

# Human Behaviour and Emergency Planning

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This work presents concepts related to human behaviour in crisis, like emergencies and disasters, presenting cases of real emergencies where psychological aspects of stakeholders could be identified and contributed to the final result of the event.

Based on these concepts, it is possible to draw action lines to help the emergency managers in corporate environments in the planning phase, such as the review of the role of the evacuation coordinators, application of phased evacuation in high-rise buildings and measures to avoid panic, among others.

This paper has the intent to present the practical application of the knowledge of the human behaviour and show its applicability and advantages to the emergency planning in corporate environment.

## 1. Introduction

The evolution of the society has brought new systems and technologies that create new risks, as new industrial processes and the elevated number of occupants in office buildings. Emergency managers need to be prepared to face these new challenges.

Many times, the design of emergency systems and evacuation plans are done based only in technical aspects. This classical approach can lead to results that are not compatible with reality, with a bad distribution of the available resources, with excessive concentration in some aspects and neglecting other important issues.

This work aims to understand how the concepts of emergency psychology can help in the emergency planning process and to propose actions that can be taken in an emergency in a corporate environment.

## 2. Myths and facts about behaviour in emergencies

### 2.1 Fight or flight

The term “fight or flight” to describe human behaviour in threat situations was coined by Cannon (1927), stating that body changes in animals, like the increase of sugar in the blood, the adrenalin production and the altered circulation were biological adaptations to situations with probable pain and emotional arousing, presenting the necessity to fight or to run away.

In present days, there is the widespread concept that human beings, when exposed to fear or extreme stress situations, like the ones find in emergencies, will immediately present the classical “fight or flight” behaviour, facing the situation directly or taking evasive actions.

According to this belief, as observed by Leach (2004), systems for escape, evacuation, and rescue are designed on the assumption that people will be proactive in the face of danger”.

However, studies that are more recent propose a review of the “fight or flight” behaviour. According to Gray (1988, apud Bracha, 2004), the sequence of fear responses in mammals can be characterized as freeze, flight, fight and fright.

The first instinctive reaction of the sequence is freeze, also known as hypervigilance. According to Bracha (2004), “this initial freeze response is the “stop, look, and listen” action tendency associated with fear. Prey that remain “frozen” during threat are more likely to avoid capture, because the visual cortex and the retina of mammalian carnivores (and, to a lesser degree, of male Homo sapiens) evolved primarily for detecting moving objects and not colour”.

Besides, according to Bracha et al. (2004), the attempt to fight occurs only after the attempts to escape are exhausted, so the correct order would be “flight or fight”, instead of “fight or flight”. The fright response, also known as tonic immobility, still according the same authors, occurs during the direct physical contact of the carnivore (or human predator).

The observation of human behaviour in real emergencies confirms that the widespread use of the “fight or flight” concept is not adequate; in case of an emergency, some people are apathetic and do not take action to save their own lives.

### 2.1.1 Examples

As related by Stanton (2002), during the shipwreck of the USS Indianapolis, torpedoed by a Japanese submarine in 1945, sailors acted in strange ways. Some of them returned to their dormitories to finish letters home, one of them stopped to cut his toenails and another made a sandwich and ate it.

According to Ripley (2008), in February 27, 1980, during an intense shootout that occurred during the invasion the Dominican Republic’s Embassy in Bogota, Colombia, by terrorists from group M-19, the general consul general of Costa Rica wandered the room, until one of the invaders pulled him down to the ground.

According to the Joint Accident Investigation Commission of Estonia, Finland and Sweden (1997), during the shipwreck of MV Estonia in the Baltic Sea, in September 28, 1994, many passengers were seen just waiting, without moving, while others seemed to be paralyzed and unable to understand what was happening.

In February 14, 2008, a former student invaded a large auditorium-style lecture hall at Northern Illinois University in DeKalb, USA, killing five people, injuring eighteen and committing suicide. According to the U. S. Fire Administration (2008), when the first campus police responders arrived at the shooting scene, they found around six students still sitting in their places, in shock.

## 2.2 Panic

According to the Oxford Living Dictionaries (2018), panic can be defined as “sudden uncontrollable fear or anxiety, often causing wildly unthinking behaviour”. Although this definition can be used in this paper, Mason (2005) gives a more appropriate definition: “the term “panic” refers to inappropriate (or excessive) fear and/or flight and highly intense fear and/or flight”.

There is a widespread idea among public and some emergency managers that a population facing an emergency or disaster situation will necessarily panic.

According to Alamo (2008), the popular image is that people will be terrorized and acting irrationally, in a selfish and antisocial way, during and immediately after a disaster threat.

Proulx (2002) states that “the media and general public often mention the potential of mass panic during fires, imagining a crowd that suddenly wants to flee danger at all cost, possibly getting trampled or crushed in the process”.

However, studies have demonstrate that mass panic is an uncommon occurrence in many types of emergency or threat situations.

For instance, in combat situation the phenomenon seldom occurs, according to L’Etang (1966, apud Mawson, 2005). Even in air raids against civilians, according to Janis et al. (1955), it is significant and surprising the low number of panic episodes in such situations.

As stated by the World Health Organization (1991, apud Noji, 1997), the idea that disasters bring up the worst of human behaviour, such as riots and looting, is a myth. “Although isolated cases of antisocial behaviour exist (...), most people respond spontaneously and generously”.

Although these studies, among others, demonstrate that panic is rare, it can exist in some situations, as observed by Ripley (2008): “the current fashion in disaster research is to deny that panic ever happens. (...) But just because panic is rare doesn’t mean we shouldn’t speak of it. Panic does happen”.

Quarantelli (1954, apud Ripley, 2008) concluded that there are three necessary conditions of panic to exist: people must feel that they may be trapped, they must feel a sensation of great helplessness, which often grows from the interaction with others, and a sense of profound isolation. If these three elements are present, panic is a possibility that must be taken into account. It is worth noticing that according to Quarantelli (1954, apud Mawson, 2007), that the feeling or the sensation of entrapment is more relevant that the certainty that there is no exit, when panic is not expected.

### 2.2.1 Affiliation

A kind of behaviour normally found in emergencies and very different from panic is the so-called affiliation. As stated by Drury (2009), when threatened, we are motivated to seek the familiar rather than simply exit.

Experiments on people’s escape from a fire in a large-scale room containing an entrance and emergency fire exit in opposite corners were related by Sime (1985) and show that, generally, employees exited by the

emergency exit, whereas members of the public separated from their groups escaped by the same door that they entered, showing the importance of the affiliation behaviour in a fire situation.

Such behaviour, although without the selfish and competitive characteristics related to panic, does not mean that the possibility of escaping the threat is bigger. According to Mawson (2005), the typical behaviour in face of a physical threat is affiliation that is, "seeking the proximity of familiar persons and places, even though this may involve approaching or remaining in a situation of danger; indeed, separation from attachment is a greater stressor than physical danger itself".

### **2.2.2 Normalcy bias**

A parameter used in advanced fire protection projects is the RSET (Required Safe Egress Time). A factor influencing the RSET is composed by the initial behaviour (pre-movement time), that is, the time between the activation of the alarm and beginning of the movement towards the exits. In many cases, the pre-movement time is increased by apparently incoherent behaviours. According to Ripley (2008), we tend to believe that everything is all right because it usually has been before. This tendency is known as normalcy bias.

This behaviour can be seen in other emergencies beyond fires. On the one hand people in emergency situations are submitted to stimuli, which can be warnings through mass communications means, emergency alarms, signs that the situation is abnormal (smoke, noise or others) or a combination of these stimuli, but on the other hand the normalcy bias lead them to believe that everything is all right. According to Oda (2007), these paradoxical thoughts create a cognitive dissonance, which people try to eliminate in two different ways: accepting the signs and evading the threat zone or ignoring them and trying to keep normalcy. It is clear that the second behaviour can have dire consequences, like not evading the hazardous area timely.

### **2.2.3 Examples**

On October 30, 1938, Orson Welles narrated the radio drama "The War of the Worlds" as an actual news broadcast. Although one can consider that the conditions to panic were present, according to Cantril et al. (1940, apud Mawson, 2005), the vast majority of people that listened to the broadcast and became terrorized thinking the alien attack was true did not panicked or ran away, but contacted relatives and friends. Most of the people who fled did not have relatives in the area or fled after reuniting with family members.

In the fire of Kings Cross subway station in London, in 1987, there was no panic, according to Donald and Canter (1990, apud Drury 2009).

In the MV Estonia shipwreck, as related by the Joint Accident Investigation Commission of Estonia, Finland and Sweden (1997), "a number of people reacted incredulously to the very early signs. They slowly realised that the sounds they heard were abnormal, or rather, they failed to persuade themselves that the situation was still normal".

The National Institute of Standards and Technology – NIST (2005), after interviewing survivors of the terrorist attacks to the World Trade Center on September 11, 2001, concluded that occupants of the WTC 1 (North Tower) engaged in various activities between the perception of the impact of the aircraft and the beginning of the evacuation. Some of them were related to survival, as helping other (30% of the interviewed) or fighting fires (6%), but others were not direct related to survival, as talk to others (70%), take personal belongings (46%), turn off computers (6%) or simply continue to work (3%). In WTC 2 (South Tower), which was hit later, similar behaviour was observed. From the interviewed, 75% talked to others, 57% gathered personal belongings, 7% turned off computers and 6% kept on working. In the same study, a survivor from 78th floor related that during the evacuation of WTC 2, in the stairs, "people were having general conversations, seemed calm, and walked at a steady pace, no sense of panic". The evacuation of WTC 1 was also relatively calm and orderly, according to the final report of the National Commission on Terrorist Attacks Upon the United States (2004).

During the terrorist attacks against the London subway on July 7, 2005, panic was not observed, according to Drury, Cocking and Reicher (2009, apud Drury, 2009). On the contrary, a survivor relates, "I remember walking towards the stairs and at the top of the stairs there was a guy coming from the other direction. I remember him kind of gesturing; kind of politely that I should go in front- 'you first' that. And I was struck I thought, God even in a situation like this someone has kind of got manners, really".

### **2.3 Victims are totally dependent on external help**

Another belief shared among some emergency managers is that, after the first moments of the emergency, the affected people will depend totally on specialized external help. According the World Health Organization (1991, apud Noji, 1997), there is a myth that during a disaster, the affected population will be too shocked and powerless to take responsibility for their own survival, although this is not observed in real situations.

On the other hand, rescue teams are not always able to respond in a timely manner so that the public have to work for their own survival. As noted by Kong and Zhao (2018) the allocation of emergency resources many times is not done properly.

Ripley (2009) cites Craig Fugate, US FEMA Administrator from 2009 to 2017, who said that to avoid a “system collapse,” the government must draft the public. “We tend to look at the public as a liability. [But] who is going to be the fastest responder when your house falls on your head? Your neighbour.” A few years ago, Fugate dropped the word victim from his vocabulary. “You’re not going to hear me refer to people as victims unless we’ve lost ’em. I call them survivors”.

### **2.3.1 Examples**

Several reports of real emergencies and disasters show that the public took charge of their own rescue, at least upon the arrival of specialized teams.

In the 9/11 attack on the World Trade Center, the first emergency response came from individuals and private companies in the building, according to the final report of the National Commission on Terrorist Attacks Upon the United States (2004).

In the terrorist attacks against the London subway in 2005, Drury, Cocking and Reicher (2009, apud Drury, 2009) mention that emergency services were unable of reaching all survivors immediately.

On the Christmas Eve 2009, in the attempted bombing of a Northwest Airlines flight from Amsterdam to Detroit, after the terrorist attempted to activate his explosives, passengers and crew, who put out the small fire generated, dominated him.

## **3. Proposals to emergency planning**

By knowing the main human behaviours towards crises, the emergency manager can plan more effectively and take measures to improve the probability of success. The corporate environment presents the advantage to be relatively controlled when compared to the public in general, so measures as emergency training can be more productive, as observed by Leach (2004).

### **3.1 Role of evacuation coordinators**

Many companies employ the figure of the evacuation coordinator, whose function consists of gathering the employees and lead them safely to a pre-determinate meeting point, when the evacuation of the area or building is ordered. In the World Trade Center, in 2001, the system of Fire Marshalls was in use, but, as observed by Gershon (2007, apud Ripley, 2008), 94% of them never had exited the buildings as part of training and just 50% considered themselves able to escape the buildings by themselves.

It is possible to propose that the evacuation coordinators system can be successfully utilized, as long they are corrected trained to the safe egress of the building and clearly identified. The coordinator has also to have active postures, not only checking the number of people and leading them to the emergency exits, but also giving clear and objective instructions, in loud voice, if necessary with a megaphone, to neutralize the freezing reaction.

The action of rescuing an involved person from a state of paralysis often occurs spontaneously and was observed in many cases, among them the shipwreck of USS Indianapolis. One survivor told that, despite the fear of death, he simply had not had the wish to leave one of rooms of the doomed ship, until hearing someone shouting demanding him to open a hatch. In this moment, he left the state of paralysis and could escape and survive the wreckage, according to Stanton (2002).

Ripley (2008) tells the case of an employee of the World Trade Center 1 who related that she had not the will to leave the building after the plane collision, until a co-worker shouted to leave the building, when the evasion began.

### **3.2 Familiarity with escape routes**

As seen, people tend to seek the familiar during an emergency, as demonstrated by the tendency to exit by the same door that they entered. Winerman (2004) tells that this behaviour makes sense, because the occupants do not want to use an unknown exit that they are not sure where it is heading, especially during a crisis.

A way to minimize the negative effects of the affiliation during emergencies is to reinforce the evacuation drills of the workplace, in order to have all occupants already familiarized with escape routes and emergency exits. Workers on business trips should be oriented to know the emergency plan of the hotels where they are staying and make a reconnaissance of the escape route, not only checking the location of the emergency exit of the floor, but also leaving the building at least once, whenever possible.

### 3.3 Evacuation of buildings

The typical behaviour during emergencies is the lack of panic and even the presence of a certain degree of courtesy. According to Ripley (2008), this courtesy can delay the evacuation of a high-rise building when people coming from upper floors give way to occupants who are entering the stairways from lower levels, affecting mainly the occupants of upper floors, who naturally already have a bigger egress time and, thus, an increased exposition to risk.

Rescue vehicles from Fire and Rescue Services normally are not able to reach buildings more than 25 meters high, the high-rise buildings. It is possible to propose the use of phased evacuation for such buildings. According to Ronchi and Nilsson (2013), this strategy is based on the concept that occupants in the most critical floors such as the fire floor and floors nearby will be prioritized. In the case of a full evacuation, occupants from the last floor start the egress; people in the floor immediately below begin to exit after the last occupant of the upper floor passes, and subsequently for other floors. The phased evacuation was successfully adopted by Rick Rescorla, then Security Director of Morgan Stanley, in the evacuation of the company's offices in the World Trade Center in the 2001 attack, as noted by Ripley (2008).

### 3.4 Avoiding panic

Even with scientific literature showing that panic is rare in emergencies, it can happen. The emergency managers should be aware of this in the planning phase to decrease the probability of panic by eliminating the conditions that favour its emergence.

The entrapment sensation can be minimized, for example, through appropriate signposting and lighting of escape routes. The use of doors with automatic opening in case of an alarm can be a valuable resource, according to Proulx (apud Winerman, 2004).

Constant training, aiming the familiarity with emergency systems and escape routes, can reduce the helplessness sensation.

The isolation feeling can be decreased by Emergency Response Teams and Corporate Management by providing information about the incident, in the most complete and clear manner possible.

### 3.5 Participation of stakeholders

Fellow colleagues will probably take charge of the first response for an emergency in a corporate environment. This response can happen in search and rescue, firefighting or even hazardous materials incidents. Even in companies with own professional firefighters with an adequate response time, the participation of co-workers will occur, for example, in multiple and simultaneous incidents or great disasters, when the response capability of the emergency response team is exceeded.

Thus, it is possible to suppose that the more the employees are trained and prepared for emergency response in the work environment, the more effective this spontaneous response will be. To achieve this, the fire brigades can receive training above the minimum required by law, based on the specific risks of the activity.

In addition, all employees, even the ones that are not part of the fire brigade, should receive basic training on emergency response, including the command and control model adopted by the company, to allow a fast and effective integration with the emergency response team.

### 3.6 Vulnerable groups

Within corporate responsibility programs, corporations make efforts to improve the integration with the community, with "open doors" activities, where students, neighbours and family members of the employees are invited to visit their installations.

Special attention should be given to children, because, as noted by Leach (2004), regarding survival, they should be acknowledged as functionally different from adults due to their neurological and cognitive development. Children will face difficulties in using emergency systems and will need the help of an adult. It can be proposed that every visitor group, especially with children, must count with the full-time presence of an adequate number of employees, specifically trained for this situation.

## 4. Conclusions

The human behaviour in emergencies is frequently neglected during the preparation for emergency and disasters. The emergency planning is usually done taking into account the physical aspects of the work area, such as in the design of the fire protection systems. When the human aspect is considered, it is not rare that misconceptions are used.

The knowledge of the mechanisms of the human actions in emergencies can improve the planning process, using a realistic view of how people will probably behave in such situations.

Other important factor is that the emergency manager has more control of the public in a corporate environment, when compared to the general public. From mandatory training to the installation of emergency equipment, including the detailed knowledge of the risks, the corporate environment favours the emergency planning.

Thus, the use of emergency proposals derived from human behaviour concepts can improve the emergency planning, increasing the probability of success and loss reduction.

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