Tracking the Social Dynamics of Responses to Terrorism: Language, Behavior, and the Internet

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The Social Stage Model of Disasters is examined as a parallel to natural responses to terrorism. After a shared upheaval, people tend to go through an emergency phase, where they talk about the event, followed by a drop in talking during a longer inhibition phase. Thoughts of the event still weigh heavily on people’s minds until the adaptation phase, where social and physiological patterns stabilize. New methodological and analytical tools have enabled the study of immediate reactions to natural disasters, collective trauma, and terrorist attacks. These include the Electronically-Activated Recorder (EAR), which captures how people congregate and talk to or avoid others. Also, Linguistic Inquiry and Word Count (LIWC), a software program that analyzes psychological states through linguistic markers, has been applied to language samples from various internet forums for communication before, during, and after shared upheavals. A review of the research using these recent technological developments suggests that terrorism can have the unintended effects of encouraging affiliation, strengthening values, and reaffirming identities. The findings further suggest that distancing, a natural phase in the course of crises and challenges, may be helpful when faced with terrorism. The internet will continue to be a valuable venue for both victims and researchers.

On September 11, 2001, almost 3,000 people were killed in a series of suicide attacks in the United States. In over three years since that day, only a handful of Americans have died in terrorist attacks in the United States, while tens of thousands of Americans have died from murder, suicide, and a host of preventable diseases. Nevertheless, the fear of future terrorist attacks continues to plague the media and the minds of Americans. It has changed the country -- economically, politically, and socially in ways that no other groups of illness or deaths have.

Beyond any immediate physical damage, threats of terrorism instill a lingering sense of fear and anxiety which can have insidious effects on human behavior. As social scientists, we need to explore the natural unfolding of events that are associated with fear, loss of life, and terrorism. Our first line of defense in overcoming terrorism is to understand its psychological mechanisms, along with adaptive responses to it.

1. Social and Behavioral Effects of Fear and Anxiety

Fear and anxiety are common emotions among most vertebrates in response to threat. It is beyond the scope of this chapter to outline the biological changes that occur in the brain and body during and following the arousal of extreme fear [1,2]. Concurrent with biological
upheavals, most social organisms also change in their social behaviors during fear arousal. For example, one of the most consistent behavioral changes seen in nonhuman primates in response to exposure to fearful stimuli is increased contact with family members through touching or grooming [3,4]. Fear can serve to teach younger animals how to respond to fearful stimuli through affiliation. At times, it can also serve to inhibit social exploration and sexual behavior [5].

Events that provoke fear and anxiety in the non-human animal kingdom are generally short-lived. The predator either eats the prey or goes away hungry. The lightening storm that produced the clap of thunder that frightens dissipates. Perhaps through some basic mechanisms of classical conditioning, the animals will more readily experience fear in the future when similar conditions arise. Otherwise, however, longterm anxiety or stress is not the norm for most animals. Humans are another story. We have the unique ability to learn about a fear-related object or event, mull it over, and live with it for days, weeks, or years.

Research on fear and anxiety in humans has been conducted primarily in highly controlled laboratory studies. In some of the classical studies in social psychology, for example, people who fear they will receive a painful shock opt to wait with others as opposed to alone [6]. Other work suggests that people who become highly anxious are more compliant with attitudinal messages [7], more uncritically accepting of information [8], and poorer information processors in general [9].

Laboratory studies on fear and anxiety provide only a hint of what might happen to people in the real world who collectively must cope with a terrorist threat. There have, of course, been several studies that have described people’s reactions in the aftermath of highly threatening events. Baum and his colleagues have evaluated the psychological consequences of technological catastrophes, including toxic waste spills and nuclear accidents [e.g. 10,11]. Most studies have relied exclusively on self-reports, tests of cognitive performance, or interviews several weeks or months after the event and virtually none have focused on terrorism.

What happens to groups of people when faced with unpredictable upheavals? Acts of terrorism, natural disasters, and man-made upheavals all have the potential to instill long-lasting fear and to change the ways people think, feel, and behave. Particularly interesting are the questions concerning the social dynamics of upheavals. For example, in the wake of a novel life-threatening event, how do people talk with one another, where do they go, what do they do, and how do they make decisions? Further, how do these processes change over time – from the first hours after the event to the next days and months?

These questions have been at the heart of our research for the last two decades. Our findings are based on multiple methodologies including surveys, monitoring of natural behaviors, archive analyses of health and crime data, and linguistic analyses of internet usage. Because of our interest in both individual and collective traumas, we have studied natural disasters (Mount St. Helen’s Volcano eruption in 1981; Loma Prieta Earthquake in the San Francisco area in 1989), public human tragedies (death of Princess Diana in 1997; the Texas A&M Bonfire tragedy where 12 students died during the building of the annual bonfire in 1999), and the general population’s responses to war (the Persian Gulf War in 1991; the September 11, 2001 attacks). In all cases, this research has focused on people who may have been emotionally touched by the events but not directly victimized. Our interests, then, have been on how the average person reacts on learning of a profoundly upsetting event.

The purpose of this chapter is to summarize the results of these projects and to generalize to possible scenarios of terrorism in the future. Although we have not studied bioterrorism directly, any research on the social dynamics of terror can be potentially valuable in the creation of contagion and information dispersal models.
2. Social Stages of Disasters: An Overview

Perhaps the most frustrating aspect of studying disasters is their unpredictability and inherent chaos. Unlike most other research topics, the conventional scientific niceties such as experimental control, random selection of participants, pre-measures, approval to conduct research from ethics committees, and even the ability to select the location for research are simply not available. Consequently, most solid large-scale studies of disasters generally begin several weeks or months after they have occurred. The problem is that the ways people think about and deal with an upheaval unfold over time.

Across several studies, we have been able to detect important social changes in the aftermath of an upheaval. Using weekly random digit dialing telephone surveys with hundreds of people following the Loma Prieta Earthquake and the beginning of the Persian Gulf War, we discovered that three identifiable shifts occurred. During the first 2-3 weeks after the events, people reported talking, hearing about, and thinking about the events at very high rates. However, for both the earthquake and the outbreak of war, there was a dramatic drop in talking about the event starting about three weeks after their occurrence. Although their talking rates dropped considerably, they continued to think about the events at very high rates. In both cases, it took at least 8 weeks after the events until people reported not thinking or talking them [12].

As depicted in Figure 1, the first stage, referred to as the “emergency phase,” is characterized by high rates of thinking and talking about the upheaval. During this time, people’s physical health is surprisingly good and self-reports of hostility and aggression towards family and coworkers is low. However, during the subsequent inhibition stage when talking rates are low but thinking rates are high, a number of interesting phenomena emerge. During this period, people report heightened rates of physical symptoms, more nightmares about the upheavals, and higher rates of fights with friends and coworkers. Indeed, analyses

![Figure 1. Rates of thought and talking following upheaval.](image-url)
of aggravated assault rates in the San Francisco area in the years surrounding the earthquake revealed that assaults increased starting 2 weeks after the earthquake and continued at this elevated rate for about a month in comparison with the year before the earthquake [13]. We have speculated that these effects occur because individuals are still concerned about the upheavals but are likely to misattribute this diffuse anxiety to other sources [e.g. 14]. Finally, by the adaptation phase, people are no longer talking or thinking about the event and markers of distress return to baseline.

Why do these social stages occur? In the earthquake project, we asked people how much they would like to tell others about what happened to them during the earthquake and also asked them how much they would like to hear other people’s earthquake stories. Across all time periods, people said they would enjoy telling others about their own stories. However, beginning about three weeks after the earthquake – coinciding with the inhibition stage – people reported that they did not want to hear other people’s stories. In fact, about a month after the earthquake, t-shirts began appearing in San Francisco that proclaimed, “Thank you for not sharing your earthquake experience.” The inhibition phase may well be a subtle social defense that members of the society all erect about the same time. Hearing other people’s upsetting experiences is itself distressing. To avoid unneeded reminders of the earthquake, everyone tacitly agrees to stop talking.

In the years since the development of our social stage model, two shortcomings have become apparent. First, the time estimates of the various stages clearly vary as a function of the upheaval. For the death of Princess Diana among people in the United States, analyses of online discussions of her death dropped to very low rates by approximately a week afterwards [15]. The events of September 11 (9/11) suggested a much longer time span in the ways people talked about the event [16]. Taken together, it appears that the more powerful the personal and cultural impact, the longer the emergency phase appears to last.

A second shortcoming of the social stage model is that it fails to address the social dynamics in the first hours or days after a disaster occurs. The initial model was based on weekly assessments of people’s reactions to an event. Only recently have we been able to evaluate psychological changes in a more fine-grained way using the day-by-day web postings of individuals. As will be described below, large-scale changes in emotional expression, self-focus, and collective focus occur during the first few days after an upheaval – many of which return to baseline by the end of the first week. In short, future social stage models must focus on the immediate reactions of people after an event.

2. Immediate Reactions: Hours, Days, and Weeks after a Disaster

In many ways, the 9/11 attacks coincided with a number of technological developments that have allowed us to look at upheavals with new sets of eyes. One system that we were testing before and during the months preceding 9/11 was a digital tape recorder that periodically captured people’s auditory worlds several times a day. Coincidentally, we had started a study the day before the attacks and were able to track a small group of individuals as 9/11 unfolded. A second methodology we had been working on for several years was a comprehensive computerized text analysis program that allows investigators to quickly and efficiently analyze large corpora of text files. In the months after 9/11, we were able to obtain a massive data set of over 1,000 people who were high users of online diaries. By analyzing their writings before and after 9/11, we monitored how a broad sample of people were thinking and writing on a daily basis.
In the late 1990s, we developed a specially-engineered digital voice recorder that was designed to record for 30 seconds once every 12-13 minutes. The Electronically-Activated Recorder, or EAR, was created so that we could capture snippets of people’s everyday lives in as unobtrusive ways as possible over several days [17]. In early September, 2001, two EAR projects were underway. One was a personality study wherein we asked people to wear the EAR for two days so that we could see how their social behaviors and natural language were correlated with self-reports [e.g. 18]. A second project, begun on September 10, involved a group of 5 participants who were to wear the EAR and an ambulatory blood pressure monitor for 48 hours. On the morning of September 11, they were to report to the laboratory where they would write about emotional upheavals. In Austin, Texas, where the study was being conducted, the first 9/11 attacks were announced around 8:00 AM. The first World Trade Center building collapsed a little after 9:00 AM, just about the time participants arrived at the lab.

Rather than have them write about previous traumatic experiences, we asked all participants to go about their daily lives and to continue wearing the EAR for the next 10 days and blood pressure machines for the next 24 hours. An additional 6 participants who had worn the EAR earlier in the month were recruited to also wear the EAR for the next 10 days. Overall, then, 11 individuals wore the EAR 24 hours per day for 1-2 days prior to 9/11 and for 10 days thereafter. The participants were either current or recently-graduated students with a mean age of 20. Seven were female and four were born in countries outside the United States [19].

Analyses of the EAR data indicated that in the days after 9/11, people changed in their patterns of social interactions. Overall, there was a reduction in the amount of time that people spent in groups of three or more whereas a corresponding increase in dyadic interactions occurred. In other words, in the 5-6 days after the attacks, people spent more time at home with one other person rather than congregating in large or moderate-sized groups. Interestingly, the more that people deviated from this social profile, the less well-adjusted they appeared to be two weeks later.

These statistical patterns matched our field observations as well. In the two days after 9/11, we periodically walked along a set path around the university campus with a tape recorder to capture ongoing social interactions. In the first 3 hours after the Tuesday morning attacks, students were congregating in large groups with a high degree of nervous laughing. By four hours after the attacks, the campus was almost deserted. Although classes continued to be held throughout the week, attendance was down and students did not mass in the typical indoor (cafeterias) or outdoor (patios) locations. The following weekend, movie theaters were virtually empty, restaurants deserted, and public parks devoid of people.

There is every reason to think that the social patterns in Austin – a city of almost one million people – were similar to cities elsewhere in the United States. Modern-day urban humans, it seems, evidence a distinctive social process in the face of a large-scale ambiguous threat. Rather than congregating in large social groups during periods of threat, we seek the quiet refuge of family and very close friends.

This social patterning may be good news for bioterrorism experts. Should an infectious toxin be released and its effects made known quickly, individuals appear to naturally move into smaller units that are in contact via phone and computer rather than in person.
Beginning in the mid-1980s, we began studying how people deal with personal upheavals in their lives. Early findings suggested that those people who have had a traumatic experience were much more likely to suffer subsequent health problems if they kept the trauma secret than if they could openly talk about it to others [e.g. 20]. Part of this research asked participants to either write about their traumas or, for those assigned to a control condition, to write about superficial topics for 3-4 days, 15-20 minutes per day. Multiple studies eventually found that writing about traumatic experiences was associated with improvements in physical and mental health over the next several months [e.g. 21,22].

By the early 1990s, a number of research teams began exploring why expressive writing was effective. One strategy to answer this question was to analyze people's writing samples – a surprisingly complicated undertaking. To simplify this task, we developed a computerized text analysis program that simply counted the number of different types of words in any text file – emotion words, cognitive words, pronouns, etc. The computer program, Linguistic Inquiry and Word Count, or LIWC, calculates the percentage of words in each of 72 different categories [23]. In the years since LIWC was first developed, we have found compelling evidence to suggest that the ways people use words in daily conversation and writing can provide rich insights into their thoughts and feelings [24].

The LIWC methodology is ideally suited to the analysis of large groups of text files. With the rapid development of the internet, finding text samples to address psychologically important questions has been made considerably easier. In various ways, millions of people around the world are constantly posting their personal stories and observations on the web. Some electronic strategies include standard emails or list-serves that go to selected friends of the writer. Other strategies are more dynamic wherein individuals enter a “chat room” where individuals “talk” to one another in real time online communications that all members of the chat room can read. Another popular forum is the use of weblogs or “blogs” where people post their personal diaries for the world to read. By collecting this public information, we can begin to track how people are thinking and communicating with others before, during, and following an upheaval.

Our most promising approach to date has been to analyze a select group of people who post their daily diaries on the website www.livejournal.com. LiveJournal has over 5 million members who post at the rate of 2300 posts per hour. In their blogs, people write about all aspects of their lives from experiences at work, to love concerns, to lists of favorite songs or things they have just bought at the grocery store. Several months after 9/11, we worked with LiveJournal to download the blogs of high users who posted blogs in the two months before 9/11 and who posted at least 14 out of a possible 17 time frames in the two months after 9/11. The sample was restricted to self-identified U.S. citizens over the age of 18 with equal numbers of males and females and stratified by age groups. The final sample included 1,084 participants who posted a total of 71,800 blogs between July 11 and November 11, 2001.

The beauty of a sample such as this is that we were able to track people’s natural blogs on a day-by-day basis following 9/11 and compare their postings from before the attacks. The results have been striking along several dimensions. In terms of simple volume of writing, individuals drastically increased the number of words that they wrote for each post. Prior to 9/11, for example, the average post was 348 words. In the week after 9/11, the average post increased to 390 words. In wasn’t until late October that words per post returned to baseline. Interestingly, this increase in writing volume was not just writing about terrorism. Even those who wrote virtually nothing about the attacks increased in their writing rate.
More striking, however, were the changes in how people expressed themselves. Ironically, very few emotion researchers have ever been able to measure how long emotions last—especially real world emotions. By calculating the percentage of positive and negative emotions used by participants, we see that the 9/11 attacks provoked large increases in negative emotions and a suppression of positive emotions in daily blogs. More impressive is how short-lived these effects are. As depicted in Figure 2, negative emotion words increase from a base rate of 2.1 percent of total words to 3.2 percent in the two days after 9/11 but then return to 2.2 percent by 9/15 and back to baseline in less than a week. Positive emotion words paint a more intriguing picture. They drop from a baseline rate of 2.6 percent to 2.1 percent on 9/11 and return to baseline on 9/15. By September 18—one week after the attacks—positive emotion word use is slightly (but significantly) higher than baseline for the remainder of the study.

What accounts for this peculiar positive emotion shift? The analysis of pronouns adds another piece of the puzzle. Across multiple studies, we have discovered that the use of first person singular pronouns—especially the word “I”—is associated with self-focus, depression, low self-esteem, and low dominance [24-26]. Use of first person plural (we, us, our), on the other hand, serves multiple purposes. It often signals group solidarity (“we love one another”) and can also reflect emotional detachment (“we need to take out the trash” [translation: you need to take out the trash]). It is not uncommon for people to switch from the detached “we” to the personal “we” during emotional upheavals [27].

The LiveJournal sample evidenced a large drop in “I” usage—from 7 percent of all words at baseline to 5.9 percent for 3 days immediately after the attacks. Interestingly, “I” continued to be suppressed for the next two months of data collection averaging 6.6 percent the entire month of October and early November. Corresponding with drops in “I”, there was a significant increase in “we” usage. In the months before 9/11, mean “we” usage was 0.63 percent of all words. Between 9/11 and 9/14 this rate increased to 1.05 percent. Indeed, the rate of 1st person plural remained elevated above baseline until mid-October. Interestingly, this elevated use of “we” words was not reflecting nationalistic fervor. Rather, people were talking about “my boyfriend and me” or “our family.” In short, a personalized “we” rather
than detached one. Taken together, the pronoun data suggest that people became less self-absorbed after the 9/11 attacks and focused more on other people. Implications for mental and physical health are discussed in the next section.

A third linguistic finding deserves mention. Certain types of cognitive words have been found to be related to higher level cognitive processing. For example, exclusive prepositions and conjunctions (except, without, but, exclude) are used at higher rates among people who are attempting to make distinctions between categories and ideas. We have found these words to be related to honesty, better grades on exams, and more cognitively complex ideas. Similarly, the use of certain types of cognitive words associated with thinking (sometimes referred to as ontological verbs: think, believe, wonder, know) have been linked to better health outcomes among people writing about emotional upheavals [28]. Analysis of exclusive and other cognitive words evidenced an important pattern: immediately after 9/11, people drastically increased in cognitive word usage for about a week. Soon thereafter, cognitive word usage dropped below baseline and continued to drop for the remainder of the study in early November.

The longterm drop in cognitive word usage suggests a certain passivity or reduction in critical thinking skills in the wake of a disaster. These findings are reminiscent of the lab studies by Glass and Singer [29] on psychic cost. In their studies, people were exposed to bursts of loud, unpredictable noise while working on tasks. Surprisingly, performance during the noise was not affected; however, after the noise stopped, people’s subsequent task performance greatly diminished. Later studies with children living next to expressway traffic showed the same aftereffects of unpredictable and uncontrollable stressors [30].

3. The Terrorism Paradox: When Good Things Come from Horrible Experiences

The events of 9/11, the death of young students, the effects of large scale natural disasters all extract an unforgiving human toll. In addition to the pain of the immediate survivors, these events arouse feelings of anxiety, constant fear, and recurring episodes of terror among the populace. Despite these powerful effects, a recurring series of positive effects have been emerging in our studies and others.

The linguistic analyses of 9/11 suggest that people felt more positive and were more psychologically connected with others in the weeks and months after the attacks compared with before the attacks. Similarly, the EAR data showed increased dyadic interactions with others. Even the earthquake and Gulf War study found drops in aggravated assaults in the first weeks after the events (although these rates increased to above baseline levels about a month afterwards). Markers of mental and physical health show similar benefits. In the 6 months after the Texas A&M Bonfire tragedy, the A&M students visited the student health center for illness 40% less than they had a year before – whereas these numbers remained unchanged at its sister school, the University of Texas at Austin some 150 KM away [31]. Note that there are similar reports of drops in suicide rates among Londoners during the Nazi blitz [32].

Terrorism has the unintended effect of bringing people together, making us feel more connected and appreciated. This is not a new idea, of course. Ernest Becker [33] argued that thoughts of death caused people to embrace their cultural values. Dozens of studies by Pyszczynski, Solomon, and Greenberg [34] have found that reminders of death cause people to believe more firmly in the principals that guide their lives. Oftentimes these principals include deeper beliefs in the correctness of their religion and their nation.

How can we reconcile the well-publicized findings of the high rates of free-floating anxiety, physical symptoms, and symptoms of Post-Traumatic Stress Disorder (PTSD) in the
general population after 9/11 [e.g. 35,36] with these puzzling positive effects? The reality is that most people felt both anxious and socially integrated – both bad and good. Large-scale surveys placed a frame on people’s lives to focus on the negative side of the 9/11 attacks. When any of us are asked about our reactions to a tragedy, the question automatically triggers tragedy-related schemas – thoughts of sadness, pain, loss. For most of us, the thought that a horrible event could be associated with love and meaning is disrespectful and downright inappropriate. This is where measures such as the EAR and online text analysis strategies can provide a more “frame-free” assessment of people’s lives. Note that we are not arguing that a cultural disaster is not like a dark storm; rather we argue that there are many silver linings. Indeed, these silver linings should be integrated into our thinking about and approaching terrorism and other disasters in the future.

4. Psychological Distancing and Implications for Interventions

Across multiple studies, it is clear that most people who deal with traumatic experiences ultimately cope quite well. Those who are most adversely affected by upheavals are the very people who were coping most poorly with life prior to the upheavals [37]. The linguistic analyses surrounding 9/11 and other cultural upheavals undoubtedly reflect the ways that healthy people deal with disasters. When the upsetting events occurred, most adopted a coping strategy characterized by psychological distancing. That is, they dropped in their use of first person singular pronouns, they started using bigger words, and were more concrete and cognitively complex in their posts. Although they exhibited brief increases in negative emotions, these returned to baseline within a week or so of the attacks.

Compare the 9/11 posts with writing samples of individuals who are chronically depressed. In both lab studies [e.g. 25] and blogs on depression websites in English [38] Spanish [39], people who are depressed use far higher rates of first person singular, tend to use shorter words and less concrete and complex sentences. Individuals who are depressed have difficulty emotionally distancing themselves from whatever topics they are addressing. Non-depressed individuals, including those dealing with an inherently upsetting topic such as 9/11, are quickly able to distance themselves from the event and seek out the companionship of others. Indeed, our data show that the more people write about the terrorist attacks, the more they distance themselves linguistically [16].

These findings have clear implications for potential interventions. Any short term, broad-based intervention strategies should probably reinforce distancing rather than demand people process their emotions and thoughts. This may explain the spectacular failure of debriefing strategies such as Critical Incident Stress Debriefing in the wake of a disaster [40]. Most debriefing techniques require that people who have witnessed a traumatic experience to emotionally process the event within 72 hours of its occurrence [41]. Instead of asking people to get closer to the trauma, our data suggests that any techniques to help people avoid the thoughts about it might be helpful.

Ironically, these data – together with those associated with the social stages model – hint that interventions that encourage emotional processing may be best suited to people several weeks or months after the event. Perhaps the earliest point at which emotional processing interventions would be appropriate would be when the social environment begins to actively discourage people from talking about the event. At the point that people feel no one wants to listen is the time that therapists should become available.

Because terrorism touches everyone in the culture, there are obviously large individual differences in how people respond. Realistically, most people probably need to be able to talk with close friends or family members. Others may simply not want to talk to
anyone. For those who don’t have access to a social network, the development of terrorism-related blog sites might be a good idea. By the same token, a small group of people – perhaps those most vulnerable to any kind of upheaval – will require hand holding and additional support. Whether immediate therapy is beneficial to them is simply not known at this point. We would hope that this is an area where future research efforts are focused.
References


