Responses to terrorism scenarios: Event features, individual characteristics, and subjective evaluations

Clinton Michael Jenkin
University of New Hampshire, Durham

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RESPONSES TO TERRORISM SCENARIOS:
EVENT FEATURES, INDIVIDUAL CHARACTERISTICS,
AND SUBJECTIVE EVALUATIONS

BY

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DISSERTATION

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Proverbs 16:3

"Commit they works unto the LORD,
and thy thoughts shall be established."

Proverbs 31:10

... and to my beautiful wife, Carole
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I would like to acknowledge my debt of gratitude to Ellen Cohn, my advisor throughout my graduate career. She allowed me great liberty in selecting and pursuing my own research interests, and offered whatever resources she could to clear my way. Her advice was always helpful, and in every instance improved my initial effort. She made my goals her own, and for that I am ever grateful.

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One of the primary lessons that graduate school taught me was the importance of staying anchored in the real world. My faith and my family provided that anchor at times when academia threatened to absorb all of my worthwhile efforts. I hope that in the future I will be able to stay anchored to the things that are really important, even as I (hopefully) achieve success in my chosen career.

Two of the people who changed my perspective of the world during graduate school were my brother-in-law, Army Cpt. Dan Enslen (Fantom 6), and my dearly departed daughter, Isabel Grace. Here are my thoughts for each of them:
"The Men Who Go"

Who are these men who willing risk their lives
For others? Men who called aside to go
And strive for right and good, respond as men?
With Faith and Duty, Courage, Pride not Shame.
They call their own the life-tax on free men.

These common fathers, brothers, husbands, sons,
Become our Warriors, Heroes, Martyrs, Kings.
"We rouse to fight—to win the day!" Their cries
Are heard by all. Which cries are dread to foes
Who grip and struggle, cursing life with hate.
“To Isabel”

I love you, but I never knew you.

I have seen the purest snow
Falling as softly as you ascended.
And I have seen the brightest star
Filling a void in the heavens.
I have seen you.

I have heard the rolling surf
Forever changing all it touches.
And I have heard the reckless birds
Proclaiming the joys of flight.
I have heard you.

I have felt the cooling breeze
Making the world as soft as velvet.
And I have felt the touch of love
Giving me a part of myself.
I have felt you.

When I know the wonders of the world, I will know you.
Until then I love you.
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ABSTRACT
RESPONSES TO TERRORISM SCENARIOS:
SITUATIONAL FACTORS, INDIVIDUAL CHARACTERISTICS,
AND SUBJECTIVE EVALUATIONS

by

Clinton Michael Jenkin

University of New Hampshire, September, 2006

The extensive research into responses to terrorism has focused on the effects of individual characteristics on reactions to past terrorism events. This literature has largely omitted two issues: the impact of terrorism event features, and reactions to possible future terrorism events. The first purpose of this dissertation was to account for the effects of event features as well as subjective evaluations on responses to terrorism events. The second purpose of this dissertation was to compare reactions to past and future terrorism scenarios.

A series of actual and hypothetical written scenarios were presented to undergraduate psychology students, and various responses measured. A number of individual characteristics were also measured. Studies 1 and 2 served to identify type of weapon, number of victims, type of target, and level of disruption as specific features of terrorism events or threats that are salient to observers. Study 3 through 5 manipulated these features to examine their impact on responses. Study 3 found that weapon independently affected some responses to terrorism, and affected others in conjunction.
with the type of target. Study 3 also found that some individual characteristics were important after controlling for event features. Study 4 found that type of weapon interacted with the presence of an actual attack to impact responses to terrorism. Study 5 incorporated a series of subjective evaluations of each scenario, and found that these evaluations were not related to responses after accounting for event features and individual characteristics. Differences between Studies 3 and 5 also suggest differing responses to threats and attacks.

This dissertation reviews the relevant literature for responses to terrorism and perceptions of risk. Also, the results are discussed in relation to previous research, and several implications are outlined for emergency preparedness and response agencies. Implications for future studies and empirical extensions of this work are also discussed.
INTRODUCTION

Most research studies into responses toward terrorism follow a similar pattern. First, a terrorism event occurs. Within a few days, or even a few hours, psychologists and sociologists begin interviewing the general public, emergency responders, or government officials. Further studies are conducted over the next weeks, months, and years. These studies deal with large groups of people, reference a specific point in time, and can be very effective at helping us understand how—and occasionally why—people respond in a specific way to a specific terrorism event.

However, research of this sort has a major limitation: it is tied to a specific act—or acts—of terrorism. These researchers can only measure responses to the event in question. In methodological terms, the stimulus is set; it is outside the control of the researcher. These researchers cannot ascertain how responses might have been different if the actual event was different. For example, this constraint dictates that almost all studies dealing with terrorism have dealt with terrorist bombings, for the simple reason that those are the most common types of attacks. Studies of the nature described above, which account for the vast majority of all terrorism response studies, are naturally limited to whatever stimuli occur in the real world.

Another limitation that stems from this methodology is that responses are usually (but not always) tied to a past event. Most of this research does not take into account how
people may respond to the potential of a terrorism event. Therefore little is known about the impact of general or specific threats of terrorism.

This dissertation was designed to address these limitations. Instead of basing questions on some past event, it asked for responses to specific scenarios. Some of these scenarios were presented as past events, some as future events; some were terrorist attacks, and some were only threats of attacks. The primary advantage of this methodology was the ability to manipulate specific features of the scenarios, and gauge the impact of those manipulations on participant responses. Another important advantage of this method was the ability to evaluate participant responses to terrorism events that only may occur—as opposed to events that have already occurred. These two considerations drove the design and implementation of this project.

This dissertation’s over-arching goal was to fill gaps in the terrorism response literature by examining responses to deliberately constructed terrorism scenarios, and by accounting for event features, individual characteristics, and subjective evaluations of those scenarios. Within this general goal, there were seven specific purposes to the following studies: first, to determine which event features were important to responders; second, to quantify the impact of changes in those features; third, to identify natural groupings among responses to terrorism events; fourth, to identify how these responses were related to the other sets of variables; fifth, to examine how individual characteristics were related to the other sets of variables; sixth, to identify natural groupings among subjective evaluations of terrorism threats; and seventh, to evaluate how these subjective evaluations were related to the other sets of variables. The design, hypotheses, and analyses used throughout the dissertation were all related to these seven purposes.
This dissertation used four sets of variables. They were terrorism event features, responses to the scenarios, participant characteristics, and subjective evaluations of the scenarios. The hypotheses and analyses were designed to construe relations within and among these sets of variables.

The event features were the objective characteristics of the scenarios. The first two studies in the dissertation were used for the first purpose of this dissertation: to identify which event features were likely to have an impact on participants. The last three studies systematically manipulated these features in order to quantify their impact. Event features included the type of weapon, the type of target, the number of victims, whether or not the attacker died in the attack, and whether the scenario contained an attack or only the threat of an attack. The second purpose of this dissertation was to evaluate what effect changes in the event features had on participant responses.

The second set of variables consisted of a number of specific responses to terrorism events. These included emotional responses such as fear and anger, cognitive appraisals such as seriousness and disruptiveness, and behavioral responses such as communication. The final three studies used these same response variables to provide measures of how participants rated hypothetical responses to a number of terrorism scenarios. The third and fourth purposes of this dissertation were to examine natural groupings among these responses, and to determine how they were related to the other three sets of variables.

The third set of variables consisted of several individual characteristics of each participant. These individual characteristics were gender, political ideology, tolerance for terrorism as a form of political expression, fear of terrorism, and perceived risk of
terrorism. Some of these characteristics have been linked to responses to terrorism in previous studies; the fifth purpose of this dissertation was to examine how these individual characteristics were related to responses to terrorism, and to compare the strength of such relations with the impact of the event features.

The final set of variables was a group of subjective evaluations of potential terrorism scenarios. These subjective evaluations were only used in the final study, which dealt exclusively with future terrorism events. Previous research has found that subjective evaluations of hazards have a strong impact on responses to those hazards; however, none of those studies dealt specifically with terrorism scenarios. The sixth and seventh purposes of this dissertation were to identify groupings among these subjective evaluations, and to examine how subjective evaluations of a terrorism threat are related to the other variables of interest.

In summary, this dissertation was constructed to investigate how the objective features of a terrorism event impact responses to the event, how responses to threats differ from responses to attacks, how perceptions of an event are related to these responses, and the relative importance of individual characteristics. The hypotheses and analyses that follow were designed to construe relationships among and within four sets of variables: event features, subjective evaluations, individual characteristics, and responses to a terrorism event.
TERRORISM ATTITUDES

Terrorism has become a central issue in our society. Since the attacks of September 11th, psychologists have researched and debated the definitions, causes, effects, and proper responses to terrorism. Most of the research on terrorism attitudes has examined responses by victims and society to specific acts of terrorism, such as the Oklahoma City bombing, the September 11th attacks, or the anthrax letters that followed. However, a complete understanding of public attitudes toward terrorism events must also include attitudes toward future terrorist attacks, which have mostly been ignored by researchers. The terrorism attitudes literature has also focused on personality issues—coping styles, demographic variables, or social support structures—that are related to attitudes toward terrorism. Event features have received little attention from terrorism attitudes researchers.

The Definition and Characteristics of Terrorism

Terrorism is a difficult concept to define. The adage summarizing this difficulty is “one man’s terrorist is another man’s freedom fighter,” or some variation of this statement. This statement encompasses the idea that terrorism is largely a matter of perspective. However, effective research must begin with a working definition of its basic concepts. While the debate over whether a specific attack constitutes terrorism may best
be left to political scientists and historians, a working definition of terrorism can be outlined for the purpose of examining public attitudes toward this phenomenon. This working definition establishes terrorism as a psychological phenomenon.

Carr (2002) summarizes terrorism as warfare against civilians designed to erode public support for leaders or policies. This basic definition specifies two conditions: civilian targets and a psychological goal. These two conditions are fairly standard in other definitions of terrorism. Pfefferbaum (2003) provides a good review of various definitions and outlines several common elements: actual or implied violence, fear and intimidation, indirect victims, and goals to change attitudes or behaviors.

Terrorism is qualitatively different from other forms of violence in that terrorism targets non-combatants and has a non-military objective; other features of terrorism include its randomness and the innocence of its victims (Pfefferbaum, 2003). For the purpose of this dissertation, terrorism will be defined as an act of violence against civilian (non-combatant) targets to effect some change in attitudes.

Based on this definition, two defining characteristics are relevant to the study of attitudes toward terrorism. First, terrorism targets civilians with no direct military value. From this perspective, the attacks on the U.S.S. Cole would not be considered terrorism (though it is often described as terrorism because the perpetrators did not have state sponsorship). Ongoing attacks on U.S. forces in Iraq and Afghanistan also cannot be considered terrorism. While a military observer might consider such attacks to be terrorism because of the types of military tactics used to counter them, a civilian observer is likely to view such actions as qualitatively different from attacks that directly target civilians.
The characteristic of targeting civilians also excludes collateral damage from being considered terrorism. Civilian casualties have historically been a part of legitimate military actions. To include such operations in a study of public attitudes toward terrorism would introduce several confounds, such as the strategic importance or the moral legitimacy of the military operation. In order for terrorism attitudes research to be focused, it is important to limit terrorist actions to those in which civilians are the primary targets. People likely respond very differently to the risk of being collateral damage (which is not random, a concept discussed below) than to the risk of being directly targeted by violence.

Second, the concept of psychological goals is a defining characteristic for developing a consistent definition of terrorism for psychological research. Unlike other types of military actions, the goal of terrorism is to change attitudes or behaviors (Pfefferbaum, 2003), which include emotions, beliefs, and behaviors. It is this factor that distinguishes the World War II factory bombings from true terrorism; those bombings were intended to reduce Germany's access to weapons of war, not to change its citizens' attitudes about the war or their leaders (although other Allied-sponsored programs did have this goal). This intent is often difficult to extrapolate, because it requires determining the motivation of the perpetrators, who are often dead or in hiding. For example, American Airlines Flight 77, which flew into the Pentagon on 9/11, could be considered a military strike. The primary target was a valid military objective, and the persons on the plane could be considered collateral damage. However, in this case Osama Bin Laden clearly indicated afterward that his goal was not to hamper military capability, but rather to send a signal to the American people that they were vulnerable. His
motivation, along with the civilian casualties on the plane, places the attack on the
Pentagon in the same category as the attacks on the World Trade Center. For
psychologists studying terrorism attitudes, it is important to focus on violence that has
psychological rather than military goals.

While not part of the definition, the randomness of a terrorist act is a
psychologically important attribute of terrorism. Randomness distinguishes terrorism
from most other forms of violence, both military and criminal (Pfefferbaum, 2003). For
most other types of violence, specific actions can be taken to reduce the threat of
victimization, such as avoiding certain areas or carrying defensive weapons. It is much
more difficult to take measures that will effectively reduce the risk of becoming a victim
of terrorism. Shaw (2003) posited that people respond differently to terrorism than to war
precisely because terrorism is random. From a behavioral perspective, the
unpredictability of terrorism makes it a potent psychological threat: terrorism acts as a
partial reinforcer of anxiety, and partially reinforced behaviors are very resistant to
extinction (Dougall, Hayward, & Baum, 2005). Randomness is an important
psychological aspect of terrorism, and is one of the features that make it so intimidating.

Another important psychological attribute of terrorism is its contradictory
psychological effects. The goal of terrorism is to change attitudes and behaviors in
general (Pfefferbaum, 2003) and to increase negative attitudes toward specific policies in
particular (Carr, 2002). Beyond simple attitude change, terrorists endeavor to create
political change through fear and intimidation (Pfefferbaum, 2003). However, terrorist
attacks often evoke a sense of outrage and determination in the populations they seek to
intimidate (Carr, 2002; Lerner, Gonzales, Small, & Fischhoff, 2003), which is quite
detrimental to their long-term goals. Once a terrorist event occurs, it often results in attitudes of patriotism, group cohesiveness, and support of national leaders and policies (Carr, 2002; Pyszczynski, Solomon, & Greenberg, 2003). All of these results are antithetical to the goals of any terrorist organization.

Herein lies the paradoxical psychological nature of terrorism: it is the terrorist act that has not yet happened that fulfills the terrorists' goals of fear and intimidation. Yet an event must occur in order for the public to feel threatened. Therefore terrorists stage an attack—which hurts their cause—so that the public will fear a future attack—which helps their cause. Shaw (2003) posits that psychological responses to a terrorist event are not driven by that event, but rather by the uncertainty it creates for the future. Long (1990) notes that a threat can be more useful to a terrorist organization, because once an attack has taken place, the organization loses control of the aftermath; as long as the threat is present, the terrorists maintains this control. In addition, Browne (2003) clearly differentiates the psychological consequences of acute and chronic exposure to terrorism. Such a difference is consistent with the idea that true terror is a result of threat (which is always present during chronic exposure to violence), not an actual event (as in acute exposure). Psychologists need to study responses to future terrorism as a distinct phenomenon from responses to specific terrorist events. However, the empirical literature dealing with attitudes toward terrorism is almost entirely oriented toward past events.

In summary, because terrorism is a psychological phenomenon in both its motives and its consequences, psychologists must be concerned with how people respond to it. The political debate about what constitutes terrorism, while important, can be sufficiently resolved so that attitude researchers can articulate the boundaries in which to study the
phenomenon empirically. And finally, any study of terrorism attitudes must take into account that people respond differently to past and future terrorist incidents, and that effective terrorists are motivated to carry out as few attacks as possible while still maintaining a believable threat.

The Psychological Effects of Terrorism

Researchers have documented behavioral changes in response to terrorism. On the business end, after 9/11 there were increases in gun purchases, pet sales, wills, and trust accounts (McCaughey, 2004), as well as buying protective gear, gambling, renting videos, shopping, and watching television (Pyszczynski et al., 2003). There were also increases in recreational drug and cigarette use (Miller & Heldring, 2004). Social behaviors changed as well, with increases in behaviors such as helping, connecting with others, attending religious services, and patriotic activities (Greenberg & Hofschire, 2002; Step, Finucane, & Horvath, 2002). Even the U.S. Congress demonstrated changes in behavior as they spent much of the next Congressional session dealing directly with issues made salient after 9/11 (e.g. guns in commercial airliner cockpits) (Beavin & Looney, 2002). These behavioral changes were mostly voluntary in nature, once again illustrating the psychological influence of terrorism on personal choices.

Terrorism also has an impact on public thoughts and beliefs about related concepts. After 9/11 heroes became more important and relevant to society (Pyszczynski et al., 2003) (note the ubiquitous photos of relief workers at Ground Zero, increased positive attention to police and firefighters, even a resurgence of comic book heroes in movie adaptations). Depending on personal values, people called for either tolerance or conformity (Pyszczynski et al., 2003). Even as far away as Germany, ideological tensions
between East Germans and West Germans decreased as a new common threat was recognized (Noelle-Neumann, 2002). Muldoon (2003) studied groups exposed to long-term threats of violence and found increases in segregation, homogenous groups, social identities, and stereotyping; these were noted after 9/11 as well (Pyszczynski et al., 2003). There was also a marked increase in reported fear of flying, although this could partially be due to more people being willing to let a previous fear of flying keep them on the ground (McCauley, 2004).

Psychologists have also studied the emotional impact of terrorism. As would be expected, emotional reactions to 9/11 were common, diverse, and severe. Survey respondents recalled feeling anxiety, surprise, sadness, fear, interest, anger, and disgust (Hoffner et al., 2002; Miller & Heldring, 2004; Step et al., 2002). Interestingly, anxiety and fear were not reliably correlated, suggesting two distinct emotional responses (Hoffner et al., 2002). There was also an increased demand for mental health services (Miller & Heldring, 2004). Even though these emotional reactions were pervasive and sometimes overwhelming, past attacks & disasters—such as Three Mile Island, the 1993 World Trade Center bombing, and even 9/11—provide historical anecdotes that panic and hysteria are the exceptions rather than the rule (Stout, 2004). However, emotional reactions to 9/11 were very strong and fairly long-lasting.

Even the economic impact of terrorism has a strong psychological component. The U.S. economy, which had been showing negative trends since the late 1990’s, entered a full-scale recession after 9/11. The negative economic indicators were due both to direct losses (such as the real estate of the World Trade Center, and the grounding of all domestic flights for three days) and indirect losses (e.g. the stock market collapse and
the drop in domestic and international travel). Weidenbaum (2001) estimated the direct economic impact at $40 billion and the indirect impact at an additional $60 billion. Notice that the indirect impact—generally due to psychological factors—was larger than the direct economic impact. Much of the economic impact of 9/11 was due to a drop in consumer spending. For example, both air travel and hotel bookings were lower immediately after 9/11 (McCauley, 2004; Pyszczynski et al., 2003): this change in consumer spending habits was attributable to higher anxiety and less confidence in the U.S. economy (McCauley, 2004; Weidenbaum, 2001)—a psychological rather than physical consequence. The psychological impact of 9/11 did greater economic damage than did the physical impact of the attacks.

Empirical research has also examined the effects of terror on children. One robust finding is that children’s responses to a stressful situation mirror the adults around them (Roger & Schmitt, 2002). If the adults respond with emotional strength, so will the children. From a developmental perspective this is not surprising, because a child has no context from which to evaluate and respond to an extreme situation. He or she must look to authority figures to determine whether the situation even qualifies as extreme, and if so, what response is appropriate. There is mixed evidence, however, that children are more negatively impacted by extreme stress than are adults. Responses to stress may have greater long-term consequences for children because they establish a pattern of responding, but some evidence indicates little or no short or long-term psychological maladaptation to war-related stressors (Shaw, 2003). There may even be habituation; some children in more frequently bombed areas in Israel actually report less disturbed sleep and dream patterns than do children in less frequently bombed areas, although in other
cases exposure builds up over time and is linked to more psychological problems, not less (Shaw, 2003). The effect of terrorism or other extreme stressors on children is diverse and not well understood.

In summary, terrorist attacks produce a wide range of effects on behaviors, thoughts, and emotions. These effects are long-lasting and widespread, impacting many more than just the direct victims. These effects also tend to be related both to the actual incident and to some undefined potential incident, although it is difficult if not impossible to delineate which effects are which.

Two important points stand out about these reactions and responses to 9/11. First, all reactions were observed in indirect victims. These changes occurred in persons who were not directly exposed to the attacks, but rather were exposed via relatives, acquaintances, and/or the media. The power of terrorism to impact those who are not in proximity to the attack is another demonstration of its strong psychological component. Second, many of these effects may have been oriented toward future attacks. While it is impossible to definitively determine which responses were to potential attacks and which were to past attacks, it may be that many observed responses to terrorism were driven by the possibility of a future attack. Reactions such as religious activities, disgust, stereotyping, that gun sales, will and trust increases, anxiety, or avoiding travel could be related to either or both. It is clear that responses to terrorism are oriented toward potential terrorist attacks as well as past attacks.

The research outlined in this section illustrates another central point to this dissertation: empirical literature has mostly neglected identifying which features of the terrorist event are responsible for particular responses or reactions. Because of the
scarcity of domestic terrorist incidents, and the relative homogeneity of the attacks that have taken place (mostly bombings and hijackings) it is impossible to identify what it was about 9/11 that evoked the observed or reported responses. "Responses to terrorism" is a very vague description for such diverse and important reactions, but it is unfortunately the state of the science at this time. This dissertation begins addressing the issue of which attacks foster which responses.

**Factors Related to Responses to Terrorism**

Most psychologists studying responses to terrorism have examined psychological distress and the personal factors that are related to it (for a review, see Miller & Heldring, 2004). Most of the following studies used either 9/11 or the Oklahoma City bombing as the reference point and investigated the factors related to psychological distress. As outlined below, researchers identified age, other demographic variables, various personality variables, proximity to the event, experience factors, coping strategies, and event related features as the predictors of psychological responses to terrorism events.

This type of terrorism attitudes research is open to several confounding issues. One confound is the time frame in which the study was conducted. For example, Snyder & Park (2002) used telephone surveys conducted on September 11th, Brown et al. (2002) used an internet survey posted on September 12th, and Hoffner et al. (2002) used a paper questionnaire administered three weeks after 9/11. Another confound is how the variables are measured. For example, Brown et al. measured fear with a composite score of four items, whereas Hoffner et al. measured fear with a single item. A third confound is how participant groups are operationalized. For example, Bleich, Gelkopf, Melamed, and Solomon (2005), Stempel and Hargrove (2002), and Miller and Heldring (2004) all
examined age differences. However, Bleich et al. focused on geriatric samples, and thus defined “younger adults” as ages 18-74. Stempel and Hargrove separated adults into ages 18-34 (younger) and ages 35-54 (older). Miller & Heldring used a middle group of ages 40-50. The disparate operationalizations of age makes it difficult to compare results. These issues must be taken into consideration as multiple studies are evaluated.

Age

As just mentioned several empirical studies have compared reactions of different age groups. Despite aforementioned problems in making comparisons between studies, there were significant age differences in the strength of the response to terrorism. After 9/11, young adults reported stronger reactions to the events than did adults over 60 (Ford, 2004; Miller & Heldring, 2004; Wadsworth, Gudmensen, Raviv, Ahlkvist, McIntosh, Kline et al., 2004). Ford (2004) posited that this difference existed because young adults are in a developmentally sensitive period, and also because they have a greater risk of becoming militarily involved. Stempel and Hargrove (2002) noted that young adults reported feeling less safe and more likely to become a victim than did adults over 35. However, Bleich et al. (2005) found that adults under 65 were more optimistic about the future than adults over 65, and Miller & Heldring reported that reactions were higher in 40-50 year-olds than in children and older adults. Wadsworth et al. (2004) reported that teens and young adults demonstrated greater overall response to 9/11 than did older adults, while Lerner et al. (2003) found no difference in perceived risk between teens and young adults. Among children, older children are more vulnerable to the stress of a terrorist attack (Shaw, 2003). While it is difficult to draw concrete conclusions because
these researchers defined their variables and age groups differently, terrorism appears to impact some age groups more strongly than others.

There are also observed qualitative differences in how different age groups are impacted by terrorism. (These differences may account for the quantitative differences described above.) Stempel and Hargrove (2002) found that adults over 35 were more likely than younger adults to report having made life changes because of the terrorist events of 9/11. Bleich et al. (2005) found that older adults (over 65) used more alcohol to cope, and “old-old adults” (over 74) had more sleeplessness in response to 9/11. This pattern, however, was not distinguishable 19 months after the event. Wadsworth et al. (2004) examined both voluntary and involuntary responses to 9/11 and found several differences across ages. Adolescents engaged in more concrete activities such as fundraising, while young adults reported higher levels of social support and religious activities. Also, adolescents and young adults used more secondary coping strategies, while older adults used more primary coping strategies (Wadsworth et al., 2004). They also found that cognitive restructuring, emotion regulation, and emotional expression increased with age, while rumination, wishful thinking, and emotional numbing decreased with age, and intrusive thoughts were lowest for young adults (Wadsworth et al., 2004). Terrorism seems to have both a quantitatively and qualitatively different effects on different age groups.

Other Demographic Variables

Gender was also a consistent predictor of psychological distress after a terrorist event. Emotionally, women reported higher levels of sadness (Hoffner et al., 2002), fear (Hoffner et al., 2002; Snyder & Park, 2002; Stempel & Hargrove, 2002), and being upset
(Hoffner et al., 2002), whereas men reported higher levels of anger (Hoffner, et al., 2002), more impulsive action, and greater emotional numbing (Wadsworth et al., 2004). In children, females generally had higher responses to stress (Shaw, 2003). Responses to terrorism events differed based on gender.

Ethnicity was also found to be a predictor of reactions to 9/11. Minorities reported greater distress symptoms (Hispanics demonstrated greatest distress reactions), but had a lower rate of Post-Traumatic Stress Disorder (PTSD) (Miller & Heldring, 2004). Sprang (2003) noted that being female, minority, or having a lower income or lower education level were risk factors associated with psychopathology following a terrorist attack. Ethnicity is an important predictor of terrorism responses, and may in fact interact with various other demographic variables.

Residential setting was also a significant factor. Stempel & Hargrove compared residents of small cities, large cities, suburbs, and rural areas. They found that suburbanites had the highest feelings of safeness from terror attacks, followed by residents of rural areas and small cities, and lastly by residents of large cities. Various demographic variables are related to responses to terrorism.

**Personality Variables**

Personality variables also play a role in terrorism reactions. Sprang (2003) identified the following personality-based risk factors for psychopathology following a terrorist event: lower intelligence, memory impairment, personality disorder, and dissociation. Generally, people with a previous psychiatric diagnosis reported higher levels of stress but lower occurrence of PTSD, perhaps due to ongoing treatment; one exception is schizophrenia, which was negatively associated with stress reactions (Miller...
& Heldring, 2004). The immediate subjective appraisal of the situation is also an important predictor of psychological distress, specifically among children (Shaw, 2003). Developmental differences were also related to reactions to 9/11 (Miller & Heldring, 2004). Other personality variables that were negatively associated with psychological stress after a traumatic event were positive affect and finding meaning in the event (Miller & Heldring, 2004).

Social Variables

Social variables can be significant predictors of responses to terrorism. For adults, a family history of mood disorders or substance abuse was positively associated with psychopathology, as is family instability for both adults and children (Miller & Heldring, 2004; Sprang, 2003). In children, as noted earlier, the reactions of authority figures in general, and parents in particular, is indicative of children’s reactions to a terrorist event (Shaw, 2003). The use of social coping strategies, which strengthen interpersonal connections, were negatively associated with psychological distress (Knowlton, 2004; Sprang, 2003). A lack of social support was positively associated with negative reactions (Miller & Heldring, 2004). Being around others with shared ideology was related to recovery from psychological stress (Shaw, 2003).

The amount and type of interpersonal communication about a terrorist event may or may not affect reactions to it. How a person heard about 9/11 was not related to the strength of the emotional reaction (Brown et al., 2002), but hearing about it early was related to being upset, but not to fear, sadness, or anger (Hoffner et al., 2002). While Brown et al. reported that emotional reactions were not related to passing the news on to others, Hoffner et al. reported that contacting others about 9/11 was positively associated.
with fear, sadness, and anger. Differences in data collection techniques could account for this discrepancy.

**Coping Strategies**

The method of coping with a terrorist incident has been linked to psychological symptoms. Endler and Parker (1990) developed a coping inventory which measures coping along task-oriented, emotion-oriented, and avoidance strategies. Sprang (2003) used this inventory to see if coping strategy was related to levels of distress among indirect victims of the Oklahoma City bombing. She found that those who used avoidance coping as their primary coping strategy were less likely to receive formal intervention, but reported higher levels of perceived risk. She also found that coping strategy accounted for 44.9% of the variance in perceived risk (Sprang, 2003). Knowlton (2004) posits that the most adaptive post-terror coping strategies were socially oriented, because they strengthen interpersonal relationships, but that aspiration toward personal growth was an adaptive self-oriented coping strategy. Coping strategy does seem to impact reactions to terrorism, and can be particularly valuable resources for mental health responders, because coping techniques can be learned and practiced.

**Proximity and Experience Variables**

Geographical proximity to a terrorism attack is strongly related to distress. While strong stress reactions can and do occur in geographically removed areas, they are not as strong as in the immediate vicinity (Ford, 2004; Snyder & Park, 2002). After the Oklahoma City bombing, residents of Oklahoma City with no direct exposure to the attack were distinguishable from a control group in Kentucky based on a series of victimization variables (Sprang, 2003). Yet persons not directly exposed to the anthrax
threat of October 2001 were still psychologically affected (Dougall et al., 2005). As indicated above, all of the emotional reactions, behavioral and attitude changes after 9/11 were observed in persons without direct exposure as well as those directly involved. However, geographical proximity is still a robust predictor of the severity of reaction to a terrorist incident.

History of exposure also plays a role in reactions, but the literature is contradictory, indicating some unknown moderating variable. Previous trauma can be related to stronger stress reactions to a new traumatic event (Heldring, 2004). However, some research suggests that immunity may build up over time (Jenkins, 1981; Shaw, 2003), while other research indicates that effects of exposure build up over time, leading to even more significant reactions (Shaw, 2003; Sprang, 2003). Muldoon (2003) reported desensitization in Israeli students during the SCUD missile attacks of the first Gulf War, as well as in Israeli bus commuters, where commuting frequency was negatively related to anxiety. Muldoon suggests that desensitization occurs only for indirect exposure, and not for those directly exposed to an event. More research is needed to empirically identify the other factor or factors involved in exposure over time.

Media

Media exposure is another variable that has been studied in relation to reactions to terrorism. Media plays a vital role in terrorism. Because a primary goal of terrorism is fear and intimidation, media coverage plays a central role in whether or not terrorist achieve their psychological objectives (Pfefferbaum, 2003). In fact, the psychological effects of terrorism cannot be separated from media coverage of terrorist events (Jenkins, 1981), because it is primarily through media that terrorists instill fear in their indirect
victims. Without media coverage, the impact of a terrorist event would be limited to people directly involved. The selective nature of media topics ("if it bleeds, it leads") skews the perception of the level of terrorism, causing the public to view future terrorist incidents as more likely than is realistic; selective reporting also skews perception of government effectiveness, which can drive demand for unwarranted policy changes (Jenkins, 1981). Terrorists depend on media reporting to maximize the impact of their attacks.

Given the importance of media to the psychological effects of terrorism, it is not surprising that media exposure was related to reactions to 9/11. After 9/11 and during the anthrax attacks, greater media exposure was linked to higher levels of distress (Dougall et al., 2005; Snyder & Park, 2002), and chronic post-tragedy media exposure was linked to negative affective outcomes, not positive ones (Greenberg & Hofschire, 2002). However, the relationship is not that simple. Brown et al. (2002) found that fear and sympathy were positively correlated with television consumption on September 11th, but not with grief. Among people who found out about 9/11 via media (as opposed to via interpersonal report), respondents reported feeling more upset and angry, but not greater levels of fear or sadness (Hoffner et al., 2002). Snyder and Park found that two specific types of media messages were linked to higher stress levels: graphic images and advice for staying safe. In addition, Greenberg and Hofschire posited that it was not initial media exposure that drove emotional outcomes, but rather exposure over time, which would account for how media consumption was related to fear and sympathy, but hearing about 9/11 via media was not related to fear and sadness. The relation between media and reactions to terrorism appear to be fairly complex.
Stempel and Hargrove (2002) conducted a study that shed some light on media effects. Their sample was almost evenly divided on whether media coverage made them feel better (31%), worse (33%), or had no effect (27%). It should be noted that in this study no direct emotional measurements were taken; participants were simply asked about how media coverage affected them. Gender was an important variable. Women were more likely to say that the coverage made either a positive or negative difference, and men were more likely to say that there was no difference (Stempel & Hargrove, 2002). Type of media was also a significant factor. Those who said that media helped them emotionally were more likely to use the traditional media of television, radio, and newspapers, while those who reported that media made them feel worse were more likely to use the internet (Stempel & Hargrove, 2002). Some demographic variables were also relevant. Those with higher education (post-graduate) and higher income (> $80,000) were more likely to report that media helped (Stempel & Hargrove, 2002). Finally, those who reported that media did not impact them also reported feeling safer, less likely to become a victim, and less likely to make life changes (Stempel & Hargrove, 2002). This study indicates that the effect of media on reactions to terrorism are quite complex and involve many moderators, such as gender, socioeconomic status, and type of media.

Several points must be made about these findings. First, it is difficult to compare findings from different studies because of differences in emotion measures, samples, and time after 9/11, all of which will impact results. Even replicating a single study would be problematic because participants would need to recall their emotional state at a given point in time. Second, no causal relationship can even be proposed with these cross-sectional designs, because it is just as likely that increased emotional turmoil led people...
to seek out information as it is that being exposed changed their emotional state. In all probability there is a cyclical relationship, but longitudinal designs would be needed to properly evaluate this relation. Third, any explanation of media exposure effects must take into account personal factors such as those discussed above. Finally, as with most terrorism attitudes research, a distinction must be made between media reporting of past events and potential future events. Such a distinction may account for the contradictory findings outlined above, because the researchers did not specify when their participants were responding to a previous attack and when they were responding to a potential attack.

*Event Features*

While most research into stress reactions has dealt with personal variables, some has looked at event features that are salient to stress reactions. Discussed below, event features have included the unexpectedness of the event, number of casualties, severity of damage, or the motivation of the attackers. This research generally applies to many types of traumatic events, not just terrorism. Carr (2002) theorized that emotional reactions to 9/11 were similar to Pearl Harbor because both were surprise attacks. Shaw (2003) also posited that responses to unexpected events were different than responses to expected events. It seems reasonable that people will respond differently to a traumatic event for which they have not been able to prepare. Another event factor is severity. Sprang (2003) reported that the death rate of an event was a moderator between the event and psychological distress, although Shalev, Peri, Canetti, and Schreiber (1996) reported that they did not find a link between event severity and development of PTSD. This is not a surprising difference because PTSD is qualitatively different than emotional distress.
Another factor is culpability. In a review of past research, Sprang (2003) reported contradictory findings: some literature found that having a target to blame lead to increased psychopathology, while other research found that an identifiable cause was linked to decreases in psychopathology. (Perhaps some feature of the causal agent determined the type of reaction.) Given these inconsistent results, it is likely that personality variables interact with event features to moderate stress reactions and psychopathology.

Political science terrorism researchers have identified several characteristics that could possibly lead to higher stress reactions among direct and indirect victims, including motivation, presence of suicide, and the type of weapon. First, religious motivation may impact response to a terrorism event. In many ways, religion is a more defining cultural trait than is language or customs, and when two cultures interact, religious differences are more often maintained, and even exaggerated, than are secular cultural differences (Pape, 2005). It may be the case that religiously motivated terrorism is viewed as more damaging to a culture’s shared value. Cronin (2002) postulates that religious attacks are based on faith, which may be more intimidating because it is less understood by the victims, and less likely to be overcome by negotiation. Religious motivation may be an important consideration for understanding responses to terrorism.

Second, the presence or absence of suicide may impact responses to a terrorism event. Suicide attacks denote a tremendous commitment to a particular cause (Pape, 2005), and also may be more lethal, because the attacker has more direct control over the event. For both of these reasons, direct and indirect victims may have a greater negative reaction to suicide attacks.
Third, the method of attack may also be related to responses to terrorism. Long (1990) states that different types of attacks are perpetrated to accomplish different goals against different populations, and are also related to differences in consequence severity. For both of these reasons it is probable that method of attack is an important consideration for responses to a specific terrorist event.

Fourth, the number of victims should also be important, because the immorality of terrorism lies in its creation of innocent victims (Long, 1990). Therefore an attack with more victims may be seen as more immoral and evoke greater negative reactions.

Slovic and Burns (2006) conducted a study to examine which event features impacted public responses to specific scenarios. They found that the type of weapon (explosion versus infectious disease), presence of suicide, motive (fear versus prisoner release), and type of victim (government versus civilian) were all predictors of concern and perceived risk. Infectious diseases, presence of suicide, and civilian casualties were all positively related to risk and concern; interestingly, number of victim were not significant predictors (Slovic & Burns, 2006). This study demonstrates that various event features of a terrorist attack are important to how people perceive and relate to that attack.

In conclusion, demographic, personality, social, geographical, and experiential variables have all been linked to the strength of and/or type of reactions to traumatic events like terrorism. The relationship between the features of the event and reactions to the event are not so well studied or understood, and these variables may even interact with person-centered variables in their relation to stress reactions. The delineation of event features that are relevant to attitudes toward terrorism is an important feature of the proposed studies.
Attitudes Toward Potential Terrorism

In the studies outlined above, it is often difficult if not impossible to distinguish between reactions to past events and reactions to potential future events. However, some empirical work has studied reactions specifically to the general threat of terrorism. Most of this work is oriented around the concepts of fear of terrorism and perceived risk of terrorism. Viscusi and Zeckhauser (2003) found that survey respondents feared the severe terrorist actions, but perceived higher risk of lesser scale attacks. This difference between objects of fear and objects of perceived risk indicate that these are distinct constructs. Huddy et al. (2002) found a distinction between personal threat and national threat of terrorism; national threat had a stronger effect on perceptions of the national consequences of terrorism than did personal threat. Their conclusions are consistent with Warr and Ellison's (2000) conclusions that personal and altruistic perceived risk are conceptually distinct, and that altruistic perceived risk is a stronger predictor of adaptive behaviors than is personal perceived risk. Research into attitudes toward future terrorism supports the idea that these attitudes are multifaceted.

Using the framework that fear and perceived risk are distinct concepts, and that they can be self-oriented or others-oriented, Jenkin and Cohn (under review) found that fear and perceived risk of terrorism were positively correlated with gender, patriotism, and a desire for stricter airline security. These results are consistent with other studies that have investigated fear and perceived risk of terrorism (Huddy et al., 2002; Viscusi & Zeckhauser, 2003).

Fear and perceived risk of terrorism are associated with certain political attitudes. Huddy, Feldman, Taber, & Lahav (2005) found that fear and perceived risk of terrorism
appeared to have contrasting effects on political attitudes: high levels of fear were correlated with reduced support for aggressive responses to terrorism, while high levels of perceived threat without fear were correlated with increased support for aggressive antiterrorism policies. Lerner et al. (2003) used emotionally laden primes to evoke fear from their participants experimentally; they found that participants showed greater support for government efforts to combat terrorism. As discussed above, patriotism has also been associated with fear and perceived risk of terrorism. Displays of patriotism were ubiquitous after 9/11, and this phenomenon has been of interest to psychologists. McCauley (2004) suggested that, much like small groups, large groups develop cohesion from shared threat. This cohesion is often demonstrated by greater regard for group norms as well as greater social sanctioning of deviants (McCauley, 2004). As mentioned earlier, Pyszczynski et al. (2003) cited TMT as the mechanism by which fear of terrorism led to increases in patriotism.

A proper understanding of responses to terrorism events requires that researchers delineate (as much as possible) which responses are oriented toward past acts of terrorism and which attitudes are oriented toward future acts of terrorism. At the same time, these orientations are often difficult to differentiate, because attitudes toward any future event are developed based on previous experience. Research into perceived risk has developed a framework with which to examine response to potential events, as well as to examine how specific features of those events are related to perceptions and responses. The theories and techniques from the risk literature can be adapted to the study of terrorism.
The concept of risk is a psychological one. Risk, as opposed to danger, is a socially constructed phenomenon (Slovic, 1999). Riskiness is based on perception rather than fact, and this perception is based on qualitative, not quantitative characteristics of the hazard being considered (Slovic, 1987). Slovic (1999) argues that risks are made up of qualitative attributes like voluntariness or probability. He further posits that no single attribute defines the risk of a particular hazard, neither are specific attributes equally influential across different hazards (Slovic, 1999). Even when the facts and probabilities of a particular hazard are well defined and well known, human judgment is required to determine which information is most important to defining the risk of that hazard (Slovic, Fischhoff, & Lichtenstein, 1979/2000). These authors found that participants’ ratings of risk did not match their own mortality estimates, indicating that other factors must be related to risk decisions (Slovic et al., 1979/2000). Whether a risk is considered acceptable is also a matter of priorities and values, which are psychological by definition (Wandersman & Hallman, 1993). The subjective and perceptual nature of risk makes it an important area of study for the psychological sciences.
Consider the following scenario developed by Mackenzie (quoted in Stout, 2004).

It begins with a threat. A terrorist group declares that unless its demands are met within 48 hours, it will release anthrax over San Francisco. Two days later, a private plane flies across the Bay, spreading an aerosol cloud that shimmers briefly in the sunlight before disappearing.

**Scenario one:** Thousands are killed in the panic as 2 million people flee the city. Another 1.6 million inhale anthrax spores. Antibiotics are rushed in, but the hospitals are overwhelmed and not everyone receives treatment. Most of the country’s limited stock of anthrax vaccine has already been given to soldiers. Emergency crews provide little help as there are only four germ-proof suits in the whole city. More than a million of the Bay Area’s 6.5 million residents die.

**Scenario two:** In the two days before the attack, the citizens seal their doors and windows with germ-proof tape. They listen to the radio for instructions, their gas masks, drugs, and disinfectants ready. Few panic. When sensors around the city confirm that the cloud contains anthrax spores, the hospitals receive the appropriate antibiotics and vaccines. Trained emergency teams with germ-proof suits and tents set up in the places where automated weather analyses show the deadly cloud will drift. With advance preparation and rapid response only 100,000 people die (pp. 8-9).

These scenarios demonstrate the complexity of perceived risk regarding terrorism. From an objective perspective, Scenario two seems very plausible: if people know what is in their best interest, they will do it. However, this attitude ignores several key issues about the psychological nature of risk. One such issue is dread (Slovic, MacGregor, & Kraus, 1978/2000). If people dread a death from anthrax more than a death from being trampled, they may avoid the first even if it means high risk of the second. Another issue is trust (Seguin, Pelletier, & Hunsley, 1999); people may or may not trust the instructions they receive. They may consider such instructions to be ineffective, as many did when President Bush advised people to purchase the same supplies mentioned above. A third issue is control (Slovic et al., 1978/2000). People may
wish to attempt to leave the city anyway, because they perceive that they have more control over their exposure or treatment if they evacuate.

Perhaps the best illustration of the subjective nature of risk is the discrepancy between expert and lay evaluations of a hazard. When judging the risk of a hazard, experts rely much more heavily on mortality estimates and probabilities than do laypersons. Slovic et al. (1979/2000) reported that expert judgments of risk corresponded to objective statistical data, whereas layperson judgments did not. Slovic (1999) accounted for such a discrepancy by concluding that experts view risk as the likelihood of actual harm based on mortality estimates, whereas lay perceptions of risk are based on a number of qualitative (and subjective) characteristics. Some of the characteristics that have been linked to lay perceptions of risk include the voluntariness of exposure, the amount of dread associated with the hazard, the extent to which the risk can be controlled, the potential for catastrophe, level of uncertainty associated with the hazard, and the perceived inequality of risk/benefit distribution (Slovic et al., 1978/2000). It is well documented that expert and lay judgments of risk are different, and this difference can be traced to qualitative dimensions of risk that are applied to lay judgments but not to expert judgments. Ironically, both experts and lay risk assessors tend to be overconfident in their judgments (Slovic et al., 1979/2000). The inconsistency between expert and lay judgments of risk demonstrates the psychological nature of risk.

This inconsistency also creates a debate about the appropriateness of using expert evaluations for policy decisions. In most cases, government and business policy makers rely almost exclusively on quantitative risk assessment to guide policies. In many cases the involved public fails to accept such assessment. One example is nuclear power
generation, which has been largely rejected in this country even though it is both safer
and cleaner than fossil fuel alternatives. Another example is the decrease of property
values near toxic waste sites despite repeated assurances that the materials have not and
will not impact local residents. Participants in MacGregor and Slovic (1986) considered
the standard cost-benefit analysis used by experts to be morally insufficient for evaluating
and regulating risk, but acceptable as part of a more subjective evaluation process.
Wandersman and Hallman (1993) agreed that such analysis was insufficient for a number
of reasons. First, quantitative risk assessments are based on a number of assumptions that
introduce uncertainty into the process; second, the credibility of the risk assessors may be
suspect; and third, expert assessment often leaves fails to consider issues that are
important to the public interest (Wandersman & Hallman, 1993). The unwillingness of
the public to accept expert risk assessment is a further demonstration of the psychological
nature of risk.

In conclusion, the concept of risk is socially constructed and psychologically
oriented. Comparisons of expert and lay judgments of risk illustrate that public
assessments of risk are tied to qualitative rather than quantitative characteristics of a
hazard. The relative importance of these qualitative characteristics varies across people or
across hazards. Risk perception research techniques can identify which characteristics are
important and when.

Benefits of Risk Perception Research

Slovic (1987) uses the Ford Pinto as a case study to illustrate the value of
understanding risk perception. After producing and selling the Pinto, Ford discovered that
a defect in the fuel tank could cause the car to catch fire. Ford did a cost-benefit analysis
and concluded that a recall would be too expensive. If Ford had considered perceived risk in the analysis they might have made a different decision (Slovic, 1987). As a result of declining to fix the problem via a recall, Ford suffered public relations nightmare that cost them much more than a recall would have. Even though the actual fires did not create a significant economic problem, the perception that Ford's product may catch fire did. The mere perception of a threat was enough to cause severe problems. The same holds true for terrorism. If a terrorist organization provided a credible threat that a nuclear bomb would detonate in New York Harbor, the resulting evacuation and general atmosphere of the city would cripple the state and perhaps national economy, independent of whether the danger was real. Understanding risk perceptions and responses to risk is vital for understanding—and ultimately affecting—public responses to terrorism.

Risk Perception and Political Attitudes

The study of risk is important in several ways. The first benefit to studying risk is that it allows psychologists to better understand political attitudes. Perceptions of risk drive public priorities (Renn, 1992). As in the case of the Pinto, or nuclear energy, or airline security, the perception of risk, rather than actual danger, drive citizen demands for action. This phenomenon is demonstrated in cases of environmental hazards. Public perceptions of risk seriously affect management and regulatory organizations' budgets, agendas, and priorities (Slovic, 1999). For policymakers, especially elected policymakers, the psychological impact of environmental hazards are just as important as the physical impacts (Wandersman & Hallman, 1993). Perceptions of risk are an important component of political attitudes.
Gerber and Neeley (2005) studied how perceived risk of routine hazards was related to attitudes about government regulation. They found that increased perceived risk of a hazard was positively related to support for regulation of that hazard, even when the cost of such regulation was stated to be significant (Gerber & Neeley, 2005). Two other variables affected this relationship: issue awareness and trust in the regulators. If respondents considered themselves to be ill-informed on an issue, there was no relationship between perceived risk and support for regulation (Gerber & Neeley, 2005). Trust moderated the relationship between perceived risk and support for regulation; if the respondents did not trust the regulators, then they were less likely to support regulation, even if perceived risk was high (Gerber & Neeley, 2005). These results also apply to terrorism. As cited above, Huddy et al. (2005) found that levels of perceived risk were linked to willingness to support aggressive anti-terrorist policies. Studying which features of a terrorist hazard impact perceptions of risk allow policymakers to understand which terrorist hazards are likely to become important to the public, and why. In our democratic society understanding public priorities is essential to developing a politically acceptable action plan.

**Risk Perception and Lifestyle**

The second benefit to studying risk is that researchers can understand how perception of risk impacts lifestyles (Renn, 1992). Jenkin and Cohn (under revision) documented that perceived risk of terrorism was positively related to adaptive behaviors—behaviors related to avoiding risk or minimizing the potential cost of exposure. Similar studies have found this relationship to hold true for fear and perceived risk of crime as well (Ferraro, 1995). Williams, Singh, and Singh (1994), in a study of
urban adolescents, found that fear of crime was an important predictor of defensive behaviors, such as going out in groups, learning self-defense, carrying spray, or carrying a safety whistle. Lavrakas (1982) compared suburban dwellers with urban dwellers, who exhibited a greater fear of crime; he found that the urban dwellers restricted their behavior more than the subjects living in the suburbs. McDowell (1995) found a positive link between fear of crime and gun ownership. Mesch (2000) found that an increase in perceived risk was indicative of a decrease in nighttime activities. The behavioral effects of perceived risk and fear of crime are well documented, though the research has not differentiated behavioral changes related to fear from those related to perceived risk. Numerous behavioral changes were also observed after 9/11 (McCauley, 2004; Pyszczynski et al., 2003, Weidenbaum, 2001), although it is unclear which—if any—of these behavioral changes were actual lifestyle changes. Identifying to what extent perceived risk changes behaviors is an important goal of risk researchers.

**Risk Amplification and Attenuation**

The third benefit to studying risk is that it can clarify the conditions under which perceptions of risk either increase or decrease. Risk researchers have developed a descriptive mechanism known as risk amplification. Risk amplification is concerned with factors, both personal and social, that create either a heightened or lowered sense of risk within a society (for a complete treatment of this framework, see Pidgeon, Kaspersion, & Slovic, 2003). Risk amplification ties reactions to socio-economic processes as well as event characteristics (Barnett & Breakwell, 2003). This framework considers issues such as the stigma associated with a hazard (Flynn, 2003), assignment of blame (Susarla, 2003), or the social dynamics within a society (Horlick-Jones, Sime, & Pidgeon, 2003) in
order to understand why a risk might become over or underestimated. Understanding the 
complex interplay between perceptions of risk and social processes is an important 
contribution of risk research, and can inform communication and policy decisions 
regarding risk.

The social amplification of risk framework can be a useful tool for tracing the 
social evolution of attitudes toward terrorism. Consider that several major terrorist attacks 
occurred that involved U.S. citizens before 9/11, such as the two previous World Trade 
Center bombings, the Oklahoma City Bombing, the Marine barracks bombing in 
Lebanon, and the dual U.S. Embassy bombings in Kenya and Tanzania. However, 
counter-terrorism did not become a national priority until after 9/11. While the damage of 
the 9/11 attacks is one variable, the risk amplification framework provides a mechanism 
for understanding what other social factors were involved in alternately keeping terrorism 
in the background for a time and then thrusting it onto an international center-stage.

Risk Perception and Communication

The fourth benefit to studying risk is that an understanding or risk perceptions is 
vital to developing proper communication and education strategies (Renn, 1992; Slovic, 
2004). For any hazard it is important for decision makers and enforcement officials to be 
able to explain a hazard and related course of action to the public. It is also important the 
proper educational initiatives build an accurate and useful public awareness base. Neither 
of these can be accomplish unless communicators understand how risk is defined and 
perceived by the public. For terrorism, communication is particularly important, because 
any major warning must be accompanied by instructions, and those instructions must be 
heeded by the public at large.
Several factors are known to impact risk perception. The first and most important is trust, which has been repeatedly linked to perceived risk. Heldring (2004) identified credibility as the first requirement for effective risk communication. Trust in information source was found to impact perceived risk of environmental health hazards (Seguin et al., 1999). In a study that manipulated various features of communications of risk, the manipulations were not as important as issues of trust in government and authority (Johnson & Slovic, 1995). Trust seems to be more important when the perceiver knows little about the hazard; trust was a key factor for opinions about hazard waste disposal, but not for opinions about pollution or crime (Gerber & Neeley, 2005). Any communication or education initiative that lacks credibility will have minimal effect on perceptions of risk. It is vital that agencies responsible for communicating terrorism information to the public maintain this trust, or any directions concerning evacuation, sheltering, et cetera stand a fair chance of being ignored by the public.

Sjoberg (1999) posited that the issue of trust may go a long way toward understanding why risk perceptions seem irrational to experts; if the experts themselves are do not have credibility, then disbelieving their assurances is the only rational response. Slovic (1999) addresses systemic influences that destroy trust. These influences are noticeably present in the arena of terrorism. One, failures are more noticeable than successes (Slovic, 1999). This is especially true for the war on terror, because most successes cannot be identified or publicized because any information would compromise intelligence sources. Two, failures are given greater weight than successes, even if salience is equal (Slovic, 1999). One explanation for this may be that failures alter the status quo, whereas successes preserve it. Three, once distrust is achieved, it screens
perceptions and makes failures even more noticeable (Slovic, 1999), because people tend to retain information consistent with their attitudes. While trust is an extremely important variable in risk communication, it is also a very fragile one.

Specificity is another communication factor that impacts perceptions of risk. Risk communications that are not specific are more likely to increase anxiety without increasing awareness (Stout, 2004). One example of this is the color-coded alert system used by the Department of Homeland Security. For law enforcement officials, this alert system is useful and effective. Each level of alert is accompanied by specific instructions and procedures. For the general public, however, the system is rightfully criticized for being counterproductive, precisely because for a public audience it offers no useful information. Heldring (2004) outlined criteria for risk communication to be considered useful: credibility, specific information about the risk, specific information about what is being done by authorities, specific information about what the audience should do, and empathy. In the case of terrorist warnings, unfortunately, such specific information is usually unavailable, or cannot be shared with the public. However, risk research provides insight into how terrorist warnings should ideally be constructed and relayed.

Barnett and Breakwell (2003) used the 1995 contraceptive pill scare in England as a case study for how risk communication drive public perceptions of risk that are unwarranted. The pill scare was caused by the release of information that certain oral contraceptives were linked to negative health outcomes for the women using them. In this case the risk was limited to a small segment of the general population, but thousands of women stopped using their birth control, and the health care system was temporarily overwhelmed with concerned patients and false alarms. The authors identified four
factors that contributed to the false sense of risk. The first was that expert opinions contradicted each other (Barnett & Breakwell, 2003). When the public is exposed to experts that disagree with each other, both sides lose credibility and the public perceives the risk to be higher. The second factor was that the media emphasized relative risk rather than absolute risk (Barnett & Breakwell, 2003). For example, reporting a 100% increase in risk can mask the fact that the risk may still be extremely small. The third factor was that the public was informed of the problem before their general practitioners (Barnett & Breakwell, 2003). This has to do with specificity; the public knows there is a problem but does not have access (through their health care providers) to detailed information about what they should do. All three of these factors are often present during a terrorist warning, and all three generally act to increase public perception of risk.

These authors also postulated a mechanism by which past risk communications influence the response to further risk communications. The series of previous hazard notifications (a hazard sequence) impacts the way a hazard is normalized; this normalization results in a hazard template—a social heuristic that speeds the processing of information related to the hazard (Barnett & Breakwell, 2003). The hazard template is the public’s conception of the hazard, and includes such characteristics as the organizations responsible, potential victims, causes, and consequences; this template provides a common ground for interpersonal communication about the hazard (Barnett & Breakwell, 2003). They conclude that in order to understand how people will react to a future risk communication, we must first understand how previous communications have shaped the audience’s hazard template (Barnett & Breakwell, 2005). According to this view, risk communication is a vital component of risk perception, and the two cannot be
studied independently. This view is consistent with Slovic's (1999) conception of risk as a socially constructed phenomenon. The studies proposed here do not address specific factors of the message, such as credibility or specificity, but instead they lay the groundwork for how these factors might interact with features of the hazard itself.

**Event Features**

A fifth benefit to studying risk is to identify event features that influence risk perception. Psychological research has identified four event features that influence how people judge risk: expected loss, catastrophic potential and other qualitative characteristics (these will be discussed in greater detail below), and beliefs about cause (Renn, 1992). Risk perception research provides insight into which event or event features will be most important for particular hazards. In the case of terrorism, it is useful to allow researchers or public officials—given specific information about the characteristics of a terrorist threat—to predict how people might react to that threat.

**Personal Factors**

Several intra-personal factors have been linked to risk perception. In the health psychology literature, three factors have been associated with risk perception: demographics, sociopsychological variables (like those discussed above regarding responses to terrorism), and structural variables such as experience with the hazard or depth of knowledge (Sarafino, 2002). Sjoberg (1999) postulated that certain individuals may demonstrate a greater sensitivity to risk, and this possibility deserves empirical analysis. Slovic (1999) linked risk judgments to sex (women judge risk to be higher), race, (minorities judge risk as higher), political worldview, personal affiliations, emotional affect, and trust (as outlined above). However, upon closer inspection, it
appears that race and sex differences in perceived risk can be tied to the “white male effect” (Slovic, 1999). About one-third of white men have much lower risk judgments than do everyone else, regardless of sex or race; when these responses are excluded from analyses, race and sex differences become non-significant (Slovic, 1999). Examining these low risk respondents reveal that they tend to be well-educated, have high socioeconomic status, conservative political orientation, and higher trust in authority (Slovic, 1999). The white male effect may provide a link to other personal factors that influence risk perceptions. Fortunately, intra-personal variables in one area that terrorism attitude researchers have acquired a great deal of useful information; however, as previously discussed, most of the research failed to differentiate between reactions to past events and reactions to potential events. The risk literature provides the empirical background to devise and test specific hypotheses regarding terrorism and personal variables.

In sum, studying risk perception is beneficial in many ways. It provides insight into how risk perception is related to attitudes, and lifestyles. It provides a framework for understanding how risk is amplified or attenuated across a culture. It allows for the proper development of effective communication and education strategies, and it provides an understanding of situational and personal factors associated with risk perception. As long as people perceive risk, they will take steps to reduce or eliminate it. It is an important contribution of psychology to provide empirical analysis of how and why risk is perceived, and what consequences are associated with risk perception.
The Psychometric Paradigm

The psychometric paradigm was developed as the research paradigm that logically follows the assumption that risk is psychologically determined. The primary assumption of the psychometric paradigm is that risk is inherently subjective (Slovic, 1992). Recall the importance of qualitative hazard characteristics to lay perceptions of risk. The psychometric paradigm is based on techniques that collect and analyze subjective rating of these qualitative characteristics, including both global (e.g. riskiness, etc.) and dimensional (e.g. controllability, familiarity, etc.) evaluations of particular hazards (Slovic, 2000). These subjective ratings then form a sort of personality profile for each hazard being studied. It is this pattern of qualitative ratings that affect perceptions of risk (Slovic, 2004). Psychometric studies have discovered five factors that generally account for risk perceptions: qualitative features of the hazard, benefits of the hazard, annual mortality rates, catastrophic mortality potential, and relative mortality seriousness (Slovic, 2004). For the purposes of the proposed studies, the factor of greatest interest is the qualitative features, or personality profile, of the hazard itself. An understanding of how these qualitative ratings impact perceptions of risk is a vital step toward understanding attitudes toward terrorism.

Dimensions and Factors of Risk

Psychometric studies have studied numerous dimensions of risk for scores of hazards. Dimensions commonly used are listed in Table 1 (from Fischhoff, Slovic, Lichtenstein, Read, & Combs, 2000; Johnson & Tversky, 1984; Slovic, Fischhoff, & Lichtenstein, 1980/2000). Obviously, so many dimensions can lead to very cumbersome research designs, so most risk studies include the dimensions most applicable to the study.
at hand. For example, a terrorism study may elect to exclude inequitability, because the inequity of terrorism risk is not likely to be an issue as it might be for the risks of a toxic waste dump or nuclear power plant.

Table 1

*Qualitative Dimensions of Risk Used in the Psychometric Paradigm*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>voluntariness</td>
<td>the extent to which exposure to the hazard is voluntary</td>
</tr>
<tr>
<td>immediacy</td>
<td>the extent to which the consequences are noticed immediately</td>
</tr>
<tr>
<td>knowledge of exposure</td>
<td>the extent to which a person knows if he has been exposed</td>
</tr>
<tr>
<td>expert knowledge</td>
<td>the extent to which experts know about the hazard</td>
</tr>
<tr>
<td><em>controllability</em></td>
<td>the extent to which a victim can control the severity of consequences due to exposure</td>
</tr>
<tr>
<td>novelty</td>
<td>the extent to which the hazard is new to society</td>
</tr>
<tr>
<td><em>catastrophic potential</em></td>
<td>how many fatalities occur at once</td>
</tr>
<tr>
<td><em>dread</em></td>
<td>the extent to which the effects of exposure are dreaded</td>
</tr>
<tr>
<td><em>severity</em></td>
<td>the extent to which the consequences of exposure are severe</td>
</tr>
<tr>
<td><em>increasing</em></td>
<td>the extent to which the risk is increasing over time</td>
</tr>
</tbody>
</table>

*Note.* Dimensions marked with an asterisk (*) were correlated with perceptions of risk (Slovic, et al., 1979/2000; Slovic, et al., 1980/2000).

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Table 1 (con’t)

**Qualitative Dimensions of Risk Used in the Psychometric Paradigm**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>*preventability</td>
<td>the extent to which the hazard is preventable</td>
</tr>
<tr>
<td>delayed risk</td>
<td>the extent to which the consequences of exposure are delayed</td>
</tr>
<tr>
<td>*certainly fatal</td>
<td>the extent to which exposure will definitely cause fatality</td>
</tr>
<tr>
<td>*inequitable</td>
<td>the extent to which risks and benefits are not equally distributed across society</td>
</tr>
<tr>
<td>*effects future generations</td>
<td>the extent to which the hazard will effect future generations</td>
</tr>
<tr>
<td>*global catastrophe</td>
<td>the extent to which the hazard threatens a global catastrophe</td>
</tr>
<tr>
<td>*easily reduced</td>
<td>the extent to which risk associated with the hazard can be easily reduced</td>
</tr>
<tr>
<td>*personal impact</td>
<td>the extent to which the risk effects the respondent personally</td>
</tr>
<tr>
<td>observability</td>
<td>the extent to which the effects of exposure are observable</td>
</tr>
</tbody>
</table>

*Note.* Dimensions marked with an asterisk (*) were correlated with perceptions of risk (Slovic, et al., 1979/2000; Slovic, et al., 1980/2000).

Risk studies have also sought to reduce the number of analyses by reducing these qualitative dimensions into factors via factor analysis. This approach has been very successful and has lead to robust research findings. Two factors have been consistently (though not exclusively) identified—dread risk, which is associated with lack of control,
dreaded consequences, catastrophic potential, inequitable distribution, increasing risk, and fatal consequences; and unknown risk, which is associated with unobservability, novelty, unknown exposure, unknown to science, and delayed consequences (Slovic, 1992; Slovic, 2004). Two other factors have also been identified in individual studies: number of people exposed (Slovic et al., 1980/2000), and severity of consequences (Fischhoff et al., 2000). The consistent finding, however, is that the factor dread risk has been the best predictor of the overall perceived risk of a hazard (Fischhoff et al., 2000; Slovic, 1992, Slovic, 2004; Slovic et al., 1979/2000; Slovic et al., 1980/2000). Identifying the importance of dread and its impact on perceptions of risk is a valuable contribution of risk research in general and the psychometric paradigm in particular.

The identification of two primary factors that qualitatively described hazards has allowed risk researchers to map out a number of hazards in two-factor space. Such taxonomy is useful for two purposes. The first value is that it accounts for differences in risk perceptions across hazards (Slovic, 1987). In fact, the perceived risk of a hazard is related to its position in the two-factor space (Slovic, 1992, Slovic, 2004; Slovic et al., 1979/2000; Slovic et al., 1980/2000). The second value is that it accounts for discrepancies between lay and expert estimates of risk (Slovic, 1987). While lay perceptions of risk are consistently tied to dread risk, expert ratings are not (Slovic, 1992).

In sum, the psychometric paradigm is research methodology derived from the assumption that risk is subjective and that qualitative features of hazards will be linked to perceptions of risk. Numerous qualitative features (dimensions) have been studied; some are consistently related to risk and some are not. One of the most relevant features to
terrorism hazards is signal value. These dimensions can also be reduced to underlying factors—dread and unknown risk. These two factors allow the hazards to be mapped on a Cartesian plane. The location of each hazard is useful for understanding how it is perceived. This paradigm provides a promising set of techniques with which to better understand attitudes toward terrorism.

*The Psychometric Paradigm and Specific Hazards*

While most psychometric studies examine many different hazards, the paradigm can be adapted to accommodate an in-depth study of one hazard. Single hazard domains have been studied using the psychometric paradigm, and they too can be represented in two-factor space, where position is predictive of perceived risk (Slovic, 1987). Slovic (1992) examined attitudes toward unwanted land uses, and also provided several examples hazards that have been studied using psychometric techniques to specific hazards, such as automobile structural defect (Slovic, MacGregor, & Kraus, 1987), railroad accidents (Kraus & Slovic, 1988), automobile subsystem failures (MacGregor & Slovic, 1989), and medicines (Slovic, Kraus, Lappe, Letzel, & Malmfors, 1989). While in these studies risk dimensions were reducible into factors, the factors did not always match those found in multiple-hazard studies. For example, the factors that were observed for automobile subsystem defects were “foreseeable” and “severe, uncontrollable damage” (Slovic et al., 1987). Given the nature of the hazard, these factors are more logical than dread risk and unknown risk. The psychometric paradigm has been successfully applied to single hazards. Slovic (1992) cautioned against representing complex events as a single homogenous data point. While terrorism has been included as
a single hazard in past psychometric studies, the complexity and relevance of terrorism in today’s society merits an empirical exploration of terrorism as the entire hazard space.

**Conclusion**

The study of attitudes toward terrorism is a vital psychological endeavor in the post-9/11 world. Fortunately, much work has been done, and the resulting literature provides a great deal of insight into how people respond to terrorism and other threats of violence (e.g. Brown et al, 2002; Miller & Heldring, 2004; Snyder & Park, 2002; Sprang, 2003). Unfortunately, most of the empirical work has focused on responses to past terrorist incidents, and have looked mainly at personal factors that are related to such response (e.g. Ford, 2004; Grothberg, 2004; Miller & Heldring, 2004; Muldoon, 2003). However, because each terrorist attack evokes anger and resolve, terrorists primarily achieve their goal of fear and intimidation through the threat of future attacks rather than the occurrence of previous ones. From a psychological perspective, the terrorism that has not yet happened is as important as the terrorism that just happened.

Terrorism’s future-orientation highlights the importance of understanding how people respond to threats as well as to actual incidents. The best psychological approach to such attitudes is through the field of risk. Risk is based on judgments, and thus is psychological in nature. The psychological study of risk provides insight into how people view various threats, and therefore informs predictions about how people will react to the threat of terrorism. The psychometric paradigm specifically offers a valuable methodology to explore which features of a terrorist incident drive psychological perceptions and reactions to that incident. Both Sjoberg (2004) and Slovic (2002) suggest that risk perception methodology should be used to study attitudes toward terrorism.
Terrorism has become a driving cultural and political force. More specifically, the threat of terrorism has become a driving cultural and political force. Credible threat is the currency of terrorist organizations. An organization that cannot threaten and be taken seriously has no power to change attitudes and behaviors. Because the power of terrorism comes from such threats, controlling risk has taken on national significance, with an entire cabinet-level department, as well as local and state-wide partner agencies, devoted to managing (and hopefully reducing) risk. However, these agencies cannot properly reduce risk without first understanding how risk is perceived. Because of the United States’ political structure, public attitudes toward terrorism occupy a pre- eminent place in establishing government priorities. It is essential that psychologists develop empirically tested knowledge about how these attitudes are constructed, how they change across time, and how they impact behavior. The literature reviewed here provides essential progress toward understanding terrorism attitudes, and outlines a promising framework for continuing that progress.
CHAPTER III

STUDY 1: EVENT FEATURES AND TERRORISM EVENTS

Introduction

As discussed in the introduction, this dissertation was designed to examine how event features—the objective characteristics of an act of terrorism, impact responses. A list of several dozen such features could easily be constructed; however, methodological considerations dictate that a small subset of important features must be selected from the set of all possible features. Unfortunately, previous literature offered no empirical insight into which features should be manipulated. Study 1 was designed to address this concern. Study 1 met the first purpose of this dissertation: to identify which event features are of greatest import for terrorism. Once a small group of event features could be empirically identified as the most salient, systematic manipulations could be designed for further studies.

For Study 1, participants grouped attacks into subjective categories, and also rated the same attacks based on how serious they thought the each attacks was. The criteria used to group the attacks, the number of times attacks were placed in the same category, and the seriousness rating of each attack was the variable of interest. In addition, objective characteristics of each attack were examined to determine which ones, if any, were related to subjective perceptions. Because of the exploratory nature of this study, no
specific hypotheses were tested. In fact, no past studies offered any predictions regarding which event features would be most salient.

**Method**

**Participants**

One hundred fifteen University of New Hampshire undergraduates participated in this study (21 males, 93 females), and were randomly assigned either to a categorization task (n = 39) or a rating task (n = 76). Ages ranged from 18-23 (M = 19.9, SD = 1.0). Participants were Caucasian (n = 103), Hispanic (n = 5), Asian (n = 3), and African American (n = 2). In response to religious identification, participants indicated Catholic (n = 51), Protestant (n = 12), “Christian, non-denominational” (n = 10), Muslim (n = 1), “none” (n = 30), and “other” (n = 10). One hundred nine indicated that they were U.S. citizens, and most lived in the northeast United States (n = 113). Participants received partial course credit for their participation.

**Materials**

Forty-nine terrorist attacks were selected from the U.S. State Department’s International Information Program’s (2001) list of terrorist attacks (Appendix A). Low-publicity incidents were selected, and all incidents were changed to exclude specific names and dates. However, titles (e.g. Ambassador) and countries were retained, because target and location were considered to be possible salient features. Each attack was presented on an index card. Participants in the categorization task were given a stack of all 49 cards, and were also given a blank card on which to write brief descriptions of each category.
Participants in the rating task were presented with each attack and asked to assign a rating of 0-100 based on seriousness, where 0 indicate “not at all serious,” and 100 indicated “extremely serious.” Participants were given one additional attack as a reference point, and were told that this reference attack had a value of 50.

**Procedure**

*Categorization task.* Participants for the categorization task participated in groups of 5. Upon arrival, participants were asked to sign an informed consent sheet, and then were presented with instructions and the index cards. Each participant received an entire stack of cards. They were instructed to divide their stack into 3-7 categories. The exact number of categories, and the composition of each category, was explicitly left to their discretion. They were asked only to describe each category briefly on their blank answer card. Upon completion of the task, participants were given a debriefing and dismissed.

*Rating task.* Participants in the rating task signed up to participate in groups of 20 with no knowledge of the topic or procedures of the study. Upon arrival, each participant filled out an informed consent sheet, and was then instructed to rate each attack. Upon completion of the survey, participants were given a debriefing and dismissed.

**Results**

*Frequency Analysis*

The criteria used in the categorization task to divide the cards are listed in Table 2. It should be noted that most participants used multiple criteria to divide their stacks of cards, so the totals exceed the number of participants. The common criterion was type of attack, which was used in some way by more than half the participants. Other common
criteria were suicide vs. non-suicide ($n = 11$), number of victims ($n = 11$), and type of target ($n = 10$).

Table 2

**Sorting Criteria: Past Terrorism Events (Study 1)**

<table>
<thead>
<tr>
<th>Sorting Criteria</th>
<th>Frequency</th>
<th>% of Participants (N=39)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Attack</td>
<td>23</td>
<td>59.0</td>
</tr>
<tr>
<td>Suicide</td>
<td>11</td>
<td>28.2</td>
</tr>
<tr>
<td>Number of victims</td>
<td>11</td>
<td>28.2</td>
</tr>
<tr>
<td>Type of target</td>
<td>9</td>
<td>23.1</td>
</tr>
<tr>
<td>Type of victim</td>
<td>6</td>
<td>15.4</td>
</tr>
<tr>
<td>Motivation</td>
<td>5</td>
<td>12.8</td>
</tr>
<tr>
<td>Known perps</td>
<td>5</td>
<td>12.8</td>
</tr>
<tr>
<td>Victim nationality</td>
<td>4</td>
<td>10.3</td>
</tr>
<tr>
<td>Geographic location</td>
<td>2</td>
<td>5.1</td>
</tr>
<tr>
<td>Ratio dead/injured</td>
<td>2</td>
<td>5.1</td>
</tr>
<tr>
<td>Survivors</td>
<td>2</td>
<td>5.1</td>
</tr>
<tr>
<td>Perpetrators caught</td>
<td>1</td>
<td>2.6</td>
</tr>
<tr>
<td>Success of attack</td>
<td>1</td>
<td>2.6</td>
</tr>
<tr>
<td>Amount of planning</td>
<td>1</td>
<td>2.6</td>
</tr>
<tr>
<td>Amount of information given</td>
<td>1</td>
<td>2.6</td>
</tr>
</tbody>
</table>

**Multidimensional Scaling**

A co-occurrence matrix was devised in which each attack was paired with every other attack. A number was assigned to each pair—the number of times they were placed in different categories by a participant. These scores were converted into a distance measure (a higher score represented a greater distance between attacks) and entered into a Multidimensional Scaling (MDS) analysis. MDS is an iterative process by which a group of stimuli are arranged and rearranged until their spatial distances in Euclidean space.
correspond to the observed distances. (Non-Euclidean spatial representations are also possible, but were not used for these data.) Two dimensions were specified for this analysis. The two-dimensional solution is presented in Figure 1. As is evident from this figure, the attacks were grouped based on their type, which is a direct result of type of attack being used as the most common grouping variable.

Figure 1

*Multidimensional Scaling Analysis for Terrorist Attacks (Study 1)*

However, of greatest interest here are each attack’s dimensional coordinates. These coordinates were examined to see if either dimension could be related to some other characteristic of the attacks. All 49 attacks were assigned a score by the researcher based on eleven yes or no questions. These questions are listed in Table 3. If the answer was “yes,” the attack was given a score of 1. If the answer was “no,” the attack was given a score of 0. These binary scores were then correlated with each of the dimensions from the MDS analysis. Whether the attacks targeted a specific person, $r(48) = .47, p = .001$, and whether the perpetrators were caught, $r(48) = .36, p = .012$, were both significantly correlated with dimension 1. No correlations with dimension 2 were significant. From these correlations, and the qualitative assessment of the location of each type of attack in the two-dimensional space, dimension 1 appears to be related to the randomness of the attack, with targeted attacks located higher on the number line. A qualitative examination of dimension 2 suggests that perhaps it is related to the perpetrator having direct contact with the victim. The attacks above the abscissa, (groups 2 and 3, suicide bombings and kidnappings respectively) require personal contact between the attacker and the victim.

**Seriousness Ratings**

The binary coding from the eleven yes/no questions from the previous task were correlated with ratings of seriousness. These correlations are also presented in Table 3. Whether or not victims died, and whether or not the specific number of casualties was mentioned were both positively correlated with seriousness, as well as whether the attack was religiously motivated. Political motivation, specific mention of a terrorist group, and specific target were all negatively correlated with seriousness. It should also be noted that
dimension 1, which seemed to be related to the randomness of the attack, was also negatively correlated with seriousness.

Table 3

Correlations: Rating Task (Study 1)

<table>
<thead>
<tr>
<th>Question</th>
<th>Seriousness</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Were U.S. citizens involved?</td>
<td>-.24</td>
<td>.16</td>
<td></td>
</tr>
<tr>
<td>Did any of the victims die?</td>
<td>.67</td>
<td>***</td>
<td>-.23</td>
</tr>
<tr>
<td>Did the summary specify the number of killed and/or injured?</td>
<td>.52</td>
<td>***</td>
<td>-.19</td>
</tr>
</tbody>
</table>
| Were the perpetrators known?                                             | -.14        | .36| *
| Were the perps caught?                                                   | .13         | -.06|
| Did the perps die?                                                       | .12         | -.19|
| Was it religiously motivated?                                            | .32         | * | .04 |
| Was it politically motivated?                                           | -.35        | * | .14 |
| Was a specific terrorist organization mentioned?                         | -.36        | * | .03 |
| Did the attack target specific persons?                                  | -.32        | * | .47**|

*Note: N = 49; seriousness was correlated with Dimension 1, r = -.29**. *p < .05; **p < .01; ***p < .001

Discussion

Several general conclusions can be drawn from these results. First, type of attack was the most salient feature of a past terrorist incident. The type of attack was used by 59% of participants to divide attacks into categories. Characteristics that also seem important from the categorization results are whether or not the attack was a suicide attack, how many people were killed or injured, and the type of target being attacked. But the type of attack was used much more often than any other characteristic to compose categories of attacks.
Second, randomness was an important variable in how terrorist attacks were grouped. The MDS spatial representation seemed to be related to whether the attacks were random or targeted, and ratings of seriousness were also correlated with this factor. Whether the perpetrators were known was also related to the MDS analysis, and could arguably be a measure of how random an attack appears to an observer. These results indicate that targeted attacks are seen as less serious than random attacks, and that random types of attacks may be seen as more similar to each other than targeted attacks.

Third, one significant correlation that deserves further attention is the positive correlation between religious motivation and seriousness. This correlation can be accounted for in several ways. Perhaps the attacks of 9/11 produced a schema of terrorism in which religious terrorism is more serious. Perhaps politically motivated terrorism (such as is common in Israel) is viewed as justifiable, whereas religiously motivated terrorism is not. Perhaps the religiously motivated attacks in the sample were actually more serious in terms of how many people were involved or the scale of the violence.

Study 3 will manipulate some of these event features to determine how they impact responses to terrorism events. However, one more pilot study was completed first, to determine the salient features of potential terrorism.
CHAPTER IV

STUDY 2: EVENT FEATURES AND POTENTIAL TERRORISM

Introduction

One of the distinctions that drove the design and implementation of this dissertation was the difference between responses to past attacks and responses to future attacks. While Study 1 successfully identified a group of salient features for past attacks, a separate study was needed to identify the salient features of potential attacks. The primary reason that the findings from Study 1 could not be applied to potential terrorism is that much less is known about events that have not yet happened. If an event has not occurred, then the number of victims or the death of the attacker cannot be known. The salient features of terrorist threats must be determined separately from the salient features of terrorist attacks. Study 2 fills this gap. It further addressed the first purpose of this dissertation: narrowing down the list of event features to be manipulated in future studies.

The purpose of Study 2 was to determine which event features were most salient to observers for potential terrorist attacks. Once these features were identified, a new set of threats were fabricated in which the relevant features are known quantities. Salient features were identified by examining the criteria used to sort a group of potential terrorist attacks into categories. As with Study 1, Study 2 was primarily exploratory, and no specific hypotheses were tested. However, based on the findings from Study 1, type of
attack was expected to be used most often as a sorting criterion. Type of target was also expected to be commonly used to sort the scenarios.

Method

Participants

Forty-seven University of New Hampshire undergraduate students were used for Study 2. Demographic data was not collected. Students participated in groups of five. Participants were given partial course credit for their participation.

Materials

Participants were given a stack of 4x6 index cards. Each card contained a possible terrorist attack. These attacks were selected and adapted from Cockerham (n.d.). The complete list of stimuli is included in Appendix B. Participants were also given a blank index card on which to write their category descriptors.

Procedures

Participants signed up for the study and were given a place and time. Upon arrival, each participant was asked to read and sign an informed consent sheet. After agreeing to participate, participants were asked to sort their cards into categories. Participants were instructed to use between 2 and 7 categories, and to decide for themselves what categories to use and which cards to place in each category. They were also asked to give a brief description of each category when they were finished. Upon completion of the task, they were given a debriefing form and dismissed.

Results

A research assistant independently examined the descriptors provided by each participant and identified the criteria used to compile the categories. The investigator
tallied how many times each criterion was used. The results are presented in Table 4. It should be noted that many participants used multiple criteria to distinguish one category form another, so the totals do not sum to 49. The criterion most often used was the type of weapon used for the attack ($n = 27$), followed by the disruptiveness of the attack ($n = 20$). Other common criteria were the number of people affected ($n = 11$), type of people affected ($n = 10$), and type of damage caused ($n = 10$). From these results it is apparent that the type of weapon used in an attack and the level of disruption are the most salient features of a potential terrorist attack. Both of these features will be used as event features for Study 4.

Table 4

*Sorting Criteria: Potential Terrorist Attacks (Study 2)*

<table>
<thead>
<tr>
<th>Sorting Criteria</th>
<th>Frequency</th>
<th>% of Participants (N=49)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weapon used</td>
<td>27</td>
<td>55.1</td>
</tr>
<tr>
<td>Level of disruption</td>
<td>20</td>
<td>40.8</td>
</tr>
<tr>
<td>Number of people affected</td>
<td>11</td>
<td>22.4</td>
</tr>
<tr>
<td>Type of people affected</td>
<td>10</td>
<td>20.4</td>
</tr>
<tr>
<td>Type of damage</td>
<td>10</td>
<td>20.4</td>
</tr>
<tr>
<td>Level of psychological damage</td>
<td>5</td>
<td>10.2</td>
</tr>
<tr>
<td>Type of target</td>
<td>4</td>
<td>8.2</td>
</tr>
<tr>
<td>Likelihood of occurrence</td>
<td>3</td>
<td>6.1</td>
</tr>
<tr>
<td>Threatened vs. actual attack</td>
<td>3</td>
<td>6.1</td>
</tr>
<tr>
<td>Level of actual damages</td>
<td>3</td>
<td>6.1</td>
</tr>
<tr>
<td>Sophistication</td>
<td>2</td>
<td>4.1</td>
</tr>
</tbody>
</table>
Discussion

Once again the type of weapon was used more often than any other feature, which is consistent with Study 1, as well as with Slovic and Burns’ (2006) examination of event features. However, disruptiveness did not emerge as a categorization criteria in Study 1. Two possible explanations can be offered. First, the attacks in Study 1 were primarily in foreign countries (to avoid any participant’s personal familiarity from becoming a confounding variable), which may have led participants to not consider the impact it would have on the people nearby. Second, the characteristic of disruptiveness might only have been important for potential events, and not for events that have already happened. For past events, the status quo has already changed (and perhaps changed back), so this change is not salient. For future events, the disruption of the status quo is still an important consideration.

The use of disruptiveness to classify potential terrorist attacks is consistent with the risk literature, which finds that people use subjective qualitative evaluations when analyzing and responding to risks (Slovic 1992). However, in these risk studies, disruptiveness itself was not measured as one of the subjective dimensions of risk.

Study 2 identified type of weapon and level of disruptiveness as the most salient grouping features of potential terrorist events. Type of weapon will be manipulated for Studies 3 through 5, which will examine how these features relate to subjective ratings of risk. For this purpose, a new set of attacks were fabricated in which the type of weapon is a known factor. Level of disruptiveness will be used as a response variable.

Taken together, Studies 1 and 2 provided a good empirical basis for the next three studies. Type of weapon, type of target, number of victims, presence of suicide, and
judgments of disruptiveness are all important variables for understanding responses to terrorism. These variables will be considered further in the following three studies.
CHAPTER V

STUDY 3: EVENT FEATURES AND INDIVIDUAL CHARACTERISTICS

Introduction

Study 3 was the first of the five studies that addressed the second purpose of this dissertation: to quantify the impact of event features on responses to terrorism. In addition, it also addressed purpose three: to identify natural groupings within the set of response variables. Finally, it addressed purposes four and five: examining the relations among individual characteristics, event features, and responses to terrorism events.

For this study a series of hypothetical terrorist attacks were fabricated, which differed on the event features identified in Study 1: type of weapon, type of target, number of victims, and suicide/non-suicide attackers. A number of individual characteristics were measured, including gender, tolerance for terrorism, fear and perceived risk of terrorism, adaptive behaviors, and political ideology. The predictive value of the event features and the individual characteristics were evaluated and compared.

Individual Characteristics and to Responses to Terrorism

Previous studies have found that individual characteristics such as age (Ford, 2004), gender (Shaw, 2003), family structure (Sprang, 2003), ethnicity (Miller & Heldring, 2004), media use (Snyder & Park, 2002), and coping strategies (Sprang, 2003)
are related to how people react to terrorist events. Study 3 will measure gender, tolerance for terrorism, fear of terrorism, perceived risk of terrorism, adaptive behaviors, political ideology, and media use, to determine which of these, if any, are predictors of various responses to terrorist scenarios.

Several of these individual characteristics have been linked to responses to terrorism, so a particular result can be predicted. For gender, researchers have found that women tend to have a stronger fear and sadness reactions, whereas men tend to have a stronger anger reaction (Hoffner et al., 2002). The Gender Hypothesis predicted that men would score lower on fear, and higher on anger, than women. Media consumption of news has been linked to a stronger fear reaction to terrorist events (Brown et al., 2002), but that was specifically news regarding the event in question. Because the events in this study are completely hypothetical, there is no news coverage. However, information seeking should be positively related to fear responses. The Information Seeking Hypothesis predicted that participants who scored higher on information seeking after a terrorist event would also score higher on fear responses. Tolerance for terrorism has not been linked to reactions to a specific terrorist event, but anecdotal evidence suggests the Tolerance Hypothesis: participants who scored higher on tolerance of terrorism as political expression were predicted to be less angry, and that they would judge specific events as less serious.

Event Features and Responses to Terrorism

Studies 1 and 2 established that type of attack, number of victims, presence of suicide, type of target, and level of disruptiveness were salient features of terrorist attacks. In addition, Slovic and Burns (2006) found that type of attack, presence of
suicide, and type of victims were all related to judgments of risk, but that number of victims was not. This study manipulated type of attack, type of victim, number of victims, and presence of suicide, and also controlled for disruptiveness, to determine which of these variables, if any, impacted responses to terrorism. The Event Features Hypothesis predicted that type of attack, suicide, number of victims, type of target, and disruptiveness would all be related to ratings of seriousness. Presence of suicide and number of victims should be positively related to seriousness (Slovic & Burns, under review, also see Study 1); attacks on government targets should be judged less serious than attacks on civilian targets (Slovic & Burns, under review); finally, based on the findings of Study 2, attacks seen as more disruptive should also be judged as more serious.

Event Features vs. Individual Characteristics

The Individual Characteristics Hypothesis predicted that individual characteristics predict responses to terrorism after accounting for the impact of event features. While there is ample empirical evidence that both individual and event features are important to responses to terrorism, both types of variables have not been included in a single analysis.

Method

Participants

Two hundred fifty participants were recruited via the University of New Hampshire Psychology Department’s participant pool. This pool consists of undergraduate psychology students who agree to participate in return for partial course credit. Participants signed up for the study without knowledge of the topic or procedures. Participants received partial course credit for their participation.
One hundred seventy eight females and seventy-two males participated in this study. Ages ranged from 19 to 27 ($M = 20.2, SD = 1.2$). Racial composition was Caucasian ($n = 128$), Asian/Pacific Islander ($n = 5$), Black/African American ($n = 3$), Hispanic/Latino ($n = 2$), mixed race ($n = 5$), and undisclosed ($n = 7$). Religious identifications were Catholic ($n = 93$), no religion ($n = 85$), Protestant ($n = 30$), other Christian ($n = 25$), Jewish ($n = 5$), atheist ($n = 6$), Unitarian ($n = 2$), and 1 each of Muslim, Hindu, agnostic, and pagan. Two participants were not United States Citizens, and were excluded from further analysis. The demographic composition of this sample, while relatively homogenous, was consistent with the Psychology Department’s participant pool.

**Materials**

*Event features.* The study was conducted using a survey format. The stimuli consisted of 40 terrorist scenarios (Appendix C). These scenarios consist of 5 types of attacks: conventional explosion, firearm, biological, chemical, and radioactive. The type of weapon was a within-subjects variable, so that each participant was asked for responses to a scenario for each level of weapon. Within each type of attack, eight separate conditions were used. These eight conditions varied based on presence of suicide (yes/no), type of target (government/civilian), and number of victims (several/several dozen). These features were between-subjects variables, so that each participant was randomly assigned to one of eight conditions (2x2x2 between-subjects design).

*Individual characteristics.* The individual characteristics were measured using a variety of scales. A standard set of demographic questions were used, which measured age, gender, ethnic background, religion, residence, citizenship, and political ideology.
However, because of sample characteristics, it was expected that some of these characteristics would not have enough variance to be used in the analyses.

Fear of terrorism, perceived risk of terrorism, and adaptive behaviors were measured using the Attitude Toward Terrorism Scale developed by Jenkin and Cohn (under revision). This scale consists of 33 separate statements, which participants agree with on a six-point Likert scale (1 = “Strongly Disagree”; 6 = “Strongly Agree”). The ATTS consists of items designed to measure emotional fear of terrorism (“When I see a low-flying plane, I worry that it might crash”), perceived risk of victimization (“I think that I live in a place that is a good target for terrorists”), and behaviors related to terrorism (“I have an emergency supply kit”). Behavioral items used a simple “yes”/”no” response option.

Tolerance towards terrorism was assessed using the terrorism attitudes scale developed by Takooshian and Verdi (1995). This scale was designed to measure a participant’s tolerance for terrorism as a form of political expression by responses to a series of statements (ex. “Sometimes terrorism is the only way for dissenters to resist an unjust system”) on a 6-point Likert scales responses (1 = “Strongly Disagree”; 6 = “Strongly Agree”).

Response variables. Participants were asked for a number of responses as if the scenarios were real. They were asked to what extent they thought that the event was a serious one. They were also asked to what extent they felt that the event would be harmful to direct and indirect victims. Disruptiveness was measured by asking participants to estimate how much the scenario would disrupt the activities of local and federal government, the local population, and themselves.
Information seeking was measured after each scenario by asking to what extent the participant would pay attention to and/or search out additional information about the scenario. Participants were asked to rate their answers on a Likert scale, where a higher score indicated a higher need for information. Each participant was also asked to indicate to what extent he/she would talk to others about each scenario.

Participants were also asked about their media consumption habits. Participants were asked how much they would support diplomatic and military retaliations to those responsible for the events. Finally, participants were asked for an estimate of the probability that the event would actually occur. The entire set of measures used in Study 3 is included in Appendix D. These measures were used in Studies 3 through 5. Table 5 shows the name and description of each major variable used in Studies 3, 4, and 5. Minor variables, such as emotional responses, are not included.

Table 5

Variables for Studies 3, 4, and 5

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Event features</strong></td>
<td></td>
</tr>
<tr>
<td>Type of weapon</td>
<td>Within-subjects variable with up to six levels: bomb, biological, chemical, chemical, firearm, nuclear (Study 5 only), and radiological</td>
</tr>
<tr>
<td>Type of target</td>
<td>Two levels: civilian target and government target</td>
</tr>
<tr>
<td>Presence of suicide</td>
<td>Two levels: suicide and non-suicide (Study 3 only)</td>
</tr>
<tr>
<td>Number of victims</td>
<td>Two levels: several deaths and several dozen deaths (Study 3 only)</td>
</tr>
<tr>
<td>Threat condition</td>
<td>Two levels: threat and attack (Study 4 only)</td>
</tr>
</tbody>
</table>
Table 5 (con’t)

*Variables for Studies 3, 4, and 5*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response variables</td>
<td></td>
</tr>
<tr>
<td>Severity judgments</td>
<td>Participant’s rating of seriousness, disruptiveness, and harmfulness for each scenario</td>
</tr>
<tr>
<td>Communication</td>
<td>Participant’s rating of the extent to which he/she would give and receive information about each scenario</td>
</tr>
<tr>
<td>Estimated probability of occurring</td>
<td>Participant’s rating of the probability that a given scenario would actually occur</td>
</tr>
<tr>
<td>Individual characteristics</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Participant’s self-identification as male or female</td>
</tr>
<tr>
<td>Tolerance of terrorism</td>
<td>An eleven item scale to measure the extent to which each participant agrees that terrorism is a legitimate form of political expression.</td>
</tr>
<tr>
<td>ATTS</td>
<td>A thirty-three item scale to measure the extent to which each participant is afraid of terrorism, or perceives a high risk of terrorism</td>
</tr>
<tr>
<td>News interest</td>
<td>A single-response item to measure how much each participant follows news related to homeland security issues (Study 5 only).</td>
</tr>
<tr>
<td>Subjective evaluations (Study 5 only)</td>
<td></td>
</tr>
<tr>
<td>Danger evaluations</td>
<td>For a given scenario, participant’s ratings of the risk to U.S. population, his/her own personal risk, the potential for catastrophe, and the extent to which the risk is increasing for a given scenario</td>
</tr>
<tr>
<td>Knowledge evaluations</td>
<td>For a given scenario, participant’s ratings of the extent to which experts know about the risk, the extent to which victims know they have been exposed, and the amount of control victims have over their consequences</td>
</tr>
</tbody>
</table>
Procedures

Participants signed up for the study in groups of 30. Upon arrival, each participant signed a consent form (which was kept separate from the surveys to protect confidentiality). After consenting, participants were given one of the eight survey conditions to complete. Each survey consisted of one scenario condition (for each of the five attacks), and the scales and items listed above. After completing the survey, participants were debriefed and dismissed. Male and female participants were run separately to ensure that each cell is filled proportionally with each gender.

Results

The Attitudes Toward Terrorism Scale demonstrated very high internal reliability, Cronbach's $\alpha = .93$. The Tolerance for Terrorism Scale had moderate reliability, $\alpha = .71$. Response variables for the biological scenarios were entered into a principal components factor analysis with a Varimax rotation. Factors with an Eigenvalue greater than one were retained. This analysis revealed that response variables “seriousness,” “harmfulness,” and “disruptiveness” all loaded onto one factor; these responses were combined into a “judgment of severity.” In addition, the four response items dealing with information seeking and sharing loaded onto a second factor; these were combined into a “communication” response variable. The support for military retaliation did not load onto either factor; support for diplomatic retaliation was not entered into the analysis due to a lack of variability. These factor loadings are presented in Table 6. Because this analysis was substantively replicated with other weapon scenarios, these response divisions are used for the remainder of the analyses.
Table 6

Factor Analysis: Response Variables (Study 3)

<table>
<thead>
<tr>
<th>Response Variables</th>
<th>Component Loadings</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Severity</td>
<td>Communication</td>
<td>Communality</td>
</tr>
<tr>
<td>Disruption of U.S. population</td>
<td>.72*</td>
<td>.29</td>
<td>.61</td>
</tr>
<tr>
<td>Disruption of Federal government</td>
<td>.71*</td>
<td>.08</td>
<td>.52</td>
</tr>
<tr>
<td>Harmful to U.S. population</td>
<td>.70*</td>
<td>.18</td>
<td>.53</td>
</tr>
<tr>
<td>Harmful to local area</td>
<td>.69*</td>
<td>.21</td>
<td>.52</td>
</tr>
<tr>
<td>Disruption of local government</td>
<td>.67*</td>
<td>-.02</td>
<td>.45</td>
</tr>
<tr>
<td>Seriousness</td>
<td>.66*</td>
<td>.24</td>
<td>.49</td>
</tr>
<tr>
<td>Disruption to local area</td>
<td>.63*</td>
<td>.15</td>
<td>.41</td>
</tr>
<tr>
<td>Disruption to respondent</td>
<td>.57*</td>
<td>.38</td>
<td>.48</td>
</tr>
<tr>
<td>Try to talk to others</td>
<td>.17</td>
<td>.86*</td>
<td>.77</td>
</tr>
<tr>
<td>Seek information</td>
<td>.24</td>
<td>.81*</td>
<td>.71</td>
</tr>
<tr>
<td>Willing to talk to others</td>
<td>.04</td>
<td>.78*</td>
<td>.63</td>
</tr>
<tr>
<td>Pay attention to information</td>
<td>.43</td>
<td>.74*</td>
<td>.74</td>
</tr>
<tr>
<td>Support military retaliation</td>
<td>.50</td>
<td>.28</td>
<td>.33</td>
</tr>
</tbody>
</table>

% of variance explained 29.01 24.73
Internal reliability .85 .86

Note. * factor loading > .50; Factors with Eigenvalue > 1 were retained.

Individual Characteristics and Responses to Terrorism

Gender Hypothesis. The Gender Hypothesis predicted that women would score higher on fear, and that men would score higher on anger. Independent-sample t-tests were conducted to determine if men and women scored differently on these responses. For fear, \( t(240) = 6.78, p < .001 \), with women demonstrating a significantly higher fear response than did men. For anger, \( t(239) = 1.99, p = .048 \), also with women scoring significantly higher than did men. The Gender Hypothesis is only partially supported: women did score higher than men on fear, which was predicted, but they also scored higher than men on anger, which was the opposite of what was predicted.
**Communication Hypothesis.** This hypothesis predicted that higher scores on the fear response would be positively correlated with higher ratings on interpersonal communication. Based on the factor analysis discussed above, the four survey items that dealt with information seeking and information sharing were combined into one “communication” item for each attack. The four interpersonal communication items had strong reliability, Cronbach’s $a = .93$, so they were combined for this analysis (due to a ceiling effect, radiological attacks were excluded). The overall interpersonal communication variable was Winsorized to account for outliers. The correlation between overall interpersonal communication and fear response was significant, $r(241) = .42, p < .001$, and in the expected direction. This result indicates that higher levels of fear are associated with higher levels of interpersonal communication, and is consistent with the hypothesis.

**Tolerance Hypothesis.** This hypothesis predicted that tolerance for terrorism would be negatively related to anger and severity judgments. Severity was computed by combining the severity scores (from the factor analysis discussed above), with the exception of the radiological attack scores, which showed a ceiling effect (for the severity ratings, Cronbach’s $a = .85$).

The correlation matrix showed that anger, $r(236) = -.33, p < .001$ and severity, $r(234) = -.16, p = .014$, were both significantly correlated with tolerance toward terrorism, even after a Bonferroni correction ($a = .05/2 = .025$). Both correlations were in the expected direction, indicating that as tolerance toward terrorism increased, anger responses and judgments of seriousness both decreased.
**Event Features Hypothesis: Event Features Will Be Related to Responses to Terrorism**

*Event features and judgments of severity.* A 4x2x2x2 Mixed ANOVA was used to test for effects of event features on judgments of severity (see Table 7). There was a main effect for weapon, $F(3, 643) = 28.33, p < .001, \eta^2 = .11$; there was also a main effect for type of target, $F(1, 231) = 4.16, p = .043, \eta^2 = .02$. An examination of the means showed that attacks on government targets were considered more severe than attacks on civilian targets (Figure 2). Planned comparisons revealed that bomb attacks were rated as more severe than all other attacks, and that firearm attacks were rated as less severe than all other attacks. However, biological and chemical attacks showed no significant difference.

**Table 7**

*Means: Judgments of Severity (Study 3)*

<table>
<thead>
<tr>
<th>Weapon</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>25.59b (10.60)</td>
</tr>
<tr>
<td>Bomb</td>
<td>29.28a (10.67)</td>
</tr>
<tr>
<td>Chemical</td>
<td>25.20b (10.39)</td>
</tr>
<tr>
<td>Firearm</td>
<td>23.55c (11.91)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civilian</td>
<td>24.89a (9.55)</td>
</tr>
<tr>
<td>Government</td>
<td>27.17b (8.52)</td>
</tr>
</tbody>
</table>

*Note.* Means with the same superscript were not significantly different, $p < .05$
Figure 2

*Main Effect of Weapon on Judgments of Severity (Study 3)*

![Bar graph showing main effect of weapon on judgments of severity. The x-axis represents different types of weapons: Biological, Bomb, Chemical, Firearm. The y-axis represents severity judgments. The graph shows that Bomb has the highest severity judgments, followed by Biological, Chemical, and Firearm.]({attachment2})

Figure 3

*Main Effect of Target on Judgments of Severity (Study 3)*

![Bar graph showing main effect of target on judgments of severity. The x-axis represents different types of targets: Civilian, Government. The y-axis represents severity judgments. The graph shows that Government has higher severity judgments than Civilian.]({attachment3})
Event features and communication. An ANOVA was also used to test for effects of event features on communication responses (see Table 8). For communication, there was a main effect for weapon, $F(3, 723) = 11.71, p < .001, \eta^2 = .05$. There was a significant interaction for weapon and target, $F(3, 723) = 3.27, p = .021, \eta^2 = .01$. Figure 4 indicates that for bomb attacks, there was no difference between government and civilian targets, but that for the other three types of weapons, government targets fostered lower communication scores than did civilian targets. There was also a significant interaction for type of target and presence of suicide, $F(1, 241) = 4.52, p = 0.034, \eta^2 = .02$. Figure 5 indicates that there were higher communication scores for civilian attacks when suicide was present; when the attacker escaped, communication scores were higher for government attacks.
Table 8

Means: Communication (Study 3)

<table>
<thead>
<tr>
<th>Weapon</th>
<th>Target</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>Civilian</td>
<td>18.48 (4.11)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>17.44 (4.99)</td>
</tr>
<tr>
<td>Bomb</td>
<td>Civilian</td>
<td>18.73 (4.54)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>18.85 (5.01)</td>
</tr>
<tr>
<td>Chemical</td>
<td>Civilian</td>
<td>18.26 (4.50)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>17.30 (5.10)</td>
</tr>
<tr>
<td>Firearm</td>
<td>Civilian</td>
<td>17.91 (4.47)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>17.47 (5.23)</td>
</tr>
<tr>
<td>Suicide</td>
<td>Target</td>
<td></td>
</tr>
<tr>
<td>Suicide</td>
<td>Civilian</td>
<td>18.69 (3.37)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>16.97 (4.50)</td>
</tr>
<tr>
<td>No suicide</td>
<td>Civilian</td>
<td>18.00 (4.78)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>18.60 (4.41)</td>
</tr>
</tbody>
</table>

Note. Significant interactions for weapon x target and for suicide x target, $p < .05$
Figure 4

*Weapon by Target Interaction on Communication (Study 3)*

![Bar graph showing the interaction between weapons and targets on communication in Study 3.](image)

- Biological
- Bomb
- Chemical
- Firearm

Legend:
- □ Civilian
- □ Government

Figure 5

*Presence of Suicide by Target Interaction on Communication (Study 3)*

![Bar graph showing the presence of suicide by targets in Study 3.](image)

- Suicide
- No suicide

Legend:
- □ Civilian
- □ Government

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Event features estimated probability. An ANOVA was also used to test whether estimated probabilities were affected by event features (see Table 9). The results for the dependent variable of estimated probability that the scenarios would actually occur showed only a significant main effect for weapon, $F(4, 948) = 29.30, p < .001, \eta^2 = .11$ (Figure 6). The number of victims, type of target, or presence of suicide did not impact estimated probability. Planned post hoc comparisons revealed that the firearm attack was seen as most probable, followed by bomb attacks, then biological and chemical attacks, then radiological attacks. All differences were significant except for the difference between biological and chemical attacks.

Table 9

Means: Estimated Probability (Study 3)

<table>
<thead>
<tr>
<th>Weapon</th>
<th>$M$ (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>42.73° (25.49)</td>
</tr>
<tr>
<td>Bomb</td>
<td>46.70b (24.60)</td>
</tr>
<tr>
<td>Chemical</td>
<td>41.42c (23.62)</td>
</tr>
<tr>
<td>Firearm</td>
<td>50.02a (23.37)</td>
</tr>
<tr>
<td>Radiological</td>
<td>38.44d (24.66)</td>
</tr>
</tbody>
</table>

Note. Means with the same superscript were not significantly different, $p < .05$
Individual Characteristics vs. Event features (Individual Characteristics Hypothesis)

The following analyses address the issue of whether the manipulated event features or the measured individual characteristics had a stronger relation with the dependent variables of severity, communication, and probability. For individual characteristics, gender, Attitudes Toward Terrorism Scale (ATTS; fear and perceived risk were combined for the regression because of their moderate intercorrelation), and Tolerance for Terrorism were included.

Judgments of severity. Linear regression models were used to evaluate the joint impact of event features and individual characteristics on judgments of severity. Because level of weapon was a within-subjects design, and could not be included in the model,
this factor was controlled by doing a separate regression for each level of weapon. Target was entered as a binary variable, and the individual characteristics were entered on the same step. After a Bonferroni adjustment ($\alpha = .05/4 = .013$), the ATTS was significant for both firearm and bomb attacks. These results indicate that fear and perceived risk of terrorism are significant after predictors of severity for some attacks, even after controlling for the event features of the attacks.

Table 10

$\beta$’s for Series of Regressions: Judgments of Severity (Study 3)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Biological</th>
<th>Bomb</th>
<th>Chemical</th>
<th>Firearm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>.10 (.01)</td>
<td>.17* (.03)</td>
<td>.11 (.02)</td>
<td>.14 (.02)</td>
</tr>
<tr>
<td>ATTS</td>
<td>.12 (.01)</td>
<td>.22* (.04)</td>
<td>.17* (.03)</td>
<td>.18* (.03)</td>
</tr>
<tr>
<td>Tolerance</td>
<td>-.13 (-.02)</td>
<td>-.03 (.00)</td>
<td>-.05 (.00)</td>
<td>-.09 (.01)</td>
</tr>
<tr>
<td>Gender</td>
<td>.09 (.01)</td>
<td>.09 (.01)</td>
<td>-.04 (.00)</td>
<td>.06 (.00)</td>
</tr>
</tbody>
</table>

Model

| F (4, 221) | 3.82* | 5.63*** | 2.55 | 4.35* |
| R          | .25   | .30     | .21  | .27   |

Note. Values in parentheses are $r^2$. "ATTS" = Attitudes Toward Terrorism Scale. *$p < .013$ (Bonferroni adjustment); **$p < .01$; ***$p < .001$. 

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Communication. Regression models were also used to evaluate the joint impact of the event features and individual characteristics on communication responses. The regressions for communication included target and suicide on the first step, because these factors were significant in the ANOVA. The individual characteristics were gender, ATTS, and tolerance. The series of regressions were consistent (Table 11). In each model, ATTS was the only significant predictor of communication. These results indicate that the Attitudes Toward Terrorism Scale is an important predictor of communication following a terrorist attack, even when event features were controlled.

Table 11

β’s for Series of Regressions: Judgments of Severity (Study 3)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Biological</th>
<th>Bomb</th>
<th>Chemical</th>
<th>Firearm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target</td>
<td>-.11 (.01)</td>
<td>.01 (.03)</td>
<td>-.10 (.01)</td>
<td>-.05 (.02)</td>
</tr>
<tr>
<td>Suicide</td>
<td>.08 (.01)</td>
<td>.03 (.00)</td>
<td>.09 (.01)</td>
<td>.07 (.00)</td>
</tr>
<tr>
<td>ATTS</td>
<td>.26*** (.06)</td>
<td>.28*** (.07)</td>
<td>.24*** (.05)</td>
<td>.26*** (.06)</td>
</tr>
<tr>
<td>Tolerance</td>
<td>-.07 (.00)</td>
<td>-.01 (.00)</td>
<td>-.03 (.00)</td>
<td>-.06 (.00)</td>
</tr>
<tr>
<td>Gender</td>
<td>.01 (.00)</td>
<td>.04 (.01)</td>
<td>.00 (.00)</td>
<td>.00 (.00)</td>
</tr>
</tbody>
</table>

Model

<table>
<thead>
<tr>
<th></th>
<th>F (5, 222)</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.18***</td>
<td>.32</td>
</tr>
<tr>
<td></td>
<td>4.11**</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td>4.19**</td>
<td>.29</td>
</tr>
<tr>
<td></td>
<td>4.34**</td>
<td>.30</td>
</tr>
</tbody>
</table>

Note. Values in parentheses are \( r^2 \). "ATTS" = Attitudes Toward Terrorism Scale. *\( p < .013 \) (Bonferroni adjustment); **\( p < .01 \); ***\( p < .001 \).
**Estimated probability.** A series of regression was also used to test whether individual characteristics were significant predictors of estimated probability of occurrence, after accounting for event features. In the ANOVA, only weapon had a significant main effect; this factor was controlled by performing a separate regression for each type of weapon. No event features were entered into the regression models. The predictors were gender, tolerance of terrorism, and the fear portion of the ATTS (the perceived risk portion was excluded due to its similarity with probability estimates). Again, the results were consistent across levels of weapon (Table 12). Fear of terrorism was the only significant predictor for all four models. These results indicate that fear of terrorism is an important characteristic after accounting for the type of weapon.

Table 12

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type of Weapon Used</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biological</td>
<td>Bomb</td>
<td>Chemical</td>
<td>Firearm</td>
</tr>
<tr>
<td>Fear of Terrorism</td>
<td>.32*** (.09)</td>
<td>.40*** (.14)</td>
<td>.43*** (.17)</td>
<td>.38*** (.12)</td>
</tr>
<tr>
<td>Tolerance</td>
<td>-.09 (.01)</td>
<td>-.03 (.00)</td>
<td>-.07 (.01)</td>
<td>.02 (.00)</td>
</tr>
<tr>
<td>Gender</td>
<td>.06 (.00)</td>
<td>.04 (.00)</td>
<td>.02 (.00)</td>
<td>.00 (.00)</td>
</tr>
</tbody>
</table>

**Model**

| F (3, 233) | 12.86*** | 16.27*** | 20.28*** | 12.52*** |
| R          | .38      | .42      | .46      | .37      |

*Note.* Values in parentheses are $r^2$. *p < .013 (Bonferroni adjustment); **p < .01; ***p < .001.
Discussion

Individual Characteristics and Responses to Terrorist Scenarios

The Gender Hypothesis was only partially supported: females did score higher on fear responses than did males, as predicted, but females also scored higher on anger responses, which was the opposite of the prediction. These results only partially replicate findings from Hoffner, et al (2002) and Shaw (2003), who found that men scored higher on anger than did women. There are a number of possible reasons for the discrepancies. First, both of the referenced articles dealt with actual terrorism, while this study used hypothetical scenarios. It is difficult enough to accurately identify an emotional state after it has passed; it is even more difficult to accurately identify an emotional state that is conditional on some future event. The extreme emotional responses seen in this study, and the small amount of variance in several of the responses, allow for the possibility that participants were identifying and personalizing stereotypical emotional reactions to the scenarios.

The Communication Hypothesis was supported; communication, including information seeking, was positively related to the fear response to the scenarios. This result supports Brown et al (2002), with one added benefit. Brown et al linked media consumption with fear, but it was just as likely that media consumption caused fear as that fear caused media consumption. In the current study it is still statistically impossible to draw either conclusion, but one direction does seem more logical than the other. Because this study did not measure actual media consumption, but rather measured predicted media consumption, it makes more sense that the fear response might lead to increased media consumption. It is less probable that hypothetical media consumption
would increase the hypothetical fear response. However, it must be reiterated that the statistical techniques used here can in no way imply such causality.

The Tolerance Hypothesis was also supported. While there was no previous empirical work on which to draw, it was predicted that tolerance for terrorism as a means of political expression would be negatively related to anger and seriousness. These relations were significant and in the hypothesized direction. These results provide the first empirical link between tolerance for terrorism and emotional, cognitive, and behavioral responses to terrorism. This construct, and its impact on responses to terrorism, is worth further empirical study.

Event Features and Responses to Terrorism

Judgments of severity. The impact of event features on responses to terrorism is complicated, and depends on the particular response being considered. For judgments of severity, both the type of weapon and the type of target had independent effects. Specifically, attacks on state capitol buildings were viewed as more severe than attacks on shopping malls. This result is contrary to Slovic and Burns (2006), who found that attacks were viewed as more serious if they had civilian targets. Two explanations seem probable. First, this study identified physical locations as the target, while Slovic and Burns identified groups of people as the target. It is possible that the government attacks in this study were viewed as more serious because they took place at a government location. The second reason is related: because of the loadings in the factor analysis, these results took into account judgments of harmfulness and disruptiveness when computing a seriousness score. Slovic and Burns used a more global assessment of seriousness, in which participants may not have explicitly considered harmfulness and
disruptiveness. Either of these differences, or both, may account for the contradictory results. Future research endeavors should look at different facets of “target,” including location and person.

Beside the main effect of target, weapon was also an important factor. Bomb attacks were seen as more severe than other weapons, and firearm attacks were seen as less severe than the other types of weapons. This is also contradictory to Slovic and Burns’ (2006) study, which found that biological attacks were viewed as more serious than bomb attacks. Slovic and Burns used a greater amount of detail in their stimuli than were used here. Study 4 used a more detailed account of biological versus bomb attacks. Those results should assist in the interpretation of this one.

*Communication.* This dependent variable revealed an interaction between weapon and target. Communication scores were higher for civilian target, except for bomb attacks, in which case the target did not matter. These results indicate a greater desire for information about civilian casualties, but this effect depends on the type of weapon used in the attack. Again, perhaps bomb attacks (especially on government locations) have a greater emotional salience that masks differences in communication due to target.

*Estimated probability.* As with severity, estimated probability of occurrence demonstrated a main effect for weapon only. Firearm attacks were viewed as most probable, followed by bomb attacks, then biological and chemical attacks, and finally by radiological attacks. This pattern seems fairly consistent with real-world occurrences of these types of attacks (with the possible exception that bombings may be more common than firearm attacks).
It should also be noted that the lack of any effect for the number of victims replicated Slovic and Burns (2006), who found that the number of victims was not a significant predictor of responses to hypothetical terrorist attacks.

**Individual vs. Event Features**

For each of the dependent variables of interest (severity, communication, and probability), fear and/or perceived risk of terrorism were significant predictors after controlling for the relevant event features. Obviously, many other individual characteristics were not measured and analyzed, and future studies should undertake empirical evaluations of many other such characteristics. However, it must be noted that the regression models were sometimes different based on which type of weapon was being responded to. These results do not validate the current emphasis on such demographic and psychographic variables in the literature. The type of weapon used in the attack can potentially affect the relative importance of individual characteristics.

The regression models used in Study 3 did not evaluate the impact of type of weapon along with the individual characteristics; they only controlled for it. It was left until Study 5 to evaluate the relative impact of this event feature, when subjective evaluations could also be included in the model.

A weakness of this third study is that the events are hypothetical. Many of the social factors that influenced the response to 9/11 or Oklahoma City, such as the grief of friends and neighbors, the bombardment of political speeches, and the minute-by-minute press coverage, are simply not present. These factors are extremely important to personal and community responses to terrorist events, and excluding them from the design of this study, while necessary, will certainly have an impact on the severity of the responses, if
not the character of the responses. Other weaknesses, which are shared by other studies proposed here, are discussed later.
CHAPTER VI

STUDY 4: RESPONSES TO THREATS AND ATTACKS

Introduction

Study 4 was designed to determine whether participants would respond differently based on whether an actual attack was part of the scenario, and it is the first empirical study to do so. Because the presence of an attack is an event feature, this study addressed the second purpose of this dissertation: to determine the effect of event features on responses to terrorism. Two hypotheses were tested for this study, that reactions to threats differ from reactions to attacks, and that reactions differ based on weapon used.

Differences Between Actual Attacks and Threats

As discussed above, no empirical work has been done that compares actual and threatened terrorist events. However, there should be differences. People respond differently to a threat than an actual attack, and this phenomenon should also apply to terrorism. The Threat Hypothesis predicted that attack scenarios would evoke higher levels of anger, lower levels of fear, higher judgments of severity, higher levels of communication, and lower judgments of likelihood than would the threat scenarios.

Differences Between Car Bombs and Infectious Disease Releases

This difference should be consistent with the Event Features Hypothesis from Study 1, which found that different types of attacks are viewed as distinct, as well as with
Slovic and Burns (2006), who found that infectious disease attacks were rated as more serious than explosions. Risk perception research has also found that negative consequences that take place over time (such as an epidemic) are viewed as more serious than negative consequences that occur at a specific point in time (such as an explosion) (Slovic, 2002). For Study 4, the Event Features Hypothesis predicted that the infectious disease scenario would be judged as more severe, and that it would evoke higher levels of communication than the bomb scenario.

Method

Participants

Seventy four participants were recruited via the University of New Hampshire Psychology Department’s participant pool. This pool consists of undergraduate psychology students who agree to participate in return for partial course credit. Participants signed up for the study without knowledge of the topic or procedures. Participants received partial course credit for their participation.

Of the original seventy-four participants, thirteen were excluded from the study for inconsistent data (see below). Forty-two females and nineteen males were actually included in the final data set. Ages ranged from 19 to 27 ($M = 20.2, SD = 1.2$). Participants included Caucasian ($n = 56$), Black/African American ($n = 2$), Hispanic/Latino ($n = 1$), and mixed race ($n = 2$). Religious affiliations included Catholic ($n = 22$), no religion ($n = 15$), Protestant ($n = 9$), other Christian ($n = 11$), Mormon ($n = 2$), Jewish ($n = 1$), and agnostic ($n = 1$). All participants were U.S. citizens. The demographic composition of this sample, while relatively homogenous, is consistent with the Psychology Department’s participant pool.
Materials

For this study, four scenarios were fabricated (Appendix E), which varied across two factors. One scenario was a car bomb, and the other was the release of an infectious disease. For each type of weapon, one scenario was presented as a credible threat, while the other scenario was presented as an attack. Participants received the same set of individual characteristics and response measures as in Study 3.

Procedure

After signing a consent form, participants were randomly given one of two surveys. One half of the participants were given the threat scenarios, and one-half were given the attack scenarios. After completing the survey, they were asked to identify (without looking back) if the scenarios were threat or attack scenarios. This question was asked as a manipulation check to determine if participants accurately perceived whether their scenarios were attacks or threats. Thirteen participants were not able to accurately identify their scenarios, and were excluded from the analyses.

Results

Threat Hypothesis

The Threat Hypothesis predicted that responses would be different for the threat scenarios than for the attack scenarios. A MANOVA was used to test whether the pattern of emotional responses was the same across the different event features. For the MANOVA, the emotional responses were the dependent variables of interest. However, several emotional measures were excluded for various statistical or procedural reasons. “Contempt” was excluded because many participants did not respond, and some indicated that they did not understand the definition. “Happiness” and “satisfaction” were excluded...
because of a lack of variability (all but one respondent marked the lowest possible value). “Confidence” was excluded because of a definite floor effect. Finally, “excitement” was excluded from the analysis because it was unclear whether students interpreted this as a general increase in energy levels (as intended) or a positive anticipation. For the MANOVA, then, the five dependent variables were fear, anger, anxiety, surprise, and frustration. However, the one-way MANOVA (with threat factor as the independent factor) showed no significant multivariate differences, Wilkes’ $A(5, 45) = .08, p = .610.$ An examination of the univariate analyses did not reveal any significant differences for any emotional response.

*Threat Hypothesis (continued) and Event Features Hypothesis*

As in Study 3, the Event Features Hypothesis predicted that event features would impact responses to terrorism. A 2x2 mixed-design ANOVA was conducted to determine if the event features affected judgments of severity. Weapon was entered as the within-subjects factor, and threat condition was entered as the between-subjects factor. The results revealed a main effect for type of weapon, $F(1, 49) = 10.23, p = .002, \eta^2 = .17$ (Table 13). There was no main effect for threat condition, nor was there a significant interaction. These results indicate that biological attacks were viewed as more severe than were bomb attacks (Figure 7).
Table 13

*Means: Judgments of Severity (Study 4)*

<table>
<thead>
<tr>
<th>Weapon</th>
<th>M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>36.85(^a) (8.63)</td>
</tr>
<tr>
<td>Bomb</td>
<td>32.79(^b) (9.03)</td>
</tr>
</tbody>
</table>

*Note.* Means with the same superscript were not significantly different, \(p < .05\)

Figure 7

*Main Effect of Weapon on Judgments of Severity (Study 4)*

An ANOVA was also used to test whether type of attack or threat condition impacted communication responses. For communication as the dependent variable, there was no main effect either for weapon or for threat condition. However, there was a
significant weapon by condition interaction, $F(1, 59) = 5.49, p = .022, \eta^2 = .09$ (Table 14). Communication ratings were higher for the biological threat, but lower for the biological attack (Figure 8). These results indicate that the communication pattern after a terrorist scenario depends on both the type of weapon and whether there is an actual attack present.

Table 14

*Means: Communication (Study 4)*

<table>
<thead>
<tr>
<th>Weapon</th>
<th>Condition</th>
<th>$M(SD)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>Threat</td>
<td>22.56 (2.97)</td>
</tr>
<tr>
<td></td>
<td>Attack</td>
<td>21.58 (3.89)</td>
</tr>
<tr>
<td>Bomb</td>
<td>Threat</td>
<td>21.59 (3.70)</td>
</tr>
<tr>
<td></td>
<td>Attack</td>
<td>21.75 (3.82)</td>
</tr>
</tbody>
</table>

*Note.* Significant interaction for weapon by condition, $p < .05$. 

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An ANOVA was also used to test for differences in estimated probability of occurrence based on type of weapon and threat condition. For estimated probability, a similar pattern was revealed as for severity. First, the estimated probability for disease scenarios was Winsorized to correct for outliers. The 2x2 mixed ANOVA yielded a main effect for weapon only, $F(1, 48) = 17.60, p < .001, \eta^2 = .27$, with bomb judged as more probable than infectious disease (Table 15, Figure 9). Neither threat condition nor the interaction term was significant. While bomb actions were viewed as more probable than disease actions, threats were not viewed as significantly more probable than attacks.
Table 15

*Means: Estimated Probability (Study 4)*

<table>
<thead>
<tr>
<th>Weapon</th>
<th>M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>38.16b (21.19)</td>
</tr>
<tr>
<td>Bomb</td>
<td>48.88a (22.32)</td>
</tr>
</tbody>
</table>

*Note.* Means with the same superscript were not significantly different, *p* < .05

Figure 9

*Main Effect of Weapon on Estimated Probability (Study 4)*

Discussion

Study 4 was the first empirical study to evaluate whether past and future attacks evoke different responses in observers. Given the importance of threats to the political goals of terrorist organizations (Long 1990), it is important to examine whether the threat

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or the attack produce the reactions that terrorist organizations desire. Study 4 replicated Slovic and Burns’ (2006) finding that infectious disease attacks were viewed as more severe than bomb attacks, and it extend that study by examining which other response variables are also impacted. This pattern of results is not consistent with those found in Study 3, which found that bombings were rated as more severe than diseases.

The most likely reason for this difference is some effect due to the level of information given. Study 4 offered a much more specific scenario than did Study 3, as did Slovic and Burns’ (2006) study that found the same effect. Such an effect should be examined in future research. Another, less likely reason is that the greater number of victims mentioned in the disease scenario drove the effect. This reason is less likely, because neither Study 3—which used moderate victim manipulations—nor Slovic and Burns—who used extreme victim manipulations—found an effect for number of victims. However, given the importance of the number of victims to the sorting task in Study 1, such an effect should not be ruled out.

As in Study 3, there was an interaction for communication response. This interaction indicated that communication ratings were higher for the biological scenario when it was a threat, but higher for the bomb scenario when it was an attack. It may be that the disease scenario was more relevant than the bomb scenario as threats, because exposure to biological threats is more controllable, and they have a potentially much larger geographical area of impact. However, as attack scenarios, a bombing has more information available as pictures, damage reports, etc., than does a spreading disease. This was the only result which suggested that threats are responded to differently than attacks are. Reasons for this lack of effects due to threat are discussed below.
There was also a significant main effect for estimated probability, with bombings rated as significantly more probable than biological scenarios. This result is not surprising, because terrorist bombings have actually occurred in the U.S. multiple times, while infectious disease attacks have only occurred once (anthrax in the fall of 2001), and are not generally seen as stereotypical of terrorist actions. This result is consistent with the estimated probabilities from Study 3.

Comparisons between threats and attacks were directly not significant for any of the tested dependent variables, and this lack of significance may be due to weaknesses inherent in the study. One weakness is the stimuli used. In order to directly compare responses, it was essential that the attack and the threat both present the same information. However, this is rarely the case. In most instances the level of specificity in a threat is much lower, and sometimes that threat is nothing more than a simple announcement of target or method. This unrealistic similarity among the scenarios may have masked any response differential that may exist in the real world.

Another problem that may have masked real differences between responses to threats and responses to attacks is the weakness of the manipulation. Because both the threat and the attack scenario are presented as hypothetical, participants may respond to them in a more similar way than if they were encountered in actuality. They may both be seen as hypothetical scenarios, rather than a hypothetical attack and a hypothetical threat. A manipulation check question was included, and incorrect surveys were excluded, but correct interpretation of the stimuli does not guarantee that participants responded as they would in a real situation.
Taken as a whole, the results from Study 4 seem to indicate that subjects were more sensitive to the weapon involved in a terrorist scenario than whether the scenario presented a threat or an attack. These results may be due to a hyper-sensitivity to threats, or to weaknesses inherent in the manipulations.
STUDY 5: INCLUDING SUBJECTIVE EVALUATIONS

Introduction

Study 5 was a replication and extension of Study 3. It was a replication in that the same individual characteristics and dependent variables were examined, as well as some of the same event features. These variables were subject to the same analyses used in the previous study. Study 5 extended Study 3 in two important ways. First, Study 5 used terrorism scenarios presented as threats rather than actual attacks. As threats, fewer event features could be manipulated, because less is known about an attack that might happen than an attack—even a hypothetical one—that has happened. For example, the number of victims, as well as the presence of suicide, cannot be known for a terrorist threat. Second, by using terrorist threats as the stimuli, this study can tap into the literature of risk perception, and examine which subjective characteristics of risk perception models are relevant to terrorism. Study 5 addressed purpose two: evaluating the impact of event features on responses to terrorism; as well as purposes four through seven; examining relations among event features, individual characteristics, and subjective evaluations of the scenarios.

The features most salient to terrorism threats (from Study 2) were the type of attack and the level of disruptiveness. Type of attack was manipulated at six levels:
explosions, firearms, biological, chemical, radioactive, and nuclear. In addition to type of attack, threats also varied across two levels of target—government and civilian. Disruptiveness was not varied as an event feature, but was instead included in the response variables.

The second set of variables was the subjective evaluations of each threat. The subjective evaluation of a threat has been found to be important predictors of response to that threat. Past research has identified several subjective characteristics that are consistently related to attitudes. These subjective characteristics were measured for each threat to determine which were related to the event features and/or the individual characteristics.

The third set of variables was the same individual characteristics used in Study 3. Study 5 examined how individual characteristics were related to subjective characteristics as well as the response variables.

The fourth set of variables was response to the terrorism threats. Study 5 used the same response variables as Study 3. These four sets of variables were examined in the following hypotheses.

*Individual Characteristics Will Be Related to Responses to Terrorism*

These findings should replicate the Gender Hypothesis, Communication Hypothesis, and Tolerance Hypothesis from Study 3: fear should be higher for women, anger should be higher for men, and information seeking should be related to fear.

*Individual Characteristics and Subjective Evaluations*

The relation between individual characteristics and subjective evaluations is one not well addressed in the risk literature. However, one significant and robust finding from
the risk literature is that men perceive overall risk to be significantly less than do women (Slovic, 1999). The "Risk Hypothesis" predicted that gender would be related to perceived risk, with men scoring lower than women.

Event Features Will Be Related to Responses to Terrorism

The same hypotheses from Study 3 were tested in this study. Specifically, there should be differences in seriousness among the types of attack, and type of target (both from the Event Features Hypothesis), with higher judgments of severity for attacks on civilian targets. Number of victims and presence of suicide were not manipulated here, because the stimuli represent potential attacks, for which this information would not be known.

Subjective Characteristics Will Account for the Relation Between Event Features and Responses to Terrorism

A primary assumption of the psychometric paradigm is that evaluations of a threat, rather than the threat itself, mediate responses (Slovic, 1992). If the psychometric paradigm does indeed apply to terrorist events, than changing event features should influence responses to hazards insofar as those changes alter the subjective qualitative evaluations of that hazard. The "Psychometric Hypothesis" predicted that subjective evaluations of terrorism would account for the impact of event features on responses to terrorism.

Method

Participants

Sixty participants were recruited via the University of New Hampshire Psychology Department’s participant pool. This pool consists of undergraduate
psychology students who agree to participate in return for partial course credit.

Participants signed up for the study without knowledge of the topic or procedures.

Participants received partial course credit for their participation.

Forty-one females and nineteen males participated in this study. Ages ranged from 19 to 24 ($M = 20.2$, $SD = 1.2$) Participants included Caucasian ($n = 58$), Black/African American ($n = 1$), and Hispanic/Latino ($n = 1$). Religious affiliations included Catholic ($n = 25$), no religion ($n = 17$), Protestant ($n = 6$), other Christian ($n = 8$), atheists ($n = 2$), Jewish ($n = 1$), and Christian Science ($n = 1$). All participants were U.S citizens. The demographic composition of this sample, while relatively homogenous, is consistent with the Psychology Department’s participant pool.

Materials

Twelve terrorist threat scenarios were fabricated for this study (Appendix F). These scenarios consisted of explosive, firearm, biological, chemical, radioactive, and nuclear terrorist attacks on both government and civilian targets. Participants were asked to rate each scenario on several subjective dimensions adapted from the risk perception literature (Appendix G). For each scenario, participants were asked to respond to the same items used in Study 3. Participants were also given the same individual characteristic items used in Study 3: demographics, media consumption, fear and perceived risk of terrorism, adaptive behaviors, and tolerance for terrorism.

Procedures

Participants signed up to complete the survey in groups of 30. Upon arrival each participant was asked to sign a consent form. After signing, he or she was given the survey. Each participant was given all twelve six scenarios for one target condition. After
completing the survey, participants were debriefed and dismissed. Male and female participants were run separately to ensure that each cell is filled proportionally with both genders.

**Results**

The Attitudes Toward Terrorism Scale demonstrated very high internal validity, Cronbach’s $\alpha = .93$. The Tolerance of Terrorism Scale had fair reliability, $\alpha = .77$. The factor analysis of the response variables was not repeated, because the number of participants used in Study 5 ($N = 60$) was not sufficient. Instead, the response factors from Study 3 (severity and communication) were reconstructed, and tested for internal reliability. For severity, $\alpha = .85$, and for communication, $\alpha = .93$. Both factors demonstrated strong internal reliability.

*Individual Characteristics Will Be Related to Responses to Terrorism*

**Gender Hypothesis.** The Gender Hypothesis predicted that women would score higher than men on fear responses, and that men would score higher than women on anger responses. As in Study 3, a $t$-test was used to examine gender differences. There was a significant difference between genders for fear, $t(57) = 3.79, p < 0.001$, but no significant difference for anger. These results partially replicate the findings reported in Study 3: women scored higher on fear response, but there was no difference for anger responses.

**Communication Hypothesis.** The Communication Hypothesis was that communication responses would be positively related to fear responses. Communication was computed by summing the information seeking and information sharing scores for each scenario. As in Study 3, this correlation was positive and significant, $r(58) = .53, p <$
Participants who scored higher on interpersonal communication also scored significantly higher on their fear responses.

_Tolerance Hypothesis_. The Tolerance Hypothesis predicted that the Tolerance of Terrorism Scale would be negatively related to anger ratings and judgments of severity. Each participant's score for tolerance of terrorism was correlated with average ratings of anger and severity. However, neither of these correlations was significant.

_Individual Characteristics and Subjective Characteristics (Risk Hypothesis)_

The subjective evaluations were summed across all six terrorism scenarios and factor analyzed. The results of the factor analysis are presented in Table 16. Based on previous psychometric paradigm studies, the items were forced into two factors with a Varimax rotation (also because two factors are easier to conceptualize, and thus more useful). The evaluations of overall risk, increasing threat, personal risk, and catastrophic potential all loaded onto a single factor; this factor was termed "danger evaluation." Knowledge of exposure, expert knowledge, and control over consequences loaded onto the second factor; this factor was termed "knowledge evaluation."
Table 16

*Factor Analysis: Subjective Evaluations (Study 5)*

<table>
<thead>
<tr>
<th>Subjective Evaluation</th>
<th>Component Loadings</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Danger</td>
<td>Knowledge</td>
<td>Communality</td>
</tr>
<tr>
<td>Catastrophic potential of threat</td>
<td>.70*</td>
<td>-.01</td>
<td>.49</td>
</tr>
<tr>
<td>Threat increasing over time</td>
<td>.64*</td>
<td>.17</td>
<td>.44</td>
</tr>
<tr>
<td>U.S. population’s risk of exposure</td>
<td>.63*</td>
<td>-.16</td>
<td>.42</td>
</tr>
<tr>
<td>Personal risk of exposure</td>
<td>.59*</td>
<td>.10</td>
<td>.35</td>
</tr>
<tr>
<td>Knowledge of exposure</td>
<td>.14</td>
<td>.73*</td>
<td>.56</td>
</tr>
<tr>
<td>Threat is known to experts</td>
<td>.21</td>
<td>.66*</td>
<td>.48</td>
</tr>
<tr>
<td>Control over consequences</td>
<td>-.13</td>
<td>.65*</td>
<td>.44</td>
</tr>
<tr>
<td>Dread of consequences</td>
<td>.35</td>
<td>.17</td>
<td>.15</td>
</tr>
<tr>
<td>Severity of consequences</td>
<td>.40</td>
<td>-.01</td>
<td>.16</td>
</tr>
<tr>
<td>Preventability of exposure</td>
<td>-.30</td>
<td>.30</td>
<td>.18</td>
</tr>
<tr>
<td>Novelty of threat</td>
<td>.34</td>
<td>.28</td>
<td>.22</td>
</tr>
<tr>
<td>Immediacy of threat</td>
<td>-.04</td>
<td>.31</td>
<td>.10</td>
</tr>
</tbody>
</table>

% of variance explained                                      18.60      14.61      
Internal reliability                                         .62        .56        

*Note.* * factor loading > .50

Each factor was regressed on individual characteristics: gender, tolerance of terrorism, and fear and perceived risk of terrorism (perceived risk was omitted from the danger evaluations model because of its similarity). For the danger evaluations, the model was significant $F(3, 56) = 3.89, p = .014, \text{adj. } R^2 = .13$. Fear of terrorism was the only significant predictor (Table 17). The regression model for the knowledge evaluations was not significant. These results indicate that the individual characteristics studied here had only a limited impact on subjective evaluations.
Table 17

*Linear Regression: Danger Evaluations (Study 5)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear of Terrorism</td>
<td>.48</td>
<td>.19</td>
<td>.33*</td>
</tr>
<tr>
<td>Tolerance of Terrorism</td>
<td>-.32</td>
<td>.32</td>
<td>-.13</td>
</tr>
<tr>
<td>Gender</td>
<td>1.63</td>
<td>5.80</td>
<td>.04</td>
</tr>
</tbody>
</table>

*Note. *p < .05

*Event Features and Responses to Terrorism (Event Features Hypothesis)*

*Event features and judgments of severity.* For judgments of severity, the nuclear scenario was not included in the analysis, because of a ceiling effect. The resulting 5x2 mixed design ANOVA tested whether judgments of severity were impacted by type of weapon and/or type of target. This ANOVA revealed a main effect for weapon \( F(4, 220) = 18.10, \ p < .001, \ \eta^2 = .25, \) and a significant weapon by target interaction, \( F(4, 220) = 4.65, \ p = .001, \ \eta^2 = .08 \) (Table 18). An examination of the interaction revealed that the bomb scenario was rated more severe when it had a civilian target; each other scenario was rated more severe if it had a government target (Figure 10).
Table 18

Means: Judgments of Severity (Study 5)

<table>
<thead>
<tr>
<th>Weapon</th>
<th>Target</th>
<th>M(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>Civilian</td>
<td>25.78 (9.37)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>31.23 (11.13)</td>
</tr>
<tr>
<td>Bomb</td>
<td>Civilian</td>
<td>25.96 (7.40)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>22.47 (11.79)</td>
</tr>
<tr>
<td>Chemical</td>
<td>Civilian</td>
<td>29.70 (9.28)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>35.93 (9.99)</td>
</tr>
<tr>
<td>Firearm</td>
<td>Civilian</td>
<td>30.81 (8.43)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>33.37 (9.83)</td>
</tr>
<tr>
<td>Radiological</td>
<td>Civilian</td>
<td>31.70 (7.85)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>34.27 (9.54)</td>
</tr>
</tbody>
</table>

Note. Significant interaction for weapon x target, \( p < .05 \)

Figure 10

Weapon by Target Interaction on Judgments of Severity (Study 5)
Event features and communication. A 6x2 ANOVA was used to test for differences in communication responses across weapon and target. All levels of weapon were included because the distributions were acceptably normal. There was a main effect for weapon, $F(5, 290) = 26.811, p < .001, \eta^2 = .32$, but there was no main effect for target, and no interaction.

Planned post hoc comparisons directly compared communication ratings for each type of weapon. As expected, the ratings were significantly higher for nuclear scenarios than any other scenario (Table 19; Figure 11). The bomb and biological scenarios were rated lower than all other scenarios (except each other). There were no differences among radiological, chemical, and firearm scenarios.

Table 19

Means: Communication (Study 3)

<table>
<thead>
<tr>
<th>Weapon</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>18.21b (5.19)</td>
</tr>
<tr>
<td>Bomb</td>
<td>17.63b (5.44)</td>
</tr>
<tr>
<td>Chemical</td>
<td>19.80b (4.51)</td>
</tr>
<tr>
<td>Firearm</td>
<td>19.27c (4.56)</td>
</tr>
<tr>
<td>Nuclear</td>
<td>22.77a (4.47)</td>
</tr>
<tr>
<td>Radiological</td>
<td>19.58c (4.82)</td>
</tr>
</tbody>
</table>

Note. Means with the same superscript were not significantly different, $p < .05$
Figure 11

Main Effect of Weapon on Communication (Study 5)

![Bar Chart]


Event features and estimated probability. An ANOVA was also used to evaluate the impact of event features on estimated probability of occurrence. The results for the estimated probabilities are presented in Table 20. There was a main effect for weapon, $F(5, 285) = 25.27, p < .001, \eta^2 = .31$, and a significant interaction for weapon and target, $F(5, 285) = 3.80, p = .002, \eta^2 = .06$. There was no main effect for target.

An examination of the interaction (Figure 12) revealed that scenarios with government targets were judged as more probable than those with civilian targets, except for bomb scenarios and nuclear scenarios. Bomb scenarios with civilian targets were judged as more probable than those with government targets. Nuclear scenarios were
judged equally probable across both targets. These results indicate that both weapon and target are important to the estimated probability of an attack occurring.

Table 20

*Means: Estimated Probability (Study 5)*

<table>
<thead>
<tr>
<th>Weapon</th>
<th>Target</th>
<th>M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological</td>
<td>Civilian</td>
<td>43.40 (22.50)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>51.34 (21.32)</td>
</tr>
<tr>
<td>Bomb</td>
<td>Civilian</td>
<td>49.93 (21.99)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>47.24 (21.37)</td>
</tr>
<tr>
<td>Chemical</td>
<td>Civilian</td>
<td>33.83 (21.68)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>47.79 (24.03)</td>
</tr>
<tr>
<td>Firearm</td>
<td>Civilian</td>
<td>34.87 (22.70)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>45.86 (22.79)</td>
</tr>
<tr>
<td>Nuclear</td>
<td>Civilian</td>
<td>25.93 (22.85)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>26.97 (22.55)</td>
</tr>
<tr>
<td>Radiological</td>
<td>Civilian</td>
<td>41.63 (23.13)</td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>46.90 (22.55)</td>
</tr>
</tbody>
</table>

*Note.* Significant interactions for weapon x target, $p < .05$
Subjective Evaluations, Event Features, Individual Characteristics, and Responses to Terrorism

Study 5 was designed to allow for a comparison of the impact of all three sets of variables (event features, individual characteristics, and subjective evaluations) on responses to terrorism events. Given that multiple observations were collected from each participant, the best way to include all three types of variables in the same analysis was a "clustered" least squares regression model. This analysis uses an inflated standard error term that accounts for correlations among the five observations given by each participant (Hamilton, 2006). This robust error term compensates for violating the assumption of
independent observations required for traditional regression; however, because of the lack of independent observations, this analysis provides likelihood estimates for the sample $b$ coefficients rather than the population $\beta$ coefficients (Hamilton, 2006). The type of weapon was entered as a series of dummy variables. Also, to maintain consistency with Study 3, the nuclear scenarios were omitted from these analyses.

**Judgments of severity.** The clustered regression for judgments of severity—which evaluated the impact of all three sets of variables—is displayed in Table 21. Even after accounting for all other variables, type of weapon and type of target were significant predictors of severity judgments; these relationships were in the same direction as the ANOVAs discussed above. The only other predictor was interest in homeland security news, which was entered as an individual characteristic. In order for a mediating model to be considered, the mediator (subjective regressions) must predict the $y$-variable (judgments of severity) when all predictors are included in the model (Baron & Kenney, 1986). Because the subjective evaluations did not predict of severity judgments in this regression, a mediating model was ruled out. This analysis showed that type of weapon, type of target, and interest in homeland security news were the significant predictors of participant’s judgments of severity.
Table 21

**Clustered Linear Regression: Judgments of Severity (Study 5)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Robust b</th>
<th>Robust SE b</th>
<th>Robust t</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Constant</strong></td>
<td>7.48</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Event Features</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weapon: bio vs. bomb</td>
<td>2.71</td>
<td>1.58</td>
<td>1.72</td>
</tr>
<tr>
<td>Weapon: chem vs. bomb</td>
<td>7.56</td>
<td>1.92</td>
<td>3.93***</td>
</tr>
<tr>
<td>Weapon: gun vs. bomb</td>
<td>7.69</td>
<td>1.57</td>
<td>4.89***</td>
</tr>
<tr>
<td>Weapon: rad vs. bomb</td>
<td>7.24</td>
<td>1.43</td>
<td>5.05***</td>
</tr>
<tr>
<td>Target</td>
<td>3.99</td>
<td>1.90</td>
<td>2.10*</td>
</tr>
<tr>
<td><strong>Individual Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.96</td>
<td>2.02</td>
<td>.48</td>
</tr>
<tr>
<td>Tolerance for terrorism</td>
<td>-.02</td>
<td>.12</td>
<td>-.19</td>
</tr>
<tr>
<td>Attitudes toward terrorism</td>
<td>.04</td>
<td>.06</td>
<td>.63</td>
</tr>
<tr>
<td>Interest in HLS news</td>
<td>1.44</td>
<td>.64</td>
<td>2.25*</td>
</tr>
<tr>
<td><strong>Subjective Evaluation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk factor</td>
<td>.57</td>
<td>.30</td>
<td>1.89</td>
</tr>
<tr>
<td>Knowledge factor</td>
<td>-.14</td>
<td>.27</td>
<td>-.51</td>
</tr>
</tbody>
</table>

*Note. *p < .05; **p < .01; ***p < .001. “bio” = biological; “chem” = chemical; “gun” = firearm; “nuke” = nuclear; “rad” = radiological; “HLS” = homeland security.*

**Communication.** The clustered regression for communication responses—which evaluated the impact of event features, individual characteristics, and subjective evaluations—is displayed in Table 22. Even after accounting for all other variables, type of weapon and was a significant predictor of communication responses; these relationships mimic the ANOVAs discussed above. The only other predictor was interest in homeland security news, which was entered as an individual characteristic. The subjective evaluations were not significant predictors of communication responses;
therefore, as with severity judgments, a mediating model was ruled out without further regression analyses (Baron & Kenney, 1986). This analysis showed that type of weapon and interest in homeland security news were the significant predictors of the extent to which participants would give and receive information about the scenarios.

Table 22

*Clustered Linear Regression: Communication (Study 5)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>b</th>
<th>Robust SE</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>11.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event Features</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weapon: bio vs. bomb</td>
<td>.24</td>
<td>.75</td>
<td>.32</td>
</tr>
<tr>
<td>Weapon: chem vs. bomb</td>
<td>1.96</td>
<td>.68</td>
<td>2.89**</td>
</tr>
<tr>
<td>Weapon: gun vs. bomb</td>
<td>1.59</td>
<td>.56</td>
<td>2.83**</td>
</tr>
<tr>
<td>Weapon: rad vs. bomb</td>
<td>1.43</td>
<td>.61</td>
<td>2.33*</td>
</tr>
<tr>
<td>Target</td>
<td>-.89</td>
<td>.88</td>
<td>-1.01</td>
</tr>
<tr>
<td>Individual Characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>.62</td>
<td>.83</td>
<td>.74</td>
</tr>
<tr>
<td>Tolerance for terrorism</td>
<td>-.04</td>
<td>.04</td>
<td>-.95</td>
</tr>
<tr>
<td>Attitudes toward terrorism</td>
<td>.03</td>
<td>.03</td>
<td>1.17</td>
</tr>
<tr>
<td>Interest in HLS news</td>
<td>1.24</td>
<td>.37</td>
<td>3.35**</td>
</tr>
<tr>
<td>Subjective Evaluation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk factor</td>
<td>.19</td>
<td>.13</td>
<td>1.45</td>
</tr>
<tr>
<td>Knowledge factor</td>
<td>-.23</td>
<td>.13</td>
<td>-1.78</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05; **p < .01; ***p < .001. “bio” = biological; “chem” = chemical; “gun” = firearm; “nuke” = nuclear; “rad” = radiological; “HLS” = homeland security.

*Estimated probability.* The clustered regression for participants’ estimated probability of occurring is displayed in Table 23. The subjective evaluations were not included in this because the dependent variable itself was very similar to the danger.
evaluations; therefore this regression model only evaluated the impact of event features and individual characteristics. Of the event features and individual characteristics entered into the regression, only type of weapon and interest in homeland security news were the significant predictors of estimates of probability. As with the above ANOVA, bomb attacks were had lower probability estimates than each other scenario. The probability estimates were positively related to interest in homeland security news, so that participants who scored higher in interest also produced higher probability estimates.

Table 23

Clustered Linear Regression: Estimated Probability (Study 5)

<table>
<thead>
<tr>
<th>Variable</th>
<th>$b$</th>
<th>Robust SE $b$</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>4.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event Features</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weapon: bio vs. bomb</td>
<td>-6.75</td>
<td>3.13</td>
<td>-2.15*</td>
</tr>
<tr>
<td>Weapon: chem vs. bomb</td>
<td>-12.24</td>
<td>3.12</td>
<td>-3.92**</td>
</tr>
<tr>
<td>Weapon: gun vs. bomb</td>
<td>-10.14</td>
<td>2.94</td>
<td>-3.45**</td>
</tr>
<tr>
<td>Weapon: rad vs. bomb</td>
<td>-7.94</td>
<td>3.29</td>
<td>-2.42*</td>
</tr>
<tr>
<td>Target</td>
<td>3.77</td>
<td>4.17</td>
<td>.90</td>
</tr>
<tr>
<td>Individual Characteristics</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>7.90</td>
<td>4.85</td>
<td>1.63</td>
</tr>
<tr>
<td>Tolerance for terrorism</td>
<td>-.14</td>
<td>.24</td>
<td>-.61</td>
</tr>
<tr>
<td>Attitudes toward terrorism</td>
<td>.02</td>
<td>.11</td>
<td>.22</td>
</tr>
<tr>
<td>Interest in HLS news</td>
<td>4.28</td>
<td>1.41</td>
<td>3.03**</td>
</tr>
</tbody>
</table>

Note. *$p < .05$; **$p < .01$; ***$p < .001$. “bio” = biological; “chem” = chemical; “gun” = firearm; “nuke” = nuclear; “rad” = radiological; “HLS” = homeland security.
Discussion

Individual Characteristics and Responses to Terrorism

The Gender Hypothesis partially replicated the findings from Study 3. Women did have significantly higher fear responses to the scenarios, but there were no differences for anger. It is possible that leaving out references to victims may have masked gender differences. Also, Study 3 had a much larger number of participants, and therefore greater statistical power to detect gender differences.

The Communication Hypothesis did replicate the findings from Study 3 that fear was related to communication. This finding also supports Brown et al’s (2002) position that fear is related to media consumption. As discussed above, while no causal inference can be made, it does seem more likely that fear would lead to media consumption, because in these studies there was no actual media consumption that could increase the fear response. In this way these findings may actually inform a possible hypothesis to be evaluated in future research. The Tolerance Hypothesis not replicated the results from Study 3. Tolerance was not significantly related to anger or seriousness.

The discrepancies between these results and those presented in Study 3 are of interest. There were two primary differences between the two studies. First, Study 3 had 250 participants, while Study 5 only had 60. Therefore Study 3 had greater statistical power to detect real effects. Second, the stimuli used in the two studies were not the same. Study 3 presented attack scenarios, while Study 5 presented threat scenarios. It is possible that this factor could change the relations among the variables measured here. Because Study 5 used threats rather than attack, there was also a difference in the information presented: no casualties or suicide conditions were specified. It is possible
that these differences could have lead to the discrepancies in the statistical results. These same factors may be relevant to other finding discrepancies reported below.

*Individual Characteristics and Subjective Evaluations (Risk Hypothesis)*

The psychometric literature has repeatedly identified underlying factors for subjective evaluations of hazards (Slovic, 1992). The factor analysis in Study 5 identified two factors: danger evaluations (included overall risk to U.S. population, personal risk, and catastrophic potential) and knowledge evaluations (included expert knowledge, knowledge of exposure, and control over consequences). The knowledge evaluations factor is consistent with previous psychometric studies (Slovic 1992; Slovic 2004). The other factor in Study 5, danger evaluations, does overlap with the “dread risk” factor identified in earlier studies, in that both factors include increasing risk, catastrophic potential. However, dread did not load onto this factor, nor was it related to responses to terrorism. It is not unusual, though, for psychometric studies dealing with specific hazards to identify different factors than those studies dealing with a more global list of hazards (Slovic et al., 1987).

The results here are generally consistent with the psychometric paradigm risk literature. It appears that subjective evaluations may offer an empirically driven method for mapping terrorist attacks in Euclidean space, which previous psychometric studies have done with larger groups of hazards (Fischhoff, et al., 2000; Slovic, 1992; Slovic et al., 1980/2000). Such taxonomy would be helpful for generalizing results for one type of terrorism to other types that may be perceived as similar.

The Risk Hypothesis in Study 5 was that the underlying “danger evaluations” and “knowledge evaluations” factors would be related to individual characteristics. This
hypothesis was partially supported. Danger evaluations were related to fear of terrorism, but no other relations were significant for either factor. This is not consistent with previous studies which have found gender to be a strong predictor of risk perceptions (Slovic, 1999).

**Event Features and Responses to Terrorism (Event Features Hypothesis)**

*Judgments of severity.* Study 5 found a weapon by target interaction for judgments of severity. Government targets were generally rated as more severe than were civilian targets. However, this was reversed for bomb scenarios, where civilian targets were rated as more severe. The effect of target depended on which level of weapon was being considered. The mechanism behind this change is unclear, but may be related to the emotional impact of previous bomb attacks. The bomb scenario results are consistent with Slovic and Burns (2006), who found that scenarios with civilian targets were judged as more serious. However, the other weapon-response patterns are not consistent with this previous study.

*Communication.* This variable also demonstrated a main effect for weapon. Bomb and biological scenarios had lower communication ratings than did all other scenarios. It is unclear why these pairwise comparisons demonstrated this pattern; this is the only case where bomb and biological scenarios showed similar responses that were also different from all others scenarios.

*Estimated probability.* This variable showed a weapon by target interaction, where government targets were judged as more likely than civilian targets for all scenarios except for bombings and nuclear attacks. Bomb scenarios were judged as more likely against civilian targets, and nuclear scenarios were judged as equally likely for
both types of targets. The nuclear results make intuitive sense, because a nuclear attack covers such a wide area that its specific target is irrelevant. It is unclear why bomb scenarios were different from the other non-nuclear scenarios.

*Event Features, Individual Characteristics, and Subjective Evaluations (Psychometric Hypothesis)*

In addition to studying subjective evaluations alone, Study 5 was also designed to simultaneously examine the impact of event features and subjective evaluations on the dependent variables. The Psychometric Hypothesis was that these subjective evaluations would account for effects observed due to the event features.

The Psychometric Hypothesis was not confirmed. For each response variable, the impact of event features was still significant after accounting for subjective evaluations. It seems that subjective evaluations, while informative, should be studied in conjunction with event features.

The primary weakness of Study 5 is that the design is somewhat exploratory. The subjective characteristics were selected and included based on previous studies that did not deal with terrorism. Therefore some important subjective characteristics may have been omitted. A more comprehensive study could be done that included all subjective ratings previously studied, in order to evaluate which ones are important to the study of terrorism. Until such a study is done, this one provides a basis for future studies that prefer to look at a more select group of characteristics.
CHAPTER VIII

CONCLUSIONS

These five studies make substantial contributions to the understanding of terrorism attitudes. These studies investigated the following issues: the current emphasis on individual characteristics, the impact of event features, differences between responding to threats and responding to attacks, and the role of subjective evaluations to predict responses to terrorism. These issues currently missing from current terrorism attitudes research findings provide good starting points from which to begin a more thorough systematic investigation of terrorism attitudes.

Summary of Basic Findings

Response Variables

These studies shed some empirical light on how to group responses to terrorism. The factor analysis from Study 3 showed that seriousness ratings could be grouped with harmfulness and disruptiveness ratings. This finding is useful for understanding how people conceptualize "seriousness." Also, all four communication items loaded together, which is not surprising, and is helpful for understanding how to develop further survey items.

In the variety of analyses performed across Studies 3, 4, and 5, no one group of variables (event features, individual characteristics, and subjective evaluations) emerged
as having the strongest association with response variables. Each group was important to understanding responses to terrorism, and their relative importance depended on both the scenario and response in question.

**Event Features**

One of the primary conclusions of these research studies is that the type of weapon used in a terrorist attack matters. In Studies 1 and 2, weapon was identified as a salient feature of terrorism events. In Study 3, weapon independently affected some responses to terrorism, and affected others in conjunction with the type of target. Study 3 showed that the associations between individual characteristics and responses changed based on the type of weapon. These results indicate that weapon is an important consideration in responses to terrorism.

Within the event feature of weapon, several general points can be made. One is that responses to biological and chemical attacks rarely were significantly different, indicating that these attacks may be viewed as one type of weapon. Responses to nuclear scenarios, on the other hand, were always different from responses to all other attacks. Responses to bomb scenarios were usually different from responses to other attacks, but not always; the same is true of responses to the gunmen and radiological attacks. More research is needed before conclusions can be drawn about which attacks are like other attacks, and under what conditions.

The type of target was also an important event feature, although it did not have the same impact on responses that weapon did. In most of the analyses, the impact of target on response variables depended on the type of weapon. Likewise, when the presence of suicide was relevant, its impact depended on whether the scenario had a
civilian or a government target. Both of these event features did impact response variables under certain circumstances.

Attacks vs. Threats

Threat condition (whether the scenario represented an attack or a threat) did interact with type of weapon in Study 4 for the response variable of communication. This was the only analysis where threats were explicitly different from attacks. However, the differences between the results from Study 3 and Study 5 could be a sign that threats are perceived and responded to differently than are attacks. One major discrepancy between these two studies was that in Study 3, bomb scenarios were consistently rated higher on severity; in Study 5, they were consistently rated lower on these responses. The results from these studies do not allow for a solid conclusion about responses to threats versus responses to attacks; future research endeavors should continue this line of investigation.

Individual Characteristics

The individual characteristics used in these studies obviously represent only a small subset of all possible characteristics. However, several individual characteristics were consistently related to responses to terrorism. This research finding is consistent with a previous research finding (Hoffner et al., 2002; Snyder & Park, 2002; Stempel & Hargrove, 2002) that women reported higher fear responses, but not consistent with previous research findings that men demonstrated higher levels of anger (Hoffner et al., 2002). The Attitudes Toward Terrorism Scale (including fear of terrorism and perceived risk of terrorism) was strongly related to all response variables.
Subjective Evaluations

Subjective evaluations were only included in Study 5. Several of these evaluations loaded onto two factors, danger evaluations and knowledge evaluations. However, these factors were not related to responses to terrorism after accounting for certain event features and individual characteristics.

Implications

Implications for Previous Research

Individual characteristics. Previous research has tied many individual characteristics to responses to terrorism, such as age (Bleich et al., 2005; Ford, 2004; Miller & Heldring, 2004; Stempel & Hargrove, 2002; Wadsworth et al., 2004), gender (Hoffner et al., 2002; Shaw, 2003; Snyder & Park, 2002; Stempel & Hargrove, 2002), ethnicity (Miller & Heldring, 2004; Sprang, 2003), residential setting (Stempel & Hargrove, 2002), family characteristics (Miller & Heldring, 2004; Shaw, 2003), coping strategies (Knowlton, 2004; Sprang, 2003), social support structure (Miller & Heldring, 2004; Shaw, 2003), communication patterns (Brown et al., 2002; Hoffner et al., 2002), personal history (Heldring, 2004; Muldoon, 2003; Shaw, 2003; Sprang, 2003), and media use (Brown et al., 2002; Dougall et al., 2005; Greenberg & Hofschire, 2002; Hoffner et al., 2002; Snyder & Park, 2002). Many of these could variables could not be addressed, because the sample lacked variability. However, this study does have some implications for gender and communication patterns.

In Study 3 and Study 5, women indicated a higher fear response than did men. This finding is consistent with previous research (Hoffner et al., 2002; Snyder & Park, 2002; Stempel & Hargrove, 2002). However, in Study 3 women had a higher anger
response than did men; this result is not consistent with previous research findings that men demonstrated higher levels of anger (Hoffner et al., 2002). These studies only partially support previous findings regarding gender and emotional responses to terrorism.

Previous research has identified links between patterns of communication and responses to terrorism. Hoffner et al. (2002) reported that contacting others about 9/11 was positively related to fear, sadness, and anger. The results reported here support this conclusion, in that higher communication ratings were linked to higher fear responses. The causal direction of this association is uncertain. It is possible that levels of fear drive interpersonal communication, but it is also possible that communicating with others drives the fear response. While no causal conclusions can be made, a causal hypothesis can be constructed for future research. Because the studies presented here did not ask about actual communication, but only about estimated communication, it is unlikely that the communication drove the fear response. It is more likely that the fear response may lead to higher estimates of communication, especially because in this study the fear responses were obtained prior to the communication responses. This hypothesis could be directly investigated in future studies.

Event features. Previous researchers have suggested that event features such as type of weapon (Long, 2002), number of victims (Long, 1990; Sprang, 2003), known cause (Sprang, 2003), motivation (Cronin, 2002), and presence of suicide (Pape, 2005) impact responses to terrorism. An empirical study by Slovic and Burns (2006) verified that type of weapon, presence of suicide, and motive were related to responses to
terrorism scenarios, but that number of victims was not. Slovic and Burns also found that type of target was a predictor of responses.

The current findings support previous research suggesting that type of weapon, type of target, and presence of suicide are all related to responses to terrorism. They also support Slovic and Burn's (2006) finding that the number of victims did not impact responses to terrorism, even though this feature was previously posited to be important (Long, 1990; Sprang, 2003). Unlike Slovic and Burn's study, which did not address the interactions of event features, the current findings revealed several interaction, suggesting that the impact of some event features depends on others.

**Subjective evaluations.** In previous studies of subjective evaluations, two underlying factors have been consistently (though not exclusively) identified—dread risk, which is associated with lack of control, dreaded consequences, catastrophic potential, inequitable distribution, increasing risk, and fatal consequences; and unknown risk, which is associated with unobservability, novelty, unknown exposure, unknown to science, and delayed consequences (Slovic, 1992; Slovic, 2004). Two other factors have also been identified in individual studies: number of people exposed (Slovic et al., 1980/2000), and severity of consequences (Fischhoff et al., 2000). The consistent finding, however, is that the factor dread risk has been the best predictor of the overall perceived risk of a hazard

The factors identified in Study 5 were similar to the ones described above. The knowledge evaluations factor in Study 5 consisted of several of the same evaluations found in previous studies; the danger evaluations factor from Study 5 contained a subset
of the evaluations normally found in the *dread* factor from previous studies (Slovic, 1992; Slovic 2004).

The major discrepancy in Study 5 was that dread was not an important variable for responses to terrorism, as it has been in previous studies (Fischhoff et al., 2000; Slovic, 1992, Slovic, 2004; Slovic et al., 1979/2000; Slovic et al., 1980/2000). This difference is most likely due to the fact that these previous studies dealt with diverse hazards, while Study 5 dealt only with terrorism hazards. Previous psychometric studies using specific hazards have also identified different factors, including the number of people exposed (Slovic et al., 1980/2000) and the severity of consequences (Fischhoff et al., 2000). In fact, the psychometric paradigm predicts that the most relevant subjective evaluations will vary depending on the hazards under consideration (Slovic, 1987; Slovic, 1992).

Given the flexibility of the psychometric paradigm in dealing with various hazards, the findings from Study 5 seem to complement rather than contradict previous research. It is logical to conclude that dread is not an important factor for responses to terrorism and that overall level of risk is relevant to responses to terrorism. However, because this is the first study applying the psychometric paradigm to terrorism hazards, these conclusions should undergo replication in future research.

*Implications for Government Agencies*

Based on the previous and current studies discussed above, several recommendations can be made for those directly involved in homeland security, emergency preparedness, and disaster recovery. These recommendations are purposely general, because the specifics of how to implement them will vary from one context to
another. This list is not intended to be exhaustive; surely other recommendations can be made, again based on a specific context. The following do provide, however, a framework within which to apply the research discussed here.

One important finding from this research was that communication patterns will differ for different terrorism events. The public will have varied desires and expectations for information about the event. For agencies tasked with providing this information, the following issues should be considered.

It is essential for an organization to build trust with its constituents. Researchers have found trust in sources of information to be an important factor for public perceptions (Johnson & Slovic, 1995; Seguin et al., 1999; Sjoberg, 1999). Without trust, any information from that organization will likely be discounted, including information about levels of safety, disaster scenarios, or evacuation procedures. One important aspect of gaining and/or maintaining trust is to make the successes of an organization as visible as possible. This task is more difficult than it sounds, because the failures of any organization are generally more apparent and noticeable than are its successes (Slovic, 1999). In some cases, particularly with intelligence organizations, successes cannot be shared with the public because such information may compromise future efforts. But it is essential that agencies involved with homeland security have proactive campaigns designed to build trust with the public by actively communicating information favorable to the agency. Agencies can also build trust in the way that they deal with failures. Open communication about the cause of a failure, and steps being taken to prevent another, can and should be used to rebuild trust after an agency fails to meet its responsibilities.
A psychological phenomenon that naturally inhibits trust is hindsight bias, or the "I-knew-it-all-along" phenomenon. Once an event has occurred, observers tend to overestimate the predictability of the event. This phenomenon means that failures are not only more noticeable, they are considered to be inexcusable, especially failures of foresight. From the public's perspective, any catastrophe or disaster could have been avoided, because there was sufficient evidence beforehand that it was going to occur. From an agency's perspective, the evidence predicting an event was buried within the evidence against the event occurring, and thus no foresight was possible. Agencies, and especially their press liaisons, must be aware of this difference in perspective and be ready to publicly account for it.

Agencies must also offer specific information whenever possible. This point is particularly salient for organizations tasked with motivating people to take action. People tend to ignore general instructions that do not include specific actions (Heldring, 2004; Stout, 2004). Of course, the actions requested must also be sensible to the public, or even specifics will be ignored. Therefore agencies must not only provide specific instructions, but give detailed (and simple) reasons for those instructions. Specific information is also needed for warnings (Barnett & Breakwell, 2003). As discussed above, the color-coded system is largely useless to the general population because of its lack of specificity. If details cannot be given, the agency must consider whether releasing general instructions or warnings will actually cause harm to their communication efforts, either through creating distrust among the public, or through desensitizing their audience to such communication. In some cases, it may actually be advisable to present no information rather than to present information that the audience cannot use.
A second important finding from the current studies is that different terrorism events lead to different perceptions of severity. As the public perceives one event to be more severe than another, it will naturally place greater important on preventing and/or managing that event. Thus various public priorities will emerge, and these priorities must be understood by government agencies tasked with emergency preparedness.

In cases of general homeland security or emergency preparedness issues, public opinion polls can offer a basic level of insight. In more specific cases, some level of primary research—such as the studies conducted here—may need to be conducted in order to identify priorities. Once an organization can understand the perspective (and thus the priorities) of its constituents, they are better prepared to address those priorities. Often an agency is already addressing these priorities, and it simply needs to do a better job of communicating these efforts to the public. In other cases the public priorities may need to be altered; this is a very difficult thing to do, but it is possible if the issues of trust and specificity have already been addressed. If an agency does find it necessary to conduct a campaign to alter the public priorities, awareness of public priorities will inform decision makers of the progress of such a campaign.

A third important implication for government agencies is that public perceptions should be incorporated into scenario development exercises. Scenario development will be more accurate if the subjective features of a threat are included along with the objective features. Of course, the impact of these subjective features is still a matter of ongoing research, especially in the area of terrorism, so such a process would necessarily be iterative. DHS is beginning to include evaluative responses in its modeling programs (R. G. Ross, Deputy Director, Office of Comparative Studies, personal communication, 127)
July 25, 2006), and such efforts should be noticed and applied by local preparedness agencies. As this information is incorporated into the current knowledge and accounted for in predictive models, it should allow for a more sophisticated and accurate prediction of actual behaviors.

A fourth implication for government agencies is the ability to map the results discussed above onto the Health Belief Model from the field of health psychology literature. The Health Belief Model emphasizes that health decisions are based on perceptions of benefits and barriers as well as perceptions of threat; these two perceptions are in turn dependent on individual characteristics such as demographics and previous exposure, beliefs about susceptibility and the seriousness of exposure, as well as cues to action such as doctor’s advice or the prodding of friends and family (Sarafino, 2002). This model has been effective as a basis for designing educational programs for certain diseases, such as AIDS. Given the findings from these studies that individual characteristics, event features, and perceptions are related to responses to terrorism, it is likely that similar programs could be developed to better inform the public about the risks of and proper responses to terrorism events.

**Limitations**

**Sample Limitations**

One of the major limitations of these studies was the undergraduate sample. Using an undergraduate sample from UNH limited the variability for most of the individual characteristics that have been important in other studies, such age, geographical residence, and ethnicity. Using the undergraduate sample also limits the generalizability
of the results. In order for these results to be safely generalized to the American public, they should be replicated on a community sample.

**Procedural Limitations**

Several limitations emerged from the procedures followed in these studies. First, the scenarios used were hypothetical. While using hypothetical scenarios allowed the degree of control and manipulation needed for the studies, it is likely that responses to the scenarios would have been much stronger and more nuanced given an actual event. Therefore differences in responses among scenarios may have been masked, decreasing the ability of the analyses to reject the null hypotheses.

Another procedural limitation was that the scenarios used were non-random. Because the scenarios were selected *a priori*, and were not a random sample from the population of terrorist scenarios, it is not possible to generalize these findings to events not included in the stimuli. However, it is doubtful that such a random sample could be obtained, given that the population of terrorist events is continually expanding. It is likely that future studies will have the same limitation, though perhaps not to the same degree.

Another procedural limitation was that the attitude measures were collected in the same sitting as were the response measures. While the attitude measures were not collected in association with any particular stimuli, the participants were exposed to the stimuli some time prior to completing the attitude measures. It is therefore possible that the scenarios themselves could have affected the attitude measures.

Also, the stimuli were presented to all participants in a specific order, and not randomized. However, one group of participants was given the stimuli in reverse order to check for this effect. These participants did not differ significantly on the response
variables. However, it is possible that other order effects existed within the two orders employed for these studies.

Analysis Limitations

Two main limitations affected the analyses. One was that the type of weapon was a within-subjects variable. This constrained the type of regression that could be used, because the assumption of independent observations was violated. A clustered regression was able to partially overcome this limitation, but it was not able to provide an estimate of population parameters, as would a regular regression.

The second limitation was that the response measures that could be used as dependent variables were limited by non-normal distributions. For example, “seriousness” was a response measure, and provided a good global evaluation of each scenario. However, this measure showed a bimodal distribution with a strong ceiling effect, and was not able to be analyzed with parametric analyses. Through the factor analysis reported in Study 3, this measure was combined with measures of “disruptiveness” and “harmfulness” to produce more normally distributed responses. While this combination of variables allowed for standard parametric techniques, it also made the resulting dependent variable, “judgments of severity,” more specific and less global than was originally sought. Therefore the results could not be directly compared to previous studies (e.g. Slovic & Burns, under review) which used the more global measure of seriousness. Other minor response variables, such as some of the emotional reactions, were completely left out of the analyses for lack of variability among participants. Also, in both Study 3 and Study 5, certain scenarios had to be excluded from analyses due to ceiling effects.
There are several possible reasons for these distributions. First, it is plausible that responses to terrorism are not normally distributed, and responses to extreme events will tend to show bimodality, ceiling effect, or lack of variance. However, many other studies have studied responses to terrorism with standard parametric techniques, and evidently they do not come across these issues on a regular basis (or they use extensive data treatments without reporting them). Another reason may be that the hypothetical scenarios constrained the natural variability in responses. People will not have the same breadth of response to a manufactured stimulus on a page as to an actual event with real consequences (and a lot more information than was offered in the survey). Yet another reason, also mentioned previously, could be the relatively homogenous sample of New England undergraduates. Whatever the cause, the distributions of some of the response variables limited their use in the analyses.

**Future Directions**

The studies presented here, while somewhat exploratory, offer a strong foundation to continue terrorism attitudes research. Several directions can and should be taken by future research. First, the impact of event features should be further explored. Because of the number of features that can be manipulated, and the number of levels of many of them, there are a multitude of main effects and interactions that can be explored. These studies focus on a few, but future studies could systematically control and manipulate various characteristics, and in this way develop a descriptive taxonomy of which terrorist attacks are considered most serious, or most likely, or most preventable, or most catastrophic, etc. Unfortunately such taxonomy might be greatly impacted by world events, and would have to be periodically verified and updated. But it would be a useful
database of stimuli with which to conduct terrorism attitude research. It would also
provide cognitive researchers with a means to delineate schemas associated with
terrorism events.

Another direction for future research would be to use historical terrorist attacks,
media coverage, and public opinion polls to attempt to historically verify the findings of
the current studies. Such research would present its own methodological challenges due
to dealing with missing information, operationalizing concepts, and quantifying data.
However, such research would offer a valuable real-world confirmation and application
of the principles that have been studied here with hypothetical scenarios.

Using similar designs as those presented here, personality researchers could focus
exclusively on individual variables that are related to reactions to terrorism. This research
only examined a handful of possible individual and response variables. Larger designs
could accommodate a great number of personality variables such as the classic Big Five,
and investigate which of these are most predictive of responses to terrorism. In a
historical context, personality researchers could examine leaders who have become
prominent in countries or regions most affected by terrorism, to determine if they share
common qualities.

Future research could also examine the cyclical relationship between responses to
terrorism and some of the attitude measures examined here (fear of terrorism, perceived
risk of terrorism, tolerance for terrorism, etc.). These attitudes are almost certainly
impacted by previous responses to terrorism, and they certainly do impact responses to
threatened and actual terrorism events. The nature of this relationship should be
examined and described in future studies.

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Future researchers should also seek to develop more realistic stimuli for these types of studies. There has always been and will always be a trade-off between realism and control in the social sciences, but creative researchers have often made significant breakthroughs by maximizing both of these attributes. Some possible methods of using more realistic scenarios could be the development of more detailed scenarios that only vary on the desired features. (More detailed scenarios could not be used in the present studies due to the fact that each participant received five stimuli, and if they were too detailed and still very similar, the stimuli would not have been believable.) Also, video segments could be produced and used as the stimuli, including segments of newscasts of actual events that the participants would not be familiar with (perhaps obscure events from foreign countries). It would take some effort to use such stimuli and still maintain experimental control, but the payoff would be substantial in terms of understanding how people respond to terrorism.

Concluding Remarks

Terrorism, while historically ubiquitous, has recently become a singular political and cultural force, both in the U.S. and across the globe. Public attitudes toward terrorism have become a driving force behind U.S. domestic and foreign policy. It is vitally important that social scientists and government agencies develop a proper understanding of these attitudes, including the impact of individual characteristics, event features, and subjective evaluations. The studies presented here represent a significant advancement in that understanding, while laying the groundwork for future research endeavors.

The threat of terrorism is transforming politics and societies on a global scale. The importance of these studies is that they examine responses toward both past and future
terrorism, and that they tie those attitudes to features and perceptions of the events, as well as to features of the person. Such research is important socially and politically, as it can describe and predict public priorities, and suggest more effective ways of dealing with public concerns about risk and safety.
REFERENCES


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APPENDICES
APPENDIX A

STIMULI FROM STUDY 1

1. U.S. Ambassador to Sudan and other diplomats are assassinated at the Saudi Arabian Embassy in Khartoum by members of the Black September organization.
2. Five terrorists pull weapons from their luggage in the terminal lounge at the Rome airport, killing two persons. They then attack a Pan American 707 bound for Beirut and Tehran, destroying it with incendiary grenades and killing 29 persons, including 4 senior Moroccan officials and 14 American employees of ARAMCO. They then herd 5 Italian hostages into a Lufthansa airliner and kill an Italian customs agent as he tries to escape, after which they force the pilot to fly to Beirut. After Lebanese authorities refuse to let the plane land, it lands in Athens, where the terrorists demand the release of 2 Arab terrorists. In order to make Greek authorities comply with their demands, the terrorists kill a hostage and throw his body onto the tarmac. The plane then flies to Damascus, where it stops for two hours to obtain fuel and food. It then flies to Kuwait, where the terrorists release their hostages in return for passage to an unknown destination.
3. Puerto Rican nationalists bomb a Wall Street bar, killing four and injuring 60.
4. Members of the Baader-Meinhof Group and the Popular Front for the Liberation of Palestine (PFLP) seize an Air France airliner and its 258 passengers. They force the plane to land in Uganda. On July 3 Israeli commandos successfully rescue the passengers.
5. 200 Islamic terrorists seize the Grand Mosque in Mecca, Saudi Arabia, taking hundreds of pilgrims hostage. Saudi and French security forces retake the shrine after an intense battle in which some 250 people are killed and 600 wounded.
6. Three American nuns and one lay missionary are found murdered outside San Salvador, El Salvador. They were killed by members of the National Guard, and the killers are currently in prison.
7. A U.S. citizen is seized by the Revolutionary Armed Forces of Colombia (FARC) and held for ransom.
8. Sixty-three people, including the CIA's Middle East director, are killed and 120 are injured in a 400-pound suicide truck-bomb attack on the U.S. Embassy in Beirut, Lebanon. The Islamic Jihad claim responsibility.
9. Eighteen U.S. servicemen are killed and 83 people are injured in a bomb attack on a restaurant near a U.S. Air Force Base in Torrejon, Spain.
10. Sikh terrorists seize the Golden Temple in Amritsar, India. One hundred people die when Indian security forces retake the Sikh holy shrine.

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11. A Trans-World Airlines flight is hijacked en route to Rome from Athens by two Lebanese Hizballah terrorists and forced to fly to Beirut. The eight crew members and 145 passengers are held for seventeen days, during which one American hostage, a U.S. Navy sailor, is murdered. After being flown twice to Algiers, the aircraft is returned to Beirut after Israel releases 435 Lebanese and Palestinian prisoners.

12. A bomb destroys an Air India Boeing 747 over the Atlantic, killing all 329 people aboard. Both Sikh and Kashmiri terrorists are blamed for the attack.

13. Four Palestinian Liberation Front terrorists seize the Italian cruise liner in the eastern Mediterranean Sea, taking more than 700 hostages. One U.S. passenger is murdered before the Egyptian government offered the terrorists safe haven in return for the hostages' freedom.

14. Four gunmen belonging to the Abu Nidal Organization attack the El Al and Trans World Airlines ticket counters at Rome's Leonardo da Vinci Airport with grenades and automatic rifles. Thirteen persons are killed and 75 are wounded before Italian police and Israeli security guards kill three of the gunmen and captured the fourth.

15. Pan American Airlines Flight 103 is blown up over Lockerbie, Scotland, by a bomb believed to have been placed on the aircraft by Libyan terrorists in Frankfurt, West Germany. All 259 people on board are killed.

16. The Tupac Amaru Revolutionary Movement bombs the U.S. Embassy in Lima, Peru.

17. Three Red Army Faction members fire automatic rifles from across the Rhine River at the U.S. Embassy Chancery. No one is hurt.

18. Two U.S. businessmen are seized independently by the National Liberation Army and by Revolutionary Armed Forces of Colombia (FARC).

19. Hizballah claims responsibility for a blast that levels the Israeli Embassy in Buenos Aires, Argentina, causing the deaths of 29 and wounding 242.


22. Twelve persons are killed and 5,700 are injured in a Sarin nerve gas attack on a crowded subway station in the center of Tokyo, Japan. A similar attack occurs nearly simultaneously in the Yokohama subway system. The Aum Shinri-kyo cult is blamed for the attacks.

23. A rocket-propelled grenade is fired through the window of the U.S. Embassy in Moscow, ostensibly in retaliation for U.S. strikes on Serb positions in Bosnia.

24. A suicide bomber drives a vehicle into the Egyptian Embassy compound in Islamabad, Pakistan, killing at least 16 and injuring 60 persons. Three militant Islamic groups claim responsibility.

25. Revolutionary Armed Forces of Colombia (FARC) guerrillas kidnap a US citizen and demand a $1 million ransom. The hostage is released.

26. Members of the Liberation Tigers of Tamil Eelam (LTTE) ram an explosives-laden truck into the Central Bank in the heart of downtown Colombo, Sri Lanka, killing 90 civilians and injuring more than 1,400 others, including 2 US citizens.
27. Unidentified assailants fire a rocket at the U.S. Embassy compound in Athens, causing minor damage to three diplomatic vehicles and some surrounding buildings. Circumstances of the attack suggest it was an operation carried out by the 17 November group.

28. In Jerusalem, a suicide bomber blows up a bus, killing 26 persons, including three U.S. citizens, and injuring some 80 persons, including three other US citizens.

29. HAMAS and the Palestine Islamic Jihad (PIJ) both claim responsibility for a bombing outside of Tel Aviv's largest shopping mall that killed 20 persons and injured 75 others, including 2 U.S. citizens.

30. A gang of former Contra guerrillas kidnap a U.S. employee of the Agency for International Development (AID) who was assisting with election preparations in rural northern Nicaragua. She is released unharmed the next day after members of the international commission overseeing the preparations intervene.

31. An IRA truck bomb detonates at a Manchester shopping center, wounding 206 persons, including two German tourists, and cause extensive property damage.

32. A bomb explodes at the home of the French Archbishop of Oran, killing him and his chauffeur. The attack occurs after the Archbishop's meeting with the French Foreign Minister. The Algerian Armed Islamic Group (GIA) is suspected.

33. In Vladivostok, Russia, assailants attack and kill a South Korean consul near his home. No one claims responsibility, but South Korean authorities believe that the attack was carried out by professionals and that the assailants were North Koreans. North Korean officials deny the country's involvement in the attack.

34. A bomb explodes aboard a Paris subway train as it arrives at the Port Royal station, killing two French nationals, a Moroccan, and a Canadian, and injuring 86 persons. Among those injured are one U.S. citizen and a Canadian. No one claims responsibility for the attack, but Algerian extremists are suspected.

35. A series of letter bombs with Alexandria, Egypt, postmarks are discovered at Al-Hayat newspaper bureaus in Washington, New York City, London, and Riyadh, Saudi Arabia. Three similar devices, also postmarked in Egypt, are found at a prison facility in Leavenworth, Kansas. Bomb disposal experts defuse all the devices, but one detonates at the Al-Hayat office in London, injuring two security guards and causing minor damage.

36. A Palestinian gunman opens fire on tourists at an observation deck atop the Empire State Building in New York City, killing a Danish national and wounding visitors from the United States, Argentina, Switzerland, and France before turning the gun on himself. A handwritten note carried by the gunman claims this is a punishment attack against the "enemies of Palestine."

37. National Liberation Army (ELN) guerrillas kidnap a U.S. citizen employed by a Las Vegas gold corporation who is scouting a gold mining operation in Colombia. The ELN demand a ransom of $2.5 million.

38. Al-Sha'if tribesmen kidnap a U.S. businessman near Sanaa. The tribesmen seek the release of two fellow tribesmen who were arrested on smuggling charges and several public works projects they claim the government promised them. They later release the hostage.
39. A UN plane carrying one U.S. citizen, four Angolans, two Philippine nationals and
one Namibian is shot down, according to a UN official. No deaths or injuries are
reported. Angolan authorities blame the attack on National Union for the Total
Independence of Angola (UNITA) rebels. UNITA officials deny shooting down the
plane.

40. A bomb explosion destroys UTA Flight 772 over the Sahara Desert in southern Niger
during a flight from Brazzaville to Paris. All 170 persons aboard are killed. Six
Libyans are later found guilty in absentia and sentenced to life imprisonment.

41. North Korean agents plant a bomb aboard Korean Air Lines Flight 858, which
subsequently crashes into the Indian Ocean.

42. A bomb destroys the Baghdad office of the Supreme Council of the Islamic
Revolution in Iraq, killing a woman and wounding at least 7 other persons.

43. A female suicide bomber kills 5 other persons and wounds 14 outside Moscow's
National Hotel. She is said to be looking for the State Duma.

44. Grenade attacks on two bars frequented by Americans in Bogota kill one person and
wounded 72, including 4 Americans. Colombian authorities suspect FARC (the
Revolutionary Armed Forces of Colombia). The U.S. Embassy suspect that the
attacks targeted Americans and warn against visiting commercial centers and places
of entertainment.

45. Two suicide truck bombs explode outside the Neve Shalom and Beth Israel
synagogues in Istanbul, killing 25 persons and wounding at least 300 more. The
initial claim of responsibility comes from a Turkish militant group, the Great Eastern
Islamic Raiders' Front, but Turkish authorities suspect an al-Qaeda connection. The
next day, the London-based newspaper *al-Quds al-Arabi* receives an e-mail in which
an al-Qaeda branch called the Brigades of the Martyr Abu Hafz al-Masri claims
responsible for the Istanbul synagogue bombings.

46. In Riyadh, a suicide car bombing takes place in the Muhaya residential compound,
which is occupied mainly by nationals of other Arab countries. Seventeen persons are
killed and 122 are wounded. The latter includes 4 Americans. The next day, Deputy
Secretary of State Armitage says al-Qaeda is probably responsible.

47. A suicide car bomb attack on the UN Headquarters in Baghdad kills a security guard
and wounds 19 other persons.

48. A suicide bombing aboard a bus in Jerusalem kills 20 persons and injures at least 100,
one of whom dies later. Five of the dead are American citizens. HAMAS and Islamic
Jihad claim responsibility, although HAMAS leader al-Rantisi says that his
organization remains committed to the truce while reserving the right to respond to
Israeli military actions.

49. A car bomb explodes outside a night club in Bogota, Colombia, killing 32 persons
and wounding 160. No group claims responsibility, but Colombian officials suspect
the Colombian Revolutionary Armed Forces (FARC).
APPENDIX B

STIMULI FROM STUDY 2

1. Terrorists might poison water reservoirs
2. Terrorists might detonate bombs in a subway
3. Terrorists might disrupt elections with polling place snipers
4. Terrorists might fire rockets towards the White House from a van roof
5. Terrorists might poison Starbucks Coffee
6. Terrorists might detonate a subterranean nuclear weapon
7. Terrorists might do a 50-state simultaneous mall bombing
8. Terrorists might Bomb Union Station with a suitcase bomb
9. Terrorists might create and spread a debilitating computer virus
10. Terrorists might irradiate a vital economic area with a radioactive bomb.
11. Terrorists might poison the water misters at an amusement park
12. Terrorists might detonate grenades in a crowded sports stadium
13. Terrorists might use knives for coordinated attacks on civilians
14. Terrorists might shoot the ultra-high tension power transformers
15. Terrorists might incapacitate offshore drilling rigs in the Gulf of Mexico
16. Terrorists might poison communion at churches
17. Terrorists might dump a bag of broken light bulbs over Times Square on New Years Eve
18. Terrorists might create a hostage situation at the New York Stock Exchange or other vital economic location
19. Terrorists might hijack the Emergency Broadcast System and initiate a public panic with false information
20. Terrorists might simultaneously incapacitate the four east-west interstate highway arteries
21. Terrorists might use suicide bombers in Walmart or some other shopping center
22. Terrorists might release poison gas in forced ventilation skyscrapers
23. Terrorists might attack a crowded indoor arena with toxic gases in the air conditioning
24. Terrorists might pose as a bus driver and drive a full bus off a cliff
25. Terrorist might send out misinformation that several food products have been poisoned
26. Terrorists might detonate a dirty nuke briefcase bomb at the Capitol building
27. Terrorists might plant viruses in the computer systems of powerplants
28. Terrorists might spread a biological weapon at a large airport hub

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29. Terrorists might storm the White House with 200 well armed and defended terrorists
30. Terrorists might infect people on a few international flights with smallpox
31. Terrorists might bulldoze the bleachers at a sports arena
32. Terrorists might use a potato gun to launch C4 explosives at the White House
33. Terrorists might plant land mines
34. Terrorists might plant land mines on bike path
35. Terrorists might go on a state fair shooting spree
36. Terrorists might isolate a large city by incapacitating its transportation routes.
37. Terrorists might detonate bombs at dozens of shopping malls nationwide
38. Terrorists might bomb a cruise ship far from help
39. Terrorists might use armored machinegun attackers at a Halloween street festival
40. Terrorists might try contamination of over-the-counter drugs
41. Terrorists might shoot the pilot or crewmember of an airplane while it is docked at a gate
42. Terrorists might conceal a bomb on a plane by shipping a concealed package
43. Terrorists might use chemicals or sharp objects to destroy priceless art treasures
44. Terrorists might bulk-mail millions of small incendiary devices
45. Terrorists might crash automobile simultaneously around the country on major roads at rush hour
46. Terrorists might hold hostage the patrons of a movie theater on a crowded opening weekend
47. Terrorists might activate an electronic satellite jamming system to disrupt surface-to-satellite communications
48. Terrorists might attack the US with one of the former USSR's unsecured nukes
49. Terrorists might use bombs to destroy a large prominent college or university
50. Terrorists might plant explosives on traffic light boxes.
51. Terrorists might use a fertilizer truck to blow up a major bridge
52. Terrorists might blow up a truck while driving over a bridge at the mouth of a busy port.
53. Terrorists might use virus-laden perfume bottles to infect a sports arena
54. Terrorists might bring down the Internet and all connected computers with a computer virus
55. Terrorists might crash a plane at the intersection of I-75 and I-80 (or some other major interchange)
56. Terrorists might use explosives to destroy the intake of a large hydroelectric plant
57. Terrorists might blow all of the bridges and tunnels into and from the island of Manhattan
58. Terrorists might infect water supply with AIDS virus
59. Terrorists might switch flu vaccines with smallpox injections
60. Terrorists might detonate a dirty nuke RV in the infield area at the Daytona 500
61. Terrorists might park cars on train tracks
62. Terrorists might use a truck bomb in the parking garage basement of an important building
63. Terrorists might poison a food additive that is used to produce a variety of food items
64. Terrorists might try cross-country coordinated truck-bombs on bridges
65. Terrorists might destroy high capacity power lines in rural areas
66. Terrorists might kill the heads of several major companies
67. Terrorists might contaminate U.S. currency
68. Terrorists might rig all the bridges over a major river with explosives and detonate them during rush hour.
69. Terrorists might spray anthrax on fresh produce in supermarkets
70. Terrorists might poison McDonald's beef products
71. Terrorists might call in bomb scares at major train stations and airports
72. Terrorists might kidnap random civilians and publicize their beheading videos
73. Terrorists might detonate a tanker truck underneath an overpass, blocking two highways
74. Terrorists might overload the 911 emergency system
75. Terrorists might launch small shoulder mounted missiles at passenger airplanes
76. Terrorists might try suicide collisions in 100 stolen cars
77. Terrorists might cause car accidents by seeding freeways with nails
78. Terrorists might call in bomb scares at major train stations and airports
79. Terrorists might destroy farm irrigation equipment
80. Terrorists might attach bombs to skyscraper support columns
APPENDIX C

STIMULI FROM STUDY 3

Biological Attacks
A suicide attacker [An attacker] exposes people in a shopping plaza [in the State Capitol building/on a city bus] to smallpox. Several [dozen] people die from the disease, along with the attacker [but the attacker escapes].

Bomb Attacks
A suicide bomber [A bomber] detonates a bomb inside a shopping plaza [inside the State Capitol building/on a city bus]. Several [dozen] people are killed. [The bomber escapes.]

Chemical Attacks
A suicide attacker [An attacker] releases sarin gas inside a shopping plaza [inside the State Capitol building/on a city bus]. Several [dozen] people in the immediate vicinity are killed. [The attacker escapes].

Firearm Attacks
Gunmen burst into a shopping plaza [burst into the State Capitol building/on a city bus] and gun down several [dozen] people before shooting themselves [before escaping].

Radiological Attacks
A suicide bomber [A bomber] detonates a “dirty bomb” which releases radiation into a shopping plaza [into the State Capitol building/on a city bus]. Several [dozen] people die from radiation poisoning. [The bomber escapes.]
1. People respond in a variety of ways to terrorist attacks. How much of the following emotions would you experience, if this attack actually happened?

<table>
<thead>
<tr>
<th>None</th>
<th>A little</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fear</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Excitement</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Anger</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Happiness</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Anxiety</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Confidence</td>
<td>f</td>
<td>1</td>
</tr>
<tr>
<td>Contempt</td>
<td>g</td>
<td>1</td>
</tr>
<tr>
<td>Surprise</td>
<td>h</td>
<td>1</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>i</td>
<td>1</td>
</tr>
<tr>
<td>Frustration</td>
<td>j</td>
<td>1</td>
</tr>
</tbody>
</table>

2. If this actually happened, do you think it would be a serious attack? (circle one)

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

If you marked “Yes,” please indicate how serious it would be (if “No,” skip this question):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIGHTLY SERIOUS</td>
<td>MODERATELY SERIOUS</td>
<td>EXTREMELY SERIOUS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. If this actually happened, do you think it would be harmful to the other people in that area?

<table>
<thead>
<tr>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

If you marked “Yes,” please indicate how harmful it would be (if “No,” skip this question):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIGHTLY HARMFUL</td>
<td>MODERATELY HARMFUL</td>
<td>EXTREMELY HARMFUL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4. Would this attack be *harmful* to the U.S. population as a whole? (circle one)

0. No  1. Yes

If you marked “Yes,” please indicate how harmful it would be (if “No,” skip this question):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIGHTLY HARMFUL</td>
<td>MODERATELY HARMFUL</td>
<td>EXTREMELY HARMFUL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. If this actually happened, do you think it would be *disruptive* to the daily activities of the other people in that area?

0. No  1. Yes

If you marked “Yes,” please indicate how disruptive it would be (if “No,” skip this question):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIGHTLY DISRUPTIVE</td>
<td>MODERATELY DISRUPTIVE</td>
<td>EXTREMELY DISRUPTIVE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Would this attack be *disruptive* to the daily activities of the U.S. population as a whole?

0. No  1. Yes

If you marked “Yes,” please indicate how disruptive it would be (if “No,” skip this question):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIGHTLY DISRUPTIVE</td>
<td>MODERATELY DISRUPTIVE</td>
<td>EXTREMELY DISRUPTIVE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Would this attack be *disruptive* to the local government’s daily activities?

0. No  1. Yes

If you marked “Yes,” please indicate how disruptive it would be (if “No,” skip this question):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIGHTLY DISRUPTIVE</td>
<td>MODERATELY DISRUPTIVE</td>
<td>EXTREMELY DISRUPTIVE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Would this attack be *disruptive* to the federal government’s activities?

0. No  1. Yes

If you marked “Yes,” please indicate how disruptive it would be (if “No,” skip this question):

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLIGHTLY DISRUPTIVE</td>
<td>MODERATELY DISRUPTIVE</td>
<td>EXTREMELY DISRUPTIVE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9. Would this attack be *disruptive* to your *daily activities*?

0. No  1. Yes

If you marked “Yes,” please indicate how disruptive it would be (if “No,” skip this question):

1  2  3  4  5  6  7
SLIGHTLY DISRUPTIVE  MODERATELY DISRUPTIVE  EXTREMELY DISRUPTIVE

10. Assuming that we knew who was responsible for this attack, how *supportive* would you be of the following responses which the U.S. government might engage in? (please circle a number)

<table>
<thead>
<tr>
<th></th>
<th>Not at all supportive</th>
<th>Somewhat supportive</th>
<th>Extremely supportive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Military response</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diplomatic respns</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

11. If this attack actually happened, how much would you *pay attention* to news stories about the attack?

1  2  3  4  5  6  7
no attention  some attention  all my attention

12. If this attack actually happened, how much information would you *seek out* about the attack?

1  2  3  4  5  6  7
no information  some information  all available information

13. If this attack actually happened, how much would you be *willing to talk* about it with others?

1  2  3  4  5  6  7
I would not be willing to talk at all  I would be willing to talk somewhat  I would be willing to talk all the time

14. If this attack actually happened, how much would you actively *try to talk* to others about it?

1  2  3  4  5  6  7
I would not try to talk at all  I would try to talk somewhat  I would try to talk all the time
15. What is the likelihood of this attack actually occurring in the U.S. during the next two years? Please assign a number between 0 and 100, where 0 means that it DEFINITELY WON'T HAPPEN, and 100 means that it DEFINITELY WILL HAPPEN _________

Please rate the scenarios based on how serious they would be, where
1 = MOST SERIOUS, and 5 = LEAST SERIOUS.
(Condition: non-suicide, civilian target, low casualties)

76. _____ An attacker exposes people in a shopping plaza to smallpox. Several people die from the disease, but the attacker escapes.
77. _____ An attacker releases poisonous gas inside a shopping plaza. Several people in the immediate vicinity are killed. The attacker escapes.
78. _____ Gunmen burst into a shopping plaza and gun down several people before escaping.
79. _____ A bomber detonates a bomb inside a shopping plaza. Several people in the immediate vicinity are killed. The bomber escapes.
80. _____ A bomber detonates a “dirty bomb” which releases radiation into a shopping plaza. Several people die from radiation poisoning. The bomber escapes.
A. Please rate the following statements on the 6 point scale provided. Consider only your own views when rating your responses.

1 = Completely disagree; 2 = Somewhat disagree; 3 = Slightly disagree
4 = Slightly agree; 5 = Somewhat agree; 6 = Completely agree

<table>
<thead>
<tr>
<th>Statement</th>
<th>Completely Disagree</th>
<th>Completely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) It is understandable if people resort to terrorism if it is their only way to be heard.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>2) Terrorists must be considered the enemy of civilized society, regardless of their motives.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>3) Only a cowardly group would resort to terrorism to achieve its goals.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>4) Terrorists would act violent even in an ideal society.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>5) Terrorism is sometimes morally justified.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>6) I’d say many terrorists are courageous people.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>7) I’d say the goals of some terrorists have been noble ones, such as freedom.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>8) There is NEVER justification for violence that targets civilians.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>9) Governments should exterminate known terrorists without mercy.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>10) Insensitive governments share much of the blame for the acts of terrorism against them.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>11) I’d say there is no difference between “terrorism” and “freedom fighting.”</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
</tbody>
</table>
B. Please indicate the extent to which you agree with each statement using the following scale:

1 = Completely disagree; 2 = Somewhat disagree; 3 = Slightly disagree
4 = Slightly agree; 5 = Somewhat agree; 6 = Completely agree

<table>
<thead>
<tr>
<th>Number</th>
<th>Statement</th>
<th>Completely Disagree</th>
<th>Completely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I have been kept awake at night worrying about being a part of the next big attack.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I am not concerned that the terrorists will attack using nuclear or radioactive weapons.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>I am scared that terrorist may be planning an attack near my home.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I don't worry about becoming the victim of a chemical attack.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>I am afraid of becoming a victim of a terrorist attack.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>I never worry that my mail might be contaminated.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I worry about being in an area where terrorists may use nuclear or radioactive weapons.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I don't worry that terrorists may release biological weapons in my area.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>I do not think that when I travel I am at greater risk of terrorism.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>I don't worry about terrorism when I travel.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>When I see a low-flying plane, I worry that it might crash.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>I don't worry about people I know being attacked by terrorists.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>I am afraid for people who fly across the country because of the threat of hijacking.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>I worry about U.S. citizens becoming victims of biological terrorist attacks.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>I don't worry about the mail carriers becoming infected with anthrax.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>I worry about when and where the next big attack will take place.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>I worry about people I know becoming victims of a chemical attack.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>I think it unlikely that I will be the victim of a chemical attack.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>I think it likely that I will be the victim of a nuclear or radioactive terrorist attack.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>I believe that I am likely to be a victim of a terrorist attack.</td>
<td>1 2 3 4 5 6</td>
<td></td>
</tr>
</tbody>
</table>
attack.

21. I think it unlikely that I will be exposed to a biological terrorist attack.  1 2 3 4 5 6
22. I believe that I will be the victim of terrorism using conventional weapons.  1 2 3 4 5 6
23. I think that people I know are likely victims of contaminated mail.  1 2 3 4 5 6
24. I believe that people I know live in areas that are likely terrorist targets.  1 2 3 4 5 6
25. I think it unlikely that a friend or relative will be a victim of a chemical attack.  1 2 3 4 5 6
26. I think that my friends and family are at risk of terrorism when they travel.  1 2 3 4 5 6
27. I think it likely that someone I know will be the victim of a nuclear or radioactive terrorist attack.  1 2 3 4 5 6

28. I have taken action to reduce my risk of becoming a victim of terrorism.  0 No 1 Yes
29. I fly less because of terrorist hijackings.  0 No 1 Yes
30. I have a terrorism emergency supply kit.  0 No 1 Yes
31. I have a plan in place in case of terrorist attack.  0 No 1 Yes
32. I have discussed my personal risk of terrorism with a friend or family member  0 No 1 Yes
33. I have encouraged others to take steps to stay safe from terrorism.  0 No 1 Yes
C. Personal Information:
1. In what year were you born? ___________
2. Where were you born? (Select one)
   1. In the United States; 2. Outside the United States (includes U.S territories)
3. Please indicate your gender below. (Select one)
   1. Male 2. Female 3. Transgender
4. Do you consider yourself to be... (Select all that apply)
   1. African American / Black
   2. American Indian/Alaskan Native
   3. Asian/Pacific Islander
   4. Chicano/Latino/Hispanic
   5. White/Caucasian
   6. Other:
5. Are you a citizen of the United States? (Select one)
   0. No 1. Yes
6. If you live in the U.S., what is the location of your legal residence? ____________
7. What is your religious affiliation (if any)? _______________________________
8. Do you have non-military family members or close friends who live in a war zone?
   0. No 1. Yes
   If "Yes," please explain:
   ______________________________________________________________________
9. Do you have family members or close friends in the military who have been deployed
   overseas in the past year?
   0. No 1. Yes
   If "Yes," please explain:
   ______________________________________________________________________
10. Were you, a family member, or a close friend directly affected by a terrorist attack?
    0. No 1. Yes
    If "Yes," please explain:
    ______________________________________________________________________
11. How would you judge your political views? (Please circle a number)
    Extremely Liberal Liberal Slightly Liberal Moderate Slightly Conservative Conservative Extremely Conservative
    1  2  3  4  5  6  7
    158
12. How interested are you in news stories about homeland security issues? (Please circle a number)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not interested</td>
<td>Very interested</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

13. How interested are you in news stories about national politics? (Please circle a number)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not interested</td>
<td>Very interested</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

14. How interested are you in news stories about the military? (Please circle a number)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not interested</td>
<td>Very interested</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. In a typical week, how much news do you get from the following sources? (Please circle a number)

<table>
<thead>
<tr>
<th>Source</th>
<th>None</th>
<th>A little</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Television</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b. Radio</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c. Internet</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d. Newspaper</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e. Other people</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

16. How often do you watch the TV show 24? (Please circle a number)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>Rarely</td>
<td>Occasionally</td>
<td>Often</td>
<td>Usually</td>
<td>All the time</td>
</tr>
</tbody>
</table>

17. Would you like to offer an explanation for any of your answers on this survey, or make any comments?
Bomb Attack Scenario

You wake up in the morning and check the news. The headline shocks you. You find out that very early this morning, in Boston, another terrorist attack has occurred. Suicide attackers blew up a truck in the I-93 tunnel underneath the city. Hundreds of cars were trapped underneath the rubble, and two office buildings over the tunnel collapsed. Authorities are confirming reports that about 350 people are dead, and almost 1500 are wounded. At the same time as the attack, a letter was delivered to Boston’s FBI field office in which Al-Qaeda claimed responsibility for the attack.

Bomb Threat Scenario

You wake up in the morning and check the news. The headline shocks you. You find out that the FBI’s field office in Boston has received a warning that suicide attackers from Al-Qaeda might blow up a truck in the I-93 tunnel underneath Boston. Such an attack would trap hundreds of cars underneath the rubble, and collapse office buildings over the tunnel. Authorities estimate that the attack, if carried out, would kill about 350 people and wound almost 1500. The FBI states that the letter appears to be a credible threat, and should be taken seriously.

Disease Attack Scenario

You wake up in the morning and check the news. You can’t believe what you are seeing. Every station is reporting that Al-Qaeda terrorists have released weaponized smallpox into Boston from a crop-duster airplane. Initial estimates are that 500,000 people have been exposed. FEMA is working with local hospitals to get enough vaccines into the city, but panic is starting to break out, along with rioting and looting.

Disease Threat Scenario

You wake up in the morning and check the news. You can’t believe what you are seeing. Every station is reporting that they received a threat from Al-Qaeda terrorists. The threat is that they will release weaponized smallpox over Boston using a crop-duster. Experts estimate that this would expose about 500,000 people. FEMA is working with the local hospitals to get enough vaccines into the city. They are also worried about rioting and looting if the attack were to set off a panic in the city.
APPENDIX F

STIMULI FROM STUDY 5

Civilian Targets
1. A conventional might bomb blow up at an indoor shopping mall
2. Gunmen might shoot people at an indoor shopping mall
3. A chemical weapon might be released at an indoor shopping mall
4. A nuclear bomb might be detonated at an indoor shopping mall
5. A biological weapon might be released at an indoor shopping mall
6. A radioactive “dirty” bomb might be detonated at an indoor shopping mall

Government Targets
7. A conventional bomb might blow up at the Capitol building
8. Gunmen might shoot people at the Capitol building
9. A chemical weapon might be released at the Capitol building
10. A nuclear bomb might be detonated at the Capitol building
11. A biological weapon might be released at the Capitol building
12. A radioactive “dirty” bomb might be detonated at the Capitol building
APPENDIX G

SUBJECTIVE EVALUATIONS FROM STUDY 5

1. Please rate the risk for each hazard for the U.S. population as a whole (overall risk)
   1=Slight risk; 7=Extreme risk

2. To what extent is the risk from this hazard “here and now” as opposed to being distant in time (immediacy)
   1 = “Risk Now”; 7 = “Risk Distant in Time”

3. To what extent are the risks known by the persons exposed to those risks? (knowledge)
   1=Risk level known; 7=Risk level not known

4. To what extent are the risks known to science? (expert knowledge)
   1=Risk level known; 7=Risk level not known

5. Is this a risk that people dread? (dread)
   1=not dreaded; 7=dreaded

6. When the risk from this hazard is realized [i.e. if it actually happens], how likely is it that the consequences will be severe? (severity of consequences)
   1=not at all severe; 7=extremely severe

7. To what extent can scientists and engineers prevent this risk from causing harm? (control over risk)
   1=little ability to prevent; 7=much ability to prevent
8. Is the risk associated with this hazard increasing or decreasing? (increasing)
   1=quickly decreasing; 4=staying the same; 7=quickly increasing

9. To what extent do you believe that you are personally at risk from this hazard? (personal exposure)
   1=I am not at risk; 7=I am very much at risk

10. To what extent does this hazard have the potential to cause catastrophic death and destruction across the entire country? (catastrophic potential)
    1=low catastrophic potential; 7=high catastrophic potential

11. If this risk were to actually happen, to what extent would those exposed be able to control the consequences of that exposure? (control over consequences)
    1=low control; 7=much control

12. To what extent is this risk new to society? (newness)
    1=very old risk; 7=very new risk

13. How likely is it that this hazard would actually happen? (likelihood)
    1=extremely unlikely; 7=extremely likely

14. If this hazard were to actually happen, how disruptive would it be to the U.S. population? (disruptiveness)
    1=not at all disruptive; 7=extremely disruptive
APPENDIX H

IRB APPROVALS
August 7, 2006

Clinton Jenkin
Psychology
Durham, NH 03824

**Study:** Terrorism Attack Norming Study  
**Approval Date:** 03/25/2005

The Psychology Departmental Review Committee, a subcommittee of the Institutional Review Board (IRB) for the Protection of Human Subjects in Research, reviewed and approved the protocol for your study as Exempt as described in Federal Regulations 45 CFR 46, Subsection 101 (b).

Approval is granted to conduct the project as described in your protocol. Changes in your protocol must be submitted to this committee for review and approval prior to their implementation.

The protection of human subjects in your study is an ongoing process for which you hold primary responsibility. In receiving approval for your protocol, you agree to conduct the project in accordance with the ethical principles and guidelines for the protection of human subjects in research, as described in the Belmont Report. The full text of the Belmont Report is available on the Office of Sponsored Research (OSR) webpage at [http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.htm](http://www.hhs.gov/ohrp/humansubjects/guidance/belmont.htm) or by request from the OSR.

There is no obligation for you to provide a report to this committee upon project completion unless you experience any unusual or unanticipated results with regard to the participation of human subjects. Please report such events to this office promptly as they occur.

If you have questions or concerns about your project or this approval, please feel free to contact a member of the Psychology Departmental Review Committee.

For the IRB,

Julie F. Simpson  
Manager

cc: File
August 7, 2006

Clinton Jenkin
Psychology
Durham, NH 03824

**Study:** Categorization and Rating of Possible Terror Incidents

**Approval Date:** 10/05/2005

The Psychology Departmental Review Committee, a subcommittee of the Institutional Review Board (IRB) for the Protection of Human Subjects in Research, reviewed and approved the protocol for your study as Exempt as described in Federal Regulations 45 CFR 46, Subsection 101 (b).

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For the IRB,

Julie F. Simpson
Manager

cc: File
August 7, 2006

Clinton Jenkin
Psychology
Durham, NH 03824

Study: Risk Perception and Possible Terror Attacks
Approval Date: 04/06/2006

The Psychology Departmental Review Committee, a subcommittee of the Institutional
Review Board (IRB) for the Protection of Human Subjects in Research, reviewed and
approved the protocol for your study as Exempt as described in Federal Regulations 45 CFR
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