Enhancing Public Resilience to Mass-Casualty WMD Terrorism in the United States
Definitions, Challenges, and Recommendations

Joshua H. Pollack
Jason D. Wood
Science Applications International Corporation

June 2010

The views expressed herein are those of the authors and do not necessarily reflect
the official policy or position of the Defense Threat Reduction Agency,
the Department of Defense, or the United States Government.

This report has been approved for public release; distribution is unlimited.

The mission of the **Defense Threat Reduction Agency (DTRA)** is to safeguard America and its allies from weapons of mass destruction (chemical, biological, radiological, nuclear, and high explosives) by providing capabilities to reduce, eliminate, and counter the threat, and mitigate its effects.

The **Advanced Systems and Concepts Office (ASCO)** supports this mission by providing long-term rolling horizon perspectives to help the DTRA leadership identify, plan, and persuasively communicate what is needed in the near term to achieve the longer-term goals inherent in the agency's mission. ASCO also emphasizes the identification, integration, and further development of leading strategic thinking and analysis on the most intractable problems related to combating weapons of mass destruction.

SAIC is a FORTUNE 500® scientific, engineering, and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure, and health. For more information, visit www.saic.com. SAIC: From Science to Solutions®

For further information on this project, or on ASCO's broader research program, please contact:

<div align="center">

Defense Threat Reduction Agency
Advanced Systems and Concepts Office
8725 John J. Kingman Road
Ft. Belvoir, VA 22060-6201
ASCOinfo@dtra.mil

</div>

Contents

Executive Summary

This paper concerns how to enhance public resilience to mass-casualty terrorist attacks with weapons of mass destruction (WMD) in the United States. It aims to develop an *actionable* definition of public resilience, *i.e.,* one that can be related to specific policy choices. It identifies how U.S. Government decision-makers can take advantage of human factors both to reduce the harm done by attacks and to reduce the appeal of these attacks to terrorists. These roles are respectively described as "defense through resilience" and "deterrence through resilience."

We treat public resilience as those qualities of the public that mitigate both its vulnerability to direct, physical harm after an attack and its vulnerability to the indirect effects of an attack, which are driven by the experience of fear, threat, and traumatic stress. Actual mass-casualty WMD terrorism has yet to occur, but research on the most similar events—conventional mass-casualty terrorism and strategic bombing campaigns—has identified a variety of psychological, behavioral, and social/political effects, some with potentially severe consequences. These effects include traumatic stress disorders, major depression, and other psychiatric consequences; protracted self-evacuation from urban areas, which can intensify the deleterious psychological, social, and economic consequences of an attack; the initiation or intensification of civil violence; the initiation of international armed conflict in pursuit of revenge; and loss of support for the present form of government.

We identify three major elements of public resilience: 1) the public's sense of comprehension of events, which moderates fear of the unknown; 2) the public's sense of control of events, which moderates feelings of dread; and 3) the public's social resources, which buffer feelings of fear and threat. The first two areas are more clearly amenable to policy interventions than the third.

Summary of Recommendations

Overview. To enhance defense through resilience, we recommend training and exercise programs—both mandatory and voluntary—that will provide members of the public with ways of becoming personally and constructively involved in disaster response, thereby promoting their sense of personal control over events. We also recommend certain planning steps that will help to ensure the Government's ability to communicate effectively with the public after an attack, thereby promoting its sense of comprehension of events, as well as a vicarious, collective sense of control over events. These recommendations include strengthening the Government's capabilities to manage publicity and the news media in the event of an attack.

Achieving deterrence by resilience involves overcoming a persistent image of American fragility in the minds of the nation's adversaries. Replacing it with a more resilient image requires events that cannot be "made to order." The United States therefore should be prepared to seize opportunities to build such an image by *actually exhibiting* resilience in the course of future terrorist events, major technological disasters, and major natural disasters.

Training and exercise programs. To mitigate physical harm and to provide members of the public with the means to become personally and constructively involved in the response to a disaster, mandatory training in household preparedness, first aid, and basic disaster response could be established as a regular feature of both Federal Government employment and public high-school attendance.

(Student training could be mandated and funded through Federal education aid programs.) Training for Federal employees would have special relevance in the Washington, DC area because of the large numbers of Federal employees in the area. Mandatory training could also be extended to government contractors and to State government employees.

Voluntary opportunities for more advanced and specialized forms of training could be created for persons willing and able to serve in "reserve" roles in firefighting, search and rescue, hazardous-materials response work, and possibly other categories of responder work. (This work would be loosely comparable to the Metropolitan Medical Response System, which organizes medical professionals for emergency response duty.) A "reserve component" could provide a "follow-on" or "surge capacity" for severe disasters, and backfill professionals when they are deployed to other locations under the Emergency Management Assistance Compact or the Urban Search and Rescue Response System. Volunteering for these types of emergency response services should be understood as an important form of community service and should be integrated into existing national service programs.

Both mandatory trainees (*i.e.,* Federal Government employees and high-school students) and volunteer responders should have opportunities to participate in local and federally sponsored exercises. Participation in exercises will prepare volunteer responders for activation in genuine emergencies, and help to give emergency managers the confidence to rely on them. Emergency managers should favor the decision to activate volunteer responders during real incidents, rather than allow them to become an instrument of last resort only. Activation during non-catastrophic disasters will make material contributions to the well-being of Americans in disaster areas, while building confidence and providing valuable experience for times of the most urgent need.

Contingency planning and succession safeguards. The importance of leadership and public communication in a crisis requires that a coherent, unified message should be developed as part of comprehensive contingency plans. Because the survival of the President of the United States cannot be assumed in the event of a surprise WMD attack, these plans should include measures to assure that an authoritative leadership figure will be available and prepared to guide the Federal response and communicate with the public.

As the immediate successor to the President, the Vice President should be personally involved in the development and exercise of the relevant contingency plans. The final link in the formal chain of succession is the Secretary of Homeland Security, who is also designated as the Principal Federal Official (PFO) for domestic incident management under the Homeland Security Act of 2002, and is thus already involved in the development and exercise of relevant contingency plans. The Secretary's survival *as PFO* is of as least as much interest as his or her survival as a Presidential successor.

Three leadership safeguards are therefore recommended. The first safeguard is a simple refinement of the current practice of absenting a "designated survivor" from the annual State of the Union Address or any other high-profile event that assembles nearly the entire line of Presidential succession in one place. The designated survivors should always include the Secretary of Homeland Security, who must serve as PFO if necessary, and the Vice President, who would be the most recognizable, most legitimate, and—if the above recommendations are accepted—best-prepared possible Presidential successor.

The second safeguard is to extend a modified version of the "designated survivor" practice to all other times. The Secretary of Homeland Security should be continuously kept at a substantial physical distance from the President; the exact distance should be subject to further analysis.

The third safeguard is to revisit the role of legislators in the Presidential succession. The autonomy of the legislative branch poses a challenge to contingency planning, as the Speaker of the House of Representatives and the President Pro Tempore of the Senate may not be willing or able to invest the necessary time in contingency planning and emergency preparations. Moreover, under current practice, the member of the majority party with the longest tenure in office is elected President Pro Tempore, often placing a person of frail health third in the line of Presidential succession. If Congress is not prepared to revise the Succession Act of 1947 either to exclude legislators from the line of succession or to demote them to the end of the line, then the Senate should at least be urged to elect the Majority Leader as the President Pro Tempore.

Publicity and the news media. Whenever possible, the participation of members of the public in exercises and actual disaster response should be broadly publicized. Publicity can promote participation in training programs and should also help to provide otherwise uninvolved members of the public with a vicarious sense of control over events.

The most promising area for public affairs may be military-media relations. A program of Civil Support news media "embeds" could capitalize on the advantages of having television cameras pointing toward people in uniform after a major disaster. Alternatively, Combat Camera teams should be equipped and trained to deploy and operate with existing WMD response units. The latter approach would have the advantage of allowing emergency managers to prevent the dissemination of highly traumatizing imagery (*e.g.,* scenes of dead bodies in the streets, or survivors with extremely disfiguring wounds) while demonstrating to the public in a truthful and compelling manner that swift action had already brought responders to the scene.

Areas for further research. Several avenues have been identified for related investigation beyond the scope of the immediate effort.

First, in order to validate the concepts presented in this paper, and to help identify potential means for measuring public resilience, a set of formally structured case studies could be developed, involving groups of events generally similar to one another.

Second, a number of efforts can be taken to improve our understanding of the deterrence problem. These include studying the formation and alteration of national images; studying how information moves globally and how persuasion operates at a distance, through mass-media environments, across borders and cultures; and studying the beliefs, motives, and goals of specific terrorist leaders through the systematic use of content-analysis tools.

Third, it is possible to imagine scenarios where the government would be in a position to warn the public of a specific and imminent threat. Lessons can be drawn from research into past events about what to do (and not do) in the event of a credible threat, including what additional preparations can be made now to enable a constructive response.

I. Introduction

The efforts of the al-Qaida international terrorist organization to acquire chemical, biological, radiological, or nuclear weapons are a persistent source of concern to the United States and other Western countries.[1] So, too, are periodic statements by al-Qaida members or affiliated ideologues either threatening or claiming the right to kill millions of Americans or other enemies either with nuclear weapons or by unspecified means.[2] But the threat of mass-casualty terrorism with weapons of mass destruction (WMD) is not linked exclusively to one adversary; rather, it is founded upon the availability of unconventional weapons technologies, and will remain a problem for the foreseeable future.[3] The durability of the threat calls for equally enduring responses.

Counter-terrorism and homeland security efforts currently emphasize denying access to WMD, preventing and disrupting attacks, and protecting critical infrastructure.[4] Adding to these strategies the enhancement of the resilience of society to mass-casualty WMD terrorism—defined as the ability to withstand the consequences of catastrophic events—could play two important roles. First, it could reduce the harm done to society, which extends well beyond the physical effects of a terrorist attack; and second, it could reduce the appeal of mass-casualty WMD attacks to terrorists. We describe these respective roles as defense and deterrence.[5]

Enhancing resilience through improved public communications and education already has been identified as a potential form of *defense* against WMD terrorism.[6] The 2010 *National Security Strategy* endorses this idea, calling for "individual and community preparedness and resilience through frequent engagement that provides clear and reliable risk and emergency information to the public."[7] While some researchers have concluded that *deterrence* can apply to non-state adversaries,[8] enhancing resilience as a method of deterrence has not yet been explored in detail.[9]

Scope and Terms of Reference

The objective of this paper is to develop an actionable definition of public resilience, *i.e.,* an understanding of the concept that can be related to specific policy interventions. In developing recommendations, we therefore focus on the present-day United States, taking its history, institutions, geography, culture, known adversaries, and other contextual factors into account. The examples of two other countries—the United Kingdom and the State of Israel—tend to be prominent in discussions of public resilience, but their specific institutional arrangements and policy choices cannot be duplicated here.[10]

For our purposes, "resilience" means "the resilience of the public." We focus entirely on human and social factors, as opposed to the integrity of physical structures and the continuity of services, forms of resilience that have already been incorporated into homeland security planning under the rubric of critical infrastructure protection.[11] Rather, our aim is to identify the untapped potential of "soft" social and psychological phenomena, which have yet to receive the same attention in the United States as "hard" physical factors.[12] Nor do we seek to reinvent preparedness, which emphasizes the development of governmental capabilities for preventing and responding to terrorist attacks. Preparedness and public resilience are related and overlapping concepts, but are not identical.

Although public resilience is relevant to a wide range of events, we focus on WMD attacks for two main reasons: their special psychological resonance and their potential threat to the survival of

national leaders, whose role as communicators helps to shape how events are experienced by the country as a whole. To exclude smaller, more manageable threats that fall within the WMD category, we consider only events that produce mass casualties.[13] Even if they contribute negligibly to the risks faced by the average individual nationwide, mass-casualty incidents pose a special threat to overall public security. Not only are they disproportionately costly to manage, but they also can cross important thresholds of public concern and trigger responses whose effects are felt everywhere.[14]

Lacking a self-evident threshold, we adopt the definition of mass-casualty terrorism used by Victor Asal and Andrew Blum: "events in which 100 or more people have been killed on one day by the same nonstate actor attacking a primarily civilian target."[15] In practice, this means a successful nuclear, biological, or chemical attack in an urban setting, consistent with a large subset of the National Planning Scenarios. Radiological attack is a borderline case.[16]

Sources of Insight

There are no known instances of successful mass-casualty WMD terrorism, but past attempts can be identified.[17] The deadly release of sarin in the Tokyo subway in March 1995 appears to have been intended to create far more devastating results.[18] A series of suicide-bomb attacks involving explosives and chlorine tanks took place in early 2007 in Iraq, but none approached the mass-casualty threshold.[19] To seek to anticipate the nature of successful mass-casualty WMD terrorism, we draw on a variety of literature describing human responses to other events with similar characteristics. Table 1, below, illustrates types of potential comparison cases. No formal comparison of case studies is attempted here.

Features of MCWMDT	Terrorism	Strategic bombing	Military casualties	Major natural disaster	Technological disaster
Urban catastrophe with mass casualties	9/11	X		X	Bhopal, India
Mass displacement	Iraqi sectarian conflict	X		X	
Single, discrete event	9/11			X	X
Surprise	9/11	Pearl Harbor	Pearl Harbor	Earthquakes	X
U.S. experience	X	Pearl Harbor	X	X	Three Mile Island
Mediated via television	Recent cases	Recent cases	Recent cases	Recent cases	Recent cases
Intentional harm	X	X	X		
Enemy is elusive	X		Insurgencies		
CBRN hazard	Sarin, anthrax attacks	Some cases	Some cases		X
Harbinger of national existential threat	Israeli cases	Israeli cases			

Table 1. Features of mass-casualty WMD terrorism (MCWMDT) shared with other events.

We draw on materials related primarily to terrorism and strategic bombing, both of which involve intentional harm to civilians on a large scale. These experiences appear to be significantly more psychologically stressful and traumatic than natural disasters or technological disasters (*i.e.,* major industrial accidents).[20] Norman Milgram has described violent conflict as significantly more

challenging to the ability of people to "comprehend, predict, and control events" than other sources of danger. The crucial difference is the "deliberate and calculated intention" of a human enemy who seeks "to destroy us or to weaken or destroy our power to control our own destinies as we see it." Terrorism is psychological warfare by design.[21] The targeted population's very awareness of the enemy's persistence, intelligence, and malicious intent may be the source of intensified stress. Natural or technological disaster also does not involve the impulse to reassert one's sense of control by striking back.

II. Understanding Public Resilience

Finding ways to enhance public resilience depends on how this otherwise abstract idea is defined. The idea of society's ability to weather catastrophe provides only a starting point. To form policy recommendations, it must be understood what pressures mass-casualty WMD terrorism will place on society, and what qualities will enhance society's ability to withstand those pressures. Otherwise, the idea of resilience will not be specific enough to serve policymakers' interest in addressing the threat.

Potential Effects of Mass-Casualty WMD Terrorism

Our first question is, resilience to what?

The effects of terrorism, regardless of means or scale, can be divided between direct effects—*i.e.,* the physical effects of acts of terrorism on living things, property, and the environment—and indirect effects, which consist of a multitude of psychological, behavioral, and political sequelae. Direct effects include both prompt and delayed effects. Prompt direct effects are immediate and essentially unavoidable: for example, the blast wave of an explosive device. The consequences of delayed direct effects, by contrast, can be mitigated through response measures.

A resilient public would exhibit relatively limited vulnerability both to delayed direct effects and to indirect effects. Even after an attack has occurred, these are potential effects, not inevitabilities.

Delayed Direct Effects

The direct effects of a terrorist attack involve some combination of physical destruction, death, injury, and illness. Delayed direct effects, as noted above, can be mitigated through response measures, potentially including self-help by people in the affected areas, decontamination, and treatment. After a nuclear attack, exposure to fires and radioactive fallout—especially plentiful after a ground burst—are potentially avoidable.[22] Also, if injured survivors can find timely medical assistance, burn and blast injuries may be treatable.[23] After the initial detection of the release of toxic chemicals or harmful organisms, it is possible for potential victims either to avoid exposure or to receive decontamination and treatment.[24] Minimizing these types of harm requires people in affected areas to protect themselves as best as they can and to seek out help.

Psychological Responses to Fear, Threat, and Traumatic Stress

Terrorism, potentially even more than other forms of disaster, can create traumatic stress in those who experience it, including survivors, responders, and even those who experience the event solely through the news media. (Television in particular appears to be a potent vector for trauma.[25]) According to the current psychological diagnostic manual, a traumatic stressor consists of an event that involves or threatens death, serious injury, or a "threat to the physical integrity of self or others," triggering feelings of "intense fear, helplessness, or horror."[26]

In the diagnostic terminology in current use, exposure to a traumatic stressor may trigger Acute Stress Disorder (ASD), whose symptoms include feelings of dissociation or emotional numbing; re-experiencing of the event; avoidance of reminders of the event; anxiety; and general distress and impaired functioning in life. Symptoms persist from two days to four weeks. Exposure may also lead to Post-Traumatic Stress Disorder (PTSD), whose symptoms persist longer, but are otherwise essentially the same as those of ASD, except for dissociation. (PTSD cases are considered chronic if they persist for more than three months. Delayed onsets, more than six months after exposure to a stressor, also occur.) Traumatic stressors also can lead to major depression, adjustment disorders (*i.e.,* anxiety or depression), substance abuse, somatization (*i.e.,* symptoms expressed bodily), or other psychiatric symptoms and disorders.[27]

Exposure to a traumatic stressor does not invariably lead to trauma. Many survivors later describe being strengthened by the experience.[28] Psychological stress also tends to be transient. Susan Brandon and Andrew Silke describe processes of dissipation, adaptation, and habituation by which stress responses ease over time, are ameliorated through social and familial support and other compensatory responses, or simply become "the new normal." However, increased sensitization to traumatic stress can occur with continued exposures.[29]

Various conditions and predispositions can increase susceptibility to traumatic stress. For survivors, more frequent, direct, and intense exposures, including suffering injuries, are associated with higher rates of psychiatric morbidity. So is a sense of having survived by sheer chance. For emergency responders, the recovery of bodies and interactions with the families of people who have been killed are associated with higher rates of morbidity.[30] Young children, middle-aged adults, women, members of ethnic minorities, people with low incomes, people with cognitive or health impairments, and people with psychiatric histories have been identified as having higher-than-average vulnerability to traumatic stress.[31]

Very high rates of PTSD, depression, and other forms of psychological trauma have been recorded among war refugees and displaced people. People in these situations are exposed to severe threats, placed in a situation of helplessness and dependency, and denied access to their usual forms of social support.[32]

Behavioral Responses

A public behavior observed in past incidents is the "worried well" response to invisible hazards. After the accidental spread of a radioactive substance in the Brazilian city of Goiania in 1987 and the aftermath of the sarin attack on the Tokyo subway in 1995, people sought screening or treatment in numbers well in excess of subsequently confirmed exposures. Government information and media

reports appear to have motivated this response in both cases. In the Tokyo incident, many people may have had difficulty distinguishing somatic symptoms of anxiety from the symptoms of nerve agent exposure.[33] This response may complicate efforts to treat victims.

Another common behavior in situations of perceived danger is to "go home"—*i.e.,* to seek out one's close relatives, friends, and familiar settings. Anthony Mawson has found that most flight behavior subsequently characterized as panic is better accounted for as "affiliative" behavior. In a situation of extreme danger, cohesive groups are more likely to conduct orderly and calm evacuations than crowds of strangers.[34] Calling family members to check on their well-being and assure them of one's own is a familiar part of emergency situations. James Pennebaker and Cindy Chung observed increases in communicativeness and interpersonal connectedness among Americans after 9/11.[35] As noted above, social and familial support is an adaptive response to traumatic stress.

Once the immediate danger has passed, another widely observed behavior is to avoid places associated with the event. Paul Slovic has observed that incidents perceived as uncontrollable or incomprehensible act as warning signals, inspiring widespread public aversion. Terrorism, because it instills feelings of helplessness, fits this category.[36] After major terrorist attacks involving civil aviation or urban public transportation, the use of these modes of transport has been observed to fall off sharply.[37] In the aggregate, avoidance behavior tends to decline over time, as feelings of threat and stress recede. The factors that predict these feelings and behaviors overlap with predictors of the chronicity of PTSD; these include having friends or relatives who were killed or injured in the incident, or the belief that friends, relatives, or oneself could have been killed or injured.[38]

Avoidance behavior based on the "signal" or "harbinger" aspect of terrorism could lead members of the public to respond to a mass-casualty urban WMD attack by self-evacuating, *i.e.,* gathering their families and seeking safety elsewhere. For any given household, the signaling event could occur in the same urban area, in some other part of the country, or possibly even in another country perceived as similar to the United States. Self-evacuation, sometimes on a very large scale, has been observed during protracted campaigns of strategic bombing or terrorism.[39]

If they perceive an attack as a harbinger of additional attacks on similar targets, large numbers of Americans could self-evacuate in the days and weeks after the attack, with disruptive social and economic effects. After an attack in a downtown setting, urbanites might seek to relocate to the suburbs; residents of large urban areas might seek to relocate to other areas perceived as less threatened. Over the long term, businesses and government offices may seek to relocate outside of perceived "danger zones."[40] Some forms of WMD attack could also produce large-scale involuntary displacement by rendering housing stock uninhabitable.

Social and Political Responses

Intentionally or otherwise, terrorist attacks can have large-scale effects on government and society. The generalized atmosphere of fear that can emerge in public life after a major terrorist attack diminishes quality of life, and the pursuit of reassurance imposes additional costs upon society. These costs include new security measures, *e.g.,* new aviation security practices and technologies, public transit searches, cargo scanning, and the sanitization of mail to government offices with ionizing radiation. Less visible but more far-reaching changes can exact a toll upon civil liberties and

national self-image. It is possible to anticipate still more severe responses in the aftermath of a mass-casualty WMD terror attack.

Another potential effect of terrorism is the promotion of civil strife, such as the sectarian violence that swept Iraq for nearly two years after the destruction of a major Shi'ite shrine in February 2006. Terrorist attacks can also prod governments towards war, as shown by the response of the United States to 9/11 or the grave crisis between India and Pakistan in late 2001 and early 2002, which followed devastating attacks on Indian targets by Pakistan-backed organizations. An armed conflict is even possible based on an erroneous attribution of responsibility for a terrorist attack.

An apparent contributor to both domestic and international conflict after an attack is the urge for revenge, either among the public, among leaders, or both. The psychological effects of traumatic stress predict a greater inclination to this urge; in a variety of circumstances, higher PTSD rates have been found to correlate to more desire for revenge, which can be expressed as support for political violence. Being able to "strike back," personally or vicariously, appears to provide some relief from feelings of powerlessness.[41]

Terrorist attacks also have the potential to change governments or to reduce their foreign policy commitments. Less dramatically, citizens simply may lose confidence in their government following a disaster perceived as mishandled, and suffer a loss of trust in public institutions.[42]

Overview of Potential Responses

Fig. 1 (below) depicts the relationships of the responses described above. Three types of moderating influences are shown: public resilience, which moderates the experience of fear, threat, and traumatic stress after the attack; psychiatric interventions, which moderate the development of disorders as a result of fear, threat, and traumatic stress; and resettlement, which moderates the effects of population displacement.

On this basis, we treat "public resilience" as the qualities of the public that mitigate both the public's vulnerability to delayed direct effects and its sensitivity to fear, threat, and traumatic stress after a mass-casualty WMD terrorist event.

On the basis of the research findings summarized above, mitigating these effects is expected to reduce the psychological, behavioral, and social and political effects that can be anticipated in the aftermath of a mass-casualty WMD terrorist attack. The following section aims to establish the specific qualities that comprise public resilience.

Also noted in Fig. 1, although these are not the focus of this paper, are the potential contributions of psychiatric intervention and resettlement. These factors also can be expected to provide a moderating influence after an attack. We also exclude from present consideration those qualities of infrastructure that could play comparable roles.
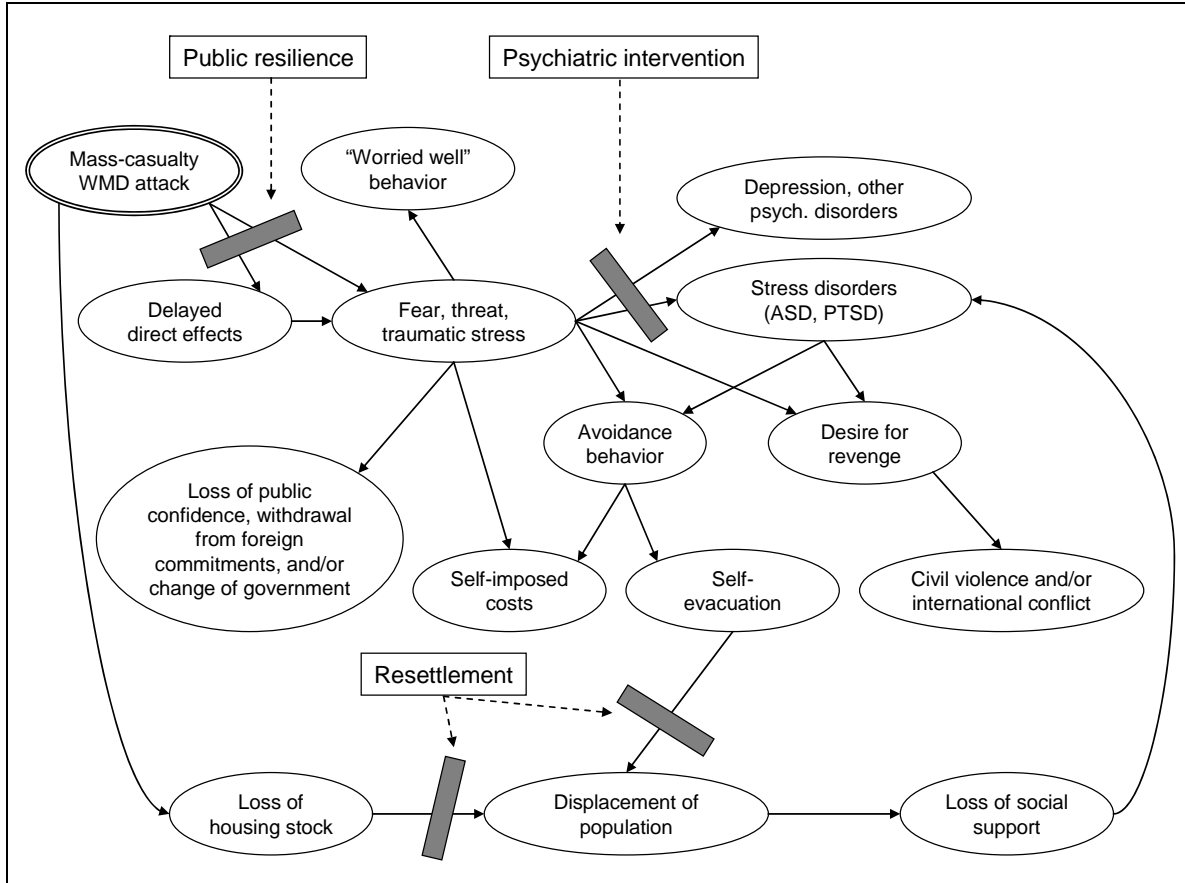
Fig. 1. Relationships between mass-casualty WMD attack and its sequelae, with public resilience, psychiatric intervention, and resettlement shown as moderating influences.

Competing Theories of Public Resilience

Experts have developed several different theories of the components of resilience, many with similar features but varying widely in emphasis and choice of terminology.[43] Their differences underscore a lack of a consensus in the field. Here, we briefly examine several conceptions before providing our own ideas.

Systems Approach

Michel Bruneau and colleagues have proposed a definition of resilience consisting of four "properties": robustness, redundancy, resourcefulness, and rapidity. These properties are presented as equally applicable across four "dimensions": technical (*i.e.,* physical systems), organizational, social, and economic.[44] This definition has been cited in recent literature, and appears to have won some acceptance.[45]

Robustness is "the ability of elements, systems, and other units of analysis to withstand a given level of stress or demand without suffering degradation or loss of function." *Redundancy* is "the extent to which elements are substitutable." *Resourcefulness* is "the capacity to identify problems, establish priorities, and mobilize resources" when normal functioning is threatened. *Rapidity* is "the capacity to meet priorities and achieve goals in a timely manner" in order to limit harm.

The authors provide illustrative performance measures for the resulting 16-element matrix. Some are obvious; for "technical rapidity," the authors suggest "Optimizing time to return to pre-event functional levels." Others are not: for "social redundancy," they suggest "Alternative means of providing for community means." In fact, a certain awkwardness of fit is apparent across the social dimension, where the illustrative performance measures all describe aspects of the services to be provided to society by the technical, organizational, and economic infrastructure, not the condition, mindset, or behavior of the human population itself.

Individual Capacities

Michael Kindt has proposed a view of resilience at the level of the individual human being, defined as "the ability to cope with a negative or traumatic event and return quickly to a healthy level of functioning." In this view, an individual's resilience to traumatic stress is determined by a combination of three capacities: the strength of their social ties, the effectiveness of their coping strategies; and an individual's characteristics or outlook. While some individuals are by nature more resilient than others, resilience can be strengthened through experiences involving a sense of "personal responsibility for the successful response" to a crisis.

Social ties strengthen the resilience of both those receiving support to others and those providing it. *Coping strategies* are the specific problem-solving skills and knowledge that allow individuals to navigate a crisis successfully. The other characteristics are several-fold. They include *optimism*, "the ability to see hope for the future even in difficult circumstances"; *self-efficacy*, "the sense that the individual can utilize available resources to manage the event or task at hand effectively"; and *mastery*, "the ability to take control of the situation one is placed in, and break a large problem down into smaller pieces and begin with these small steps to work to resolve the problem." Resilient individuals also exhibit *coherence*, the "belief that the events that happen in life make sense," allowing them to place catastrophic events into perspective.[46]

Communal Capacities

Fran Norris and colleagues focus on the community as a whole, understanding its resilience in terms of its resistance to the emergence of "disaster-related health or mental health problems" and "effective organizational behavior and disaster management." Reasoning that the wellness of the community "depends in part on the effectiveness of organizational responses," they identify the former as their ultimate concern, while focusing on the latter in practice. Four "networked adaptive capacities" underlie the ability to respond effectively to disaster: economic development, social capital, information and communication, and community competence.

Economic development provides the resource base for a community, in the form of "land and raw materials, physical capital, accessible housing, health services, schools, and employment opportunities." The ideal level of development provides *resource volume*, *diversity*, and *equity*: immediately after a disaster and during the recovery period, adequate resources (volume) of the proper types (diversity) should flow to where they are needed most (equity).

Social capital consists of resources available to individuals, groups, or organizations through networks of social relationships. *Network structures and linkages* describes how members are positioned within networks; *social support* describes the interactions that provide members with forms of

support, or the prospect and assurance of support; *community bonds, roots, and commitments* describe the attachments or "sense of community" that foster participation, involvement, and commitment.

During and after a disaster, the affected people need accurate information quickly. This information must communicate details about the danger at hand and how to respond to it. Because there is little time to verify communicated information during a crisis, "it is also important that the sender of the information be trusted." Accordingly, "closer, local sources of information are more likely to be relied upon than unfamiliar, distant sources." For these reasons, *systems and infrastructure for informing the public* must be in place in advance.

Another, more thematic type of communication is also important. *Communal narratives* "that give the shared [disaster] experience meaning and purpose" are important to effective response and recovery. The media and leaders play a significant role in shaping how a disaster is framed, influencing whether survivors and others understand events as a breakdown of social trust and cohesion or a common triumph over adversity.

Community competence describes the capacity for *collective action and decision-making*, which consists of the ability to respond to communal needs as a group: identifying them, building consensus, establishing priorities, and taking action. A sense of confidence, or *collective efficacy and empowerment*, is needed to achieve this capacity. Community competence is based on two other capacities previously identified: social capital and information and communication.[47]

<u>Relative Risk Appraisal</u>

Seeking to explain the appearance of PTSD cases linked to terrorist attacks well beyond the actual disaster areas, Randall Marshall and colleagues have proposed a theory of relative risk appraisal, drawing on the findings of Slovic and colleagues on risk perception.[48] People tend to fear technologies or phenomena primarily according to two factors: whether they are perceived as controllable ("dread risk"), and whether they are perceived as understandable ("unknown risk").[49] This conclusion parallels other research findings that draw a connection between well-being and optimism and an "illusion of control" over one's personal situation.[50]

The public is willing to support more regulatory controls and security measures in cases of dread and unknown risks, which include nuclear, chemical, and DNA technology, an intriguing parallel to the WMD category itself. Terrorism also falls into this category. "High signal" events, which involve both dread and the unknown, are perceived as harbingers of threat, producing a stronger sense of risk to one's self.[51] This signaling effect can explain why, in a mass-media environment, the psycho-social sequelae of terrorism extend well beyond the immediately affected individuals and their families. George Loewenstein and colleagues have identified vivid mental imagery as among the most important sources of threatening "anticipatory emotions," as opposed to dispassionate assessments of probability or consequences.[52]

Proposed Elements of Public Resilience

With the exception of the systems approach, the concepts described above appear to be broadly mutually consistent, despite differences of framing, focus, and terminology. On this basis, we propose a set of elements of public resilience, framed primarily in terms of relative risk appraisal,

which has the advantage of a generalizable theoretical framework founded on empirical psychological research. The three elements are a sense of comprehension, which moderates fear of the unknown; a sense of control, which moderates feelings of dread; and social resources, which buffer feelings of fear and threat. A sense of control can be either personal ("I can do something about this") or vicarious ("Events are under control") in nature, in keeping with Albert Bandura's distinction between personal and collective agency.[53] The role of leadership in public resilience is to provide the public with both a sense of comprehension and a vicarious sense of control.

Elements of Public Resilience	Related Concepts
Sense of comprehension	Coherence, communal narratives, optimism
Sense of control (personal or vicarious)	Self-efficacy, mastery, collective efficacy and empowerment, coping strategies, collective action and decision-making
Social resources	Social ties, social capital

Table 2. Elements of public resilience, mapped to related concepts.

Table 2, above, suggests how various concepts mentioned above relate to these three elements. Because of the differences between the analytical frames of the various authors, none are precisely equivalent.

III. Deterrence through Resilience

While the contribution of resilience to deterrence appears less certain than its defensive value, the two ideas are additive, not mutually exclusive. Deterrence offers the possibility that one or more urban WMD events can be avoided, and even if for no other reason, the idea of deterrence through resilience should not be dismissed. Certain conceptual issues and practical difficulties nevertheless warrant special attention. The steadily increasing willingness of non-state actors to attempt mass-casualty attacks—already apparent over a decade ago—provides a sobering backdrop to any analysis of deterrence of terrorism.[54] Our conclusions in this area are necessarily tentative.

Deterrence by Denial

As a potential contributor to deterrence of terrorism, resilience should not be considered a form of deterrence-by-punishment, which rests on credibly threatening retaliation. It is instead a form of deterrence-by-denial, which rests on credibly threatening to prevent attackers from achieving their goals. This idea originates in Glenn Snyder's distinction between the "punishment deterrence" role of strategic offensive forces and the "denial deterrence" role of tactical forces.[55] Ballistic missile defenses have also been described as supplying a form of deterrence by denial.[56]

The logic of resilience as a means of deterrence-by-denial rests on an assumption of scarcity, applying only if attacks are not considered "free of charge." Would-be attackers must see their attempts as bearing opportunity costs. (Failure may also degrade a fearsome reputation.) This assumption finds support in the meticulous, years-long process of deliberation, planning, and preparation involved in past mass-casualty attacks, especially 9/11.[57] Execution of an attack with WMD could be expected to involve a similar degree of preparation, further complicated by the

difficulties of acquiring, transporting, and using exotic weapons, which may be dangerous to the attackers themselves. If deterrence-through-resilience succeeds, it would be expected to channel terrorists' ambitions towards other pursuits, ones more readily achievable than WMD attack on the American homeland.

The Goals of Terrorists

The minds of attackers pose a thorny conceptual problem for deterrence by denial. If resilience is meant to deny attackers the achievement of their goals, then what are terrorists actually seeking to achieve, and would resilience actually interfere with these goals? There is widespread disagreement about the motives and goals that animate terrorists.[58] The debate over the purposes of terrorism cannot be resolved here, but it can be helpfully clarified.

Table 3 classifies competing theories of terrorism by their primary goal and primary audience(s). Explanations in the terrorism literature frequently combine or overlap these theories, which are offered as parsimonious ideal types.

Theory	Primary Goal	Primary Audience(s)
Strategic	To achieve a political end or effect through either coercion or provocation	Target's government and society
Ideological	To promote cherished social ideals by demonstrating devotion to them and discredit alternatives	Attacker's own society
Interpersonal	To enjoy solidarity with a small social group	Attacker's own immediate social group
Personal	To achieve stature and respect, revenge, or relief from personal suffering	Attacker's own self

Table 3. Competing theories of terrorism and their organizing principles.

Different goals may predominate at different levels of a terrorist enterprise.[59] For example, an operational leader may be strategically oriented, while an inspirational figure may be ideologically oriented. Individual operatives may be recruited on the basis of achieving goals that are fundamentally personal, and gradually become willing to risk (or expend) their lives for the sake of the group. Furthermore, multiple goals may operate concurrently in individuals, who may not entirely comprehend their own motives at a conscious level. We make no assumptions about rationality or utility-maximizing behavior, assuming only that human beings (including terrorists) associate particular means (including terrorist attacks) with the achievement of particular goals. If actors come to regard a given means as too costly or inefficacious for the achievement of important goals, then their commitment to using those means should decline.[60]

Strategic Goals: Coercion or Provocation

The strategic theory views terrorism as a type of political-military strategy, "an act of force to compel our enemy to do our will."[61] In this view, the primary objective of terrorism is to achieve a political objective either by coercing or by provoking an adversary into taking a desired action. Either strategy necessarily involves mass communication, making terrorism a mass-media strategy aimed at the target society as a whole.[62]

Compared to traditional military strategy, coercive terrorism is streamlined; according to Martha Crenshaw, it is "meant to produce a change in [a] government's political position, not the destruction of military potential."[63] This orientation implies that influencing public opinion, or at least the opinion of key elites, plays a role in the strategy. Robert Pape maintains that democratic societies conducting military occupations on foreign soil (or minority areas with separatist aspirations) have disproportionately borne the brunt of suicide terrorism.[64]

In the coercive model, the enemy's defeat comes about by the voluntary withdrawal of its military forces from occupied territories, in response to both economic losses and the danger posed to human life by future attacks. These ideas were apparent in Usama bin Ladin's videotaped address to the American people immediately prior to the election of November 2004, which compared the costs of America's wars to those of Russia's in Afghanistan, proclaimed in the name of the victims of 9/11 that America should exit the Middle East, and solemnly informed the American public that their security is in their own hands.[65]

Alternatively, strategically minded terrorists may instead seek to *provoke* the government to take repressive action at home or military action abroad, leading to heightened opposition and defeat.[66] John Steinbruner describes this type of strategy as the intentional triggering of a "societal autoimmune effect."[67] There is evidence for the conscious application of a catalytic strategy in mass-casualty terrorism; according to a 2005 text attributed to al-Qaeda member Saif al-Adl, for example, the "ultimate" goal of 9/11 was to stimulate the United States to invade Muslim countries, leading to its defeat and downfall.[68]

Ideological Goals: Demonstration or Provocation

The ideological theory views terrorism as a means to express and promote a particular worldview or belief system. Three types of ideology commonly motivate terrorists: political philosophy, either left or right; ethno-nationalism, often in the service of separatist ambitions; and religious fundamentalism.[69] Terrorist organizations with either ethno-nationalist or religious-fundamentalist ideologies are responsible for the overwhelming bulk of mass-casualty terrorist attacks in recent decades.[70] The champions of radical ideologies aim to transform their own societies if not the entire world, remaking life in the image of their own beliefs. For ideologically motivated terrorists, violence is the means of that change, however illusory or fantastic it may seem to outsiders.

Here again, terrorism is understood as a mass-media strategy, but aimed primarily at the attackers' own society. Attacks serve both to validate and strengthen belief within the group and to intimidate and impress others, demonstrating to society the commitment of the terrorists and the inefficacy of the authorities. Louise Richardson contends that the clandestine nature of terrorist organizations "means that the only way that they can demonstrate their existence is to act. In so doing, they communicate not only with their adversaries but also with their supporters and their followers throughout the world."[71] According to a former member of the Aum Shin Rikiyo cult, for example, the sarin attack on the Tokyo subway was meant to validate its founder's prophecies of Armageddon to Aum members and the Japanese public alike—although Aum's role in the event, perhaps atypically, was meant to be cloaked.[72]

Provocation strategies (described above) can be interpreted as subordinated to ideological goals when the "social autoimmune response" is meant to affect the terrorists' own home society. As

Richardson observes, "By reacting, governments communicate for [terrorists] too. By bombing their training camps or labeling them public enemy number one, governments also demonstrate the existence and strength of their terrorist adversaries."[73] According to al-Adl, al-Qaeda's spectacular destruction of iconic buildings in the United States was meant not only to punish America for aggression and to draw the United States into an unwinnable military quagmire, but also to inspire and mobilize the Islamic people worldwide.[74] Abu Musab al-Zarqawi, the leader of a terrorist organization operating in Iraq—later endorsed as the local franchise of al-Qaida—expressed a similar logic of mobilization in a letter composed in early 2004:

> [The Shi'a of Iraq] in our opinion are the key to change. I mean that targeting and hitting them in (their) religious, political, and military depth will provoke them to show the Sunnis their rabies … and bare the teeth of the hidden rancor working in their breasts. If we succeed in dragging them into the arena of sectarian war, it will become possible to awaken the inattentive Sunnis as they feel imminent danger and annihilating death at the hands of these Sabeans [derogatory term for the Shi'a].[75]

Interpersonal Goals

Another view considers the basic motivation for engaging in acts of terrorism as primarily interpersonal. In this perspective, terrorist actions do not necessarily spring from declared ideological or strategic purposes, but rather from alienated individuals' need for belonging, which can be fulfilled through joining and acting in concert with a group. This "group solidarity" phenomenon parallels the dynamics of recruitment into cults (which in some cases are also terrorist organizations).[76] Regardless of who initiates it and why, a long-running conflict provides purpose beyond its formal justifications. An organization can take on a life and logic of its own; actually achieving long-term goals would obviate the need for the organization.[77]

Observing the "protean" formal goals of terrorist organizations, the prevalence of anonymous attacks, perseverance in the face of long-running failure, and other behaviors inconsistent with the coercive model in particular, Max Abrahms concludes that the main purpose of terrorism is a response to social alienation: "[P]eople participate in terrorist organizations for the social solidarity, not for their political return."[78] Marc Sageman finds that al-Qaeda cells have formed as close-knit circles of friends who are isolated from surrounding society, even prior their assimilation to religious-fundamentalist ideology and al-Qaeda membership.[79] Ariel Merari finds that commitment to the group plays a crucial role in motivating individuals to undertake suicide terrorism.[80]

Personal Goals

A final perspective centers on the individual drawn to terrorism as a way of achieving personal goals. One possible goal is to achieve status and respect within one's own community, either for oneself or for one's family. (If "community" is defined narrowly in terms of the terrorist organization or cell, this goal appears indistinguishable from the goal of group solidarity, described above.)

Another possible goal is to derive satisfaction and a renewed sense of self-worth by exacting revenge upon enemies. The revenge motive implies either personal trauma or identification with others who are perceived to been victimized.[81] A vicarious sense of victimization may extend very broadly. As Daniel Byman has observed, the diverse grievances expressed in the speeches of Usama bin Ladin "are focused on power—who possesses it, why it is used, and (in his judgment) how it is abused."[82]

There is one common point: in bin Ladin's vision, the world's embattled Muslims have long been on the receiving end of outsiders' aggression.

Suicidal methods of attack provide the added benefit of ending one's own psychological distress. Anne Speckhard and Khapta Akhmedova, who interviewed multiple Palestinian and Chechen terrorists or their close associates, found an almost universal pattern of traumatic loss and dissociative behavior, suggestive of ASD. Most had lost family members during the course of conflict, and had strong motives both to seek revenge and to relieve their own personal suffering through suicidal (or suicidally reckless) attacks.[83]

Although it cannot entirely be distinguished from ideological motives, adherence to the dictates of a profound religious belief can be considered a personal goal. The lengthy document found in the suitcase of Muhammad Atta, the operational leader of the 9/11 plot, consists of an intensely private monologue of a true believer to his immediate companions, with the full expectation of achieving a divine reward: "You should feel in complete tranquility, because the time between you and your marriage (in heaven) is very short. Afterward begins the happy life, where God is satisfied with you… Do not seek revenge for yourself. Strike for God's sake."[84]

Layering of Goals

As noted above, different goals may operate at different levels of an organization, and even within individuals. The various goal-types described above may also be considered interconnected facets of a single phenomenon. Different social contexts and terrorist organizations may involve different interconnected goals: a strategy of provocation could facilitate a radical ideology, which in turn could justify the existence of a tight-knit group, whose root goal is group solidarity motivated by social alienation. Alternatively, a strategy of coercion could justify the pursuit of revenge on behalf of a social grouping defined by an ethno-national or religious-fundamentalist ideology. Either constellation of goals could represent the motivational structure of different al-Qaida leaders, cells, or members; conceivably, an individual could even be motivated by both combinations at once.

A different view of the layering of goals, the "significance quest," has been proposed by Arie Kruglanski and colleagues, who draw on examples of individuals from several terrorist organizations or movements that employ suicide attacks, but particularly Palestinian instances. In their conception, the universal human pursuit of a meaningful existence and self-transcendence can be channeled by ideology into terrorist acts. Societal approval ratifies the gains in significance, making suicide bombers into heroic examples for others who would follow them. Loss of close family members, as a powerful reminder of mortality, instills a need to restore lost significance. "Meaningful" suicide, perhaps ironically, holds out the promise of transcending one's own mortality.[85]

Denying Different Goals

The various motives for terrorism described here provide greater or lesser opportunities for deterrence through resilience. The role of resilience as a deterrent to strategic terrorism is quite clear: by dampening the demands of the public for policy changes or an "autoimmune response," resilience frustrates the logic of the attackers' strategy. From an ideological perspective, resilience may have somewhat less deterrence potential, but it appears reasonably clear that diminished effects on the target society would convey a less convincing message of terrorist success to the "home

audience." Personal or interpersonal goals pose greater difficulties. It is at least possible that anticipating less expression of fear and suffering could diminish some of the anticipated satisfactions of revenge, reducing the appeal of WMD terrorism at the margins.

The deterrence potential of resilience therefore depends to a large extent on the distribution of goals within an organization. On a hopeful note, an act of mass-casualty WMD terrorism will not originate with an isolated cell or individual (setting aside the possibility of a well-positioned insider). It requires a well-resourced and competently led enterprise, capable of planning and carrying out sophisticated operations over the span of years. This situation implies, at a minimum, a leadership with a high level of ideological commitment. The extensive Arabic-language media strategies long employed by al-Qaida suggest that its leadership is strongly motivated by ideological goals, and is therefore sensitive to the appearance of success.

National Image and Belief Perseverance

A greater challenge to resilience as a means of deterrence is finding ways to convince would-be attackers to *see* America as resilient. Many studies of deterrence in recent decades have emphasized the murky psychological foundations of the phenomenon.[86] Decision-makers tend to interpret complex international situations in terms of preferred analogies whose "lessons" define the situation, circumscribe roles, and either determine or justify choices of strategy.[87] Favored analogies tend to be based on historical events seen as highly consequential. Personal experience of events, especially early in life, also may cause an analogy to become preferred. The lessons drawn from the analogy depend on how its outcome is understood: failure "teaches" avoidance of old policies, while success "teaches" repetition.[88] Analogies supply or confirm schematic images of governments that tend to resist change.[89] The stock "enemy image" is problematic for deterrence by denial, insofar as the target country tends to appear not only inalterably wicked and menacing but also vulnerable and fragile, a "paper tiger."[90]

The preferred analogy of certain famous terrorists, at least, is well known. In over a decade of public remarks and writings, al-Qaida leaders Usama bin Ladin and Ayman al-Zawahiri have repeatedly cited the Soviet withdrawal from Afghanistan—and the subsequent collapse of the Soviet Union— as having "shattered the myth of the superpowers." The outcome of the Afghan war, they maintain, also indicates the fate of the United States. They derive confirmation of the Soviet/Afghan analogy and reinforcement of the "paper tiger" image from past American military withdrawals from Lebanon and Somalia, which they interpret as demonstrating a lack of resolve.[91] In May 1998, for example, Usama bin Ladin explained to John Miller of ABC News that the fundamental weakness of the United States was revealed by a series of specific episodes, starting in Lebanon:

> [W]e have seen particularly during the last decade the decline of the American government and the weakness of the American solider who is ready to wage cold wars and unprepared to fight long wars. This was proven in Beirut when the Marines fled after two explosions, and also after the two explosions in Aden [in Yemen] they ran in less than 24 hours, this was also repeated in Somalia….
>
> The youth [in Somalia] were surprised at the low morale of the American soldiers and realized more than before that the American soldier is a paper tiger. And after a few blows he ran in defeat…. Allah willing, the next victory will be in Hijaz and Najd [in Saudi Arabia.] Saudi Arabia will make the Americans forget the horrors of Vietnam and Beirut.[92]

But to Bin Ladin and Zawahiri, even episodes that seemingly should demonstrate American persistence and toughness, like the protracted wars in Afghanistan and Iraq, instead expose American wickedness and the steady progress of al-Qaida's strategy to bleed the American economy to the point of defeat.[93]

The perseverance of beliefs derived from formative experiences makes it unlikely that any subsequent event will dislodge the Soviet/Afghan analogy from the minds of highly committed senior al-Qaida figures. The virtually non-disconfirmable nature of these beliefs makes it unlikely that the image of the United States in the minds of al-Qaida leaders will soften soon.

Fortunately, it appears somewhat more likely that the image of American *fragility* in the minds of al-Qaeda members (or other terrorists) might be amended under the right circumstances. Creating a strong image of resilience—salient and durable in the minds of observers—may require events whose testimony to American toughness at home is as dramatic and memorable as the testimony of "Beirut" and "Mogadishu" are to American irresoluteness abroad. Because such events cannot be made to order, the United States cannot depend on having a resilient image in the eyes of its enemies. The United States should nevertheless be fully prepared to seize opportunities to build such an image, either in the event of a terrorist event or a major natural or technological disaster.

IV. Conclusions and Recommendations

The model of public resilience proposed and explored here creates two basic distinctions for policymakers. First, government actions to foster public resilience can be roughly divided between what must be accomplished ahead of time (pre-crisis actions) and what can be performed only during and after the event (crisis actions). Once an attack takes place, it may be too late to make plans or acquire supplies. By contrast, the acts of leadership that provide a sense that events are understood and under control cannot be performed ahead of time (although communications plans should be devised well in advance).

Second, policies that promote public resilience can be roughly divided into "what the citizen does" (public roles) and "what the government does" (leadership roles.) The threat of mass-casualty WMD terrorism warrants consideration of both top-down communications plans and bottom-up programs that enable large numbers of people to participate constructively in their own defense.

	Public roles	**Leadership roles**
Pre-crisis actions	• Greater household preparedness • Training and exercises	• Planning, training, and exercises
Crisis actions	• Self-help • Broad social participation in response	• Crisis communication • Crisis response

Table 4. Types of actions and roles related to public resilience.

To enhance defense through resilience, we recommend training and exercise programs—both mandatory and voluntary—that will provide members of the public with ways of becoming personally and constructively involved in disaster response, thereby promoting their sense of personal control over events. We also recommend certain planning steps that will help to ensure the

Government's ability to communicate effectively with the public after an attack, thereby promoting its sense of comprehension of events, as well as a vicarious, collective sense of control over events. These recommendations include strengthening the Government's capabilities to manage publicity and the news media in the event of an attack.

As discussed previously, achieving deterrence by projecting a resilient image may depend on being ready to seize an unplanned opportunity to showcase America's resilience in dramatic fashion. The buildup of U.S. population and capital in areas prone to flooding, hurricanes, and earthquakes makes "the next disaster" something to be expected in due course.[94] It therefore appears advantageous to be prepared to create a "resilience success" whose story will shape the perceptions of observers worldwide. Certainly, it is *not* advantageous to allow a public impression of post-disaster chaos to take hold, as it did following Hurricane Katrina, which was celebrated by al-Qaida figures as divine punishment and a harbinger of America's collapse.[95]

The recommendations below are organized by the distinction between public roles and leadership roles. Pre-crisis actions and the preparation for crisis actions will be considered together. Some further recommendations concern areas for further research.

Training and Exercise Programs

In a surprise attack situation, advance preparations, including training, are necessary to enable the public to play constructive roles in an emergency situation. The roles can be roughly divided into self-help (*i.e.,* assisting oneself and the members of one's own household, or those immediately nearby) and participation in organized emergency response. The ability to provide self-help is enabled by household preparedness, which benefits from some training. Emergency response is professional or voluntary activity that in large part depends on forms of intensive training in disciplines such as search and rescue, medical response, and firefighting.

Citizen Corps, part of the Federal Emergency Management Agency (FEMA) of DHS, is the main existing avenue for household preparedness and volunteer emergency response. Through a network of Citizen Corps Councils, the organization aims to promote greater personal responsibility (*i.e.,* household disaster preparedness), emergency training, and volunteer service.[96] Citizen Corps encompasses five major programs: the Community Emergency Response Team (CERT) program, the Fire Corps, USAonWatch/Neighborhood Watch, the Medical Reserve Corps (MRC) program administered by the Department of Health and Human Services, and the Volunteers in Police Service (VIPS) program. All provide opportunities for volunteerism; the CERT program also trains volunteers in basic disaster response skills.[97]

Household preparedness is a mixed picture. A series of national telephone surveys sponsored by Citizen Corps show that since 2007, over 70% of households have had packaged food for an emergency; over 70% also have had a supply of bottled water. Other emergency supplies are less well represented. Most households do not have an emergency plan. About a third of respondents are familiar with their community's disaster preparedness plans. Few are confident in their own knowledge of how to respond to an explosion (31%), a hazardous chemical release (26%), or a radiological attack (21%).[98]

Relatively few civilians have received the sort of training that could enable them to help themselves and those around them in an emergency. As Kindt observes, with the exception of Neighborhood Watch, documented participation rates in Citizen Corps programs are very low.[99] Between January 2002 and December 2004, 58,756 people received CERT training.[100] This casts doubt on the self-reports of the 10% of respondents who claimed in the 2003 and 2007 Citizens Corps Surveys to have attended CERT training in the past two years, and the 13% who claimed to have attended in the past two years in the 2009 Survey. It may therefore also be appropriate to discount the third or more of respondents who claimed in each of the three surveys to have attended first-aid skills training or CPR training in the previous two years.[101]

Mandatory Training Initiatives

Increasing the priority and prominence of existing training programs will undoubtedly help to achieve better results for both household preparedness and self-help. However, mandatory training in household preparedness, first aid, and basic disaster response appears likely to provide better results. About half of the respondents in the 2009 Citizens Corps Survey who claimed to have received any form of training in the past two years stated that they did so because it was mandatory for their job or school attendance.[102] Household preparedness, first aid, and basic disaster response training could be mandated as a feature of both Federal employment and high-school attendance. (Student training mandates could be established and funded in through Federal education aid.) Training for Federal employees would have particular relevance in the Washington, DC area, where there were 284,000 civilian Federal employees, not counting U.S. Postal Service employees, as of January 2007.[103] Mandatory training could be further extended to government contractors and to State government employees.

Volunteer Responder Services

In addition to mandatory training in first aid and basic disaster response, opportunities for more specialized training could be created for persons willing and able to serve in "reserve" roles in firefighting, search and rescue, hazardous materials response work, and possibly other categories of responder work. This work would be loosely comparable to the Metropolitan Medical Response System, which organizes medical professionals for emergency response duty. A "reserve component" could provide a "follow-on" or "surge capacity" for severe disasters, and backfill professionals when they are deployed to other locations under the Emergency Management Assistance Compact or the Urban Search and Rescue Response System. Volunteering for these types of emergency response services should be understood as an important form of community service and should be integrated into existing national service programs.

Exercising and Activating Public Roles

To test and improve readiness, both mandatory trainees (*i.e.,* Federal government employees and high-school students) and volunteer responders should have opportunities to participate in local and federally sponsored exercises. Participation in exercises will prepare volunteer responders for activation in genuine emergencies, and help to give emergency managers the confidence to rely on them. Emergency managers should favor the decision to activate volunteer responders during real incidents, rather than allow them to become an instrument of last resort only. Activation during non-catastrophic disasters will make material contributions to the well-being of Americans in

disaster areas, while building confidence and providing valuable experience for times of the most urgent need.

Contingency Planning and Succession Safeguards

The importance of public communication in a crisis indicates that a coherent, unified leadership message should be developed as part of comprehensive contingency plans for mass-casualty WMD terrorist events. Because the survival of the President of the United States cannot be assumed in the event of a surprise WMD attack, these plans should include measures to assure that an authoritative leadership figure will be available and appropriately prepared to address the nation. The nation could ill afford to compound a severe national crisis with unprepared leadership or, worse yet, a crisis of succession.

Roles in Contingency Planning

Two persons in the line of succession are of special interest. One is the Vice President, who, as the immediate successor to the President, should be personally involved in the development and exercise of the relevant contingency plans. This practice will ensure that he or she will already be as familiar as possible with the public communications and leadership role of the President during a national crisis, and prepared to step into that role at a moment's notice. The other is the Secretary of Homeland Security, who is designated as the Principal Federal Official (PFO) for domestic incident management under the Homeland Security Act of 2002. The Secretary is already involved in the development and exercise of the relevant contingency plans; moreover, the Secretary's survival *as PFO* is of as least as much interest as his or her survival as the final link in the chain of succession, as it is presently constituted.

Executive Branch Safeguards

Within the Executive Branch, two key safeguards can be created to forestall a succession crisis after a surprise mass-casualty WMD attack. The first safeguard is a simple refinement of the current practice of absenting a "designated survivor" from the annual State of the Union Address or any other high-profile event that assembles nearly the entire line of Presidential succession in one place. The designated survivors should always include the Secretary of Homeland Security, who must serve as PFO if necessary, and the Vice President, who would be the most recognizable, most legitimate, and—if the above recommendations are accepted—best-prepared possible Presidential successor.

The second safeguard is to extend a modified version of the "designated survivor" practice to all other times. The Secretary of Homeland Security should be continuously kept at a substantial physical distance from the President; the exact distance should be subject to further analysis. Three fortuitous developments make this recommendation more practical than it may seem at first glance. First, both the current Departmental headquarters on Nebraska Avenue and the future headquarters site in Southeast Washington are separated from the White House and Andrews Air Force Base by considerable distances.[104] Second, secure video teleconferencing technology now makes it possible to serve as a cabinet secretary without meeting with the President face-to-face. Third, the U.S. Secret Service, which already falls under the Department of Homeland Security, is ideally situated to ensure that the necessary distance is continuously maintained between the President and the Secretary without introducing new security risks.

<u>Legislative Branch Safeguards</u>

Unfortunately, the survival of the Vice President may be no better assured than that of the President in the event of a surprise mass-casualty WMD terrorist attack. Under the Succession Act of 1947, the Vice President is followed in the line of Presidential succession by the Speaker of the House of Representatives, followed by the President Pro Tempore of the Senate, followed by the Secretary of State and other cabinet officers. Objections have been made to the inclusion of legislative branch members in the order of succession on constitutional grounds, but these matters are beyond the scope of this paper.[105]

From a practical perspective only, the inclusion of legislators poses a challenge because of the autonomy of the legislative branch. The Speaker of the House and the President Pro Tempore of the Senate may not be willing and available to invest the appropriate time in contingency planning and emergency preparations. Furthermore, the Senator from the majority party with the longest tenure in office traditionally has been elected to the role of President Pro Tempore. This ceremonial arrangement creates deep concern about the health and mental fitness of the person in that role. If the Succession Act cannot be revised to exclude legislators from the line of succession or to demote them to the end of the line, then the Senate should be urged to make it routine to elect the Majority Leader as the President Pro Tempore.

Publicity and the News Media

Whenever possible, the participation of members of the public in exercises and actual disaster response should be broadly publicized. Publicity can promote participation in training programs and should also help to provide otherwise uninvolved members of the public with a vicarious sense of control over events.

The most promising area for public affairs may be military-media relations. After a major disaster, the presence of uniformed personnel gives a clear visual signal that events are under control; the sense of persistent public emergency after disaster has struck appears to dissipate quickly after television images are broadcast showing uniformed service members arriving where people are trapped or civil order is reported to have broken down.[106]

A program of Civil Support news media "embeds" could capitalize on the advantages of having television cameras showing uniformed personnel taking action after a major disaster. Because of the hazardous-materials aspects of WMD, providing training and equipment to news camera crews would be necessary in advance. Alternatively, Combat Camera teams should be equipped and trained to deploy and operate with existing WMD response units. The latter approach would have the advantage of allowing emergency managers to prevent the dissemination of highly traumatizing imagery (*e.g.,* scenes of dead bodies in the streets, or survivors with extremely disfiguring wounds) while demonstrating to the public in a truthful and compelling manner that swift action had already brought responders to the scene.

Areas for Further Research

Several avenues for related investigation can be identified beyond the scope of this effort.

Analysis of comparative case studies. In order to validate the concepts presented in this paper, and to help identify potential means for measuring public resilience, a set of formally structured case studies could be developed, involving groups of events generally similar to one another. Examples could include the UK, Germany, Japan in World War II (protracted strategic bombardments); the Oklahoma City, 9/11, Madrid, and London mass-casualty terrorist attacks; Iraq's missile campaigns against Iranian and Israeli cities, which both involved widespread fear of chemical weapons attack; protracted terrorist campaigns in Colombia, Israel, and Iraq; major earthquakes in Japan, Turkey, Iran, and China; major hurricanes, industrial disasters including Chernobyl and Bhopal; and the Tokyo sarin attack, the U.S. anthrax attacks, and the radiological assassination in London.

The formation and modification of national images. Deterring terrorism by resilience depends crucially on the ability to modify the image of the United States in the minds of terrorists. A better understanding of the nature of national images is needed: How do they form and how do they change?

Pathways of influence and perception. There is little understanding of how information moves globally and how persuasion operates at a distance, through mass-media environments, across borders and cultures. Case studies can be developed to build specific insights and identify general principles, including the evolution of how al-Qaida has communicated with its core audiences, from fax machine to satellite television to Internet; how U.S. homeland security measures have been perceived in particular countries; and other salient cases.

The goals of terrorists. The goals of terrorists in the abstract are hotly debated. Enough information is available on certain high-profile terrorist leaders to map their specific beliefs, motives, and goals as individuals. This would allow the development of a psychological portrait or "operational code," using content analysis tools to develop a more rigorous, less impressionistic understanding of especially "talkative" terrorist figures such as Usama bin Ladin and Ayman al-Zawahiri.

Warnings. The present study assumes surprise, but it is possible to imagine scenarios where the government would be in a position to warn the public of a specific and imminent threat. The record of nuclear extortion threats and biological terrorism hoaxes is fairly extensive in the United States and raises the question of what to do (and not do) in the event of a credible threat, including what additional preparations could be made to enable a constructive response.[107] Lessons can be drawn from foreign cases, the record of the Homeland Security Alert System (HSAS), and the experiences of U.S. troops who have been exposed to battlefield warnings of chemical or biological attack.

[1] Jonathan Spyer, "The Al-Qa'ida Network and Weapons of Mass Destruction," *Middle East Review of International Affairs* (September 2004) 8(3):29-45.

[2] Ramzi bin al-Shibh, "The Truth About the New Crusade: A Ruling on the Killing of Women and Children of the Non-Believers," 2001, as excerpted in Alan Cullison, "Inside Al-Qaeda's Hard Drive," *The Atlantic,* September 2004; Suleiman Abu Gheith, "In the Shadow of the Lances," 2002, accessed at http://www.memri.org/bin/articles.cgi?ID=sp38802; Nasir bin Hamd al-Fahd, "A Treatise on the Legal Status of Using Weapons of Mass Destruction against Infidels," May 2003; Interview with Mustafa abu Yazid, Al-Jazeera TV, June 22, 2009, transcript accessed at http://www.nefafoundation.org/documents-aqstatements.html#abuyazidqa0609.

[3] Nuclear terrorism has been a matter of public concern since at least the 1970s. See, for example, "Chapter V: The Non-State Adversary," in Office of Technology Assessment, *Nuclear Proliferation and Safeguards* (Washington, DC: U.S. Congress, June 1977), pp. 115-36.

[4] *National Strategy for Combating Terrorism,* Washington, DC: White House, September 2006; *National Strategy for Homeland Security,* Washington, DC: Homeland Security Council, October 2007.

[5] "Essentially, deterrence means discouraging the enemy from taking military action by posing for him a prospect of cost and risk outweighing his prospective gain. Defense means reducing our own prospective costs and risks in the event that deterrence fails." Glenn H. Snyder, *Deterrence and Defense: Toward a Theory of National Security* (Princeton, NJ; Princeton University Press, 1961), p. 3.

[6] Michael Moodie, "Reflections on the Implications of Terrorism Campaigns," in Lewis A. Dunn *et al.,* "Next Generation Weapons of Mass Destruction and Weapons of Mass Effects Terrorism." McLean, VA: Science Applications International Corporation, January 31, 2008.

[7] *National Security Strategy* (Washington, DC: The White House, May 2010), p. 19.

[8] Lewis A. Dunn, "Can al Qaeda Be Deterred from Using Nuclear Weapons?" Center for the Study of Weapons of Mass Destruction Occasional Paper #3, Washington, DC: National Defense University, July 2005; Robert F. Trager and Dessislava P. Zagorcheva, "Deterring Terrorism: It Can Be Done," *International Security* (2005/2006) 30(3):87-123; Brad Roberts, "Deterrence and WMD Terrorism: Calibrating its Potential Contributions to Risk Reduction," IDA Paper P-4231, Alexandria, VA: Institute for Defense Analyses, June 2007.

[9] Civil defense proposals of the early Cold War did contain elements of both defense and deterrence. See National Preparedness Task Force, "Civil Defense and Homeland Security: A Short History of National Preparedness Efforts." Washington, DC: U.S. Department of Homeland Security, September 2006.

[10] For an overview of the UK's Civil Contingencies Secretariat, see the UK Resilience Website, at http://www.cabinetoffice.gov.uk/ukresilience/about.aspx. For an detailed examination of Israeli institutions and practices, see Sibel McGee *et al., Public Role and Engagement in Counterterrorism Efforts: Implications of Israeli Practices for the U.S.* (Arlington, VA: Homeland Security Institute, 2009).

[11] *National Strategy for Homeland Security* (2007); *National Infrastructure Protection Plan: Partnering to Enhance Protection and Resiliency* (Washington, DC: U.S. Department of Homeland Security, 2009).

[12] For example, human factors received only a short and general section in the well-received report of the Committee on Science and Technology for Countering Terrorism. *Making the Nation Safer: The Role of Science and Technology in Countering Terrorism* (Washington, DC: National Academies Press, 2002).

[13] For example, the December 2001 anthrax letters, which killed five people and sickened another 17, do not approach the same level of concern as the use of an improvised nuclear device (IND) or a citywide outbreak of plague.

[14] Mark E.T. Horn, Neale Fulton, and Mark Westcott, "Measures of Societal Risk and Their Potential Use in Civil Aviation," *Risk Analysis* (2008), 28(6):1711-26, at p. 1714.

[15] Victor Asal and Andrew Blum, "Holy Terror and Mass Killings? Reexamining the Motivations and Methods of Mass Casualty Terrorists," *International Studies Review* (2005) 7:153-55, at p. 153. For a "catastrophic" category involving 10,000 or more casualties, see Steve Coll, "The Unthinkable," *New Yorker,* March 12, 2007. This category appears too restrictive for current purposes, as it would be effectively confined to the use of a nuclear weapon or a highly successful biological attack. Even an urban biological or chemical weapons attack that claimed twice as many lives as 9/11 would be out of bounds.

[16] Radiological attack may require a means of attack other than explosive dispersion to rise to the level of 100 deaths, unless they are caused primarily by blast effects from conventional explosives. James M. Acton, M. Brooke Rogers, and Peter D. Zimmerman, "Beyond the Dirty Bomb: Re-thinking Radiological Terror," *Survival* (2007), 49(3):151-68.

[17] The most comprehensive list available of mass-casualty terrorist attacks consists primarily of attacks on civil aviation. One event involved fatalities from airborne chemicals: the October 2002 Moscow incident, when Russian counterterrorism forces pumped an incapacitating gas into a theater, killing 124 hostages. Wm. Robert Johnston, "Incidents of Mass Casualty Terrorism," updated December 5, 2008, accessed at http://www.johnstonsarchive.net/terrorism/wrjp394.html.

[18] This event was one of a few attempted mass-casualty attacks by the Aum Shin Rikiyo cult, using either botulinum toxin or sarin. Richard A. Falkenrath, Robert D. Newman, and Bradley A. Thayer, *America's Achilles' Heel: Nuclear, Biological, and Chemical Terrorism and Covert Attack* (Cambridge, MA: MIT Press, 1998), pp. 19-26.

[19] Wm. Robert Johnston, "Significant terrorist attacks using unconventional weapons," updated December 3, 2008, accessed at http://www.johnstonsarchive.net/terrorism/wrjp255i.html.

[20] William E. Schlenger *et al.,* "Psychological Reactions to Terrorist Attacks," *Journal of the American Medical Association* (August 7, 2002), 288(5):581-88; Adrienne Stith Butler, Allison M. Panzer, and Lewis R. Goldfrank, eds., *Preparing for the Psychological Consequences of Terrorism: A Public Health Strategy* (Washington, DC: National Academies Press, 2003) pp. 45-53.

[21] Norman A. Milgram, "An Attributional Analysis of War-Related Stress: Modes of Coping and Helping," in Norman A. Milgram, ed., *Stress and Coping in Time of War: Generalizations from the Israeli Experience* (New York: Brunner/Mazel Publishers, 1986), pp. 11-12.

[22] Office of Technology Assessment, *The Effects of Nuclear War* (Washington, DC: U.S. Congress, May 1979), pp. 15-26; Georges C. Benjamin, Michael McGeary, and Susan R. McCutchen, eds., *Assessing Medical Preparedness to Respond to a Terrorist Nuclear Event: Workshop Report* (Washington, DC: National Academies Press, 2009), pp. 8-24.

[23] Jennifer Leaning, "Burn and Blast Casualties: Triage in Nuclear War," in Solomon and Marston (1986), pp. 251-83; Benjamin, McGeary, McCutchen, eds. (2009), pp. 31-38.

[24] Amy E. Smithson, "Metropolis, USA: Progress, Pitfalls in Front-line Readiness," in Amy E. Smithson and Leslie-Anne Levy, *Ataxia: The Chemical and Biological Terrorism Threat and the US Response* (Washington, DC: Henry L. Stimson Center, 2000), pp. 201-76.

[25] Jennifer Ahern *et al.,* "Television Images and Psychological Symptoms after the September 11 Terrorist Attacks," *Psychiatry* (Winter 2002) 65(4):289-300; Michelle Slone and Anat Shoshani, "Evaluation of Preparatory Measures for Coping With Anxiety Raised by Media Coverage of Terrorism," *Journal of Counseling Psychology* (2006) 53(4):535-42; Arieh Y. Shalev *et al.,* "Psychological Responses to Continuous Terror: A Study of Two Communities in Israel," *American Journal of Psychiatry* (April 2006) 163:667-73.

[26] Carol S. Fullerton and Robert J. Ursano, "Psychological and Psychopathological Consequences of Disasters," in Juan José López-Ibor *et al.,* eds., *Disasters and Mental Health* (Chicester, UK: Wiley, 2005), 13-36, at pp. 13-17;

[27] *Ibid.,* pp. 20-25.

[28] Peter Suedfeld, "Reactions to Societal Trauma: Distress and/or Eustress," *Political Psychology* (1997), 18(4):849-61; Arieh Y. Shalev, "Further Lessons from 9/11: Does Stress Equal Trauma?" *Psychiatry* (2004), 67(2):174-77.

[29] Susan E. Brandon and Andrew P. Silke, "Near- and Long-Term Psychological Effects of Exposure to Terrorist Attacks," in Bruce Bongar *et al.,* eds., *Psychology of Terrorism* (New York: Oxford University Press, 2007), 175-193.

[30] Robert J. Ursano, James E. McCarroll, and Carol S. Fullerton, "Traumatic Death in Terrorism and Disasters: The Effects on Posttraumatic Stress and Behavior," in Robert J. Ursano, Carol S. Fullerton, and Ann E. Norwood, eds., *Terrorism and Disaster: Individual and Community Mental Health Interventions* (Cambridge, UK: Cambridge University Press, 2003); pp. 308-32; Alexander McFarlane, "Psychiatric Morbidity Following Disasters: Epidemiology, Risk, and Protective Factors," in López-Ibor *et al.* (2005), 37-63, at 47-50.

[31] Ginny Sprang, "The Psychological Impact of Isolated Acts of Terrorism," in Andrew Silke, ed., *Terrorists, Victims, and Society: Psychological Perspectives on Terrorism and its Consequences* (Chicester, UK: Wiley, 2003), 131-59, at pp. 135-37; Carol S. North, "Psychiatric Epidemiology of Disaster Responses," in Robert J. Ursano and Ann E. Norwood, eds., *Trauma & Disaster: Responses & Management* (Washington, DC: American Psychiatric Publishing, 2003), 37-62; Roy Lubit and Spencer Eth, "Children, Disasters, and the September 11th World Trade Center Attack," in Ursano and Norwood (2003), 63-96; Yuval Neria, Arijit Nandi, and Sandro Galea, "Post-Traumatic Stress Disorder Following Disasters: A Systematic Review," *Psychological Medicine* (2008), 38:467-80; Stevan E. Hobfoll *et al.,* "Trajectories of Resilience, Resistance, and Distress During Ongoing Terrorism: The Case of Jews and Arabs in Israel," *Journal of Consulting and Clinical Psychology* (2009), 77(1):138-48.

[32] Michael G. Wessells, "Terrorism and the Mental Health and Well-Being of Refugees and Displaced People," in Moghaddam and Marsella (2003), pp. 247-263. These phenomena have been observed at least as early as the work of the U.S. Strategic Bombing Survey, which described Japanese evacuees as "more frightened, more worried, and perhaps to compensate for such qualities, sometime verbally more defiant of threats, than the urban Japanese… In speaking of responsibility for [air] raids, an unusually large number blamed the United States." The United States Strategic Bombing Survey, "The Effects of Strategic Bombing on Japanese Morale," June 1947, p. 77.

[33] Fred P. Stone, "The 'Worried Well' Response to CBRN Events: Analysis and Solutions," Maxwell AFB, Al.: USAF Counterproliferation Center, June 2007.

[34] Anthony R. Mawson, "Understanding Mass Panic and Other Collective Responses to Threat and Disaster," *Psychiatry* (Summer 2005), 68(2):95-113.

[35] James W. Pennebaker and Cindy K. Chung, "Tracking the Social Dynamics of Responses to Terrorism: Language, Behavior, and the Internet," in Simon Wessely and Valery N. Krasnov, eds., *Psychological Responses to the New Terrorism: A NATO-Russia Dialogue* (Amsterdam: IOS Press, 2005), pp. 159-70.

[36] Paul Slovic, "Perception of Risk," *Science* (April 17, 1987), 236:280-85; Paul Slovic, "Terrorism as Hazard: A New Species of Trouble," *Risk Analysis* (2002), 22(3):425-26.

[37] Gerd Gigerenzer, "Out of the Frying Pan into the Fire: Behavioral Reactions to Terrorist Attacks," *Risk Analysis* (2006) 26(2):347-51.

[38] G. James Rubin *et al.,* "Enduring Consequences of Terrorism: 7-Month Follow-Up Survey of Reactions to the Bombings in London on 7 July 2005," *British Journal of Psychiatry* (2007), 190:350-56.

[39] Examples include the strategic bombing campaigns of WWII and the Iraqi sectarian conflict of 2006-2007. Irving Janis cites an estimate of two million "silent" evacuees to western England during the Blitz. See: Irving L. Janis, *Air War and Emotional Stress: Psychological Studies of Bombing and Civilian Defense* (New York: McGraw-Hill, 1951), p. 194.

[40] Jerry Markon, "FBI's Fairfax Agents Packing for Pr. William," *Washington Post,* October 25, 2006; Alec MacGillis, "New Rural Sales Pitch: Work Outside D.C.'s Fallout Zone," *Washington Post,* December 26, 2006.

[41] Wessells (2003), pp. 259-61; Stevan E. Hobfoll, Daphna Canetti-Nissim, and Robert J. Johnson, "Exposure to Terrorism, Stress-Related Mental Health Symptoms, and Defensive Coping Among Jews and Arabs in Israel," *Journal of Consulting and Clinical Psychology* (2006), 74(2):207-18; Mardi J. Horowitz, "Understanding and Ameliorating Revenge Fantasies in Psychotherapy," *American Journal of Psychiatry* (January 2007), 164:24-27; Christophe Pierre Bayer, Fiona Klasen, and Hubertus Adam, "Association of Trauma and PTSD Symptoms With Openness to Reconciliation and Feelings of Revenge Among Former Ugandan and Congolese Child Soldiers," *Journal of the American Medical Association* (August 1, 2007), 298(5):555-59; Yaira Hamama-Raz *et al.,* "PTSD symptoms, forgiveness, and revenge among Israeli Palestinian and Jewish adolescents," *Journal of Traumatic Stress* (2008), 21(6):521-29.

[42] Paul C. Light, "The Katrina Effect on American Preparedness," New York University Center for Catastrophe Preparedness and Response Information Brief, November 18, 2005; Citizen Corps, "A Post-Katrina Assessment," *Citizen Preparedness Review* (Spring 2006), Issue #2.

[43] See also Jason D. Wood, "Review of Open Source Literature on Resilience to Terrorist Attack," McLean, VA: Science Applications International Corporation, September 23, 2009.

[44] Michel Bruneau *et al.,* "A Framework to Quantitatively Assess and Enhance the Seismic Resilience of Communities," *Earthquake Spectra* (2003), 19(4):733-52.

[45] For example, T.D. O'Rourke, "Critical Infrastructure, Interdependencies, and Resilience," *The Bridge* (Spring 2007), 37(1):22-29, at p. 27.

[46] Michael T. Kindt, "Building Population Resilience to Terror Attacks: Unlearned Lessons from Military and Civilian Experience." Maxwell Air Force Base, Alabama: U.S. Air Force Counterproliferation Center, November 2006.

[47] Fran H. Norris *et al.,* "Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness," *American Journal of Community Psychology* (2008), 41:127-50.

[48] Randall D. Marshall *et al.,* "The Psychology of Ongoing Threat: Relative Risk Appraisal, the September 11 Attacks, and Terrorism-Related Fears," *American Psychologist* (May-June 2007), 64(4):304-16. For a related perspective, see also Ben Sheppard *et al.,* "Terrorism and Dispelling the Myth of a Panic Prone Public," *Jounral of Public Health Policy* (2006) 27:219-45.

[49] Paul Slovic, Baruch Fischhoff, and Sarah Lichtenstein, "Facts and Fears: Understanding Perceived Risks," (1979), as reprinted in Paul Slovic, ed., *The Perception of Risk* (Sterling, VA: Earthscan, 2000), pp. 137-53; Slovic (1987).

[50] Ellen Langer, "The Illusion of Control," *Journal of Personality and Social Psychology* (1975), as reprinted in Daniel Kahneman, Paul Slovic, and Amos Tversky, eds., *Judgment under Uncertainty: Heuristics and Biases* (Cambridge University Press, 1982), pp. 231-38; Mark Horswill and Frank P. McKenna, "The Effect of Perceived Control on Risk-Taking," *Journal of Applied Social Psychology* (2006), 29(2):377-91.

[51] Jennifer S. Lerner and Dacher Keltner, "Fear, Anger, and Risk," *Journal of Personality and Social Psychology* (2001), 81(1):146-59.

[52] George F. Loewenstein *et al.,* "Risk as Feelings," *Psychological Bulletin* (2001), 127(2):267-86.

[53] Albert Bandura, "Exercise of Human Agency Through Collective Efficacy," *Current Directions in Psychological Science* (2000), 9(3):75-78.

[54] Bruce Hoffman, "Terrorism and WMD: Some Preliminary Hypotheses," *Nonproliferation Review* (Spring-Summer 1997), 4(3):45-53; Falkenrath, Newman, and Thayer (1998), pp. 179-213.

[55] Glenn H. Snyder, "Deterrence by Denial and Punishment," Center of International Studies Research Monograph #1, Princeton, NJ: Princeton University, January 2, 1959, pp. 1-3.

[56] For example, Colin S. Gray, "A New Debate on Ballistic Missile Defence," *Survival* (1981), 23(2):60-71, at p. 61.

[57] *The 9/11 Commission Report: Final Report of the National Commission on Terrorist Attacks Upon the United States* (New York: W.W. Norton & Co., 2004), pp. 153-73.

[58] Anthony J. Marsella, "Reflections on International Terrorism: Issues, Concepts, and Directions," in Moghaddam and Marsella (2003), p. 16.

[59] Thomas F. Ditzler, "Malevolent Minds: The Teleology of Terrorism," in Moghaddam and Marsella (2003).

[60] Arie W. Kruglanski *et al.,* "A Theory of Goal Systems," in Mark Zanna, ed., *Advances in Experimental Social Psychology,* Vol. 34 (San Diego: Elsevier Academic Press: 2002), pp. 331-378.

[61] Carl von Clausewitz, *On War*, Michael Howard and Peter Paret, ed. and trans. (Princeton, NJ: Princeton University Press, 1976), p. 75.

[62] James N. Breckenridge and Philip G. Zimbardo, "The Strategy of Terrorism and the Psychology of Mass-Mediated Fear," in Bongar *et al.* (2007), pp. 116-33.

[63] Martha Crenshaw, "Theories of Terrorism: Instrumental and Organizational Approaches," in David C. Rapoport, ed., *Inside Terrorist Organizations*, (New York, NY: Columbia University Press, 1988), p. 13.

[64] Robert A. Pape, "The Strategic Logic of Suicide Terrorism," *American Political Science Review* (August 2003) 97(3):343-61; Robert A. Pape, *Dying to Win: The Strategic Logic of Suicide Terrorism* (New York: Random House, 2005), pp. 27-76.

[65] Transcript accessed at http://cryptome.org/us-eu-gap.htm.

[66] Martha Crenshaw, "The Logic of Terrorism: Terrorist Behavior as a Strategic Choice," in Walter Reich, ed., *Origins of Terrorism: Psychologies, Ideologies, Theologies, States of Mind* (Washington, DC: Woodrow Wilson Center Press, 1998), p. 17.

[67] John Steinbruner, "Terrorism: Practical Distinctions and Research Priorities," *International Studies Review* (2005) 7:137-140, at p. 138.

[68] Christopher M. Blanchard, "Al Qaeda: Statements and Evolving Ideology," CRS Report for Congress, RL32759, July 9, 2007, p. 5.

[69] Paul Shemella, "Reducing Ideological Support for Terrorism," *Strategic Insights* (April 2009) 8:2.

[70] Asal and Blum, "Holy Terror and Mass Killings?" p. 154.

[71] Louise Richardson, *What Terrorists Want: Understanding the Enemy, Containing the Threat* (New York: Random House, 2006), p. 101.

[72] Mark Juergensmeyer, *Terror in the Mind of God: The Global Rise of Religious Violence* (Berkeley and Los Angeles: University of California Press, 2003), pp. 109-13.

[73] Richardson (2006)*,* p. 101.

[74] Blanchard (2007)," p. 5.

[75] "Full Text of Zarqawi Letter," as released by the Coalition Provisional Authority, February 12, 2004, accessed at http://govinfo.library.unt.edu/cpa-iraq/transcripts/20040212_zarqawi_full.html.

[76] Jessica Stern, *Terror in the Name of God: Why Religious Militants Kill* (New York: HarperCollins, 2003), pp. 9-31.

[77] Crenshaw, "Theories of Terrorism," p. 27.

[78] Max Abrahms, "What Terrorists Really Want: Terrorist Motives and Counterterrorism Strategy," *International Security* (Spring 2008) 32(4):95.

[79] Marc Sageman, *Understanding Terror Networks* (Philadelphia: University of Pennsylvania Press, 2004).

[80] Ariel Merari, "Psychological Aspects of Suicide Terrorism," in Bongar *et al.* (2007), pp. 101-115.

[81] Andrew Silke, "Becoming a Terrorist," in Silke (2003), pp. 29-53, at pp. 39-46.

[82] Daniel Byman, "Al-Qaeda as an Adversary," *World Politics* (October 2003) 56:139-64, at pp. 144-45.

[83] Anne Speckhard and Khapta Akhmedova, "Talking to Terrorists," *Journal of Psychohistory* (Fall 2005); pre-publication copy accessed at http://www.annespeckhard.com/publications/Talking_to_terrorists.pdf.

[84] Muhammad Atta, "Suicide Note," in Barry Rubin and Judith Colp Rubin, eds., *Anti-American Terrorism and the Middle East: A Documentary Reader* (New York: Oxford University Press, 2002), pp. 233-38.

[85] Arie W. Kruglanksi *et al.,* "Fully Committed: Suicide Bombers' Motivation and the Quest for Personal Significance," *Political Psychology* (2009), 30(3):331-57.

[86] Philip E. Tetlock, Charles B. McGuire, and Gregory Mitchell, "Psychological Perspectives on Nuclear Deterrence," *Annual Review of Psychology* (1991), 42:239-76.

[87] Yaacov Y.I. Vertzberger, *The World in Their Minds: Information Processing, Cognition, and Perception in Foreign Policy Decisionmaking* (Stanford, CA: Stanford University Press, 1990), pp. 296-341.

[88] Robert Jervis, *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press, 1976), pp. 217-282.

[89] Jervis, *Perception and Misperception in International Politics,* pp. 310-15.

[90] Richard K. Herrmann *et al.,* "Images in International Relations: An Experimental Test of Cognitive Schemata," *International Studies Quarterly* (1997), 41(3):403-33, at p. 412.

[91] Vaughn P. Shannon and Michael Dennis, "Militant Islam and the Futile Fight for Reputation," *Security Studies* (April-Jun 2007) 16(2):287-317, at pp. 303-08.

[92] Transcript of ABC News interview with Usama bin Ladin, tape date May 28, 1998, air date June 10, 1998, pp. 2-3, 6, accessed at http://www.nefafoundation.org/miscellaneous/FeaturedDocs/nefaublabcnewsintvu.pdf.

[93] Shannon and Dennis (2007), pp. 308-11.

[94] Maxx Dilley *et al., Natural Disaster Hotspots: A Global Risk Analysis* (World Bank: Washington, DC, 2005), pp. 55-91.

[95] Y. Yehoshua, "In the Arab Press: Criticism of Rejoicing at Hurricane Katrina," MEMRI Inquiry & Analysis No. 242, September 22, 2005, accessed at http://memri.org/bin/articles.cgi?Page=archives&Area=ia&ID=IA24205.

[96] "Citizen Corps Councils," accessed at http://www.citizencorps.gov/councils/.

[97] "Citizen Corps Programs & Partners," accessed at http://www.citizencorps.gov/programs/.

[98] Citizen Corps, "Personal Preparedness in America: Findings from the 2009 Citizen Corps National Survey," August 2009.

[99] Kindt (2006), pp. 21-23.

[100] Citizen Corps, *Annual Report 2004* (Washington, DC: 2005), p. 9. No later data are available.

[101] Citizen Corps (2009), p. 16.

[102] *Ibid.,* p. 16.

[103] Out of a nationwide total of 1.774 million civilian federal employees, not counting Postal Service employees. Bureau of Labor Statistics, "Federal Government, Excluding the Postal Service," accessed at http://www.bls.gov/oco/cg/cgs041.htm.

[104] From the Nebraska Avenue Complex (NAC) to the White House is about 3.5 miles; from the NAC to Andrews AFB is about 14.5 miles. From the grounds of St. Elizabeth's Hospital in Southeast Washington to the White House is about 4 miles; from St. Elizabeth's to Andrews is about 7 miles.

[105] Thomas H. Neale, "Presidential Succession: An Overview with Analysis of Legislation Proposed in the 109th Congress," CRS Report RL32969, June 29, 2005.

[106] Examples include St. Croix, USVI and Charlotte, NC in 1989 after Hurricane Hugo; areas south of Miami after Hurricane Andrew in 1992; and New Orleans after Hurricane Katrina in 2005. There is also a pre-television tradition of deploying troops to reassert order in stricken areas, including in Chicago in 1872 and San Francisco in 1906.

[107] From September 1978 through mid-2002, the Nuclear Assessment Program of the U.S. government "has been used to assess the credibility of over 60 nuclear extortion threats, 25 nuclear reactor threats, 20 non-nuclear extortion threats and approximately 650 cases involving the reported or attempted illicit sale of nuclear materials." (John Gordon, Testimony before the Senate Armed Services Committee, June 26, 2002.) Biological terrorism hoaxes in the form of simulated anthrax powder attacks are quite common; the FBI investigated over 1,000 "white powder events" between January 2007 and early March 2009. (Bob Drogin, "Anthrax Hoaxes Pile Up, As Does Their Cost," *Los Angeles Times,* March 8, 2009.)