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CONTRIBUTION OF SOCIAL PSYCHOLOGY FOR UNDERSTNANDING OF HUMAN BEHAVIOR DURING FIRE EMERGENCY

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Abstract

Today we have plenty of evidence about people's reaction in the case of fire. Some reactions are peculiar for the fire emergency. However – in order to understand these reactions – it is important to know the basic principles of individual and group behavior. The main goal of this article is to present results of psychological investigations of basic instincts (anxiety, fear, panic) and results of investigations of group behavior (social facilitation, conformity, altruism, diffusion of responsibility, respect for authority, etc.) and to apply these results on investigation of human behavior during the fire emergency. In short, this article has aim to explain human behavior during the fire emergencies on the basis of main findings of social psychology. Furthermore, the article suggests possible activities – especially in the field of education and training – that may decrease human loses in fires.

Keywords: fear, panic, diffusion of responsibility, authority, fire emergency

1 INTRODUCTION

The study of human behavior in case of fire is a very important element of adequate planning of fire protection. For example, the designer of the building can make an excellent plan of evacuation routes. Nevertheless, in a situation of real fire, it can easily happen that people do not use these routes. The reason is simple: in a situation of general fear, even panic, people instinctively seek to leave facility, which is in flames, by using the same routes they use every day. Therefore, it is likely that people will not use the emergency exits.

This example shows that the findings about the behavior of people in case of fire are important for proper planning of buildings, for the adoption of appropriate legislation and for the proper training of people in case of fire. This is especially important because there are certain regularities in behavior during fire and based on previous experience one can predict people's future behavior. It is necessary to point out that the behavior of people in case of fire is almost always very risky because it takes place in difficult conditions, which change rapidly. In such conditions there is a lack of information and a great danger to people and property.

Therefore, designers and experts for fire protection must be familiar with the basics of psychology and regularities of individual and collective behavior in crisis situations. Hence, this article will first present characteristics of emotional conditions that occur in case of fire, such as anxiety, fear and panic. After that, the forms of collective behavior that are important for predicting the behavior of human groups in emergency situations (conformity, obedience, social facilitation, altruism and diffusion of responsibility) will be analyzed. In this second part, the basic instructions for guiding people during the fire emergency will be presented.

2 EMOTIONAL REACTIONS DURING A FIRE

2.1 Anxiety

Anxiety is a "fear of fear", therefore, the mildest form of fear. Studies have shown that the highest level of anxiety can be expected in people who have never experienced a fire and lowest in those who have experienced the fire but did not have negative consequences. Between them, by the degree of feeling of anxiety, come people who have experienced a fire but have also experienced

some injuries (Ibrahimpašić *et al*., 2000). Studies have also shown that unpredictability increases anxiety. For these reasons, it is very important to hold fire drills to help people not only to learn the required behavior in the event of a fire, but also to feel less fear and anxiety in case of fire. The drills are especially important for groups that are most prone to anxiety and these are the people who are younger than 18 and those who are 65 and older.

2.2 Fear

Fear is an emotional response to real or imagined danger. Fear is one of the four basic emotions (the others are joy, anger and sadness). It affects both the lower animals, but it also appears even in newborn children. The suddenness of the danger increases fear. As fires usually occur suddenly, it is very likely that people will feel intense fear in the event of fire. However, the fear is not necessarily harmful. Fear prepares the body to face the risk. It speeds up the heart rate, increases blood pressure, accelerates breathing and improves the flow of oxygen. Fear causes thirst, loss of appetite, slower digestion and clenching of fists. In this way, a sense of fear actually increases our ability to cope with danger.

The researchers were interested in the question of whether fear increases problem-solving skills. The answer is positive in case of physical effort and easier intellectual problems. However, fear reduces one's ability to solve serious logical problems (for example, solving math problems). In addition, too much fear (which turns into panic) significantly hinders the ability to solve problems. So, fear has a positive effect only if under control. If a person can no longer control his own behavior, fear increases danger.

It is important to note that only seriously ill people (psychopaths) cannot feel fear. These people are usually extremely aggressive, sadistic and prone to crime. On the other hand, between two to five percent of people suffer from anxiety and therefore must receive professional help. Some people suffer from a specific type of phobia - Pyrophobia (fear of fire). These people can cause panic in a fire.

At the end we will mention another interesting research on fear. The researchers were interested in psychological traits of heroes - people who proved to be extremely heroic in dangerous situations. It turned out that these people are extraordinarily intelligent, mentally stable but less disciplined than the average people (Gal, 1978).

2.3 Panic

Panic is unreasonable, irrational behavior that occurs because of real or imagined danger (Zvonarević, 1989). Unlike fear, which can be useful, panic almost always increases the likelihood of tragic events. The obvious example is the situation when people fail to evacuate from fire-affected cinema in which the doors open inwards and as a result people block the door. If they did not panic, they could be easily evacuated. It would be enough to step back and allow the opening of the door. However, panic prevents their rational behavior.

The most common reaction in panic is flight. In addition, people who panic are aggressive. However, sometimes panic can cause a complete stiffness. What is common to all the people who panic is the impossibility of rational thinking.

The main causes of panic are, first, the belief (real or fictitious) that there is a threat to life. Second, the panic occurs when people stop behaving rationally (see example above) when they fully indulge in emotions (the intensive fear). Third, the panic is characterized by mental infection - it is transmitted from one person to another. Alcohols and drug addicts are particularly prone to panic as well as people who do not have a leader and people who do not cooperate with each other to resolve the problems. In addition, the likelihood of panic in particular increases in conditions of emergency and physical exhaustion.

In order to prevent panic, people need to be realistic in assessment of the possible danger. People feel the greatest fear when they overestimate the risk. Fortunately, in the most cases of fire a threat to human life is relatively small and, therefore, knowledge about the real danger reduces the likelihood of panic. Second, in the situation of crises, it is very important to establish discipline.

Therefore, before the outbreak of the fire, it is necessary to assign the people responsible for evacuation and organization of fire-fighting. When people have capable leaders, who they trust, the likelihood of panic is reduced to a minimum. Not only the leaders but also the other people need to act calmly. Panic can be as contagious as calmness. A person who panics should try to calm down. If a person continues to panic, he/she needs to be isolated. Third, the activity reduces panic. Therefore, in case of fire people need to participate actively, either in firefighting activities or in the process of evacuation. Last but not least, the more people understand about fire the less likely it is that they will panic. Therefore, the fire drills are very effective means of preventing panic.
In the end, it is necessary to answer the question about the frequency of panic during a fire. The good news is that researches show that panic is relatively rare in the case of fire. Unfortunately, situations, in which panic is present, are great news for journalists. That is why the outsiders have the impression that the pervasive panic reaction of the people prevails in case of fire.

3 GROUP BEHAVIOR AND ITS IMPORTANCE IN CASE OF FIRE

It is well known, from experience, that people do not behave the same as isolated individuals and as members of groups. A polite and shy student can be, as a member of his fan group, very aggressive. Since people usually find themselves as the members of a group in case of fire, it is important to show the basic characteristics of group behavior.

3.1 Social facilitation

Not only does the group as a whole operate differently than isolated individuals but each individual also acts differently when in a group and when that person is observed by other members of the group. Each football team has an advantage if it plays at home because the support of fans increases motivation. It is interesting to note that social facilitation is present also in animals, even in insects. For example, cockroaches go through a simple labyrinth faster if they are watched by other cockroaches! However, if they have to go through a more complicated labyrinth, cockroaches are slower. It seems that in this case they are "nervous" and it is much harder for them to solve a complicated task. Similarly, people solve chess problems more easily if other people are not watching them. This phenomenon that people work better in the presence of other people in the case of physical effort and easy tasks but not if it is a complicated intellectual task is called social facilitation (Aronson, 2005).
Social facilitation affects people’s behavior in fires mostly positive. Since the exit from a fire-affected facility is associated with physical effort - and is usually a task that does not require much intellectual strain - the presence of other people increases the motivation for getting out from such a facility. In addition, the willingness of people to help in case of fire - which will be discussed later - is also associated with social facilitation. Just like football players want to present themselves in the best light in front of a home crowd, people in case of fire also want to show their willingness to help other people. However, if a fire occurs in a very complicated situation, which requires a great intellectual effort, then the presence of other people may have a negative effect.

3.2 Conformity

Another important characteristic of group behavior, which is closely associated with social facilitation, is conformism. It is a change of behavior under the influence of other people. This sort of behavior has been checked in numerous experiments. For example, Ash’s experiment (1951) is well-known, in which the people should choose which line is the same length as the model line. Although the answer was obvious, the participants made mistakes because the other respondents - who were familiar with the experiment - gave wrong answers. In other words the respondents trusted other people more than their own eyes!
Similarly, in an experiment smoke was released in the classroom in which students were doing tests. If the student was in the room by himself, in 75% of cases that student reported fire. However, if there were two more "students" who were familiar with the experiment and who did not react to smoke, only 10% of students reported the presence of smoke. Conformity is important for behavior

in case of fire because people will imitate other people. So if someone starts to panic it is likely to affect other people and spread to the entire group. Conversely, if people see that other people are helping disabled persons in an evacuation it is very likely that they are going to start helping themselves. That is why the proper conduct of people during the fire is very important not just for themselves but also for behavior of other people.

3.3 Altruism

In the literature, it is possible to find many examples that show that people sometimes do not show the slightest concern for others. Perhaps the most famous case is the case of Kitty Genovese, a girl who was brutally raped and murdered in the center of New York. The attack lasted for 45 minutes. As many as 38 residents heard her cries for help. However, not only did anyone come to help her, but they did not even call the police! Based on this event, one could have very negative conclusions about human nature. However, there are numerous instances in the literature in which people were willing to risk even their own lives to save others. For example, in 1982, in the midst of a cold winter, the plane crashed into the Potomac River. A helicopter came soon to rescue the people. One of the passengers grabbed the lifeline. He gave that rope to a nearby person. This process was repeated until the moment when all the surviving passengers, besides him, were evacuated. However, when the helicopter went to save him, the wreck of the plane sank and he sank along with it. So, he helped to rescue all the survivors thereby sacrificing his own life.
Fortunately, in the case of fire, people are more prone to behave as in the case of aircraft accident than as in the case of Kitty Genovese. Study after study shows that during fire people strongly incline to help other people. For example, when an explosion and fire occurred at the World Trade Center, people were willing to carry the disabled from the 100-th floor all the way to the exit! In other words, during the fire people are much more likely to behave altruistically than egotistically.

3.4 Diffusion of responsibility

However, there is one feature of group behavior which reduces the likelihood of support and that is the diffusion of responsibility. This term means that the mass of people expect that someone else will take responsibility. In other words, it is more likely that person who is injured will be assisted if there is just one person who can help than if the person who is injured is surrounded by hundreds of people. This is probably the main reason why no one helped aforementioned Kitty Genovese - everyone thought that someone else called the police and people asked themselves why they should risk their lives and help the unfortunate girl. In the literature, numerous cases have been reported when the fires were reported to fire-fighters hours after the fire had started. The simple reason for such behavior is that the people were convinced that someone else had already notified the fire department.
People may prevent the diffusion of responsibility the following way. If you are injured, point the finger at a specific person and ask them for help. In that case, that person will not be able to avoid responsibility. And if you come across a person who needs help, do not think that someone else will help, you should help. In the literature there is a case of a psychology student who - after a lecture on the diffusion of responsibility - accidentally came to the building on which a man who threatened to commit suicide was about to jump. Remembering what she had learned a few minutes ago, she immediately called on first aid and began to persuade the unlucky man not to commit suicide. She knew that if she did not help him, probably no one else would. She managed to persuade him to give up on committing suicide. In other words, in case of fire risk, after a person call the fire department, he/she should try to extinguish smaller fires or help evacuate people to avoid the diffusion of responsibility. In addition, it is likely that other people, because of conformism, would follow this person example and they would also behave altruistically. The presence of other people will speed up the evacuation because of the phenomenon of social facilitation. Additionally, if there is no person responsible for the organization of firefighting and evacuation, one should take control of the situation and organize people.

3.5 Compliance with the authority and guidance of groups

The best source for understanding the human inclination to respect the authority is probably given in Milgram's (1963) experiments. In them, the author studied whether people would be willing to hurt or even cause death of a person if they were ordered to do so. Participants in the experiment were to give electric shocks to people if they did not respond accurately to the questions. The shocks went from mild to lethal. Of course, those who "were given" shocks were acting as if they were in pain and the electric shocks were not real. However, those who inflicted shocks did not know that it was all just acting. Despite this, even 63% of the participants were ready to give a deadly electric shock! At the same time they listened to the cries and pleas of "victims" to end the shocks. Many of them complained. Nevertheless, when the leader of the experiment, with his authoritative voice, said that they had to continue giving shocks, they obeyed his orders. Milgram's experiment clearly shows that people are willing to follow the authorities, sometimes even blindly.
Even though Milgram's experiments suggest a pessimistic view of human nature, they nevertheless indicate that people are willing to follow the positive authority, particularly in crisis situations. Indeed, experience shows that people want to obey the authority during the fire; they look for the authority to tell them what to do. They are particularly prone to listen to people in uniforms, from the firefighters, police officers, soldiers to the medical staff. However, practice has shown that if there is no authorized person, it is good if someone takes control of the situation in order to help people organize and thereby increase their chances of survival.
Social psychologists were interested to find out whether natural "born leaders" really exist. Studies have shown that the following characteristics increase the likelihood of successful leadership: intelligence above average, extroversion, confidence and preference of domination. However, the art of leadership can be learnt. Therefore, it is especially important to teach people who are in management positions what to do in case of fire. In addition, persons who are in these positions should take the responsibility in case of fire. This means that, for example, a dean at the faculty should organize the evacuation until the arrival of fire brigades. At the same time, a dean should be helped by the people who are the heads of different departments. In addition, people in office should have a minimum of required knowledge about the behavior of people during a fire in order to successfully organize putting out of small fire and (or) the evacuation in case of major fire.

3.6 The probability of support in case of fire

At the end of this section, the main factors that affect the likelihood that someone will help in case of fire will be listed. The main reasons why people sometimes do not help are the following:

1. They do not notice the danger - it often happens that people do not call the fire department or begin to put out the fire, simply because they have not noticed that the fire broke out;
2. They do not interpret the event as a threat - it often happens that people do not start to evacuate when they hear the fire alarm because they think it is a fire drill;
3. They think that it is not up to them to help - diffusion of responsibility;
4. They do not know how to help - for example, they do not know how to use the fire extinguishers or they do not know how to provide first aid;
5. They do think about others, especially when they panic;
6. They do not want to help - many people are naturally egoistic.

However, the above mentioned problems can be reduced to a minimum if people are educated how to react in case of fire.

4 CONCLUSIONS AND RECOMMENDATIONS

At the end of this article, the most important conclusions about the behavior of people during a fire will be reported. Studies have shown that 80-90% of people respond rationally during a fire, trying to solve the problem. Generally speaking, people behave altruistically in times of crisis. The

presence of quality leadership and organization increases adequate and altruistic behavior and reduces the chances of inappropriate and egotistical behavior.

People who are trained act far more rationally. They also put out fire more frequently and they less often get hurt. There is also a rule that the smaller the risk, the more rational people are. In addition, people are willing to help the people who they do not know, especially if they are their clients (for example, patients in hospitals). When planning the evacuation, it is important to know that during the fire people should gather at the usual places, jointly discuss possible solutions and try to use the usual routes. Therefore, it is necessary to clearly mark all possible routes of evacuation. During fire, it is important to give clear instructions to the people. However, a key factor for reducing deaths, injuries and property damage - along with technical protection measures - is to properly educate people to behave in an optimal way in case of fire.

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