

The Psychological Role of the Internet in Mass Disasters: Past Evidence and Future Planning

Azy BARAK
University of Haifa

Abstract. Occasional national and international traumas and disasters may affect large numbers of people worldwide. Well-known incidents in the past decade include the death of Princess Diana, the tsunami in South-East Asia, Hurricane Katrina, the Pakistan-Kashmir earthquake, and the World Trade Center terror attack. In all these incidents, in addition to other, less publicized large-scale disasters, hundreds of millions people went through intense emotions of fear, panic, despair, depression, and anxiety. The Internet – through various channels of online communication – provided many of these people with an effective means of psychological relief. Research conducted on such mass traumas has documented the feasibility and effectiveness of Internet-assisted activities in helping people mentally survive the aftermath of such unusual circumstances. This chapter reviews these interesting research reports and identifies specific types and modalities characterizing the online provision of emotional relief. It is proposed to preemptively construct mass disaster-specific web portals that could be operated at times of need and provide numerous effective services. International organizations – such as the UN and its related agencies (e.g., UNICEF, UNESCO), NATO, the World Bank, the European Commission, Interpol, the Red Cross, and the World Health Organization – should consider the initiation and establishment of such institutionalized infrastructures to harness the Internet's ability to meet a population's psychological needs in the event of unpredicted mass-disaster incidents.

Keywords. Online communication; mass disaster; emergency; psychological assistance.

Introduction

The emergence of the Internet as a public domain in the mid-1990s, side by side with the significant development of friendly computer technology, introduced a major social change that has impacted numerous social institutions, processes, and procedures, as well as the way people operate, behave, and communicate. The introduction of a rich, efficient way of retrieving information almost freely and very comfortably, and of communicating with others easily and inexpensively has dramatically changed the way people do many things, including: socially interact; sell and buy; teach and learn; look for a dating partner or present oneself as one; search for and post information on any possible topic; play and gamble; trade merchandise and ideas; maintain intimacy and sex; provide and use professional services (medical, legal, psychological, etc.); publish and read books and personal writings; offer and receive emotional support; raise and

donate money; and do assignments for work and school, among many other common activities. In fact, the world and social life has meaningfully changed from the way it had been for generations (Bargh & McKenna, 2004; Haythornthwaite & Hagar, 2004). The *Information Revolution*, the sobriquet defining these developments, has taken place (Okin, 2005). For its part, psychology has interlaced into these changes (Barak, 1999), resulting in the area of cyberpsychology (Barak & Suler, 2008).

Internet-based communication is unique in having several characteristics, which, separately and together, make this kind of human interaction different from any other means of communication. Moreover, online communication is not only different in practical or technical aspects, but in that it causes people who use it to undergo psychological experiences that significantly affect the way they think, feel, and behave. Thus, online communication is essentially different from other, more traditional means of communication in generating special human experiences (Barak, 2007a). Some of the more prominent communication characteristics people experience online include: anonymity; invisibility; lack of eye-contact; the ability to write interpersonal messages; elasticity of level of synchronicity; neutralizing of status; and ease of mass and public dissemination of messages. These characteristics, as well as some other aspects of communication through the Internet, enable – and influence – people to communicate in a way that usually makes them more spontaneous, expressive, genuine, and open (Bargh, Fitzsimons, & McKenna, 2003; Bargh, McKenna, Fitzsimons, 2002; McKenna, 2007, 2008; McKenna & Seidman, 2005, 2006). This special pattern of behavior, allegedly presenting the true self, is known to be caused and accelerated by the online disinhibition effect (Joinson, 2007), which operates like a double-edged sword, having both toxic and positive faces (Barak & King, 2000; Suler, 2004). In addition, the uncertain, ambiguous environment created in cyberspace elicits the operation of various dynamic psychological mechanisms that influence a person's functioning and very being (Suler, 1999; Turkle, 1997, 2004).

The Internet allows efficient, convenient, inexpensive, and flexible global communication. The simple fact that communication through the Internet can be executed from practically anywhere and at any time (a phenomenon that is frequently termed *ubiquitous computing*), whether by desk or laptop computer, mobile phone or other portable device, wired or wireless, allows not only flexibility in usage but extensive mobility and almost seamless roaming. Moreover, because the Internet enables connection and communication via various means of transmission – phone lines, fiber optic cables, Wi-Fi networks, satellite, etc. – it almost ensures durability, robustness, solidity, and resilience of communication. These special technological characteristics – which are constantly undergoing further development and upgrading – directly transform into unique social and psychological experiences. That is, people feel relatively certain they can flexibly and enduringly connect with information resources, as well as with other people, and be reached by others at a time of need. This is, in part, what makes the Internet an empowering agency for many individuals (Amichai-Hamburger, McKenna, & Tal, 2008).

Furthermore, the Internet provides a unique means for actually receiving help and assistance for people in need. Numerous professional reviews, case studies, and empirical investigations have supplied evidence that clearly shows not only that people use the Internet when they need help and assistance but also that many actually obtain the help they seek, finding answers, relief, or remedy. This general rule holds in various areas, for which numerous specially-designed resources are available, including: medical (De Boer, Versteegen, & van Wijhe, 2007); emotional (Barak,

2007b); impairment- or disability-related (Barak & Sadovsky, 2008; Sanyal, 2006); gender (Beck, 2005; Döring, 2000); aging (Fuglsang, 2005); minority- and refugee-related (Mehra, Merkel, & Peterson Bishop, 2004; Siddiquee & Kagan, 2006); various psychological aspects (e.g., Polomano, Droog, Purinton, & Cohen, 2007); and legal (Maggs, 2006) or financial (Sillence & Briggs, 2007). Operated by either government or voluntary associations, many online resources nowadays provide help by means of multiple procedures, such as: publication of relevant and valid information (Allwes & Popovich, 2007); supply of guidance, counseling, and therapy (Barak, Hen, Boniel-Nissim, & Shapira, 2008); and initiation of diverse support groups (Barak, Boniel-Nissim, & Suler, 2008).

Indeed, many people use the Internet to seek help when, for any reason, it is not available within their physical proximity, or when they prefer to conceal their identity. In the context of the current chapter, people's use of the Internet to obtain assistance and to share distress seems to be clearly tied to this medium's availability, convenience, and anonymity. The examples that follow illustrate the exploitation of the Internet by large numbers of people in times of mass disasters, crises, traumas, and other large-scale catastrophes.

The Internet and Incidents of National and International Crises and Disasters

Over the past decade, quite a few crises, traumas, and disasters of national and international scope have taken place. These events, involving natural forces, accidents, and terror and wars, had two common denominators: they were unexpected, and they mentally affected a great number of people. Such traumatic incidents would be defined as –broadly speaking – mass psychological disasters regardless of how much they seemed to only cause physical harm. The sections that follow describe five such disasters and the function of the Internet in each event according to empirical research and personal testimonies.

The Death of Princess Diana

Diana, the Princess of Wales, first wife and divorcee of England's heir apparent, Prince Charles, died on August 31, 1997, in a fatal car accident in Paris, France. In her lifetime, Diana was admired and loved by many of the British people, and she gained popularity across the world as a charming and caring person. Her unexpected death generated enormous grief worldwide, but especially in England, and led to tributes and ceremonies, as well as countless tangible expressions of sorrow, consisting especially of printed cards, huge amounts of flowers, memorial candles, and personal gifts that people left at her residence and at churches, town halls, public buildings, war memorials, and even shops throughout the UK and many other countries (Bull, Clark, & Duszynski, 2002-2003). It was also found that Diana's death influenced suicides and deliberate self-harm (Hawton et al., 2000). For many others, the incident elicited vivid, stable, and durable negative memories (Hornstein, Brown, & Mulligan, 2003; Kvavilashvili, Mirani, Schlagman, & Kornbrot, 2003). Media commentators often referred to what was taking place as mass hysteria in a mourning nation, perhaps representing fears as well as hopes for a better society (Walter, 2001). A special website called *Journey of Hearts* (www.journeyofhearts.org) was launched to enable common grieving space. The unfortunate event was massively covered by the media,

which in turn not only reflected people's mourning experiences but apparently also contributed to them (Brown, Basil, & Bocarnea, 2003; Pillow & McNaughton Cassill, 2001), by spreading conspiracy theories related to the accident (Douglas & Sutton, 2008) and popular stories that did not actually reflect the realities of mourning (Mallory Wober, 2000).

Although Diana's death occurred soon after the onset of public Internet the way we know it today – that is, with graphic browsers, and online group-communication means (e.g., e-mail, chat rooms, and newsgroups) – many people communicated about the incident online. The purpose of these synchronous and asynchronous communications was to share grief, ruminate on both emotions and gossip, and express hostility (Stone & Pennebaker, 2002). Newsgroups (the former version of the current forums) were intensively exploited to spread rumors concerning the alleged murder of Diana by certain agencies for certain reasons (O'Leary, 2002), and to focus on and highlight conspiracy theories concerning her death (Punt, 2002). It seems that this mass grieving event was the first ever where the Internet played a major role, both by rapidly dispensing information and by providing a space for people to assemble for common support. The following is a typical excerpt from mourning messages in a forum:

If I may, I would like to share with you my thoughts and feelings about this tragic event. When I first found out that Princess Diana had been killed in a car accident I cried for her sons. I cried at the thought of a life being taken at such a young age. I cried for the senseless loss of such a unique and vital woman. I cried for the people who's [sic] lives and hearts she touched. I cried for the causes that supported because she cannot be replaced and will surely be missed by all. (Brunette, n.d.)

Although, some might reject the notion that the death of Princess Diana was a traumatic event, it nevertheless represents the expansion of grief from a private experience to a mass crisis expressed in public domains through the use of communication technologies. In effect, a new culture of human experience now emerged – death images and events began to be thoroughly mediated by the visual and communication technologies that vast numbers of people across the globe could employ. Death became a televisual, cinematic, and journalistic image and narrative, different from real-life temporalities of death and bereavement. The death of Diana has become eternal due to the continuous and durable presence of online text and imagery (Gibson, 2007).

The World Trade Center Terror Attack (aka 9/11)

On September 11, 2001, two commercial airplanes, hijacked by Al-Qaeda terrorists, deliberately flew into the Twin Towers of the World Trade Center (WTC), located in lower Manhattan in New York City. At about the same time, two other hijacked planes crashed, one into the Pentagon (the headquarters of the US Department of Defense) and the other, which had apparently been heading to the Capital or the White House, into an open field in rural Pennsylvania. The main attack, that on the WTC, caused the total collapse of the two skyscrapers, and consequent great damage to a huge area in lower Manhattan, and the death of close to 3,000 people of many nationalities, but mainly Americans.

The catastrophic terror incident shocked America as well as populations worldwide. Because of the size of the disaster, many people had a direct relation to it and were hurt by it, but millions of others around the globe were affected by the

extreme attack and its implications for everyone's security. The psychological responses ranged from fear and anxiety to depression and stress, but included feelings of frustration, anger, and vengeance. Data collected immediately after the event showed that people displayed a wide array of psychological dysfunction (Resnick, Galea, Kilpatrick, & Vlahov, 2004; Silver, Holman, McIntosh, Poulin, & Gil-Rivas, 2002). Detailed, specific, and vivid memories were carried by people of many nationalities (Kvavilashvili et al., 2003). These negative memories were reflected in data collected from a large Internet sample, showing that posttraumatic symptoms actually increased in most respondents and became more severe with time (Butler et al., 2005). Intensity of posttraumatic stress symptoms was related in severity to the level of depression (Rubacka et al., 2008). Posttraumatic stress disorder (PTSD) symptoms were found five and six years following the attack (Brackbill et al., 2009).

The psychological aftermath of the WTC terror attack was well reflected on the Internet. The level of distress following the attack was mirrored in and identified in the analysis of people's writings on their experiences of the attack (Graves, Schmidt, & Andrykowski, 2005). Similar findings emerged in research that analyzed people's writings in forums and blogs as linguistic markers of trauma. Linguistic markers – such as expressions of emotional positivity, social orientation, and psychological distancing – were well-detected in comparisons of online writings made shortly before and soon after the attack (Cohn, Mehl, & Pennebaker, 2004). For example, in the short-term, participants expressed more negative emotions and were more cognitively and socially engaged. After two weeks, their moods and social referencing returned to what they had been prior to the attack, and their use of cognitive-analytic words also dropped. Over the next several weeks, the participants' social referencing continued to decrease. Although the effects were generally stronger for individuals who were highly preoccupied with the attack, even those who hardly wrote about the events showed comparable language changes (Cohn et al., 2004).

Two reports, based on surveys conducted shortly after 9/11, showed that the terror attack was significantly reflected in the way Americans used the Internet (Rainie, 2001; Rainie & Kalsnes, 2001). The surveys, conducted a few days after the attacks had taken place, found that the Internet had not actually constituted a primary resource for news or outreach for most Americans after the events. It had, however, proved to be a helpful supplement to news received by radio, television, and telephone. Many found it useful as an interactive tool, with which they could express their sorrow and anger at the assault, something that could not be done, or done as readily, with traditional media. Dutta-Bergman (2004) found that Internet and telephone communications following 9/11 complemented each other. In the days after the attack, the number of people browsing the Internet fell, as did the number of people sending and reading e-mail. For instance, before the attack, 51% used email during a typical day; this figure dropped to 42% on the days following the attack, and increased to 49% a week and a half later; browsing for fun had been 20%, dropped to 13%, and rose back to 20% for the same time periods. Only the obtaining of news online did not show this pattern, as it changed from 22% to 27% to 26%, respectively. These findings highlight the importance of using e-mail communication on top of personal speech-based conversations (Dutta-Bergman, 2004). In addition to the obvious convenience of asynchronicity in communication, online written communication attracts people as a unique channel for sharing their experiences because it allows time for reflection and elicits subjective feelings (though unrealistic) of privacy and anonymity.

The findings of Rainie and Kalsnes (2001) also showed that Americans were eager for contact and reassurance in the aftermath of the attacks, and that there was an outpouring by tens of millions who personally responded to the crisis. Although the overall size of the online population was slightly smaller than usual, there was much heavier use of news sites online. Many Internet users visited a virtual town square; in the 48 hours after the crisis, 13% of Internet users “attended” virtual meetings or participated in virtual communities by reading or posting comments in chat rooms, online forums, or sending messages to e-mail lists – a figure that is approximately four times that under normal circumstances. In terms of content, Internet users were doing everything online, including: grieving and comforting each other; having reasoned discussions about policy options; and partaking in flame wars, during which emotions ran high and insults were exchanged. To be specific about online usage, 46% of Internet users received or sent patriotic material by e-mail, 33% received or sent e-mail prayer requests, 25% received or sent e-mail messages of consolation, 12% sent e-mails to people they had not spoken to in years, and 10% received e-mails from people they had not spoken to in several years (Rainie & Kalsnes, 2001). The multidimensionality of online communication was well-observed in blogs, which efficiently served for dispensing news, sharing personal experiences, and generating political discussions (Krishnamurthy, 2002).

Online communities proved an emotional, spiritual, cerebral, primal, and sorrowful venue for Americans to sort out their feelings and hash out their views. The Internet became a back-up for some whose phones did not work well, though many users had problems in the early hours after the attack trying to access websites. In all, some 30% of users reported that the Internet had helped them learn about what was going on in the first days after the attacks, and 29% said the Internet had helped them connect with people they needed to reach (Rainie, 2001).

In addition to its popularity in relation to the 9/11 terror attack and their aftermath, the Internet was also exploited for professional interventions. For example, Litz, Engel, Bryant and Papa (2007) employed web-based, therapist-supported, self-management cognitive behavioral therapy (CBT) program in the treatment of PTSD related to 9/11 and the Iraq war, and compared it to online support counseling. Both interventions were found highly effective, but the self-management program was more so. Stuber, Galea, Boscarino, and Schlesinger (2006) suggested, however, that there was a potentially unmet mental health need in New York City as a result of the 9/11 attack; however, these findings could be questioned by research showing an apparent decrease in rates of PTSD (Butler et al., 2005). Therefore, interventions should have targeted persons with mental health needs who did not previously seek help from a professional. Indeed, in a study conducted several years following 9/11, Ruggiero and his associates (2006) provided data to support evidence that web-based, cognitive-behavioral intervention was feasible under such disastrous conditions.

The Tsunami in South-Eastern Asia

On December 26, 2004, an inner-ocean massive earthquake, measuring more than 9 on the Richter scale, caused a gigantic tidal wave – a tsunami – to sweep over large coastal areas of the Indian Ocean, inundating villages of Bangladesh, India, Indonesia, Malaysia, The Maldives, Myanmar, Sri Lanka, and Thailand. The tsunami caused extensive loss of life and large-scale damage to infrastructure. It is estimated that nearly 300,000 people were killed (World Health Organization, 2005-2009), and

that damages totaled almost 4.5 billion US dollars (Centre for Research on the Epidemiology of Disasters, 2005).

Several research projects attempted to evaluate the mental effects that the tsunami had on residents in the affected areas. Becker (2007), Bhushan, and Kumar (2007), and Raj and Subramony (2008) reported significant psychological effects on tsunami survivors in India, including high stress level, anxiety, and other pathological symptoms necessitating professional care. Thienkrua and her colleagues (2006) and Tuicomepee and Romano (2006, 2008), studying Thai children and adolescents in the affected areas, found significant evidence of PTSD, depression, anxiety, and behavioral withdrawal, reflected in difficulties in concentration, nightmares, obsessive thoughts, and more. Similar findings were obtained in Sri Lanka (Neuner et al., 2006). Interestingly, but not surprisingly, Weidmann, Fehm, and Fydrich (2008) found similar symptoms in reporters who covered the tsunami disaster.

The Internet played a major role in relief and support efforts for millions of people worldwide who had been direct or indirect victims of the tsunami. According to Coren (2005), in a report for CNN, the role of the Internet in helping supply aid, raise money, and provide information in the aftermath of the tsunami was unprecedented. One of the main ways the Internet proffered immediate help was by allowing people to request and make donations for numerous aid services and supplies. Another way that the Internet was exploited after this natural disaster was by displaying thousands of pictures, accompanied by personal details, posted by friends of missing people with the hope of acquiring information about them. This was especially true among visitors to the tourist-packed zone hit by the tsunami. At the same time, bodies of unknown victims could be identified from pictures and other details posted on dedicated websites. Unfortunately, abusing phenomena of spamming and phishing of these websites, forums, and e-mail lists also occurred (Coren, 2005).

Ramos and Piper (2005) described and analyzed blogs that serviced several countries and areas hit by the tsunami, and that had been set up immediately after the disaster for ongoing information and news, donations, and reports about missing people. These authors found that, besides offering personal observations and reports, the blogs served important purposes, including: sharing emergency-response information, connecting people to missing victims, and sharing information about donations and volunteering opportunities.

Samarajiva (2005) criticized governments for not using readily-available Internet technology effectively in areas affected as an efficient hazard-alert vehicle that may have saved many people. In this context, Perry (2007) reported that in Mauritius, the Internet had hardly been exploited to disseminate tsunami-related information despite the fact that many of the island inhabitants were connected to it. The absence of this special way of alerting – and the inefficient use of television and radio for the same purpose – caused a great delay in that country in disseminating news about the tsunami warning after the earthquake had erupted.

The Internet was also used for screening and psychotherapeutic interventions in traumatic individuals. Vetter and Henley (Chapter 2 of this volume), for instance, present data obtained from an Internet-based self-screening instrument for assessing psychological stress reactions in the aftermath of the 2004 tsunami. Vermetten, van Middelkoop, Taal, and Carll (2007) described a project aimed at psychologically supporting survivors of the tsunami through a dedicated professional website. The site provided important information in publishing tips and instructions related to various relevant subjects (e.g., medical, emotional, and food-related concerns), initiated both

by the project managers and experienced users of the site. In addition, support groups composed of victims were launched and accumulated numerous active participants. Also, the site offered professional advice by experts. The authors reported on the great impact of the site and demonstrated the impact by dozens of vignettes and brief case examples.

Hurricane Katrina

Katrina – a hurricane storm named by the US National Hurricane Center – started in the Atlantic Ocean and moved on a path through the Gulf of Mexico toward New Orleans, Louisiana. Winds increased to over 250 km per hour, creating huge waves at sea. From August 23 to 30, 2005, the storm hit the land, bringing devastation to large portions of New Orleans and its environs. A great proportion of the city was flooded, and the strong winds demolished large urban sections. In addition, massive areas of southeastern United States were strongly affected by the storm. The impact on people was highly severe, despite early warnings and the evacuation of millions of people. More than 2,500 individuals died as a direct result of the storm. The cost of the damage inflicted was estimated at approximately 90 billion US dollars. In its aftermath, Katrina caused secondary devastating effects, including looting and violence and great damage to the environment.

Unlike the three disasters reviewed above, the media and local authorities had warned the population about Hurricane Katrina. Evacuation of most residents from a large geographical region was conducted in advance to lessen physical harm. Despite this a priori stage, and because of the great damage done to the area, psychological effects were significant. Galea and colleagues (2007) studied a large sample of pre-hurricane residents of New Orleans in the aftermath of the storm and followed them up for several months. The researchers found high levels of anxiety disorders and disaster-related stressors, which were further related to adverse physical health symptoms. Other studies provided evidence of inter-group aggression (Kemmelmeier, Broadus, & Padilla, 2008). African-Americans suffered the most in terms of distress factors related to the disaster (Lee, Shen, & Tran, in press), while adolescents exhibited posttraumatic stress and elevated aggression (Marsee, 2008), and children showed similar devastating psychological effects (Drury, Scheeringa, & Zeanah, 2008).

In several aspects, the Internet's role was key in helping residents of the affected areas. During the hurricane, blogs became a standard, accepted means of communication, and several blog sites served as a center for delivering news, instructions, pleas for help, and for sharing personal experiences (Glaser, 2005). Reporters used blogs to publish reports from the disaster areas, often accompanied by pictures; one such blogger earning the Pulitzer Prize. The role of the Internet was especially highlighted in this disaster, as this event and its aftermath lasted up to weeks in some locations, and people were generally separated from one another and from authorities during this period.

Horrigan and Morris (2005) reported two main ways in which the Internet was exploited in the case of Hurricane Katrina: getting news and making donations. Their survey found that more than 13 million Internet users had made donations online (this figure, however, refers to both Hurricane Katrina and Hurricane Rita, the latter happening approximately a month later). Procopio and Procopio (2007) reported survey results in regard to New Orleans residents during Hurricane Katrina. The Internet was seen to have two major roles: an instrumental role in providing important information,

reporting damage, etc.; and an expressive role in providing people with a community in which they could share and receive support. The researchers found that most of those affected had indeed gained from these two roles, though different groups exploited these roles differently. Torrey and her colleagues (2008) described two types of local online communities that had been formed in the affected area: small blogs, and large forum-based communities. These authors described the roles and accomplishments of the virtual communities, including: reporting relevant information and news, distributing donated goods directly to hurricane survivors, and providing some emotional support. It seems that a major challenge was the lack of an authoritative leadership that could guide, drive, and direct these communities (Torrey et al., 2008). Macias, Hilyard, and Freimuth (2009) analyzed the use of blogs two weeks following the storm and identified four major functions: communication, political dissemination, relaying information, and helping others. However, these researchers highlighted a unique function seldom mentioned: emotional therapy. The authors underlined the special role of the blogs in providing individuals with an efficient way to express and share feelings and experiences as well as obtain emotional support. An example they quoted from a blog posting could exemplify expression of feelings:

I was sitting in my house on my favorite chair, in front of my computer, eating food from my refrigerator, on my phone, typing my lesson plans for my Math class for the upcoming week. Now I have none of those luxuries: No home, no chair, no computer, no phone, no job, no students to prepare lessons for... (as cited in Macias, Hilyard, and Freimuth, 2009, p. 14)

Another important function enabled by the Internet is locating missing people. In this regard, Scaffidi, Shaw, and Myers (2008) interviewed six creators of *person locator sites* about their experiences in operating these services. These sites helped people locate others, but faced several major problems that hindered their functioning. For example, there was neither collaboration nor coordination among them; hence, much of the effort was redundant. In addition, some sites were abused by the posting of aggressive messages (Scaffidi, Shaw, & Myers, 2008). Thelwall and Stuart (2007) reported that blogs were written and read on a mass scale both during the storm and in its aftermath for communication with others and for obtaining news. Their use in fact exceeded the use of telephone and traditional media, apparently for practical reasons – because online communication proved less vulnerable under the effects of the storm. This finding was consistent with what had been found even in the early days of public Internet in regard to Hurricane Danny (Piotrowski & Armstrong, 1998).

The Great Pakistan-Kashmir Earthquake

On the morning of October 8, 2005 (local time), a powerful earthquake centered in Pakistan-governed Kashmir shook the region, killing almost 80,000 people and leaving many others homeless. Despite the catastrophic disaster, the Kashmir earthquake received less international attention than had many other disasters, apparently because of its remote, rural location and the special political circumstances that characterized the region. Brennan and Waldman (2006) reported great difficulties in rescue operations and supplying health-related assistance. Eventually, after special efforts by the United Nations and the World Health Organization, aid was provided. Khan (2006) and Najam, Mansoor, Hussain Kanwal, and Naz (2006) reported severe

psychological traumas among survivors, as well as great mental difficulties related to the loss of family or property, or to personal injuries.

The Kashmir disaster area was relatively underdeveloped in terms of technology, and, as mentioned, attracted relatively little international attention; hence, exploitation of the Internet during the crisis was limited. Thelwall and Stuart (2007) studied and compared blogspace use in three crises: the Kashmir earthquake, Hurricane Katrina, and the London terror attacks. They found that, although blog texts reflected the disasters and the aftermath in all three incidents, blogspace was used least in the case of the Kashmir earthquake. Blogs – reflecting Web 2.0 technologies – have a high rate of use for social communication in developed areas; however, they are much less employed in less developed areas, like rural Pakistan. This is consistent with Laituri and Kodrich's (2008) assertion that, among technologically-deprived populations, Internet media are less exploited as "sensors" (p. 3040) to detect and disseminate news of disasters. Nevertheless, the Internet was used for telemedicine applications in relation to this disaster, as reported by Gul and his associates (2008). The medical team was able to exploit the Internet to enable an assessment to be made and treatment to be delivered from a distance to a large group of paraplegics injured in the incident.

Internet-Enabled Social Functions in Mass Disaster Incidents

The five large-scale traumatic disasters reviewed in this chapter provided specific information, research, and general impressions of the social and psychological role of the Internet under extreme circumstances. Furthermore, it seems that the aforementioned events and examples show that Internet-based applications are not procedures that might or could be used effectively in mass disasters and crises, but that *ought* to be exploited to enable the provision of different types of emotional, social, and mental health aid and relief. Indeed, the Internet is simply a means of communication; however, its special characteristics, proven affordability, and durability in both environmentally and socially disastrous conditions make it perhaps the leading vehicle for offering various kinds of relief. Obviously, it is not the Internet that provides help and rescue; rather, it is motivated and skilled people who do (Schechter, 2008). Advanced technology, however, enables these people to offer the help in more efficient ways. By the same token, it enables people in distress to look for help and find some relief.

The following list of social and psychological functions characterizing the infrastructure of the Internet is based on accumulated experience (as shown in the case examples reviewed). Obviously, this list is not finite or closed in any way; additional possibilities and procedures – enabled by emerging technologies and applications, as well as by developing ideas and methods in the behavioral sciences – will eventually also be available.

Diffusion of Reliable Relevant Information

People need to know and understand their existence and situation. Mass disaster generates a chaos that enhances this need (cf. Lu et al., 2007). Preemptive actions can and should be made to forecast, educate, prepare, alert, and disseminate authoritative, reliable information in relation to mass disasters (e.g., Bernard, 2005). To paraphrase Rozeman and Mayeaux (2006), who reviewed health-related issues in the context of the

aftermath of the Katrina and Rita hurricanes, effective communication is a key to managing disaster recovery – especially in relation to healthcare efforts on behalf of evacuees. Existing daily communication sources can be overwhelmed as a result of a disaster, and, therefore, emergency plans must be in place beforehand. Credible, updated, and ongoing information is very valuable for people who find themselves in traumatic circumstances, such as the aftermath of a mass disaster. The adverse effects of rumors and conspiracy theories, as exemplified in the case of the death of Princess Diana, are considered a typical social phenomenon that might be repeated in similar situations (Walker & Gibbons, 2006). Only reliable information coming from credible sources can block such negative social processes. In this context, it should be noted that, although information about psychological trauma may be found in abundance online, such sites are frequently not useful since the information on them is inaccurate, obsolete, and unreliable (Bremner, Quinn, Quinn, & Veledar, 2006).

Sharing Information on Personal Distress

People in disaster areas are not only under distress, but are also carriers of information of potential importance regarding social and physical incidents related to the situation. These people may serve as possible sensors in remote, unreachable, or undetectable locations, and support rescue and help operations (Laituri & Kodrich, 2008). They may report personal conditions or what is happening in their surroundings, and direct and support authorities accordingly. Indeed, the sharing of personal, emotional conditions may also assist aid services and the authorities in applying possible professional interventions that may be needed.

Maintaining Personal Communication Within and Outside the Community

Maintaining continuous communication with as many people as possible in the disaster area is imperative. Personal communication through e-mail and chat is essential, as it can both lead to an assessment of people's condition in the affected areas and induce encouragement and hope (Cowen, 2008). It seems that person-to-person and person-to-resource communication helped lead to individual sentiments of relief in disaster areas, as indicated in a large survey following Katrina (Procopio & Procopio, 2007). It should be stressed that many people in an unexpected disaster incident feel isolated and lonely; hence, online communication should be considered essential for their mental survival.

Locating Missing People

As happened in the 9/11 terror attack, Hurricane Katrina, and the Asian tsunami, missing people are a common characteristic result of many mass disasters. Friends and relatives of those who were in the damaged location typically put up posters in nearby areas in an effort to locate or receive some information about those missing. In the incidents cited, it became clear that the Internet could efficiently be exploited for this purpose by allowing people to post messages and pictures in blogs or dedicated sites, as well as send e-mails containing information about those missing to specific distribution lists. These online vehicles seem to be more durable and have a wider circulation than traditional posting means (Palen & Liu, 2007; Van de Walle & Turoff, 2008). Given

the low cost and immediacy of online publication, this method of searching for missing persons appears to be irreplaceable.

Use of Remote Psychological Assessment Instruments

Assessing the medical and psychological condition of survivors is an important mission under disaster circumstances, as rescuers and authorities need to know where and how to focus help operations. Online psychological assessment – especially testing, but also interviews and other means – has developed significantly in the past decade (Barak & Hen, 2008). A meta-analysis revealed that there was no difference between diagnostics conducted face-to-face and through telepsychiatric means (Hyler, Gangure, & Batchelder, 2005). Similar findings and conclusions were drawn in a more recent research review (Antonacci, Bloch, Saeed, Yildirim, & Talley, 2008). Using such Internet-based procedures in disaster situations – through a dedicated site, e-mail, or videoconferencing – may contribute to furthering the provision of mental health services.

Providing Group Support

Participation in online support groups at a time of personal trauma is known to be an important means of obtaining psychological relief, in addition to relevant information and advice from peers. Such support groups were found in empirical studies to be effective in the aftermath of the tsunami (Vermetten, van Middelkoop, Taal, & Carll, 2007) and at times of bereavement in general (Vanderwerker & Prigerson, 2004). Extensive reviews of online support groups have provided much evidence of their ability to empower participants as well as to contribute to the participants' general well-being (Barak, Boniel-Nissim, & Suler, 2008; van Uden-Kraan et al., 2009). Online support groups, usually offered through forums, but also through chat rooms and e-mail lists, are easy to form and manage in a time of need. Borders do not obstruct their reaching users, anonymity may be fully maintained, and such groups are available at any time of day.

Providing Trauma-Related Counseling and Therapy

Web-based, self-help therapeutic applications have been under development since the beginning of the 21st century. Generally, they have been found to be effective in several areas (especially anxiety and stress reduction), and, in fact, as effective as traditional, face-to-face methods (see extensive reviews by Barak, Hen, et al., 2008; Griffiths & Christensen, 2006; Reger & Gahm, 2009; Spek et al., 2007; van't Hof, Cuijpers, & Stein, 2009), and through several approaches (especially CBT). Generally, case studies, as well as extensive empirical research, showed that therapeutic interventions provided either through self-help, web-based programs, or by online communication (via e-mail, chat, or videoconferencing) between a therapist and a patient, can be feasible and effective alternatives to face-to-face therapy (Barak, Hen, et al., 2008). In the specific context of mass disaster, Litz, Williams, Wang, Bryant, and Engel (2004) and Hirai and Clum (2006) tested self-help, web-based CBT for trauma-related symptoms and showed its effectiveness on several measures, such as depression, anxiety, and PTSD symptoms. Recently, a similar self-help, web-based intervention approach, with minimal therapist contact through e-mail, was found to be highly

effective in treating PTSD symptoms by Klein and her associates (2009). Cohen and Mannarino (2008) outlined important policy-related implications of such interventions that ought to be considered in planning for disaster situations. An important advantage of such interventions is that they can be prepared and launched for use at any time and by any user. In addition, these interventions do not necessarily need actual, ongoing human involvement by therapists, as the therapy programs are launched and presented online and controlled and activated by users alone. This way, web-based therapeutic programs may be planned and designed by experts before any type of a mass disaster occurs and could be used by patients at time of need to cope with posttraumatic symptoms (see recent review by Amstadter, Broman-Fulks, Zinzow, Ruggiero, & Cercone, 2009). In addition to web-based therapeutic approaches, therapy through various online communication channels (e.g., e-mail, chat, video conferencing) may offer another option for personal counseling at a time of need (see recent review by Goss & Anthony, 2009).

Allowing Space for Posting and Reading of Personal Diaries and Reports

It is well-documented that writing provides special emotional relief for many people (e.g., Wright, 2002; Wright & Chung, 2001). The Internet provides a convenient opportunity for those who would like to write and openly share their personal experiences with others through forums, chat rooms, and, especially, blogs. Furthermore, unlike paper diaries, online writing provides an efficient way to obtain responses from readers if writers have allowed for interactive responses. Blogs supply a kind of personal online space, in which a person may post messages and graphics, cite and give links to other online resources, and maintain communication with others. Blogging under a condition of personal distress may provide a special kind of therapeutic relief (Baker & Moore, 2008; Ko & Kuo, 2009; Nagel & Anthony, 2009; Tan, 2008), including a possible replacement of traditional types of therapeutic help at the time of a disaster. Indeed, blog writing was shown to provide relief in the cases of the 2005 London terror attack, Hurricane Katrina, and the Kashmir earthquake (Thelwall & Stuart, 2007).

Providing an Online Grieving Space

The Internet can provide a convenient place for grief after the loss of someone close. Dedicated sites provide virtual memorial places, individual areas where personal messages, pictures, prayers, and encomia may be posted and virtual candles lighted by visitors. In addition, special online communities can be organized as both memorial and support groups after specific disasters. Such online services offer a convenient meeting place for strangers who share the same crisis (Dyer & Thompson, 2000; Sofka, 2009). Indeed, online grief may provide relief and positive feelings to people anywhere who want to actively participate and identify with other people who have suffered loss in the disaster.

It should be emphasized that using and relying on the Internet in providing disaster-related solutions and remedies is far from a perfect approach. First, the Internet depends upon the smooth operation of the numerous technologies involved. A problem in one or more of these necessary ingredients (e.g., an electrical power interruption) might cause a failure of the whole system. Second, although a growing number of people use the Internet on a regular basis, there are still many millions that either

cannot afford the adoption of new communication technologies or are not computer literate enough to utilize it efficiently. This digital divide does not only discriminate among people and social classes, but – and particularly relevant to access to help resources – may be related to inability to provide help to many people in need. Third, many people expect and prefer a personal relationship with help providers. For these people, support through computer-mediated communication is perceived as being cold and alienating, and is therefore less effective. Nevertheless, due to ever-growing technological sophistication, rapid and broad penetration of the Internet into homes and institutions, and accumulated evidence concerning the success of online application in providing help, it seems that the drawbacks listed above will gradually weaken or even diminish.

A Dedicated Mass Disaster Internet Portal

The Internet-based procedures and applications described here can – if planned and constructed preemptively – significantly enhance social conditions in mass disaster areas, reduce human miseries, and provide concrete and substantial means of promoting rescue and relief services. Using these procedures is rather simple and relatively inexpensive; and, after investing in appropriate technology, design, and training, both authorities and rescue services, and the people in distress, may be rewarded. It seems that the greatest challenge is constructing the necessary association between the various applications and the policies of governments and non-government organizations, as these leading bodies should finance, prepare, and develop relevant courses of action.

A practical way that the various emergency resources listed above might be offered at time of mass disaster is through a dedicated Internet portal. Such a website may be designed and prepared at any time – along with training of staff associated with it – and set at a hibernated state until it is needed. Emergency portals like this may be prepared in different languages and saved in alternative servers at various geographical sites throughout the world. It is proposed that such a mass disaster portal should incorporate six sections (sub-sites) in offering comprehensive help if and when mass disaster erupts:

- **Information** – Information published on the site will be continuous, full, comprehensive, reliable, and supervised by an authoritative body for accuracy. It will include a Question and Answer (Q&A) section, hyperlinks to relevant and reliable online resources, and an area dedicated to possible calls for volunteers and donations.
- **Assessment** – This area includes professionally supervised, updated, reliable, and valid online tests and questionnaires. Results will immediately be generated and provided online, and will include possible referrals to relevant online assistance resources.
- **Online Counseling** – This area will supply information on and online contacts with trained counselors who provide therapy through online communication channels. Both e-mail and chat options will be proposed to fit different personal preferences of people in distress.
- **Web-Based Interventions** – This area will offer self-help, web-based interventions, based on CBT approaches, and designed to treat various PTSD

symptoms. Different interventions will be arranged according to targeted therapies and the specific problem areas they treat.

- **Blog Publishing Space** – This area will be designed to enable and encourage expressive writing by people in distress. The site will be prepared using user-friendly blog-writing software that people can adopt quickly. Such blogs may also be used to enable calls for help or specific assistance needed, and to help in locating and identifying missing people.
- **Online Support Groups** – An appropriate platform will be designed to offer participation in support groups focusing on several areas of distress, such as mourning, fears and anxieties, and depression and suicidal ideations. Groups will be moderated by trained professionals.

A portal dedicated to mass disasters requires a long and thoughtful process, in addition to financial and technological resources. Needless to say, it should be offered free of charge, so its construction and maintenance costs should be covered by authorities or philanthropic bodies to be equipped with modern facilities for unknown disasters. Such investment could prove highly beneficial at time of need. Use of the portal following actual disaster, followed by research and development, could directly contribute to further improvements to better serve its ends. Such research is not simple due to the nature of uncontrollable events the portal is targeted for, in addition to other obstacles (e.g., language, culture, age, and numerous other moderating variables). However, it seems that action research could accompany the preparation and use of such a portal in the aftermath following a mass disaster event.

Conclusion and a Call for International Initiative and Enterprise

This chapter reviewed several mass disasters that have generated severe local or international effects in terms of people's mental health. It was shown how these incidents impacted individuals not only physically, economically, and politically, but also mentally – both at the time immediately following the calamity and in the long-term. This chapter also examined how several online applications went into action in these extreme circumstances to enable help and relief to be brought in various ways to the people affected. With the Internet as their infrastructure, the procedures and methods used were seen to play numerous social and psychological roles, thus directly providing significant help to people in distress.

It should be emphasized, however, that such serendipitous and accidental exploitation of the Internet by people in catastrophic situations is definitely insufficient. Now that professionals across disciplines have experience in and are aware of these special functions of the Internet, a priori preventive initiatives should be taken to enhance usage of the Internet at times when there is great need for large-scale help owing to special disastrous situations. This could be done in two parallel, synergetic ways: (a) the construction and maintenance of an upgraded, tenable, destruction-proof communication network that could service people and communities worldwide via wired, wireless, and mobile devices, operated and connected by various means, both land-based and satellites, and backed up by sophisticated power sources, and (b) the initiation, preparation, and worldwide dissemination of information concerning this emergency network, particularly its numerous uses and applications. In this context, Samarajiva (2005) may have reflected the message when stating:

There is much that ICTs [Information & Communication Technologies] can contribute to the alleviation of human suffering caused by disasters. ICTs enable the linking of the physical world within which hazards occur and the symbolic worlds of the humans likely to be harmed by those hazards, so that they may take life-saving action. But effective linking of these worlds requires not only the use of ICTs, but also the existence of institutions that allow for the effective mobilization of their potential. (p. 743)

Maintaining a durable network of communication during a disaster is not a simple matter. First, sustainability of the very technological infrastructure is problematic, as crucial ingredients may collapse or fail to operate properly because of physical damage. Second, momentarily packed communication junctions may cause the system to function poorly. These two major obstacles can be combated, however, by preplanned conceptualization and advanced technological developments, such as ideas pertaining to *Next Generation Networking*. According to this view, a conglomeration of various independent networks may interoperate to allow for both roaming (of users) and nomadism (of services). Such a network backbone enables coordination of rescue services as well as free and sustainable communication among the people in disaster areas (Patricelli, Beakley, Carnevale, Tarabochia & von Lubitz, 2009; von Lubitz, Patricelli, & Palma, 2008). Much research is still needed to make such developments possible. Such research is complicated in the special circumstances of a mass disaster, and special considerations must be made for data collection (Schlenger & Silver Cohen, 2006); however, it is necessary to make such a viable network function well to achieve its desired goal.

Initiating this kind of international emergency network is a highly challenging enterprise. Costs will be enormous; severe cultural and language barriers cause obstructions between nations and relevant organizations, and often within them; technological difficulties will be great, and implementation long and tiring. The network's importance to saving life and reducing human misery, however, is paramount. The initiative must thus be administered, financed, synchronized, and cooperated by the leading world powers. International organizations – including the UN and its related agencies (e.g., UNICEF, UNESCO), NATO, the World Bank, the European Commission, the Arab League, the Union of South American Nations, Interpol, the International Red Cross and Red Crescent Movement, and the World Health Organization – should be among those to take the lead in this endeavor. These bodies should consider the initiation and establishment of an institutionalized infrastructure to harness the Internet to meet a population's psychological needs in the event of unpredicted incidents of mass disasters. When such a cooperative decision is made, a new international agency should then be established to lead the implementation of this important initiative.

References

- Allwes, D., & Popovich, M. L. (2007). Empowering patients and researchers through a common health information. *Studies in Health Technology & Informatics*, 127, 219-228.
- Amichai-Hamburger, Y., McKenna, K. Y. A., & Tal, S.-A. (2008). E-empowerment: Empowerment by the Internet. *Computers in Human Behavior*, 24, 1776-1789.

- Amstadter, A. B., Broman-Fulks, J., Zinzow, H., Ruggiero, K. J., & Cercone, J. (2009). Internet-based interventions for traumatic stress-related mental health problems: A review and suggestion for future research. *Clinical Psychology Review, 29*, 410-420.
- Antonacci, D. J., Bloch, R. M., Saeed, S. A., Yildirim, Y., & Talley, J. (2008). Empirical evidence on the use and effectiveness of telepsychiatry via videoconferencing: Implications for forensic and correctional psychiatry. *Behavioral Sciences & the Law, 26*, 253-269.
- Baker, J. R., & Moore, S. M. (2008). Distress, coping, and blogging: Comparing new Myspace users by their intention to blog. *CyberPsychology & Behavior, 11*, 81-85.
- Barak, A. (1999). Psychological applications on the Internet: A discipline on the threshold of a new millennium. *Applied and Preventive Psychology, 8*, 231-246.
- Barak, A. (2007a). Phantom emotions: Psychological determinants of emotional experiences on the Internet. In A. Joinson, K. McKenna, T. Postmes & U. Reips (Eds.), *The Oxford handbook of Internet psychology* (pp. 303-330). Oxford, UK: Oxford University Press.
- Barak, A. (2007b). Emotional support and suicide prevention through the Internet: A field project report. *Computers in Human Behavior, 23*, 971-984.
- Barak, A., Boniel-Nissim, M., & Suler, J. (2008). Fostering empowerment in online support groups. *Computers in Human Behavior, 24*, 1867-1883.
- Barak, A., & Hen, L. (2008). Exposure in cyberspace as means of enhancing psychological assessment. In A. Barak (Ed.), *Psychological aspects of cyberspace: Theory, research, applications* (pp. 129-162). Cambridge, UK: Cambridge University Press.
- Barak, A., Hen, L., Boniel-Nissim, M., & Shapira, N. (2008). A comprehensive review and a meta-analysis of the effectiveness of Internet-based psychotherapeutic interventions. *Journal of Technology in Human Services, 26*, 109-160.
- Barak, A., & King, S. A. (2000). The two faces of the Internet: Introduction to the Special Issue on the Internet and sexuality. *CyberPsychology & Behavior, 3*, 517-520.
- Barak, A., & Sadovsky, Y. (2008). Internet use and personal empowerment of hearing-impaired adolescents. *Computers in Human Behavior, 24*, 1802-1815.
- Barak, A., & Suler, J. (2008). Reflections on the psychology and social science of cyberspace. In A. Barak (Ed.), *Psychological aspects of cyberspace: Theory, research, applications* (pp. 1-12). Cambridge, UK: Cambridge University Press.
- Bargh, J. A., Fitzsimons, G. M., & McKenna, K. Y. A. (2003). The self, online. In S. J. Spencer, S. Fein, M. P. Zanna, & J. M. Olson (Eds.), *Motivated social perception* (pp. 195-213). Mahwah, NJ: Erlbaum.
- Bargh, J. A., & McKenna, K. Y. A. (2004). The Internet and social life. *Annual Review of Psychology, 55*, 573-590.
- Bargh, J. A., McKenna, K. Y. A., & Fitzsimons, G. M. (2002). Can you see the real me? Activation and expression of the "true self" on the Internet. *Journal of Social Issues, 58*, 33-48.
- Beck, C. T. (2005). Benefits of participating in Internet interviews: Women helping women. *Qualitative Health Research, 15*, 411-422.
- Becker, S. M. (2007). Psychosocial care for adult and child survivors of the tsunami disaster in India. *Journal of Child and Adolescent Psychiatric Nursing, 20*, 148-155.
- Bernard, E. N. (2005). The U.S. National Tsunami Hazard Mitigation Program: A successful state-federal partnership. *Natural Hazards, 35*, 5-24.
- Bhushan, B., & Kumar, S. J. (2007). Emotional distress and posttraumatic stress in children surviving the 2004 tsunami. *Journal of Loss & Trauma, 12*, 245-257.
- Brackbill, R. M., Hadler, J. L., DiGrande, L., Ekenga, C. C., Farfel, M. R., Friedman, S., et al. (2009). Asthma and posttraumatic stress symptoms 5 to 6 years following exposure to the World Trade Center terrorist attack. *Journal of the American Medical Association, 302*, 502-516.
- Brennan, R. J., & Waldman, R. J. (2006). The South Asian earthquake six months later – an ongoing crisis. *New England Journal of Medicine, 354*, 1769-1771.
- Bremner, J. D., Quinn, J., Quinn, W., & Veledar, E. (2006). Surfing the Net for medical information about psychological trauma: An empirical study of the quality and accuracy of trauma-related websites. *Medical Informatics and the Internet in Medicine, 31*, 227-236.
- Brown, W. J., Basil, M. D., & Bocarnea, M. C. (2003). Social influence of an international celebrity: Responses to the death of Princess Diana. *Journal of Communication, 53*, 587-605.
- Brunette, S. (n.d.). *In Memory of Princess Diana*. Retrieved February 20, 2010, from <http://ladystarla.tripod.com/4/diana2.html>
- Bull, M. A., Clark, S. A., & Duszynski, K. (2002-2003). Lessons from a community's response to the death of Diana, Princess of Wales. *Omega: Journal of Death & Dying, 46*, 35-49.
- Butler, L. D., Blasey, C. M., Garlan, R. W., McCaslin, S. E., Azarow, J., Chen, X.-H., et al. (2005). Posttraumatic growth following the terrorist attacks of September 11, 2001: Cognitive, coping, and trauma symptom predictors in an Internet convenience sample. *Traumatology, 11*, 247-267.

- Cohen, J., & Mannarino, A. P. (2008). Disseminating and implementing trauma-focused CBT in community settings. *Trauma, Violence, & Abuse, 9*, 214-226.
- Cohn, M. A., Mehl, M. R., & Pennebaker, J. W. (2004). Linguistic markers of psychological change surrounding September 11, 2001. *Psychological Science, 15*, 687-693.
- Coren, M. (2005, January 6). Internet aids tsunami recovery. *CNN International*. Retrieved February 25, 2009, from <http://edition.cnn.com/2005/TECH/01/05/tech.tsunami/index.html>
- Cowen, S. S. (2008). Life lessons from inside the storm. *Traumatology, 14*, 9-13.
- De Boer, M. J., Versteegen, G. J., & van Wijhe, M. (2007). Patients' use of the Internet for pain-related medical information. *Patient Education & Counseling, 68*, 86-97.
- Döring, N. (2000). Feminist views of cybersex: Victimization, liberation and empowerment. *CyberPsychology & Behavior, 3*, 863-884.
- Douglas, K. M., & Sutton, R. M. (2008). The hidden impact of conspiracy theories: Perceived and actual influence of theories surrounding the death of Princess Diana. *Journal of Social Psychology, 148*, 210-221.
- Drury, S. S., Scheeringa, M. S., & Zeanah, C. H. (2008). The traumatic impact of Hurricane Katrina on children in New Orleans. *Child & Adolescent Psychiatric Clinics of North America, 17*, 685-702.
- Dutta-Bergman, M. J. (2004). Interpersonal communication after 9/11 via telephone and Internet: A theory of channel complementarity. *New Media & Society, 6*, 659-673.
- Dyer, K. A., & Thompson, C. D. (2000). Internet use for web-education on the overlooked areas of grief and loss. *CyberPsychology & Behavior, 3*, 255-270.
- Fuglsang, L. (2005). IT and senior citizens: Using the Internet for empowering active citizenship. *Science, Technology, & Human Values, 30*, 468-495.
- Galea, S., Brewin, C. R., Gruber, M., Jones, R. T., King, D. W., King, L. A., et al. (2007). Exposure to hurricane-related stressors and mental illness after Hurricane Katrina. *Archives of General Psychiatry, 64*, 1427-1434.
- Gibson, M. (2007). Death and mourning in technologically mediated culture. *Health Sociology Review, 16*, 415-424.
- Glaser, M. (2005). NOLA.com blogs and forums help save lives after Katrina. *Online Journalism Review*. Retrieved February 27, 2009, from <http://www.ojr.org/ojr/stories/050913glaser>
- Goss, S., & Anthony, K. (2009). Developments in the use of technology in counselling and psychotherapy. *British Journal of Guidance & Counselling, 37*, 223-230.
- Graves, K. D., Schmidt, J. E., & Andrykowski, M. A. (2005). Writing about September 11, 2001: Exploration of emotional intelligence and the social environment. *Journal of Language & Social Psychology, 24*, 285-299.
- Griffiths, K. M., & Christensen, H. (2006). Review of randomised controlled trials of Internet interventions for mental disorders and related conditions. *Clinical Psychologist, 10*, 16-29.
- Gul, S., Ghaffar, H., Mirza, S., Fizza T. S., Murad, F., Ali, Q., et al. (2008). Multitasking a telemedicine training unit in earthquake disaster response: Paraplegic rehabilitation assessment. *Telemedicine & e-Health, 14*, 280-283.
- Hawton, K., Harriss, L., Simkin, S., Juszcak, E., Appleby, L., McDonnell, R., et al. (2000). Effect of death of Diana, Princess of Wales on suicide and deliberate self-harm. *British Journal of Psychiatry, 177*, 463-466.
- Haythornthwaite, C., & Hagar, C. (2004). The social worlds of the web. *Annual Review of Information Science & Technology, 39*, 311-346.
- Hirai, M., & Clum, G. A. (2006). An Internet-based self-change program for traumatic event related fear, distress, and maladaptive coping. *Journal of Traumatic Stress, 18*, 631-636.
- Hornstein, S. L., Brown, A. S., & Mulligan, N. W. (2003). Long-term flashbulb memory for learning of Princess Diana's death. *Memory, 11*, 293-306.
- Horrigan, J. B., & Morris, S. (2005). *Relief donations after Hurricanes Katrina and Rita and use of the Internet to get disaster news*. Retrieved March 5, 2009, from Pew Internet and American Life Project website: http://www.pewinternet.org/pdfs/PIP_Katrina.DateMemo.pdf
- Hylar, S. E., Gangure, D. P., & Batchelder, S. T. (2005). Can telepsychiatry replace in-person psychiatric assessments? A review and meta-analysis of comparison studies. *CNS Spectrums, 10*, 403-413.
- Kemmelmeier, M., Broadus, A. D., & Padilla, J. B. (2008). Inter-group aggression in New Orleans in the immediate aftermath of Hurricane Katrina. *Analyses of Social Issues & Public Policy, 8*, 211-245.
- Khan, M. M. (2006). When mountains weep: Psychological care for those affected by the earthquake in northern Pakistan. *Psychiatric Bulletin, 30*, 454-456.
- Klein, B., Mitchell, J., Gilson, Shandley, K., Austin, D., Kiroopoulos, L., et al. (2009). A therapist-assisted Internet-based CBT intervention for post-traumatic stress disorder: Preliminary results. *Cognitive Behaviour Therapy, 38*, 121-131.

- Ko, H.-C., & Kuo, F.-Y. (2009). Can blogging enhance subjective well-being through self-disclosure? *CyberPsychology & Behavior, 12*, 75-79.
- Krishnamurthy, S. (2002, October). *The multidimensionality of blog conversations: The virtual enactment of September 11*. Paper presented at the 3rd annual conference of the Association of Internet Researchers (AoIR), Maastricht, The Netherlands.
- Kvavilashvili, L., Mirani, J., Schlagman, S., & Kornbrot, D. E. (2003). Comparing flashbulb memories of September 11 and the death of Princess Diana: Effects of time delays and nationality. *Applied Cognitive Psychology, 17*, 1017-1031.
- Laituri, M., & Kodrich, K. (2008). On line disaster response community: People as sensors of high magnitude disasters using Internet GIS. *Sensors, 8*, 3037-3055.
- Lee, E.-K. O., Shen, C., & Tran, T. V. (in press). Coping with Hurricane Katrina: Psychological distress and resilience among African American evacuees. *Journal of Black Psychology*.
- Litz, B. T., Engel, C. C., Bryant, R. A., & Papa, A. (2007). A randomized, controlled proof-of-concept trial of an Internet-based, therapist-assisted self-management treatment for posttraumatic stress disorder. *American Journal of Psychiatry, 164*, 1676-1683.
- Litz, B. T., Williams, L., Wang, J., Bryant, R., & Engel, C. C. (2004). A therapist-assisted Internet self-help program for traumatic stress. *Professional Psychology: Research & Practice, 35*, 628-634.
- Lu, H., Case, D. O., Lustria, M. L. A., Kwon, N., Andrews, J. E., Cavendish, S., et al. (2007). Predictors of online information seeking by international students when disaster strikes their countries. *CyberPsychology & Behavior, 10*, 709-712.
- von Lubitz, D., Patricelli, F., Palma, P. (2008). Telecommunications infrastructure for worldwide networkcentric healthcare operations and the associated information system. *International Journal of Business and Systems Research, 2*, 34-51.
- Macias, W., Hilyard, K., & Freimuth, V. (2009). Blog functions as risk and crisis communication during Hurricane Katrina. *Journal of Computer-Mediated Communication, 15*, 1-31.
- Maggs, P. B. (2006). Free legal advice on the Internet. *International Journal of Legal Information, 34*, 483-512.
- Mallory Wober, J. (2000). A feeding frenzy, or feeling friendly? Events after the death of Diana, Princess of Wales. *Journal of Popular Culture, 34*, 127-134.
- Marsee, M. A. (2008). Reactive aggression and posttraumatic stress in adolescents affected by Hurricane Katrina. *Journal of Clinical Child & Adolescent Psychology, 37*, 519-529.
- McKenna, K. Y. A. (2007). Through the Internet looking glass: Expressing and validating the true self. In A. Joinson, K. McKenna, T. Postmes & U. Reips (Eds.), *The Oxford handbook of Internet psychology* (pp. 205-222). Oxford, UK: Oxford University Press.
- McKenna, K. Y. A. (2008). Influences on the nature and functioning of online groups. In A. Barak (Ed.), *Psychological aspects of cyberspace: Theory, research, applications* (pp. 228-242). Cambridge, UK: Cambridge University Press.
- McKenna, K. Y. A., & Seidman, G. (2005). Social identity and the self: Getting connected online. In W. R. Walker, & D. J. Herrmann (Eds.), *Cognitive technology* (pp. 89-110). Jefferson, NC: McFarland.
- McKenna, K. Y. A., & Seidman, G. (2006). Considering the interaction: The effects of the Internet on self and society. In R. Kraut, M. Brynin, & S. Kiesler (Eds.), *Computers, phones, and the Internet: Domesticating information technology* (pp. 279-296). New York: Oxford University Press.
- Mehra, B., Merkel, C., & Peterson Bishop, A. (2004). The Internet for empowerment of minority and marginalized users. *New Media & Society, 6*, 781-802.
- Nagel, D. M., & Anthony, K. (2009). Writing therapy using new technologies – the art of blogging. *Journal of Poetry Therapy, 22*, 41-45.
- Najam, N., Mansoor, A., Hussain Kanwal, R., & Naz, S. (2006). Dream content: Reflections of the emotional and psychological states of earthquake survivors. *Dreaming, 16*, 237-245.
- Neuner, F., Schauer, E., Canati, C., Ruf, M., & Elbert, T. (2006). Post-tsunami stress: A study of posttraumatic stress disorder in children living in three severely affected regions in Sri Lanka. *Journal of Traumatic Stress, 19*, 339-347.
- Okin, J. R. (2005). *The information revolution*. Winter Harbor, ME: Ironbound Press.
- O'Leary, S. (2002, April 2). Rumors of grace and terror. *Online Journalism Review*. Retrieved February 20, 2009, from <http://www.ojr.org/ojr/ethics/1017782038.php>
- Palen, L., & Liu, S. B. (2007, April). Citizen communications in crisis: Anticipating a future of ICT-supported public participation. *Proceedings of CHI Meeting, San Jose, CA, 727-736*. Retrieved March 10, 2009, from http://www.cs.colorado.edu/~palen/palen_papers/palen-crisis.pdf
- Patricelli, F., Beakley, J. E., Carnevale, A., Tarabochia, M., & von Lubitz, D. K. J. E. (2009). Disaster management and mitigation: The telecommunications infrastructure. *Disasters, 33*, 23-37.
- Perry, S. D. (2007). Tsunami warning dissemination in Mauritius. *Journal of Applied Communication Research, 35*, 399-417.

- Pillow, D. R., & McNaughton Cassill, M. E. (2001). Media exposure, perceived similarity, and counterfactual thinking: Why did the public grieve when Princess Diana died? *Journal of Applied Social Psychology, 31*, 2072-2094.
- Piotrowski, C., & Armstrong, T. R. (1998). Mass media preferences in disaster: A study of Hurricane Danny. *Social Behavior and Personality, 26*, 341-346.
- Polomano, R. C., Droog, N., Purinton, M. C. P., & Cohen, A. S. (2007). Social support web-based resources for patients with chronic pain. *Journal of Pain & Palliative Care Pharmacotherapy, 21*, 49-55.
- Procopio, C. H., & Procopio, S. T. (2007). Do you know what it means to miss New Orleans? Internet communication, geographic community, and social capital in crisis. *Journal of Applied Communication Research, 35*, 67-87.
- Punt, M. (2002). More sign than star: Diana, death, and the Internet. In A. Ndalianis & C. Henry (Eds.), *Stars in our eyes: The star phenomenon in the contemporary era* (pp. 85-102). Westport, CT: Praeger.
- Rainie, L. (2001). *How Americans used the Internet after the terror attack*. Retrieved February 24, 2009, from Pew Internet & American Life Project website: http://www.pewinternet.org/pdfs/PIP_Terror_Report.pdf
- Rainie, L., & Kalsnes, B. (2001). *The commons of the tragedy: How the Internet was used by millions after the terror attacks to grieve, console, share news, and debate the country's response*. Retrieved February 24, 2009, from Pew Internet & American Life Project website: http://www.pewinternet.org/pdfs/PIP_Tragedy_Report.pdf
- Raj, S. B. & Subramony, S. (2008). Impact of tsunami on the mental health of victims. *Journal of the Indian Academy of Applied Psychology, 34*, 132-140.
- Ramos, M., & Piper, P. S. (2005). Web waves: Tsunami blogs respond to disaster. *Searcher, 13*(5), 32-39.
- Reger, M. A., & Gahm, G. A. (2009). A meta-analysis of the effects of Internet- and computer-based cognitive-behavioral treatments for anxiety. *Journal of Clinical Psychology, 65*, 53-75.
- Resnick, H., Galea, S., Kilpatrick, D., & Vlahov, D. (2004). Research on trauma and PTSD in the aftermath of 9/11. *PTSD Research Quarterly, 15*, 1-8.
- Rozeman, P. A., & Mayeaux, E. J. (2006). Hurricanes Katrina and Rita: Evacuee healthcare efforts remote from hurricane affected areas. *Southern Medical Journal, 99*, 1329-1333.
- Rubacka, J. M., Schmeidler, J., Nomura, Y., Luthra, R., Rajendran, K., Abramovitz, R., et al. (2008). The relationship between PTSD arousal symptoms and depression among mothers exposed to the World Trade Center attacks. *Journal of Nervous and Mental Disease, 196*, 504-507.
- Ruggiero, K. J., Resnick, H. S., Acierno, R., Carpenter, M. J., Kilpatrick, D. G., Coffey, S. F., et al. (2006). Internet-based intervention for mental health and substance use problems in disaster-affected populations: A pilot feasibility study. *Behavior Therapy, 37*, 190-205.
- Samarajiva, R. (2005). Mobilizing information and communications technologies for effective disaster warning: lessons from the 2004 tsunami. *New Media & Society, 7*, 731-747.
- Sanyal, I. (2006). Empowering the impaired through the appropriate use of information technology and Internet. *Studies in Health Technology and Informatics, 121*, 15-21.
- Scaffidi, C., Shaw, M., & Myers, B. (2008). Trial by water: Creating Hurricane Katrina "person locator" web sites. In S. P. Weisband (Ed), *Leadership at a distance: Research in technologically-supported work* (pp. 209-221). Mahwah, NJ: Lawrence Erlbaum.
- Schechter, L. R. (2008). From 9/11 to Hurricane Katrina: Helping others and oneself cope following disasters. *Traumatology, 14*, 38-47.
- Schlenger, W. E., & Silver Cohen, R. (2006). Web-based methods in terrorism and disaster research. *Journal of Traumatic Stress, 19*, 185-193.
- Siddiquee, A., & Kagan, C. (2006). The Internet, empowerment, and identity: An exploration of participation by refugee women in a community Internet project (CIP) in the United Kingdom (UK). *Journal of Community & Applied Social Psychology, 16*, 189-206.
- Sillence, E., & Briggs, P. (2007). Please advise: Using the Internet for health and financial advice. *Computers in Human Behavior, 23*, 727-748.
- Silver, R. C., Holman, E. A., McIntosh, D. N., Poulin, M., & Gil-Rivas, V. (2002). Nationwide longitudinal study of psychological responses to September 11. *Journal of American Medical Association, 288*, 1235-1244.
- Sofka, C. J. (2009). Adolescents, technology, and the Internet: Coping with loss in the digital world. In D. E. Balk & C. A. Corr (Eds.), *Adolescent encounters with death, bereavement, and coping* (pp. 155-173). New York: Springer.
- Spek, V., Cuijpers, P., Nyklíček, I., Riper, H., Keyzer, J., & Pop, V. (2007). Internet-based cognitive behaviour therapy for symptoms of depression and anxiety: A meta-analysis. *Psychological Medicine, 37*, 319-328.
- Stone, L. D., & Pennebaker, J. W. (2002). Trauma in real time: Talking and avoiding online conversations about the death of Princess Diana. *Basic & Applied Social Psychology, 24*, 173-183.

- Stuber, J., Galea, S., Boscarino, J. A., & Schlesinger, M. (2006). Was there unmet mental health need after the September 11, 2001 terrorist attacks? *Social Psychiatry and Psychiatric Epidemiology*, *41*, 230–240.
- Suler, J. (1999). *Cyberspace as psychological space*. Retrieved March 1, 2009, from <http://www.rider.edu/~suler/psyber/psychspace.html>
- Suler, J. (2004). The online disinhibition effect. *CyberPsychology & Behavior*, *7*, 321-326.
- Tan, L. (2008). Psychotherapy 2.0: MySpace blogging as self-therapy. *American Journal of Psychotherapy*, *62*, 143-163.
- Thelwall, M., & Stuart, D. (2007). RUOK? Blogging communication technologies during crises. *Journal of Computer-Mediated Communication*, *12*, 523-548.
- Thienkrua, W., Gardozo, B., Chakkraband, S., Guadamuz, T. E., Pengjuntr, W., Tantipiwatanaskul, P., et al. (2006). Symptoms of posttraumatic stress disorder and depression among children in tsunami-affected areas in southern Thailand. *Journal of the American Medical Association*, *296*, 549–559.
- Torrey, C., Burke, M., Lee, M., Dey, A., Fussell, S., Kiesler, S. (2008). Approaches to authority in online disaster relief communities after Hurricane Katrina. In S. P. Weisband, *Leadership at a distance: Research in technologically-supported work* (pp. 223-245). Mahwah, NJ: Lawrence Erlbaum.
- Tuicomepee, A., & Romano, J. L. (2006). Children and adolescents in natural disasters: Psychological implications for Thai youth affected by the 2004 tsunami. *Journal of Mental Health of Thailand*, *14*, 134–141.
- Tuicomepee, A., & Romano, J. L. (2008). Thai adolescent survivors 1 year after the 2004 tsunami: A mixed methods study. *Journal of Counseling Psychology*, *55*, 308–320.
- Turkle, S. (1997). *Life on the screen: Identity in the age of the Internet*. New York: Simon & Schuster.
- Turkle, S. (2004). Whither psychoanalysis in computer culture? *Psychoanalytic Psychology*, *21*, 16–30.
- Vanderwerker, L. C., & Prigerson, H. G. (2004). Social support and technological connectedness as protective factors in bereavement. *Journal of Loss & Trauma*, *9*, 45-57.
- Van de Walle, B., & Turoff, M. (2008). Decision support for emergency situations. *Information Systems & E-Business Management*, *6*, 295–316.
- van't Hof, E., Cuijpers, P., & Stein, D. J. (2009). Self-help and Internet-guided interventions in depression and anxiety disorders: A systematic review of meta-analyses. *CNS Spectrums*, *14*, 34-40.
- van Uden-Kraan, C. F., Drossaert, C. H. C., Taal, E., Seydel, E. R., van de Laar, M. A. F. J. (2009). Participation in online patient support groups endorses patients' empowerment. *Patient Education & Counseling* *74*, 61–69.
- Vermetten, E., van Middelkoop, C. J., Taal, L., & Carll, E. K. (Ed). (2007). Online psychotrauma intervention in the aftermath of the tsunami: A community-building effort. In E. K. Carll (Ed.), *Trauma psychology: Issues in violence, disaster, health, and illness* (Vol. 1: Violence and disaster, pp 255-271). Westport, CT: Praeger.
- Walker, W. R., & Gibbons, J. A. (2006). Rumor mongering as a collective coping strategy for traumatic public events: Evidence from face to face interactions and rumors on the Internet. *International Journal of Cognitive Technology*, *11*, 31-35.
- Walter, T. (2001). From cathedral to supermarket: mourning, silence and solidarity. *Sociological Review*, *49*, 494-511.
- Weidmann, A., Fehm, L., & Fydrich, T. (2008). Covering the tsunami disaster: Subsequent post-traumatic and depressive symptoms and associated social factors. *Stress & Health*, *24*, 129–135.
- World Health Organization, Regional Office for the Western Pacific (2005-2009). *Asian tsunami of 2004*. Retrieved February 25, 2009, from <http://tinyurl.com/db3z1q> (no longer in existence)
- Wright, J. (2002). Online counselling: Learning from writing therapy. *British Journal of Guidance & Counselling*, *30*, 285-298.
- Wright, J., & Chung, M. C. (2001). Mastery or mystery? Therapeutic writing: A review of the literature. *British Journal of Guidance & Counselling*, *29*, 277-291.