorists within a clinical setting, it may be possible to conduct risk assessment on the basis of their past and present behavior, systematically analysing their activities, trends, developments, keeping a track of risk. Risk is not static; it is often dynamic and based on the changing climate and behavioural indicators. In the context of the terrorist movement this is likely to be based on the changing political climate and the changing trends adopted by the terrorist movement. As noted earlier, however, terrorist movements are for the most part unpredictable, so assessments must not be couched solely in past behavior. Risk must be assessed on a regular basis. Few, for instance, could have foreseen the Tokyo subway attacks or the 9/11 attacks, despite it now being common to implicitly condemn the academic research community for not predicting such events. For all the wealth of knowledge we may accumulate, one attack that goes against our conventional wisdom has the ability to skew our understandings, hence we must be aware of this changing dynamic and capriciousness of a terrorist movement. If however intelligence, policing, and academic understanding is continually revised and updated there is no reason why more accurate risk indicators cannot help inform more precise understandings of terrorists who may be prone to WMD acquisition and use.

Decision Making

There is also a further need to inform understanding concerning terrorist decision-making processes. What psychological qualities impinge on how terrorist actors and movements make decisions? Are decisions dictated by internal judgements, such as group dynamics? Or do external conditions have a more influential role on decisions made? Do leaders take sole responsibility for decision-making or are decisions reached through a process of debate and voting? Understanding this dynamic may be useful in discerning the factors
which may create internal divisions and conflicts within the group, helping focus counter-efforts.

**Evolution and Change**

A related gap for future research concerns an understanding of the psychological processes inherent in terrorist innovation. Understanding how and why terrorists innovate in terms of strategy, tactics, weaponry is a key component in understanding the psychology and motivational dimension as it relates to terrorist use of WMD. How for instance do terrorists go from using one form of tactic such as hostage taking to suicide bombing? Is it a result of social learning (imitation tactics) or is it based on collective decision-making process, or is it a leadership decision to deploy tactics? Does the issue of ‘shock-value’ determine terrorist innovation? Do terrorists for instance consider a need to re-develop as a means of surprising or catching the enemy off guard? Is innovation a product of technological development? Do terrorists consider innovation a key component of their broader strategy or is it merely a ‘what works’ focus? Speaking to terrorists in this respect may provide valuable data.

**Deterrence**

There may also be value in exploring the criminological literature in terms of deterrence strategies and how escalation is managed. In the context of burglary, for instance certain initiatives have been set up to ‘flag’ certain areas, or key ‘hotspots’ that burglars have constantly looked to target. This has also entailed community initiatives such as increased vigilance. In the context of terrorism, this may encompass targeting valuable sites, locations or areas that terrorists may focus on in terms of WMD use, decreasing their vulnerability to attack.

Future research should also be directed towards an exploration of the psychological and internal restraints that have prevented use of unconventional weapons in the past and may deter future use of WMD. As mentioned earlier understanding the impact of these restraints is crucial, particularly in counter-terrorist campaigns. Alternatively there is also a need to explore the benefits terrorists would accrue from acquiring and using WMD.
An attempt should be made in this instance to prioritise the perspective of the terrorist, as Gressang [25] has mentioned. The decision to engage in a nuclear act may be subject to a cost-benefit analysis, as Jacobs [42] points out. The costs may encompass technical issues, planning and risks of detection and apprehension. The benefits may encompass the attainment of broader objectives. Importantly Jacobs adds, in any terrorist act there may be a critical point at which a perceived benefit (e.g. public attention) may develop into a cost (e.g. public outrage and revulsion), the consequence of which may be a loss of support or sympathy for the terrorist movement. Hence research should look to explore such modes of analyses. Weighing up the costs and benefits from the perspective of the movement will be valuable in informing us of future risks of WMD acquisition and use. It is crucial in all cases identified that research explore the potential of qualitative research and the benefits of first-hand evidence, either through primary source documents or interviews.

Crucially, while the research pertaining to psychological dimensions of terrorist acquisition and use of WMD is limited, there is potential for future exploration and more reliable assessments, that may help inform effective deterrence strategies. It is imperative however that research is based on careful and rigorous analyses, rather than the imprudent and inflated statements that appear to characterize much of the research field. Deductions and conclusions reached should be the basis of sound theoretical and reasoned arguments, helping inform more prudent policy.

Summary

There is empirically sound research on the psychology of terrorism that is directly relevant to decisions to acquire and use WMD; to our knowledge, there are no well-grounded studied looking specifically at decisions to acquire nuclear weapons. This report suggests four principle applications of psychological research to the problem of WMD terrorism:

- Clarifying and focusing issues of motivation and their significance;
• Identifying capacities and inhibitors that influence terrorist groups’ decisions to seek to procure and use WMD (these two decisions are often viewed as necessarily related, but we ought not to assume that one necessarily follows the other);

• Understanding how processes of innovation and change in terrorist groups may influence the desire to seek out WMD; and

• Clarifying the psychological variables that are relevant to how threat assessments are or should be constructed and developed.

Psychological research appears particularly relevant to developing an understanding of the goals pursued by terrorists and the meanings attached to those goals, to understanding the risk-benefit calculus involved in deciding to devote resources to WMD, to understanding the constraints and inhibitors that may discourage terrorist groups from seeking WMD, to understanding how the evolving structure of terrorist groups affects decisions involving WMD and to enriching current threat assessment methods. We identify both immediate and long-term research needs in this area and avenues for applying this research in threat assessment and counterterrorism.
Citations

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