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ACCOUNT ANALYSIS OF WTC SURVIVORS

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ABSTRACT

In the days following the events at the World Trade Center on September 11, 2001, first-person accounts were collected from newspapers, television programs, e-mail exchanges etc. Over a period of 18 months, a total of 745 first-person accounts from 435 individuals were collected. To analyze the content of these accounts, a questionnaire was developed and used to 'interview' each account. Results of the analysis provide insights into the location of occupants in the initial moments, cue perceived, conditions in different locations as well as occupant responses at key times during the event. Although analysis of first-person accounts has important limitations such an analysis is useful for documenting some specific time sensitive details.

INTRODUCTION

At 8:46 a.m. on Tuesday, September 11, 2001 American Airlines Flight 11, a hijacked Boeing 767, hit WTC 1 of the World Trade Center. This impact caused extensive damage on five floors, from 94 to 98 of the 110-story high tower, trapping those above. Sixteen and a half minutes later, at 9:03 a.m., a second hijacked Boeing 767, United Airlines Flight 175, struck WTC 2, which took out seven floors, from 78 to 84 (FEMA BPAT, 2002).

Despite the massive localized damage caused by the impact, each structure remained standing. However, as each aircraft impacted a building, jet fuel on board ignited. Part of this fuel immediately burned off in large fireballs that erupted at the impact floors. Remaining fuel flowed across the floors and down elevator and utility shafts, igniting intense fires throughout upper portions of the buildings. As these fires spread, they further weakened the steel-framed structures, eventually leading to total collapse (FEMA BPAT, 2002).

At 9:59 a.m. WTC 2, the second to be hit, collapsed after burning intensely for 56 minutes. Some 29 minutes later WTC 1 collapsed at 10:28 a.m. after burning for 102 minutes (FEMA BPAT, 2002). It is estimated that approximately 2,800 people were killed and 800 others injured by the attacks and eventual collapse of the towers, including building occupants and first responders (Cauchon, 2001). The final count released by the city of New York in October 2003 is a total of 2,752 deaths.

Although the events of September 11, 2001 involved the World Trade Center, the Pentagon and the hijacked airliners, the evacuation of WTC 1 and WTC 2, the two 110-story office towers, was the focus of this study. It is estimated that approximately 50,000 people worked in each tower (100,000 total), with potentially 70,000 visitors to the complex during the course of a normal business day (Yamasaki, 2002). However, the occupancy of the towers on the morning of September 11, 2001 was not at its maximum capacity. According to *USA TODAY*, 5,000 to 7,000 people were in each tower at 8:46 a.m. that morning, the time of first impact (Cauchon, 2001). It has been suggested that the towers were not at their maximum capacity for several reasons. That morning marked New York City's mayoral primary and it is assumed that many people stopped to cast their ballots before heading in to work. The New York Stock Exchange does not open until 9:30 a.m.; therefore many people from

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trading firms had not come into work yet. Tuesday, September 11, 2001 was the first day of school in several primary school districts and many parents accompany their children to school on this day. Visitor hours had not started yet, as the viewing platform in the South Tower did not open to the public until 9:30 a.m. Overall, many simply had not arrived to work by 8:46 a.m. (Cauchon, 2001).

By certain measures, the evacuation of the World Trade Center on September 11, 2001, could be termed a success (Cauchon, 2001). Under the impacted floors, nearly every occupant who could physically get out did get out. According to *USA TODAY*, in each tower, 99% of the civilian occupants below the crash sites survived. Their analysis shows that two-thirds of WTC 2 occupants started their evacuation of the upper floors during the 16.5 minutes between the two attacks, and survived. Among the employees of the World Trade Center, under the impacted floors in WTC 1, 72 people died, where as under the impacted floors in WTC 2, 4 people died. It should be noted that a fraction of the deaths below the impacted floors in WTC 1 occurred in the elevators, which were carrying people at the time of impact.

In the days following the tragedy, the National Fire Protection Association in collaboration with the National Research Council Canada decided to collect survivors' stories to document the event and to use this background material to develop future studies on occupant behavior during the evacuation of the World Trade Center. First-person accounts were collected from newspapers, radio and television programs, e-mail exchanges and a variety of websites. Additional accounts were received at a later date from NIST. This large quantity of material was coded and analyzed to obtain a better understanding of the personal evacuation experiences of different survivors located on the different floors of the two towers.

OBJECTIVES

This exploratory study was conducted in order to gain an overall understanding of the circumstances surrounding the evacuation of the World Trade Center towers on September 11, 2001. More specifically, this research project endeavors to gain insight into the variability of human behavior and response time displayed during the evacuation, with the findings to be used as a guide for future research. Human behavior data gathered from this project will help to create a better understanding of the individual experiences of occupants in specific locations by documenting, to the extent possible, the information available to occupants, such as conditions on their floor and along their evacuation route, perceived behavior of others and escape conditions and timing.

METHODOLOGY

In the moments following the attack of the World Trade Center towers on September 11, 2001, journalists started interviewing survivors to obtain the story of their evacuation. These first-person accounts were presented on television or radio and published in newspapers, magazines, or websites and later reported in books and special media programs. During the three months following the events, over 280 first-person accounts were collected. These accounts included media reports (newspapers, magazines, television and radio), as well as material from books, personal websites and emails. The information provided, in some of these accounts, was so detailed that it provided sufficient material for a study. Additional accounts were gathered over the next year for a total of 745 first-person accounts from 465 individuals, as some survivors provided multiple accounts through different sources. The 435 accounts retained for analysis are from evacuees of the WTC 1 and WTC 2 only, and although numerous accounts were found from occupants of the surrounding buildings, only those civilians who had evacuated the actual towers were considered. For those survivors for whom numerous accounts were found, the information across the accounts was collapsed into one highly detailed account, containing the combined information from all of the given accounts.

It is recognized that the use of first-person accounts published in the media as main sources of information for a study has many limitations. The questions asked by reporters are unknown and can be different from each journalist or with each interview. It is suspected that the most dramatic

experiences are reported and that some information may be emphasized or left unreported for the purpose of the article. As stated in (Fisher, 1998), the mass media has greatly reduced the level of flamboyant exaggeration in what they report as typical behavioral and organizational response to disaster over the last 50 years; however, since a larger portion of the news is now devoted to reporting disasters, a less than accurate image is still commonly portrayed both in the print and broadcast media. It also must be stressed that the findings in this study are representative only of the sample; individual experiences captured in first-person accounts cannot be generalized to the population of the two towers.

It should be considered that with the intense media attention that the events of September 11, 2001 received, it is highly likely that this coverage influenced survivor's recollection of events. This phenomenon, referred to as 'contamination,' occurs when information outside of the actual experience is integrated into the reconstruction of memory (Grossman & Siddle, 2002). Thus, it is important to recognize this effect as possibly influencing the validity and reliability of the first-person accounts gathered from media sources over a period of 18 months.

Despite the drawbacks of using media sources for the basis of research, however, some of the accounts contained such a high level of detail, particularly the ones written by survivors themselves, they provided justification for the analysis of this information. It should also be stressed that these media accounts are the only documented descriptions of the World Trade Center evacuation and immediate reactions of the survivors, as no systematic research interviewing the survivors had been conducted in the 2 years following the events. Since documenting human behavior is time sensitive and considerable time has passed since the event, it may be said that these initial media accounts may hold significant detailed and accurate information that may be lost over time.

Accounts Content Analysis

The most appropriate social research method for analyzing media communications is content analysis. To extract the important content from the accounts a 'questionnaire' was developed to 'interview' each account. This procedure was used by Johnson (1987) to analyze police file statements related to the "Who Concert Stampede"; it is also explained in some detail in Gamson's book "The Strategy of Social Protest" (1975). The approach relies on a series of identical questions used to interview each document. Once the information is gathered in a qualitative or descriptive database, codes are developed to reduce the variety of answers to each question to a manageable number. To ensure reliability of the coding, at least two researchers independently review each account and compare their coding. Any disagreement is discussed and resolved.

Questions to 'interview' each account were designed to obtain manifest and latent information from the 745 first-person accounts. A majority of the questions, 30 of them, rely on manifest information or elements specifically reported in the account, such as the person's location at certain key moments. These questions are listed in Table 1. The remaining three questions called for latent information, such as words describing emotions. They are listed in Table 2. Data was retrieved from the accounts and entered into a qualitative database. Nominal and ordinal categories were conceptualized. It is important to note that not all questions were answered for each account gathered, as several accounts were incomplete. This lack of information for some items is the equivalent in a questionnaire survey to a respondent who did not answer some of the questions. The information gathered in the qualitative database was coded and transformed into a quantitative matrix from which descriptive statistics were calculated.

Table 1. Questions on Manifest Information

Date of published account?	Heard fire alarm?
Gender of survivor?	Location at WTC 2 impact?
Age of survivor?	Location at WTC 2 collapse?
In which building was the person at the time of first cue?	Location at WTC 1 collapse?
On what floor was the person?	Location when met firefighters?
What was the first cue of event?	At what time person exited the building?
How long did the person take to start evacuation?	Who helped person during evacuation?
Did the person delay start time?	Was the person disabled?
What mode of egress was used?	Was the person injured?
What was the condition on floor?	Location when person placed phone call?
What was the condition on the stairs?	Who was the phone call recipient?
Were obstructions encountered during evacuation?	Was there social influence on decision-making?
Heard announcement?	Use other (non-phone) communication technology?
Location when WTC 2 announcement heard?	Was person at the WTC during 1993 bombing?
Action after hearing WTC 2 announcement?	Did the person rest during evacuation?

Table 2. Questions on Latent Information

What was the person's knowledge of the situation in the initial moment?
How serious did the person judge the situation to be?
What was the person's perception of others?

RESULTS

The statistical analysis conducted was essentially descriptive statistics to organize and summarize the information. Inferential statistical tests were not conducted since the data obtained is not a representative sample of the population. Results presented in this paper should not be generalized to all occupants of the two towers on September 11, 2001. Although they are reported using terms such as 'the occupants' and 'the survivors,' the results refer only to the accounts analyzed.

Profile: Gender and Age

The sample contained accounts from 435 survivors, ranging in age from 20 to 89 years old (mean = 39.5, SD = 11.8). The total sample contained accounts from 118 women (27%) and 314 men (72%); 3 accounts did not mention their gender (1%). It is speculated that the substantially higher number of men in the sample occurred because there were more men working in the two towers than women or that men may be more likely to talk to the media than women.

Location at the Beginning of the Event

There were 251 individuals who were located in WTC 1, comprising 58% of the sample, with 42% or 184 people from WTC 2, as presented in Table 3. In WTC 1, 90 people (36%) were from upper floors (77-110), 79 people (31%) were from mid levels (43-76) and 58 people (23%) were from the lower floors of WTC 1. Another 22 people (9%) were in elevators and two people did not specify a location. In WTC 2, 94 people (51%) were from upper floors, 57 people (31%) were from mid floors, 28 people (15%) were from the lower levels of WTC 2 and five people did not specify a location. Although the distribution of accounts in the two buildings was not identical, reports were obtained from the three strata in both buildings.

Table 3. Initial Location

	WTC 1, N=251	WTC 2, N=184
Upper floors (77 th -110 th)	90 people (36%)	94 people (51%)
Mid floors (43 rd -76 th)	79 people (31%)	57 people (31%)
Lower floors (42 nd -Basement)	58 people (23%)	28 people (15%)
Elevator	22 people (9%)	-----
Location not specified	2 people (1%)	5 people (3%)

Means of Egress Used

On September 11, 2001, almost all individuals from WTC 1 (198 people or 98%) reported using the stairs to evacuate while three used both stairs and elevator and one used the elevator only. The person who used the elevator for evacuation reported that he was in an elevator when the building was struck and the elevator stopped on one of the floors. He was able to use the elevator to move people from that floor to the lobby. Two of the three who used both stairs and elevators were initially trapped in an elevator behind a 50th floor restroom. After freeing themselves, they were directed by firefighters to an elevator to the 44th floor, from which point they walked down. The third person who used both stairs and elevators rode with a person he was assisting from the 52nd floor to the 44th floor. Unable to find a working elevator on the 44th floor, he walked down the rest of the way. In WTC 2, 114 (72% of the total for that building) used the stairs while 18 people (11%) used elevators and 26 (16%) used a combination of elevators and stairs. These results are shown in Table 4. Of the 44 people who used the elevator to evacuate WTC 2, 37 were from floors served by the 78th sky lobby and 7 were from floors between the 44th and 78th sky lobbies. From these accounts, it seems that the higher up people were in WTC 2, the more likely they were to use the elevator as a means of egress.

Table 4. Means of Egress Used within the Towers

	WTC 1, N=202	WTC 2, N=158
Stairs	198 people (98.0%)	114 people (72%)
Elevator	1 person (0.5%)	18 people (11%)
Stairs & Elevator	3 people (1.5%)	26 people (16%)

First Cue Reported

The first cues of the event that were mentioned in the accounts were found to differ depending on which tower the person were located. For WTC 1, the first building hit, the most common first cue of the event reported by 146 people (69% of people in that tower) was 'building movement,' such as feeling the building sway and tremble – many thought the building was going to tip over. WTC 2 occupants most commonly reported first becoming aware of the event from 'visual' cues (96 people, 66%) such as fire, debris and smoke, most likely coming from WTC 1. Several people reported more than one first cue, so they may appear more than once in Table 5 and percentages total more than 100%. Interestingly, only 25 people (6%) made any mention of building alarms in their evacuation accounts.

Table 5. First Cues of Event within the Towers

First Cues	WTC 1, N=212	WTC 2, N=145
Audio cues: heard explosion, crash, rumble	107 (50%)	69 (48%)
Visual cues: saw fire, incoming plane, debris, smoke	87 (41%)	96 (66%)
Building movement: felt building sway, tremble, jolt	146 (69%)	30 (21%)
Contents movement: furniture movement, ceiling falling	66 (31%)	11 (8%)
Warning from others	14 (7%)	34 (23%)
Impact	29 (14%)	1 (1%)
Smelled fumes or felt heat	12 (6%)	16 (11%)

Time to Start Evacuation

After perceiving these first cues, 101 people from WTC 1 (47%) 'immediately' started evacuating, while 84 people (52%) 'immediately' started their evacuation of WTC 2. As can be seen in Figure 1,

similar numbers of people from both towers started evacuating 'shortly after' the first cue of the event (28 in WTC 1 vs. 27 in WTC 2). Another 46 people in WTC 1, and 40 people in WTC 2 'delayed' their evacuation. Some 23 people in WTC 1 (11%) reported they initially 'stayed,' while 10 people from WTC 2 (6%) also said they initially remained on their floors. Of the 16 people who reported being 'stuck' and therefore temporarily unable to start their evacuation, all but one were from WTC 1.

Among occupants who initially decided to stay, it is noteworthy to mention a group in WTC 1. Two survivors reported that a group of about 16 employees gathered in a conference room on Floor 64 of WTC 1. The group stayed in the room discussing the situation for approximately one hour before deciding to evacuate the building.

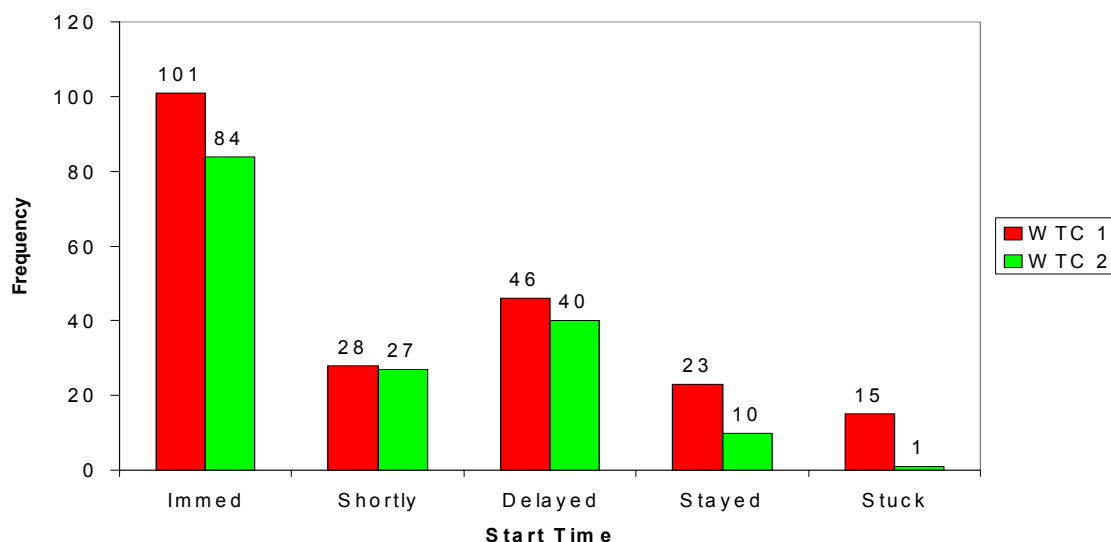


Figure 1. Distribution of Time to Start Evacuation.

Most of those who were not stuck but who took more than five minutes to begin evacuation delayed because they took the time to complete activities such as searching the floor, securing documents, making calls, or giving instructions, or because they felt it was the right thing to do. Twenty-one of 63 people in WTC 1 (33%) and 13 of 45 people in WTC 2 (29%) delayed starting their evacuation because they were completing activities such as those described above. Of those in WTC 1 who did not begin their evacuation within five minutes, 12 people simply decided to stay (19%), compared to 20 people in WTC 2 (44%). In WTC 1, 17 of those who did not begin their evacuation within five minutes (27%) were helping others or required assistance themselves, compared to only four people (9%) in WTC 2.

Conditions on Floors and in Stairwells

It was possible to code multiple reported conditions on floors and in stairwells for each individual. Six people in WTC 1 and seven people in WTC 2 indicated that conditions on their floor were normal after their building was struck. For the 191 evacuees who commented on adverse conditions on their floors after the plane hit their tower, similar results emerged between the towers, in terms of the large proportions reporting smoke or debris and collapse damage on their floor. Specifically, the most frequently reported adverse conditions in WTC 1 were smoke (55% or 74 people), debris or collapse of wall, ceiling or floor (72 people or 54%), fire (41 people or 31%), darkness or loss of power (20 people or 15%) and smell of fuel (13 people or 10%). In WTC 2, the most frequently reported adverse conditions were debris or collapse of wall, ceiling or floor (38 people or 67%), smoke (25 people or 44%), darkness or loss of power (18 people or 32%), dust (10 people or 18%), smell of fuel (7 people or 12%) and injured people (7 people or 12%). The seven people in WTC 1 who mentioned jammed doors were in the upper strata of the building. The two people in WTC 2 who reported jammed doors had moved to middle floors of their building after the first impact. The complete details on conditions are presented in Table 6.

Table 6. Adverse Conditions on Floor at Impact

	WTC 1, N=134	WTC 2, N=57
Debris (collapse)	72 (54%)	38 (67%)
Smoke	74 (55%)	25 (44%)
Fire	41 (31%)	20 (35%)
No power, dark	20 (15%)	18 (32%)
Smell of fumes	13 (10%)	7 (12%)
Dust	9 (7%)	10 (18%)
Water	7 (5%)	3 (5%)
Door jammed	7 (5%)	2 (4%)
Crowds, people injured	2 (1%)	7 (12%)
Trapped	5 (4%)	2 (4%)

A large number of evacuees (106 people) mentioned that the stairwells were crowded and hot during their evacuation (71 people in WTC 1 and 35 in WTC 2). A total of 27 indicated that conditions in the stairs were otherwise normal. For the 155 evacuees who commented on adverse conditions in the stairwells during their evacuation (other than crowdedness), the majority in both towers reported smoke and the smell of fuel in the stairs (79 people or 72% in WTC 1 and 29 people or 63% in WTC 2).

Obstructions during Evacuation

Table 6 displayed details on the adverse conditions on floors that resulted at the time of impact. These were things that were observed but that might not have presented an obstacle. (For example, a person might have reported seeing debris, without being impeded by that debris.) Obstructions address things that limited or otherwise affected a person's ability to evacuate. Many of the same items were cited as both adverse conditions and obstructions. More than one obstruction during evacuation could be recorded for each person. A total of 153 people in WTC 1 and 59 people in WTC 2 indicated encountering obstructions during their evacuation. Almost half of the evacuees in each tower reported encountering crowds and injured people in the stairs, and indicated that these interfered to some degree in their evacuation (46% in each tower). The next most frequently reported obstructions were smoke and debris. The details are shown in Figure 2.

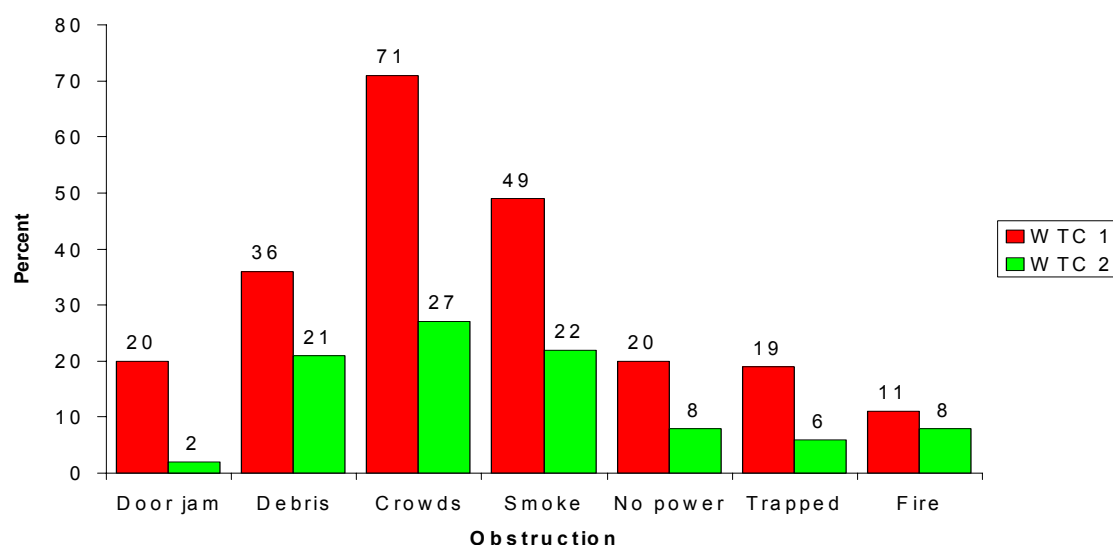


Figure 2. Obstructions Encountered During Evacuation in Both Towers

Of the 22 evacuees who reported encountering jammed or locked doors, 20 were in WTC 1 and all but three were located on upper floors. One of the WTC 2 evacuees reported that an elevator door was jammed by debris and the other reported a locked door on reaching the bottom of the stairs. Of the 25 evacuees who reported being trapped, nine were in elevators, eight were trapped by debris or smoke when their building was hit, five were trapped in the collapse of WTC 2, and three were trapped when WTC 1 collapsed.

Announcement

It is estimated that the WTC 2 announcement came over the public address system at approximately 9:00 a.m., as the majority of survivors said they heard it just minutes before WTC 2 was struck, which occurred at 9:03 a.m. As one survivor from the 103rd floor of WTC 2 describes, "When we reached the 70th floor we heard the announcement. The building was secure; no one needed to evacuate. We had descended down 3 more floors to the 67th when the second plane hit our tower" (csmonitor.com, 2001). Of the 184 WTC 2 occupants, 96 people (52%) mentioned hearing this announcement in their accounts. The majority of them, 69 survivors, decided to disregard the instructions of the message and continue their evacuation; however, 16 people (17%) said they remained in their offices or decided to return back up to their offices after hearing the message. Those returning did not have time to travel very far before the second plane hit; at that point they all resumed their evacuation down.

Location When WTC 2 Was Hit

Of the 273 survivors who mentioned their location at the time WTC 2 was hit, 36 people reported being somewhere inside the stairwells of WTC 1, while 14 people reported being on various floors of WTC 1. Fifty-six did not give a specific location and 15 had already reached the outside. Of the survivors from WTC 2, 65 people reported they were in the stairs and 52 occupants reported they were on various floors within WTC 2. Four did not give a specific location and 31 had already left the building. Of these people who were on the floors within WTC 2, 19 were on the upper floors (77th and above) at impact and survived. One of these occupants who survived the plane impact on the 78th floor of WTC 2 describes the stairwell: "a tornado of hot air and smoke and ceiling tiles and bits of drywall came flying up the stairwell. In front of me, the drywall split from the bottom up" (csmonitor.com, 2001).

Location When WTC 2 Collapsed

WTC 2 was the first tower to collapse at 9:59 a.m. Of the 296 survivors who mentioned their location at the time of WTC 2's collapse, 230 people (78%) were outside of the buildings, on the streets and surrounding areas. Some 47 people (16%) were still inside WTC 1 on lower levels from basement to the 42nd floor and three people (1%) were on mid levels (43-76) in WTC 1 when WTC 2 fell. Thirteen did not give exact locations and one was in an elevator. Three individuals were on the lower levels of WTC 2 (concourse) when it collapsed, and survived.

Location When WTC 1 Collapsed

WTC 1, the second tower to collapse, fell at 10:28 a.m. As approximately one hour and 42 minutes had passed since the initial WTC 1 impact, almost everyone who reported their location at the time WTC 1 collapsed was outside (263 people or 98%). Four people were on the lower levels of WTC 1 and two were in the concourse when it collapsed, and survived.

Location When They Saw Firefighters

For the evacuees who mentioned seeing firefighters during their evacuation, the location where they met them was recorded to gain an understanding of the dispersion of emergency workers throughout the towers. For the 169 people who reported meeting firefighters, 143 people saw them in WTC 1 with only 26 people in WTC 2 mentioning their presence. In terms of floor location within WTC 1, it was found that a majority of the people (76 people) saw firefighters in WTC 1 on the lower levels (basement-42nd) -- 74 of them saw firefighters in the stairwells and two on a floor. Another 21 people saw firefighters on the mid floors (43rd-76th) -- 17 of them were in the stairs while the other four people were on floors. Another three people saw firefighters on the upper floors (77th-110th) in office areas. All three were trapped on the 83rd floor. One survivor stated: "We saw two flashlights

belonging to two New York City firemen. They told us to leave all of our possessions and to quickly follow them" (Manning, 2001). At the mezzanine, lobby or concourse level, 11 people reported seeing firefighters. The remaining 31 occupants who saw firefighters inside WTC 1 did not give a location.

Among the 26 people who mentioned seeing firefighters in WTC 2, eight saw them on the lower floors (basement-42nd), two saw firefighters in the mid floors of the building (43rd-76th). Some seven people saw firefighters at the mezzanine, lobby or concourse levels while six people in WTC 2 mentioned seeing firefighters but did not indicate their locations. Another three people indicated that they met firefighters outside WTC 2.

Time of Exit

For evacuees from both towers who indicated at what time they exited, it was found that as more time passed, a progressively greater number of people exited the building, as shown in Table 7. Of the 183 WTC 2 occupants who indicated what time it was when they left the building, 77 exited between 9:31 and 9:58 a.m. – WTC 2 collapsed at 9:59 a.m. Of the 211 WTC 1 occupants who indicated the time they left their building, 70 exited between 9:59 and 10:27 a.m. – WTC 1 fell at 10:28 a.m. The six people who exited the towers after 10:28 a.m. were rescued from the rubble by firefighters up to several hours after the collapse.

Table 7. Time out of Towers

	WTC 1, N= 211 (impact - 8:46 a.m.) (collapse - 10:28 a.m.)	WTC 2, N= 183 (impact - 9:03 a.m.) (collapse - 9:59 a.m.)
8:48 – 9:02 a.m.(before WTC 2 impact)	19	37
9:03 – 9:30 a.m.	45	68
9:31 – 9:58 a.m.(before WTC 2 collapse)	72	77
9:59 – 10:27 a.m.(after WTC 2 collapse)	70	0
10:28 a.m.(after WTC 1 collapse)	5	1

Help Received and Help Given

Among the 435 accounts, 203 survivors described receiving help from others during their evacuation, with some mentioning more than one source of help. Some 84 people (37%) were helped by Port Authority personnel. Firefighters provided direct help to 65 people (29%). Another 65 people (29%) were helped by external officers such as NYPD or other rescuers. Help from coworkers was received by 34 people (15%). Overall, 166 people mentioned being comforted and reassured by passing firefighters. Several occupants of the two towers helped others during the evacuation. Among the first-person accounts, 20 people said they helped people with disabilities and 14 said they helped people who were injured during the event.

Occupants with Disabilities or Injuries

Among the 27 persons reporting a disability in their account, two were visually impaired, three were hearing impaired, three used wheelchairs and 19 others were physically challenged such as suffering from a heart condition, asthma, obesity, etc. Some 22 people mentioned seeing people with disabilities.

Another 47 people who provided first-person accounts were injured that morning. Some accounts from people who suffered injuries reported exiting the buildings later in the evacuation process. However, in numerous accounts occupants mention moving aside in the stairwells to let badly injured and burned people pass, thus it is assumed that those with extreme injuries who were mobile exited the building faster than the majority of others. For instance, one survivor from the 88th floor of WTC 1 who suffered burns to over 77 percent of her body reported that crowds parted in the stairwell to let her through (Kugler, 2002). These victims were all accompanied by coworkers or emergency workers. Some 25 people mentioned seeing injured people coming down in the stairwells.

Phone Calls

An overwhelming 87% of those who placed phone calls (151 people) were trying to contact their families and friends to let them know their whereabouts and gather information from them. Only 12 people (7%) tried contacting authorities, such as building security or calling 911, and 20 people (12%) placed calls to their boss or colleagues. Eleven people (6%) did not say who they called. The majority of people who placed phone calls that morning did so once they were outside (93 people or 54%); however, many did not get through.

Knowledge of Situation

In judging the evacuees' knowledge of the situation, categories were created. A 'high level' of knowledge indicated knowing that planes had hit the towers or that there had been an explosion within the towers. Those who speculated about a bombing, saw fire and debris or had reason to believe an emergency was occurring were said to have 'moderate levels' of knowledge. Survivors who were not aware of the reasons behind the evacuation were classified as having 'low levels' of knowledge. Level of knowledge was coded for 330 people. Survivors with 'high levels' of knowledge accounted for 69 people; 214 people were judged to have 'moderate levels' of knowledge and 47 survivors had 'low levels' of knowledge regarding the events of that morning.

Influence of Others

Whether others influenced evacuees' decisions was also taken into consideration for 192 survivors. It appeared that 28 people were influenced by authority figures, such as their boss or manager, and complied with their instructions. Another 97 survivors seemed to be influenced by groups of people and coworkers. One person appeared to have been influenced by both authority figure(s) and the group. Many individuals indicated that they took on leadership roles that morning. Some 66 people reported they directed people to the stairs, searched for others, gave orders or somehow took part in organizing the evacuation.

Males were more likely to perceive themselves as taking on leadership roles that morning than females. Some 38 women (59% of the females for whom influence could be inferred) were influenced by groups of coworkers, whereas only 58 men (46%) were apparently influenced by the group. Concerning leadership roles, 52 men (41%) reported adopting this behavior, compared to the 14 women who mentioned taking a leadership role (22% of the women).

Perception of Others

How survivors perceived others during the evacuation was recorded for 268 people -- others could have been perceived as 'calm,' momentarily panicked,' 'upset,' or 'helpful.' Multiple responses could be coded for each person. The results show that the majority (154 people or 57%) described people around them as calm and orderly. Some 84 people (31%) judged others as 'upset,' which included crying, shouting, nervous or anxious, but rational. There were 78 people (29%) who described others as 'momentarily panicked,' in that they were pushing, shoving or generally displaying behavior associated with chaos, while 59 people (22%) found others to be 'helpful.'

It was found that of 155 people in WTC 1, 93 survivors judged others to be 'calm,' compared to 61 of 113 people in WTC 2. Only 33 people in WTC 1 described others as 'momentarily panicked,' compared to 45 people in WTC 2. For the people in WTC 2, the perception of 'panic' occurred before WTC 2 was hit for at least three occupants, while another 29 survivors described others around them as 'panicky' after WTC 2 was hit. For two others, the 'panicky' behavior was reported at the point in time when each tower collapsed. It was not clear from the other 11 accounts from WTC 2 when the people around them were 'panicky.'

Impact of the 1993 Evacuation

Only 9% of the sample, 41 people, reported being present during the 1993 bombing and evacuation of the World Trade Center. Of them, three people explained that their experience in 1993 helped them decide to start their evacuation immediately on September 11, 2001. Five people who were present in 1993 mentioned being better prepared this time with evacuation kits. These emergency escape kits

were described as being equipped with flashlights, masks, glow sticks, whistles and water (Murphy & Levy, 2001). Another 18 people specifically mentioned that 1993 was on their mind during their evacuation, although they were not present during the events of 1993.

Four survivors reported seeing photoluminescent stripes on the stairs, railings and stairwell doors – an improvement the Port Authority made following the 1993 bombing. As one survivor stated, “All you had to do was follow those yellow-green stripes. They were wonderful. The stripes were especially valuable when the emergency stairs stopped and people had to travel horizontally through mechanical equipment spaces that had many doors” (Masetti, 2001).

A paraplegic survivor from WTC 1 who was also present for the 1993 evacuation of the World Trade Center commented on the successful use of an evacuation chair on September 11, 2001. The evacuation chairs were part of the improvements made to the World Trade Center evacuation process after the 1993 bombing, and this survivor credits the chair with saving his life. He went on to say, “If it weren’t for the evacuation chair and the 10 people that brought me down, I would not have made it, that’s for sure. That evacuation chair made the difference.” (Fink & Mathias, 2002).

CONCLUSION

Although it is recognized that content analysis of first-person accounts has limitations, and the results cannot be generalized to all occupants of the towers, this methodology was found to be particularly useful in this case. With the large number of accounts that were gathered from a variety of sources (print media, television, radio, internet, emails, etc.), the similar themes and experiences within these texts became more than merely anecdotal stories. Using first-person accounts proved to be the only timely method available to gather information on human behavior of the survivors from the World Trade Center towers. Considering that a great majority of the accounts became public within three weeks following the events and that recollection of human behavior is delicately time sensitive, it was important to analyze this information. This methodology could prove useful in future projects dealing with first-person accounts, although events of the magnitude of September 11, 2001, which produced such a large number of first-person accounts, are extremely rare.

For the accounts gathered from media sources, it is recognized that they may represent the most dramatic stories of the evacuation, as the motivating factor behind mass media is to publish eye-catching, emotion-laden headlines. At the same time, those survivors who have dramatic stories of escape may be more inclined to share them compared to other survivors who may judge their evacuation as less eventful. However, the accounts analyzed were from survivors located in several areas in each tower, providing a distribution of floors from the upper, middle and lower strata of the two towers. In total, 745 accounts were analyzed, representing 435 survivors from WTC 1 and WTC 2.

An important observation stemming from the accounts analysis encompasses the issue of evacuation strategies. It was found that 44 people, some 24% of WTC 2 occupants in this sample, used the elevators at some point during their evacuation. It has long been accepted among fire safety experts that people know they should not use elevators as a means of egress during an emergency, but those in WTC 2 who chose to use the elevators may have thought it was the quickest or safest route of escape and may have believed that because they were not in immediate danger, they were justified in their decision to use the elevators to evacuate. This same theme is echoed when examining the reactions of the 96 WTC 2 occupants who heard the public address announcement, which told them their building was secure and to return to their offices. Only 16 people took heed of this message and stopped their evacuation, making their way back to, or remaining in, their offices. Through all accounts studied (with the exception of maybe one) there was no doubt that people understood the message, as there were no audibility or intelligibility issues; the content of the message was clear. However, the majority of 69 occupants made their decision based on the information that they had at that point in time and decided to disregard the order and continue evacuating. As one survivor stated, “I was thinking that there is a real difference of opinion here about what my eyes are seeing and what the

announcement was saying" (Murphy & Levy, 2001). This decision to carry on with the evacuation may also reflect the concept of commitment: as these occupants had already made the decision to leave, they pursued this task.

Those who had experienced the 1993 terrorist bombing of the World Trade Center were prompt at leaving. Although their past experience could have suggested that the evacuation was going to be long and difficult and that people who stayed behind would be evacuated by rescuers later on, very few used this as rationale. Instead, most occupants with experience from 1993 felt an urgency to leave immediately.

The results show that 18 people who were identified as having 'high levels' of knowledge delayed evacuating. It is assumed these survivors were not in the immediate vicinity of danger, but knew an airplane had hit the building or suspected it was a terrorist attack. Those who delayed their evacuation reported that they rushed to gather their belongings or went to backup important company files, for they suspected they would not be returning to the building for an extended period of time. These are rational actions, therefore it is concluded that those with 'high levels' of knowledge who delayed evacuating had to have been in areas where the perceived threat to personal safety was not high.

The overall impression of the emotional atmosphere during the evacuation, after reading all 745 accounts, was that of calm and order. Although some reported crying and being anxious or nervous, the majority viewed themselves and others as composed.

Emergency crews disrupted evacuation in the stairwells while going against traffic, but many evacuees who mentioned seeing firefighters felt reassured and safe due to their presence. It is assumed that this counter flow did not prevent occupants from evacuating, as the last people to exit reported being alone in the stairs while they were descending rapidly seconds before the collapse.

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