American College of Neuropsychopharmacology

EXECUTIVE SUMMARY

TASK FORCE REPORT

THE IMPACT OF TERRORISM ON BRAIN AND BEHAVIOR: WHAT WE KNOW AND WHAT WE NEED TO KNOW

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Introduction

In the wake of September 11, 2001, the Nation turned its attention to confronting terrorism. Our leaders responded with concrete actions to prepare for future attacks, whether physical, chemical, or biological. But they have made far less preparations for a pervasive effect of any attack—its psychological impact.

Terrorist acts produce devastating injuries, destruction, and death. But their ultimate goal is psychological: to create a climate of fear, uncertainty, and vulnerability. Through psychological means, the perpetrators hope to attain what they cannot accomplish militarily. Research is needed on two broad fronts: to promote resilience and adaptive responses in the general population and to prevent and treat terrorism's psychological casualties.

Concerned about the lack of attention and research devoted to the psychological consequences of terrorism, the American College of Neuropsychopharmacology (ACNP) created an interdisciplinary Task Force in 2003. Its members were experts in brain and behavior, with a special focus on responses to trauma and risk communication. The Task Force evaluated the scientific literature to determine what we know about the psychological effects of terrorism, what we urgently need to know, and what recommendations we should implement now. In keeping with the ACNP's research and education mission, the Task Force identified gaps in knowledge and set a research agenda for the future. Its report deals with how to prepare and communicate risk to the general population—not only during an attack, but also before and after. Its report also deals with prevention and treatment of psychiatric illness from the attack itself. The report concludes with a series of recommendations for research and policy. The full report and its underlying component papers are to be published in the ACNP journal, *Neuropsychopharmacology*.

Terrorism Creates Widespread Fear

> *Terrorism is about psychology … it is about making ordinary people feel vulnerable, anxious, confused, uncertain, and helpless.*
> Philip Zimbardo, 2003

Terrorism is the illegal use or threatened use of violence by groups with political or ideological motives. Their goal is to coerce societies or governments by inducing fear in their population (National Research Council, 2002). The central goal of terrorism, in other words, is to create a climate of fear, uncertainty and vulnerability.

Terrorism intentionally hits emotional "hot buttons." It has several features that magnify the average person's perception of its risks: terrorist acts are both vivid and catastrophic; they are unfamiliar and difficult to avoid; and they are caused by human malevolence.

Most People Recover Psychologically, But a Minority Do Not

The images of September 11 are etched upon the memories of almost everyone who lived through the attacks, whether they were directly affected or not. Terrorism's psychological effects cover a range of emotional and behavioral reactions, some with severe consequences. The near universal and immediate reaction to an attack is fear and distress. Distress can take the form of insomnia and feelings of anxiety, anger, or vulnerability.

Soon after the September 11 attacks, a majority of Americans reported difficulty paying attention at work or school, depressed feelings, disrupted sleep, distress, and anger (Pew Research Center, 2001; Schuster et al, 2001). Many also changed their behavior by altering travel patterns, and by increasing cigarette smoking or alcohol consumption. One to two months later, a sizable number were still affected: nearly 20% of adults in the general population living *outside* of New York City reported symptoms (Silver et al, 2002). Within New York City, the prevalence was much higher. But, within weeks to months, most people's symptoms abated, and they recovered (Galea et al, 2003).

A minority of adults and children, however, did *not* recover (Galea et al, 2003; Pine et al, 2002; Pine and Cohen, 2002). Their symptoms progressed into long-term psychiatric disorders that are highly disabling. The most common are post-traumatic stress disorder (PTSD) and depression. PTSD is marked by intrusive and distressing recollections of the event; avoidance of any reminders (which may make it difficult to return to work in the affected neighborhood), numbing of normal emotional responses, disturbed sleep, and difficulty concentrating.

Who is at Greatest Risk of Trauma-Related Disorders?

In all areas of public health, it is critically important to identify those people at greatest risk of an illness. Identifying at-risk groups enables public health officials to direct those groups to prevention or treatment services. The same is true of trauma-related illness.

The risk of developing a long-term mental illness following a terrorist act is based on two interacting factors: 1) the directness and severity of a person's exposure and 2) the degree of personal vulnerability. The more directly a person is affected by a terrorist act, the greater is the risk of developing PTSD and other disorders. But research also shows that some people are more susceptible than others because of genetic risk, past history of trauma, female gender, being evacuated from the site of an attack, and surviving or witnessing an attack (Nishith et al, 2000; Breslau et al, 1999). These personal risk factors, however, apply to too many people and are not specific enough. If everyone with at least one of these risk factors were referred for some type of services, our health systems would be quickly overwhelmed. Most would recover without any intervention; casting too broad a net for intervention creates needless costs, inconvenience, and even risk of harm, if the treatments have potential side effects. Moreover, treating those who are destined to get better on their own carries the potential of medicalizing normal reactions to trauma and death.

Another problem is that people without known risk factors may be overlooked, even though they need care. After September 11th research found that a sizable number of residents in and outside of New York City had developed PTSD symptoms even though they were not directly affected by the attacks (Galea et al, 2003; Silver et al, 2002). They may have been more susceptible to PTSD by virtue of genetic or other factors.

Research is needed to find an effective way to identify those at greatest risk and to target interventions directly to them.

What Interventions are Effective in Preventing PTSD?

One widely implemented method designed to prevent PTSD is known as psychological debriefing, which is sometimes compulsory for emergency workers. Psychological debriefing entails a single-session of therapy within days of a traumatic event for everyone directly affected, regardless of whether they have symptoms. Its purpose is to allow them to vent their emotions and relive the traumatic event. While several studies found debriefing to be effective, they were inadequately designed. When rigorously tested in randomized, controlled clinical trials, the results were quite different. Not only was psychological debriefing found ineffective, but some studies found it also can impede recovery. (It is possible that reliving and rehearsing raw emotions leads to consolidation of traumatic memories.) In two separate clinical trials of individuals hospitalized after motor vehicle accidents, the group receiving psychological debriefing had higher rates of PTSD and greater impairment than did the control group (Bisson et al, 1997; Mayou et al, 2000). A prominent group of researchers now recommends against its use (The Cochrane Library, 2004).

Psychological debriefing grew in popularity out of an understandable desire for something to be done after a horrific event. Yet the evidence that it does not help, and may even do harm, underscores the importance of research to evaluate interventions rigorously ***before*** they become widely used.

Another intervention, brief cognitive behavioral therapy (CBT), is not widely used, yet research has found it either accelerates the rate of recovery or reduces the onset of PTSD. CBT involves 4-5 therapy sessions beginning 2-5 weeks after the traumatic event. It adopts a problem-solving approach to people with high levels of symptoms, seeking to change their traumatized view of the event and guiding them to more adaptable behavior. One controlled clinical trial found that CBT sped up the rate of recovery, but did not actually reduce the overall prevalence of PTSD (Foa et al, 1995). Another study found that six months after the event, the prevalence of PTSD was reduced by about two-thirds (Bryant et al, 1998, 1999, 2003).

While the evidence supports CBT, there are two problems hindering wider use. The first is lack of therapists trained in this technique, and the second is the expense and frequency of sessions. If there were another massive terrorist attack like 9/11, our mental health system might not be able to handle mass psychological casualties.

Eventually, new approaches to PTSD prevention may come in the form of medications. One medication under study capitalizes on a growing body of research tying stress hormones to the onset of PTSD. In two small clinical trials, researchers found that a medication (propranolol) blocking the action of a major stress hormone on the brain may prevent the development of

PTSD (Pitman et al, 2002; Vaiva et al, 2003). It is too early to make any recommendation about propranolol, however.

At this point there are no effective and widely available interventions to promote resilience and prevent the onset of trauma-related disorders. The priorities for future research include: 1) to identify the minimum treatment necessary to successfully prevent chronic PTSD and related problems; 2) to examine the optimum circumstances (e.g., time elapsed since the trauma, who is most likely to benefit) for providing the interventions; 3) to validate the efficacy of interventions with a wider range of trauma populations, including victims of terrorist attacks in countries where terrorism is prevalent.

Children React Differently than Adults

Children's reactions to trauma are similar to those of adults, except in one key respect: children are more susceptible to secondary exposure—exposure through the media or transmitted through the fearful reactions of parents and teachers.

Understanding the impact of terrorism on children is critical because childhood mental health problems often go unrecognized. If unattended, their problems can persist and progress, leading to school failure, poor social adjustment, and altered brain development. Disorders in children can create lifelong problems (US DHHS, 1999).

After primary trauma exposure, children, like adults, tend to be resilient unless the trauma causes death or injury to family members or dislocation from their homes. Only a minority of children will develop PTSD and other trauma-related disorders (Pine et al, 2002; Pine and Cohen, 2002). Most studies—of children exposed to the Nazi Holocaust, ethnic cleansing in Cambodia, Rwanda, and Bosnia, and the Iraqi occupation of Kuwait—find that the more directly a child is in harm's way, the more severe the risk of PTSD (e.g., Mollica et al, 1997; Sagi-Schwartz et al, 2003).

Yet children are different from adults because of their immature cognitive abilities. The media represent a powerful "vector" by which terror spreads, using the model of infectious diseases (IOM, 2003). A recent survey found that 32% of 2- to 7-year-olds and 65% of 8- to 18-year-olds have television sets in their bedrooms (Roberts et al,1999).

After Oklahoma City and 9/11, television exposure in children was associated with more post-traumatic stress symptoms, at least in the short term (Pfefferbaum et al. 2001; NYC Board of Education, 2002). Some teachers in Oklahoma City chose to forego class activities in favor of watching live reports on television in the classroom. Most of the school-aged children in the study had no physical or emotional exposure to the attack.

Children also gauge threats based on how parents and teachers react. Terrified parents are terrifying to children. Calm and functional parents, teachers, and other adults can reassure children.

Given that terrorism's effects on children can be indirect, interventions that improve parental functioning may reduce the psychological impact of terrorism (e.g., Dybdahl, 2001; Forgatch & DeGarmo, 1999). It is widely assumed that interventions with teachers will also be

beneficial. Indeed, it may be more effective to target parents, teachers, and other adults close to children rather than children themselves, particularly because adults can act as a buffer for children and minimize danger. In studies of naturally occurring resilience, effective adults function in a protective capacity for children (Masten, 2001).

In summary, the degree of both direct and indirect exposure in children matters. Prepared adults can reduce children's exposure to the media. They can reassure children with their own words and actions. While American society values openness with children and encourages them to express their fears, there is strong evidence that younger children, at least, do better if provided with some protection from the full blast of media exposure.

There is virtually no research examining the effectiveness of any intervention for children following large-scale disasters or terrorism. Closing this gap must be a high research priority.

Treatments Help But Need Improvement

Trauma-related disorders are treatable. There are effective psychotherapies and drug treatments for PTSD and depression that have been tested in well-designed clinical trials. Those treatments have been incorporated into relevant treatment guidelines issued by federal agencies and professional organizations (e.g., Foa et al, 1999). Still, existing treatments have limitations that would be magnified if there were mass psychological casualties.

The foremost limitations are that currently available treatments for PTSD and major depression are not fully effective in all individuals, and they have not been adapted to terrorism. Treatments for PTSD have been developed for other types of trauma that do not necessarily pose the type of continuing and pervasive threat that terrorism poses.

Another limitation is that the best treatments—those found effective through research—are simply unavailable or unevenly practiced by clinicians. People entering treatment are often given poor quality of care: a diagnosis may sometimes be missed, the dose of medication may be insufficient, or the length of treatment may be too short, according the US Surgeon General (US DHHS, 1999). This is a particular problem in primary care, where many seek mental health treatment. An underlying problem is insufficient training of primary care doctors and inadequate numbers of properly trained mental health professionals.

Research is needed to improve existing treatments and to develop new ones. Efforts must also be enhanced to improve the quality of clinical training and professional care if victims are to receive the best available treatments.

Disaster Planning Fails to Include Mental Health and Effective Risk Communication

The pervasive psychological impact of terrorism demands a public health response, most notably the inclusion of mental health as an integral part of disaster planning.

A recent report of the prestigious Institute of Medicine declared, "The Nation's mental health, public health, medical, and emergency response systems currently are not able to meet the psychological needs that result from terrorism" (IOM, 2003). The report pinpointed gaps in

coordination of agencies and services. Citing a range of needed interventions, the report created a framework that divided recommendations into three key phases: *before*, *during*, and *after* a terrorist attack (see figure below).

Phase	**Recommendations**
Pre-Event	•Prepare materials for media and public education •Identify and implement methods for educating the public •Decrease information and dissemination about how to produce weapons •Develop an effective risk communication strategy •Inform the public about prevention and safety efforts •Provide information that educates populations about expected response and coping strategies that would increase community resilience
Event	•Distribute information appropriate to the event •Notify survivors of services in the absence of functioning communication systems •Communicate risk and proposed response effectively
Post-Event	•Communicate that preparedness helps decrease the impact of the attack •Publicize availability of targeted services to appropriate segments of the population •Produce public information and warnings •Communicate deterrent information •Adjust risk communication, emphasizing the positive

Source: Institute of Medicine (IOM), 2003. Preparing for the psychological consequences of terrorism. Washington DC: National Academy Press.

A key aspect of disaster planning is to communicate with the public to avoid panic, ensure safety, and to help them cope. The field of risk communication has contributed greatly to our understanding of how the public perceives risk and how it acts on that knowledge.

Effective risk communication, according to a large body of research, depends on many key factors. One is the importance of trust between government agencies and the public (Slovic, 1993). Another is knowledge of how the public is likely to magnify the danger because of the inherent nature of terrorism—its unpredictability, its graphic impact, and its uncontrollability, i.e., the inability of the average person to avoid exposure (Slovic, 1987; Klar, et al. 2002). A final

factor is the values of the individual or community and how they must be taken into account. Different communities weigh risks differently; some are more risk-averse than others, depending on the demographic and ethnic composition of their population (Slovic, 2000).

Effective risk communication is a process of dialogue between government agencies and communities. Dialogue and trust cannot be created at the height of a terrorist attack. The stage must be set long before. A large body of research describing past risk communication successes and failures offers vivid and valuable lessons that, if ignored, can jeopardize public health and welfare (Satterfield et al, 2002; Fischhoff et al, 2002).

Promote Responsible Media Coverage

There is a major role for the media to play in risk communication to the general public. How the media communicates information before, during, and after a catastrophe can have a major impact on public safety and the level of distress.

As part of disaster planning, public officials need to work with the media to pave the way for ready communication during a terrorist attack. During the attack, public officials need to provide accurate and timely information about the extent and likely danger. They often need training in how to communicate complex, scientific, and technical information—as well as candidly acknowledging any uncertainties they have. They need to be responsive to the media to correct errors and to control rumors that unnecessarily heighten public anxiety. An excellent booklet on risk communication addresses most of these issues in depth (US DHHS, 2002).

Messages to the public, according to research, need to emphasize what steps the average person can take to avoid exposure and minimize risk. These are, of course, specific to the type of threat. The messages must be valid, coordinated (so as to avoid contradictory statements from different agencies), and clearly communicated. Also, warnings should be called off when the threat has diminished.

Obstacles to Research

While research has been key to understanding the psychological impact of terrorism, this report has highlighted major gaps in our knowledge. The foremost are identifying who is at greatest risk for trauma-related disorders; what interventions promote resilience and prevent onset of these disorders in adults; what interventions work for children; and what are the best treatments for disorders caused by terrorism.

A major goal of the ACNP Task Force on Terrorism is to promote research and education. As with all areas of public health, research on terrorism's behavioral, biological, and psychological effects requires financial support and the enlistment of capable scientists. Research has been greatly hampered by lack of immediate access to disaster sites and treatment centers.

Following the Oklahoma City bombing and the attacks on the World Trade Center, public officials were reluctant to permit research. Their motives included compassion for the victims and the desire not to interfere with logistics. At the same time unproven therapeutic interventions, such as psychological debriefing, were administered and may have caused harm.

While excessive intrusiveness should be avoided, it is important for the research community and the disaster response communities to reach accommodations to permit research to proceed, or it will never be possible to improve our preparedness. Researchers striving to reduce the psychological impact of terrorism should, for example, have the same access that infectious disease researchers have after a biological attack. Policymakers have a national obligation to be better prepared for the psychological consequences of terrorism and to mitigate its impact.

Major Conclusions: What We Know & What We Need to Know

1. Terrorist acts produce devastating injuries, destruction, and death. But their ultimate goal is psychological: to create a climate of fear, uncertainty, and vulnerability. The psychological effects of terrorism are central to the political goals of the perpetrators.

2. Following a terrorist attack, *most* children and adults will be fearful, anxious, and distressed for a few weeks to months—but current research suggests that the vast majority will prove resilient, and they will recover without any treatment.

3. A significant minority of those affected by terrorism will need treatment because they develop long-term and disabling disorders, most notably post-traumatic-stress disorder (PTSD). Others may develop depression or increase their use of alcohol or other addictive drugs.

4. The risk of developing a long-term mental illness is based on two interacting factors: 1) the directness and severity of a person's exposure to the terrorist event and 2) the degree of personal susceptibility. In other words, the more directly a person is affected by a terrorist act, the greater is the risk of developing post-traumatic stress disorder and other disorders. But research also shows that some people are more susceptible than others because of genetic differences, as well as other factors (e.g., prior history of traumatization).

5. An emerging response to traumatic events, including the events of 9/11, is to provide emergency mental health treatments, such as debriefing, to everyone directly exposed. In some settings debriefing has become mandatory. Research suggests that debriefing is at best ineffective and possibly harmful. For the present, interventions should only be offered to those at highest risk, especially those demonstrating serious symptoms. The interventions must have been found effective in well-designed clinical trials.

6. Some people with serious early symptoms will recover spontaneously, while others who later develop PTSD may not appear highly symptomatic in the first hours or days. Research is needed to more accurately identify who needs emergency mental health interventions.

7. Despite promising results with cognitive behavioral therapy, research is needed to develop additional interventions that promote resilience and prevent the onset of trauma-related disorders.

8. Children react somewhat differently to trauma than adults. Research is needed to develop age-appropriate interventions that prevent the onset of chronic mental disorders in children as a result of terrorist acts or ongoing terrorist threats.

9. Research-based treatments are available for people who develop PTSD, depression, or another mental disorder after a terrorist act. Unfortunately, certain treatments, such as

cognitive behavioral therapy, are not widely available, and more effective treatments must be developed.

10. If another terrorist attack occurred tomorrow, our public health and homeland security systems would *not* be prepared for dealing with the psychological effects of terrorism. Our disaster planning does not include science-based approaches to communicate risk to the general public. Mental health planning often is either ignored or separated from general disaster planning.

Recommendations: What We Must Do Now

1. We urge our public health and homeland security systems to be fully prepared for the psychological consequences of a terrorist attack:

   - Work with the media in advance to promote responsible messages about the risk of a terrorist attack and responsible coverage of an attack. Limit TV viewing by children in the aftermath of an attack.
   - Put a risk communication system in place prior to an attack that promotes adaptive responses by the public. Messages to the public should be based on the best research about risk communication.
   - Incorporate mental health into all disaster planning.
   - Discontinue the use of debriefing for healthy people. Intervene with proven interventions for those who are symptomatic or at highest risk of developing trauma-related disorders.
   - Ensure that more professionals are trained in the use of science-based treatments such as brief cognitive behavioral therapy.
   - For healthy populations, the most appropriate measures following a terrorist attack (security concerns permitting) are to connect with family and social networks, to ensure adequate nutrition and sleep, and to avoid excess alcohol or other drugs.

2. We urge greater investment in research to:

   - Develop ways to prevent onset of trauma-related disorders, especially in children.
   - Identify adults and children who are the greatest risk of developing these disorders after a terrorist attack.
   - Improve existing treatments for adults and children with trauma-related disorders.
   - Because existing treatments are based on our knowledge of trauma in general, rather than of terrorism per se, research is needed to understand how the effects of terrorism might differ, especially when the threat continues over time.
   - Determine the long-term effects of terrorism on the brain, on behavior, and on physical health (apart from injuries sustained in an attack).

3. We must find new ways to make research easier to perform soon after a terrorist attack – *or we will never learn what we need to know*. We will never discover ways to identify who is at greatest risk, what interventions will prevent them from developing long-term disorders, and when those interventions should be given.

4. We must make sure that research findings are incorporated more rapidly into disaster planning.

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