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**The mass psychology of disasters  
and emergency evacuations:  
A research report and implications for practice**

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## **Executive summary**

**1.** This report has been produced to disseminate the findings of a three-year research project, funded by the Economic and Social Research Council (ESRC), and based at the Psychology Department at the University of Sussex, which looked at the psychology and behaviour of crowds in disasters and mass emergencies.

**2.** Early accounts of crowd behaviour suggested that crowds are prone to irrational panic when faced with danger. However, later research argued that crowd behaviour in emergencies is socially structured, that mutual help is common, and that people stay with their friends and family where possible.

**3.** The present research project proposed to add to this body of research by applying modern social psychological theories to understand the conditions under which crowds of people co-operate with previous strangers during emergencies, even when faced with extreme personal danger.

**4.** The main research questions investigated in this project were:

- How do crowds behave when faced with danger such as natural disasters or terrorist attacks?
- Does 'mass panic' occur and if so how what factors might limit or prevent it?
- Does a shared social identity (sense of unity, psychological togetherness, groupness) enhance co-ordination and co-operation (and mitigate personal competitive behaviour) in disasters and emergencies?

**5.** The research project consisted of three types of studies:

- Experimental simulations of emergency evacuations
- A comparative interview study of a number of different emergency events
- An archive, questionnaire and interview study of survivors' experience of the London bombings of July 2005.

**6.** The experimental simulations comprised two types of study which were compared for their adequacy for studying aspects of mass emergency behaviour in a laboratory setting. In the first type of study, people in a pseudo-crowd were asked to evacuate a room and their behaviour observed and perceptions measured. This procedure was too brief to identify examples of helping or competitive behaviour. However, there was some evidence that a shared identity among participants, which emerged in relation to the experimenters, enhanced their sense of psychological unity.

**7.** The second type of experimental simulation involved the construction of a computer visualization ('virtual reality' program) of a fire in an underground railway station. There was some support in these studies for the idea that enhanced social identity – or psychological 'groupness' – increases mutual concern and helping behaviour in mass emergencies. It was concluded that the visualization was a potentially successful method for studying aspects of evacuation behaviour in the laboratory.

**8.** In the comparative interview study, we spoke to 21 survivors from eleven different crowd emergencies. Across the different events, we found almost no evidence of mass

panic. On the contrary, mutual helping of strangers was commonplace, and this was found to relate to feelings of togetherness that emerged in the crowd in the midst of the emergency.

**9.** The archive, questionnaire and interview study of the July 7<sup>th</sup> (2005) London bombings again established that 'selfish', competitive and disorderly behaviour was extremely rare, with co-operation and altruism being commonplace. There was evidence of enhanced unity in the crowd which occurred in and through the emergency itself, even though most people were amongst strangers.

**10.** The review of the existing research literature, together with our own studies, support the view that mass panic is a myth, and that crowd behaviour in disasters and emergencies is meaningful rather than irrational; and that such behaviour is characteristically orderly and co-operative rather than disorderly and individualistic. The results of our studies add something new and original in the explanation of this process by suggesting that the basis of this co-operation is not (just) pre-existing affiliations and everyday social rules and roles, but an emergent sense of shared social identity arising from a shared relationship to the emergency itself.

**11.** Implications for the safe management of any future mass emergencies include the following:

- Those involved in the management of crowd safety need to be prepared – to plan for the worst case scenario; provide clear and easily available instructions for the public; and to regularly practice evacuation drills.
- Communication with the crowd is crucial. This in turn means prioritizing systems of communication (e.g. public address systems) over physical features such as exit widths, and providing alarm signals that are informative about the nature of the emergency. Crowds evacuate more effectively when trusted with information rather than treated as untrustworthy and prone to panic.
- Crowds evacuate more effectively when properly informed; the withholding of information is not only ineffective in the event itself but can lead to distrust subsequently.
- It is therefore crucial to build and maintain trust between the public and the crowd.
- Survivors and witnesses often volunteer to help during emergencies, and this could be a potentially useful resource to the emergency services.
- Over-protective responses from the government may stunt the public's own natural resilience and resourcefulness.
- Since mass emergency evacuation behaviour is more effective the greater the shared identity in the crowd, appealing to crowd members' collective spirit can encourage co-operative behaviour.
- Survivor self-help groups may have therapeutic benefits after the emergency.
- The inclusion of group-based behaviour in predictive computer models of crowd flow and crowd dynamics will help create more psychologically realistic models.

## **1. Introduction**

**1.1** There are a range of types of event that come under the broad heading 'disaster and mass emergency'. Social scientists looking at emergency evacuations have defined such events in terms of three factors which each need to be present. Thus these are events which (1) involve a mass of people, (2) include the actual or perceived threat of death, but (3) in which there is still a subjective possibility of escape, albeit time-limited.<sup>1</sup> The type of events of interest would therefore include fires in crowded buildings, sports stadium crushes, sinking ships, air crashes, terrorist attacks (bomb threats as well as actual explosions), and natural disasters such as earthquakes.



**1.2** It is crucially important to develop an accurate understanding of human behaviour in such disasters and mass emergencies. This is because fatalities and injuries may be due not only to the nature of the disaster or emergency itself – whether a fire, bombing, sinking ship, or train or plane crash – but also to human factors. These human factors include not only the effectiveness and appropriateness of emergency procedures and services, but also the behaviour of the evacuating crowd, which has often been blamed for panic, disorganized, over-emotional, irrational and ineffective egress. Other human factors which may play a role include decision-making and the interpretation of events, leadership and social influence, and after-care policies and practices.

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<sup>1</sup> Quarantelli (2001)

**1.3** How those with responsibility for emergency planning and disaster responses understand human responses to emergency, and in particular crowd behaviour in such events, has particular implications for safe and effective evacuation and risk management. Theories of collective evacuation behaviour, whether explicit or implicit, inform practice, policies and procedures. For instance, the assumption that that people in a crowd will necessarily panic – i.e. behave competitively or thoughtlessly, and simply stampede towards the nearest exit – has clear implications for both the planning and design of public spaces as well as for evacuation procedures. Specifically, the presumption of crowd panic would dictate that emergency contingency plans for the evacuation of buildings focus on physical (non-psychological) factors (such as the width of emergency exits to prevent jamming, and the rate and speed of people's egress), downplaying the importance of meaningful communication with the ('irrational') crowd.<sup>2</sup> Moreover, withholding information because the evacuating crowd is seen as over-emotional and unable to act rationally on such information means that survivors of emergencies - and indeed the wider public - may develop a distrust of the authorities.<sup>3</sup> In turn, this may mean valid information may be ignored or not acted upon by the public in the future.

**1.4** To properly inform practice, there is therefore a need to critically evaluate existing academic theories of mass evacuation in relation to the research evidence on how people behave in such situations, in order to develop more adequate and useful models.

## 2. Understanding disaster and mass emergency evacuation behaviour

**2.1** Existing research and theory on evacuation behaviour might be roughly divided into three areas: **(1) decision-making and exit times; (2) clinical issues;** and **(3) crowd behaviour.** For completeness, we briefly review some of the issues surrounding the first two areas before focusing on crowd behaviour in emergencies, which is the focus of this report.

**2.2** There are a number of issues around **decision-making** in an emergency exit. Seriousness of threat and urgency of situation influence rapidity of response; and mechanism of warning affects the interpretation of the event.<sup>4</sup> The time it takes for people to decide and begin to move has been suggested to be better related to overall evacuation time than such design features as exit width and travel distance.<sup>5</sup> Physical features of location may interact with psychological factors, however, as in the finding that evacuees rely on their intended routes or way they had entered rather than designated fire-exits.<sup>6</sup> While over-reaction and panic may be a popular image of reactions to an emergency such as a fire in a building, research suggests that people often do not recognize the emergency or act quickly enough.<sup>7</sup> Even when people hear

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<sup>2</sup> Sime (1990, 1995)

<sup>3</sup> Drury (2004)

<sup>4</sup> Sorensen (1991) Proulx & Sime (1991)

<sup>5</sup> Proulx & Sime (1991)

<sup>6</sup> Donald & Canter (1990)

<sup>7</sup> Aguirre (2005, p. 126)

what they know to be a fire alarm, they sometimes assume that the equipment is simply being tested, it is a malfunction or just a drill.<sup>8</sup> Thus, a recent review of transport accidents concluded that one of the main factors determining whether a passenger survives is the accuracy of their perception of the sources and level of threat.<sup>9</sup>

**2.3** One of the potential '**clinical issues**' associated with emergencies is of people 'freezing'.<sup>10</sup> Freezing is potentially dangerous as it can prevent appropriately urgent flight action. But other 'clinical' phenomenon which likewise disconnect the person from the enormity of the events can operate as coping mechanisms that may allow that person to continue to act in the face of a threat to their lives. Thus another response is to become disassociated or psychologically distanced from the reality of what is happening, or to behave with more calmness than is appropriate. In such cases, people under impending threat and ordered to evacuate an office building waste time inappropriately tidying their desks, carefully switching their computers off, and so on.

**2.4** Further, the actual stress of the event may also not express itself till some time later, in the form of post-traumatic stress disorder (PTSD),<sup>11</sup> which may require long-term therapy. Sufferers can re-live the disaster through panic attacks and/or flashbacks, and may be unable to function normally. There has been evidence that up to one in four survivors of disasters such as terrorist attacks can get PTSD,<sup>12</sup> which can have a crippling effect on their employment prospects, quality of life, and relationships with others.

**2.5** Two main perspectives have been particularly influential in the understanding of **crowd behaviour** in disasters and emergency evacuations. These are (i) '**panic**' theories and (ii) **affiliation and normative approaches**.

**2.5** The concept of '**mass panic**' suggests that, since the crowd is less intelligent and more emotional than individuals acting alone,<sup>13</sup> crowd reactions to an emergency will be disproportionate to the actual danger.<sup>14</sup> In this account, 'instincts' will overwhelm socialized responses, and collective bonds or social norms will then break down as personal survival becomes the overriding concern.<sup>15</sup> The result is selfish and competitive panic behaviour, such as pushing and trampling others to reach safety.<sup>16</sup> These acts may also quickly spread through the crowd as a whole in a process known as 'contagion',<sup>17</sup> as people uncritically copy others' anti-social behaviour without considering the consequences.

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<sup>8</sup> Chertkoff & Kushigian (1999 p. 129)

<sup>9</sup> Muir (2004)

<sup>10</sup> Chertkoff & Kushigian (1999) Leach (2004) Muir (2004)

<sup>11</sup> Hyams, Murphy & Wessely (2002)

<sup>12</sup> e.g. Gidron (2002)

<sup>13</sup> Le Bon (1895)

<sup>14</sup> Smelser (1962)

<sup>15</sup> Cantril (1958) Quarantelli (1954) Strauss (1944).

<sup>16</sup> Schultz (1964).

<sup>17</sup> Ross (1908, p. 73) McDougall (1920, pp. 36-38).



**2.6** The main empirical problem for the 'panic' approach is that, far from being the typical reaction to a disaster, panic is actually rare.<sup>18</sup> Systematic studies of a variety of different emergencies and disasters have each emphasized the sheer lack of crowd panic – for example, the atomic bombing of Japan in 1945,<sup>19</sup> the Kings Cross Underground fire of 1987,<sup>20</sup> and the fire at the Summerland leisure complex in 1973.<sup>21</sup> More recently, in an analysis of the behaviour of evacuees from the World Trade Center on September 11<sup>th</sup> 2001, 'classic panic action or people behaving in an irrational manner was noted in [just] 1/124 (0.8%) cases'.<sup>22</sup>



INSIDE THE IROQUOIS THEATER WHILE THE FIRE RAGED.

**2.7** More specifically, actual behaviour in mass evacuations tends to conflict with the predictions of the panic model in at least three ways:

- (i) Anti-social or selfish behaviours are rare and tend not to spread to others.
- (ii) Evacuations are often orderly. For example a detailed review of seven emergencies identified extensive evidence of people queuing to get out (rather than stampeding), despite the clear threat of death.<sup>23</sup>
- (iii) Helping behaviour and co-operation (rather than individualized, competitive and selfish behaviour) are common. For instance, an investigation into a fatal crush at a concert in the US in 1979 found that most fans helped each other when they were able.<sup>24</sup>

<sup>18</sup> Brown (1965) Johnson (1988) Keating (1982) Quarantelli (1960) Sime (1983)

<sup>19</sup> Janis (1951)

<sup>20</sup> Donald & Canter (1990)

<sup>21</sup> Sime (1983)

<sup>22</sup> Blake, Galea, Westeng & Dixon (2004, p. 5)

<sup>23</sup> Chertkoff & Kushigian (1999)

<sup>24</sup> Johnson (1987)

**2.8** More recent models have looked closely at what people actually do in evacuating crowds. Thus research on fatality demographics in large fires has found that family groups often all escape or die together. Rather than 'looking after number one', people are unwilling to leave companions behind.<sup>25</sup> Observations like this led to the development of the **affiliation model** of evacuation behaviour.<sup>26</sup> The key ideas here are that:

- (i) in threat, we are motivated to seek the familiar rather than simply exit; and
- (ii) the presence of familiar others (affiliates) has a calming effect, working against the 'fight or flight' reaction.

**2.9** Affiliation accounts developed in tandem with the **normative approach**, which has become the dominant perspective in disaster research since the 1980s.<sup>27</sup> This approach stresses that behaviour in emergencies is structured by the same social rules and roles that operate in everyday life. So for example Johnson's studies of the Beverly Hills Supper Club Fire of 1977 found that, even as people tried to evacuate, they tended to help those most in need (such as the elderly) and that men helped women more than women helped men, suggesting that traditional gender roles were not abandoned.<sup>28</sup>

**2.10** Affiliation and normative approaches have in common the assumption that evacuating crowds retain their sociality and that therefore their behaviour is typically socially structured rather than uncontrolled. These models make more sense of the data from studies of evacuating crowds than do the previous ('panic') models. They are more widely used and known in sociological and disaster research, however, rather than in psychology, and they are somewhat disconnected from recent advances in the social psychology of group behaviour.

### **3. A new approach: Social identity**

**3.1** The affiliation and normative approaches explain the sociality of the crowd as deriving from pre-existing relationships: either from the existing social structure (which provides the norms and roles that people maintain) or from interaction in the small group and interpersonal ties (which shape their patterns of affiliation). However, while there is indeed evidence of normative structure and affiliation in emergencies, there is also evidence of behaviours in crowds which does not seem to be adequately explained by these kinds of processes.

**3.2** First, while affiliation approaches explain the patterns of behaviour well when the crowd is made up of small groups of families or friends (as in the Beverly Hills Supper Club fire), many emergencies and disasters involve large numbers of people most of whom don't know each other and have no personal ties. Yet in these events too there is often evidence of mutual helping and even self-sacrifice. It would be stretching the concept of 'norm' to explain some of this behaviour. While it might be normative to help

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<sup>25</sup> Cornwell (2001) Sime (1983).

<sup>26</sup> Mawson (1978, 2005)

<sup>27</sup> Aguirre (2005)

<sup>28</sup> Johnson (1988) Johnson, Feinberg & Johnson (1994)

someone in distress in everyday circumstances, it is surely novel rather than normative to take risks to oneself help strangers. Finally, the affiliation model suggests that where there is a threat but no affiliation figures present (i.e. people are amongst strangers in an unfamiliar place), there will be mass panic. Yet as we have seen, there is little evidence for mass panic. What is needed to complement these models and overcome their limits, therefore, is a model of *mass emergent* sociality. In other words, what is needed is an approach which allows for co-ordination and co-operation amongst a crowd of strangers, and which can explain sociality in emergencies (such as instances of helping strangers at a cost to the personal self) in terms of their crowd membership itself.

**3.3** The social identity approach, and self-categorization theory<sup>29</sup> specifically, is suggested to offer the basis for understanding the collective sociality of mass emergency behaviour. The basic premise of self-categorization theory is that shared social identity determines social behaviour. Social identity is multiple, however: we each have not only a personal identity (i.e. that which makes us unique as individuals), but as many social identities as we have memberships of social groups or categories. Each social identity is based on a categorization process, such that who 'we' are depends not only on our knowledge of our group but also the context, and in particular the contrast with some 'other'. The advantage of this approach is that it makes sense of collective behaviour in situations where people don't know all the members of their group. We see this for example in cases of national identity and war, where people will act on the basis of their category membership (even making sacrifices for the cause) when they don't even know (or necessarily like) all their fellow ingroup members as individuals.

**3.4** The social identity approach, and self-categorization theory in particular, has been used to explain a diverse range of group behaviours, including the following well-established findings:

- People are attracted to their groups and social categories irrespective of the individual members.<sup>30</sup>
- Greater output occurs amongst work-groups who have a shared identity compared to those who don't.<sup>31</sup>
- People show greater commitment to collective action the more they identify with their group.<sup>32</sup>
- There is greater helping of fellow category members than of non-members.<sup>33</sup>
- Greater leadership and social influence occurs where the source is seen as a typical than an untypical group member.<sup>34</sup>
- Higher expectations of mutual aid occur amongst people after defining themselves as group members than before.<sup>35</sup>

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<sup>29</sup> Turner (1982) Turner, Oakes, Hogg, Reicher & Wetherell (1987)

<sup>30</sup> Hogg (1987)

<sup>31</sup> Worchel, Rothgerber, Day, Hart & Butemeyer (1998)

<sup>32</sup> Veenstra & Haslam (2000)

<sup>33</sup> Levine, Prosser, Evans & Reicher (2005)

<sup>34</sup> Turner (1991)

<sup>35</sup> Drury & Reicher (1999)

- The more that people identify with the group, the more they are able to access group-based sources of support and reduce their stress levels.<sup>36</sup>

**3.5** This approach has already had 25 years of successful application to conflictual crowd behaviour.<sup>37</sup> Research on crowd events such as riots and protests has shown that crowd 'violence', far from being random and uncontrolled, is limited by the definitions of appropriate conduct associated with the crowd's social identity. In relation to current concerns, one of the key ideas developed in this research on crowd conflict is that of the distinction between the '*psychological crowd*' and the *aggregate*. There seems to be a crucial difference between an aggregate – such as a crowd of people milling about a shopping centre – and a psychological crowd – such as a crowd of football supporters together in a stadium. The football supporters come together as a crowd, with a common aim, and act (e.g. sing and chant) together and feel as one. None of this is true for the 'crowd' of shoppers. The football supporters are united by a shared identity, while the shoppers are divided by their distinct personal identities. The research on crowd conflict also identified some of the ways that a collection of disunited people might *become* a psychological crowd – such as through a common experience of an external threat.

**3.6** The social identity approach suggests a set of novel hypotheses about mass emergency and evacuation behaviour. Thus, in a mass emergency where people identify with each other as part of a psychological crowd (i.e., compared to people in a mere 'aggregate') there will be greater:

- (i) concern felt towards others in the crowd (including strangers)
- (ii) co-ordination, help and personal self-sacrifices (including for strangers)
- (iii) expectations of support

By the same token, in such circumstances there will be fewer personally selfish or competitive behaviours.

**3.7** In examining these ideas, the research described in this booklet had four aims: (1) To provide a test of the panic model. While discredited academically, the panic model still has some influence in applied settings. It is therefore still necessary to subject it to empirical scrutiny. (2) To develop methodological tools for research on what remains a difficult topic to study (see below). (3) To bring together existing research on disaster and mass emergency behaviour with contemporary developments in social psychology, and hence to develop theory in this field through constructive critique and cross fertilization. (4) As a consequence of the above, to inform and update applications and recommendations for practice.

## **4. Methodology**

**4.1** Mass emergency evacuation behaviour has been studied in a number of ways:

- (i) Early accounts relied on anecdotal examples and case studies from the military;
- (ii) In social psychology, a tradition of experimental research developed which sought to reproduce features of the emergency situation in the laboratory;

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<sup>36</sup> Haslam, O'Brien, Jetten, Vormedal & Penna (2005)

<sup>37</sup> See Reicher (2001).

(iii) Social scientists in the field of disaster research have relied principally on archive data.

**4.2** Each method has its advantages and disadvantages. The laboratory experimental method offers the advantage of isolating variables and hence a clear account of which factors cause which effects. However, this method is limited in its ability to fully simulate key features of mass emergencies for ethical reasons – such as the very threat that is said to motivate evacuation behaviour. Hence the experimental method typically lacks realism. Archive studies may have difficulty obtaining data at the time of the event – for legal and ethical reasons. Such studies can be high on validity (or realism) since they gather data from actual emergency events. But a reliance on pre-existing data, which is necessarily correlational in nature and often post hoc, can make it difficult to identify causal pathways.

**4.3** The present project aimed to combine methods and data-sources so that the limits of one approach could be compensated for by another. Thus we employed the following methods:

- (i) two sorts of laboratory studies which simulated certain features of mass emergency evacuations in different ways;
- (ii) two sorts of interview studies (one a comparison across different events, the other a comparison within a single event);
- (iii) archive and questionnaire data collection from the second event.

To the extent that these different data-sets in different ways each support the explanation we are suggesting, then we can have some confidence in its plausibility.

**4.4** We present below the key findings produced by each of these different studies, and the conclusions we draw from them. These findings are as yet provisional, however, as at the time of writing the studies have not yet been subject to peer review.<sup>38</sup>

## 5. Experimental simulations

**5.1** In the 1950s and 1960s, a number of experimental studies on evacuation behaviour were carried out in psychology laboratories. There are a number of reasons why this tradition died out. One of the main issues was the problem of balancing realism (i.e. a psychologically engaging threat) with the need to protect participants from harm. Given the greater concern in today's research environment with risk reduction, it is unlikely that some of the experiments carried out in the past would now get ethical clearance.

**5.2** One of the main aims of the present project was therefore to develop an experimental simulation that was both engaging and ethically sound. We therefore compared two types of experimental simulation to determine which was more suitable for further development: (i) a room evacuation design, and (ii) a visualization ('Virtual Reality') design.

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<sup>38</sup> See our website for updates on publication of the studies: <http://www.sussex.ac.uk/affiliates/panic/>

**5.3** We ran three **room evacuation** studies, each time trying to develop and build upon the format. One-hundred and thirty and 81 participants respectively took part in the first two studies. They gathered in a laboratory room in groups of up to 20 people at a time and were asked to imagine they were evacuating a room in an emergency, a technique known as role-play. Various cues were provided to enhance the simulation, such as a siren and verbal requests that they leave as quickly as possible.

**5.4** To test the idea that a shared social identity (psychological 'groupness') makes mutual concern and helping more common and personally selfish behaviours less common than if people see themselves just as different individuals, we treated one half of the participants each time as members of a relevant social category (e.g., 'Sussex University students') but addressed the rest simply as individuals. We then observed and filmed their behaviours (looking at the extent of helping, waiting for others to go first versus stepping in front of others, for example). We also gave participants a questionnaire at the end to measure subjective factors, such as level of identification with the group and feelings towards the other people evacuating.



**5.5** Both studies failed to find significant differences across the conditions, either in behaviour or subjective reports. Looking at the process behind these results can help explain why. First, participants often did not take the scenario seriously enough. There was no sense of urgency and haste and hence no need to let others go first or push them out of the way. Second, the main behavioural measure – whether they pushed or formed a bottleneck at the door – was inadequate, i.e. the evacuation was over too quickly to give people an opportunity to display selfish versus helping behaviours.

**5.6** We addressed the problems of these first two studies with a new design which embedded the 'evacuation' within an unrelated, fake 'intelligence test'. Thus we didn't rely upon role play or imagination, but still asked people to enter or leave a room as quickly as possible in order to complete the tests. As this design meant that the group of participants had to each go through the door in a hurry twice, there were also more opportunities for displaying the behaviour of interest.

**5.7** Again however analysis of this study revealed no differences on our main measures. It was understood from the outset that the lack of real threat would create issues in trying to render an emergency evacuation into an experimental simulation.

Moreover we mostly failed in these studies to get those in the 'shared identity' condition to see themselves as a group. These features point to the limits of this kind of design for studying emergency evacuation behaviour.

**5.8** However, our informal observations and some of the participant feedback we gathered from this last room evacuation study suggested that, while our experimental manipulations didn't work as intended, they had effects in line with some of the suggestions of the social identity approach. Thus, according to self-categorization theory, one factor that may lead us to see ourselves as group members (rather than as individuals) is a common relationship or a shared fate in relation to some external other. In the third study, whether we attempted to impose a social or a personal identity on our participants, simply by cramming them into a small room together, we (unintentionally) made them see themselves as a group in relation to ourselves, the experimenters. Thus, while the study was set up to look at the different effects of given social identities (i.e. personal identity versus social identity), it seemed in effect to say something about the process whereby a personal identity becomes *transformed* into a social identity. The significance of this question of the transformation of identities in relation to a common relationship to an external agent or force only became clear in the comparative interview study (below).

**5.9** The second laboratory experimental simulation we sought to develop used a computer **visualization** (or 'Virtual Reality') program. The team at Nottingham University<sup>39</sup> developed a computer animation of a crowd evacuation from an underground railway station, modelled on a computer game (using similar graphical techniques and user interface).<sup>40</sup> The 'task' facing the user is to evacuate the station as soon as possible, while at the same time facing bottlenecks caused by the rest of the crowd. The user also has to make decisions about whether to stop and help four people who are apparently injured. Within this design, we were able to vary key dimensions, such as the appearance of the characters in the evacuation, and the number of other evacuees, and to enhance the urgency of exit through a varying 'danger' indicator.

**5.10** Participants' identity was varied by a vignette at the beginning of each trial which cast them either as group members or individuals in an aggregate crowd. We then looked at the number of times 'injured' characters were helped (or not) and the extent to which participants pushed characters out of the way. A post-test questionnaire assessed the role of shared identity, feelings towards others, and intentions to help.

**5.11** Seventy-two people took part in the first experiment. While it turned out to be difficult to get people to think of themselves as group members (versus individuals) in the way we intended, there was nevertheless a correlation between feelings of psychological 'groupness' and the amount of helping. That is, the more people saw themselves as group members, the more likely they were to stop and help fallen characters – even though such action delayed their own exit. This result was replicated in a student project on 40 participants using a different vignette.<sup>41</sup> In both cases, the

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<sup>39</sup> Damian Schofield and Andy Burton.

<sup>40</sup> For more details, see

<http://www.sussex.ac.uk/affiliates/panic/Fact%20sheet%20-%20technology.doc>

<sup>41</sup> Thanks to Becky Powell for this work.

more people saw themselves as group members, not only did they help more, but on the subjective (questionnaire) measures they cared for others more and expressed a greater desire to help.

**5.12** A third experiment, in which 62 people took part, eliminated potential problems with the design but weakened the identity manipulation further. There was more helping in the 'group identity' than the 'personal identity' condition but this difference was not statistically significant. Forty people took part in a fourth experiment, which was carried out as a student project.<sup>42</sup> This study used a different vignette and identities to the previous ones ('football supporters' instead of 'students'). Those in the 'group identity' condition displayed significantly more helping behaviour than those in the 'personal identity' condition. There was some support for the idea that this behaviour was partly caused by positive feelings towards ingroup members.



**5.13** In each of these studies, while there was some evidence in support of the role of shared identity on the helping and questionnaire measures, there was no pattern in the 'pushing' data. Observations of participants in these studies, as well as at a public exhibition at the Royal Society, led us to conclude that there was a problem with the on-screen instruction at the beginning which explains how to push other characters. This could be read as an encouragement to push in what might be perceived as a 'game'. The visualization was modified three times within the project, each time achieving greater realism. But it was beyond the scope of the current project to address this problem in the instructions through further changes to the software.

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<sup>42</sup> Thanks to Andy Hardwick for this work.



**5.14** Overall, the visualization studies support the conclusion that, where there is a strong sense of collective identity, there will be mutual concern and helping. Importantly, people with a strong shared identity in these studies tended to help the fallen character even though this meant delaying their own exit. Where the sense of shared identity was weak, on the other hand (either through our deliberate manipulation or because the manipulation was weak), there was less mutual concern and less helping. The significant results that were found were therefore in line with the self-categorization account of mass emergency evacuation behaviour.



**5.16** In terms of the aim of developing an experimental simulation that was both engaging and ethically sound, our conclusion is that the visualization method has more potential than the room evacuation method. There was more psychological engagement with the visualization than the room evacuation method: participants took the visualization more seriously overall. The visualization also included more measures (more opportunities for helping versus personally selfish behaviours) than the room evacuation. The visualization is therefore a better way of testing different psychological theories of mass emergency evacuation behaviour.

## **6. Comparative interview study**

**6.1** As mentioned previously, since the 1960s, research in the field has been dominated by archive studies of actual crowd events, rather than experimental simulations. These archive studies arguably produced more insights into the nature of mass emergency behaviour than the previous work, because here the researchers were looking in detail at what actually happened at disasters and emergencies. Such

archive data includes police records, newspaper accounts and others observations. It therefore may also include quotations from survivors. As such, it is more than a behavioural record, since it includes people's subjective accounts of their behaviour. However, secondary data like this doesn't allow the researcher to *probe* people's reasons, experiences and perceptions. All this kind of data can give us is information on the issues the witness, journalist or survivor considered important and relevant at that time. In order to enquire systemically about the issues that we as researchers think important – in particular, the role of identity – we need to interview those witnesses and survivors ourselves.

**6.2** In line with our research questions the original plan was to interview people from two sorts of crowd event where there was a real (or perceived) emergency and hence requirement to evacuate: those where there was a high level of unity (a social identity) versus those with a low (or no) unity. Once we started the interviews, however, we found that most participants' level of identification with the rest of the crowd had shifted over the course of the emergency event. In almost all cases, the crowd tended to become more unified over the course of the emergency. Thus we began to look at shared identity not only as a cause (of helping and co-ordination) but also as an outcome. In other words, the evidence led us to suggest a less static and a more dynamic model of the relation between emergencies, identities and behaviour. This is detailed below.

**6.3** To recruit interviewees, we placed advertisements in UK national newspapers asking for people who had been involved in disasters and emergencies. We also pursued personal contacts for willing participants, including from events that were perceived as emergencies at the time by some participants but turned out not to be.

**6.4** Interviews were carried out with 21 survivors from 11 different incidents, as follows:

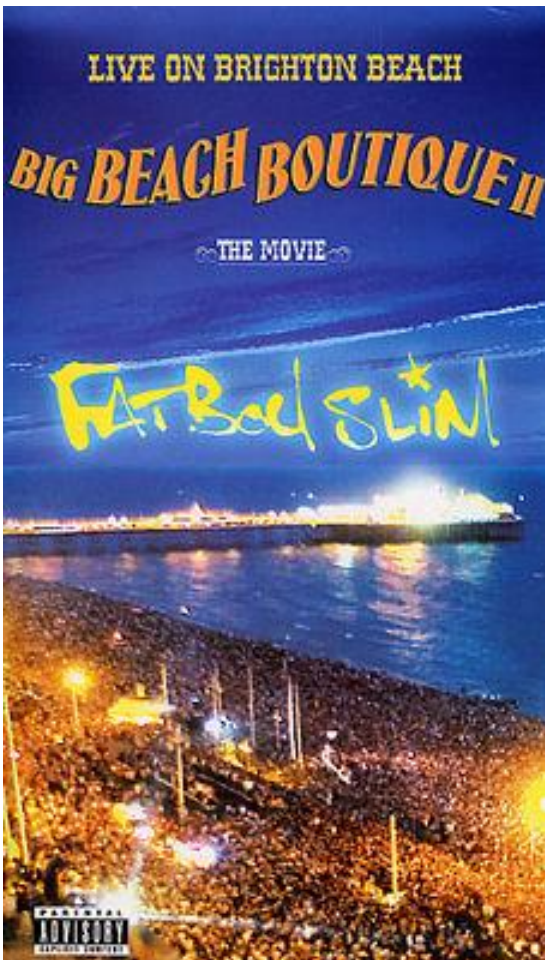
- Five from sinking ships
- Six from football stadium disasters
- Four from the 'Fat Boy Slim' free party on Brighton beach in July 2002
- Three from office evacuations in response to perceived terrorist attacks
- One from the IRA Harrods bombing in 1983
- One from a hotel fire in the US in 1971
- One from a train derailment in 2003

In each case, people were in a crowd, facing an impending threat and with limited opportunities for safe escape.

**6.5** Participants were asked to provide some background to the incident, to set the scene, and then to recount events as they remembered them. The rest of the interview was organized according to the following issues:

- Behaviour: e.g., 'What did you and others do in response to events? Was evacuation easy/ difficult? Did people co-operate/ help each other out?
- Perceptions/ feelings: e.g., 'What were you and others thinking/ feeling as incident progressed? Do you think that anyone panicked?
- Identities: e.g., 'Did you feel a sense of unity towards those in the evacuation with you?'

**6.6** The resulting data-set (approximately 160,000 words of transcribed text) was both analysed qualitatively and subjected to a statistical analysis. As well as some harrowing accounts of human suffering, we found stories of heroism, courage and inspiration. As expected, there was evidence (a) that everyday norms were upheld – for example, people formed queues; (b) that social roles continued to operate – for example teachers continued to act with authority in relation to the schoolchildren in their charge; and (c) that many people stayed with their small affiliation groups and gave more assistance to their affiliates than to others. However, there was also clear evidence against the panic model and for the social identity account of mass emergency evacuation behaviour:



**6.7** **There was no mass panic.** While the word ‘panic’ was quite frequently used in the interviews, it usually referred to individual feelings of fear of distress, was normally displayed by people screaming or crying (as opposed to displaying any overt behaviour associated with panic), and did not spread to others. Indeed, when asked directly, interviewees were typically explicit that, though there was fear, there was in fact no widespread uncontrolled, competitive, irrational and personally selfish behaviour:

‘I don’t think people did lose control of their emotions and I think the restraint shown by particularly several of the individuals that I’ve mentioned I’ve talked about [ ] it was the degree of the capacity of people to help others who were clearly struggling you know. It should be source of great pride to those people I think because you know, they were clearly in control of their own emotions’  
(Hillsborough)

**6.8** **Selfish behaviour was rare; co-operation and helping were common.**

Reports of selfish behaviour were rare. Some people displayed quite selfless behaviour by helping others even if doing so meant placing themselves at risk. When people were physically able to, they helped others, even people who they had not previously known before the emergency:

‘the stairwells [ ] are quite narrow and the way you go down them .. just round and round and steps [ ] you can only probably fit maybe three or four people wide, so .. people were moving faster than us obviously and people were .. weren’t overtaking us but at junctions we were allowing people to go past us’  
(Canary Wharf evacuation)

Importantly, there were significantly more accounts of helping (being helped, helping others, observing help) than of selfish behaviours (e.g., others being pushed or ignored):

'I couldn't get across to the steps but a woman member of staff locked arms with me and pulled me across to the steps and I was then able to start going up them.'  
(Sinking of the Jupiter)

So far this evidence is consistent with the predictions of the social identity approach. Next, however, we needed to look more closely at the possible causal processes behind the behaviours observed.

**6.9 A common identity in the crowd.** Over half of our interviewees referred unambiguously to a sense of unity or togetherness with the rest of the crowd during the emergency.

TC Oh yeah of course I I get on the train every day. So a train journey you would normally take is, you know, I myself get on the train at ten to seven in the mornings, sit down, open the paper and there might be one or two people talking out of a completely packed carriage.

Int Yeah.

TC So, you know, that that sort of thing and the perception... of of being involved in that, and everyone's involved and let's do, let's group together  
(Train accident)

This sense of unity typically extended to strangers:

'there was a little bit of camaraderie that we'd all come through something that could have been potentially very dangerous [ ] I never met any of them before 'cos I arrived that day at the hotel from England'  
(Hotel fire)

Many of these statements occurred spontaneously – i.e. before we had asked participants whether they felt any unity with others in the crowd:

'So I don't think in my view there was any question that there was an organic sense of... unity of crowd behaviour.'  
(Hillsborough)

**6.10 Causes of unity: Shared fate.** In most of the references to common identity, it is described as emerging over the course of the emergency itself. Only a minority referred to any sense of crowd unity prior to or without there being a perceived emergency – and for most of these the sense of unity increased in response to the emergency. The source of the unity was the crowd members' shared fate in relation to the threat facing them. While they might have come to the event seeing themselves as so many individuals, the threat facing them all led them to see themselves as 'all in the

same boat'. This meant categorizing themselves as a group and feeling an emotional sense of togetherness:

'all of a sudden everyone was one in this situ- when when a disaster happens when a disaster happens, I don't know, say in the war some- somewhere got bombed it was sort of that old that old English spirit where you had to club together and help one another, you know, you had to sort of do what you had to do, sort of join up as a team, and a good example of that would be when some of the fans got the hoardings and put the bodies on them and took them over to the ambulances'  
(Hillsborough)



Just as those who reported a strong sense of shared threat also reported a strong sense of unity, most of those interviewees who didn't perceived a threat to the crowd (e.g. some of those at the beach party) did not report any sense of unity with the rest of the crowd.

**6.11 Effects of unity: Mutual concern and helping.** Participants' comments on the sense of unity were usually coupled with descriptions of others' behaviour. This makes the point that the sense of togetherness was not simply a subjective thing which was simply felt by the interviewee and a few others but was more often a common experience in the crowd, which motivated people to act. In particular, because of the sense of togetherness, people supported each other, co-ordinated their actions and tried to help those who needed help:

- Int. How would you describe those who were in the evacuation with you? Is there any phrase or word you would use to describe them?  
J2 As as a whole group?  
Int Yeah

J2 .....I guess I'd say mutually supportive ..We were all strangers really we were certainly surrounded by strangers but .... most of, I mean I'd got my kids by me, but most people were split up from anybody they knew, and yet there was this sort of camaraderie like you hear about in the war times and this sort of thing .. there there was certainly a pulling together as apposed to a pulling apart.  
(Sinking of the Jupiter)

This sense of togetherness even meant taking personal risks to help others:

'It was clearly the case you know.. it was clearly the case that people were trying to get people who were seriously injured out of that crowd it was seriously a case of trying to get people to hospital, get them to safety .. I just wish I'd been able to.. to prevail on a few more people not to.. put themselves in danger.'  
(Hillsborough)

Finally, and again in line with expectations, those who felt that there was little unity in the crowd provided the lowest reports of helping behaviours and co-ordination, and the highest reports for personally selfish behaviours observed.

**6.12 In summary**, the comparative interview study supported our arguments that (i) orderly behaviour rather than panic is the typical behaviour of crowds even in disasters and emergencies; (ii) help and co-ordination rather than selfish behaviour is the norm; (iii) some of this help and co-ordination may be due to the influence of norms, roles and affiliation; (iv) a shared identity in the crowd also explains the extent of helping behaviour – in particular the helping of strangers and the risks people sometimes take to do this. However, we also found evidence that this shared identity is not simply a given, but rather that it emerges and changes over time. It emerges as an understanding of participants' shared relationship to the emergency or disaster itself. Most of the crowds analysed in this study had no sense of common identity (i.e. were not *psychological* crowds) before the emergency. For most of those that did have a sense of togetherness prior to the events, the emergency changed this so that those involved felt a common identity with all crowd members rather than just the ones with whom they had a pre-existing affinity (such as football fans of the same team).

**6.13 In conclusion**, we would suggest that this study supports the general argument that crowd behaviour in emergencies is meaningful and social (rather than instinctual and asocial). This general point has important consequences for practice, as we shall see. More specifically there is evidence in line with the particular model of crowd sociality that we were testing – the social identity approach. The data from this study also suggests that social identity processes in disasters and emergency evacuations are highly dynamic. The role of a shared fate seemed to be important in the emergence and strengthening of a shared identity. This would seem to make sense of the observations made in the room evacuation experiments; i.e. that a shared relationship to some outside force may supersede other self-categorizations and create unity where there wasn't any previously.

**6.14** However, there are a number of limitations of this study and hence a need to exercise caution in our conclusions. While a common pattern was found across different events, some of these events took place a long time in the past and some of

the accounts lack detail. The idea that shared identity can emerge from within the event itself was a hypothesis that came out of the study. What was needed was a proper test of this hypothesis. Ideally we still needed to study a single event where there was a large number of accounts. If it was an event where most people were amongst strangers and we still found evidence of shared identity and helping then this would be stronger evidence in support of our approach.

## 7. Archive, questionnaire and interview study: The July 7<sup>th</sup> London bombings

**7.1** The July 7<sup>th</sup> London bombings of 2005 took place while this research project was halfway through. The four bombs (three on the London Underground and one on a London bus) killed 56 people (including the four bombers) and injured over 700. The events were characterized by much shock and fear on the day, and crowds of people were affected directly or indirectly. Therefore, we decided to gather information from witnesses and survivors about what happened and how people felt and acted at the time.



**7.2** We gathered accounts from survivors or eye-witnesses of the bombs in the following ways:

(i) We collected accounts and quotes from contemporaneous interviews with survivors in the press. We used extracts from 141 different articles in 10 different national daily newspapers in the days immediately after July 7<sup>th</sup>.

(ii) We gathered 114 detailed personal accounts of survivors that had either been posted on the web, delivered in evidence to the London Assembly hearings into July 7<sup>th</sup> (held on March 23<sup>rd</sup> 2006) or published in books or retrospective newspaper features.

(iii) We created an on-line questionnaire so that those who were willing could

share their experiences with us via e-mail. Thirteen people e-mailed in their accounts.

The questionnaire is available at: <http://www.sussex.ac.uk/affiliates/panic/lb/index.htm>

(iv) We also conducted 12 face-to-face interviews with those who felt able to do so.

Each of these lasted around an hour. The questions were adapted from the previous interview study.

**7.3** In total, and not counting the contemporaneous newspaper data, we collected data from at least 145 people, most of whom (90) were actually caught up in the

explosions. This is about 5% of all those directly affected by the blasts.<sup>43</sup> This data was analysed quantitatively and qualitatively.

**7.4** We found that while the concept of ‘panic’ was drawn upon to some extent as an explanatory gloss by both survivors and witnesses, personally ‘selfish’ or competitive behaviour was rare. Mutual helping was much more frequent. Most people were not with friends or relatives at the time, so such ‘resilient’ behaviour cannot be explained simply by existing ties of affiliation. There was also some evidence for (i) a perceived continued danger of death (shared fate) after the explosion; (ii) an enhanced sense of togetherness, which arose from this shared fate; and (iii) personal risk-taking to help strangers. These points are detailed below.

**7.5 There was talk of ‘panic’ but there was no mass panic.** Far from the classic stereotype of mass panic in disasters, we found next to no evidence for this concept in people’s reactions to the July 7<sup>th</sup> bombings, despite the word ‘panic’ being used quite liberally in both press and eye-witness accounts. For instance, in the 141 newspaper accounts gathered immediately after the events, 57 eye-witness accounts used the term ‘panic’. However, in contrast, there were also 20 eye-witness accounts which explicitly denied that there was panic, and 37 such accounts referred to ‘calm’ amongst those affected by the bombs, and 58 to an ‘orderly evacuation’. There were also 31 reports of fear and 70 reports of people thinking they might die. So, while there was undoubtedly extreme fear and/or panic in some individuals, this was usually confined to people screaming or crying, rather than pushing or trampling over others in an effort to escape.

**7.6** Furthermore, individual panic did not spread to others in general. More often than not, other people would quickly intervene to calm down those who were visibly distressed. The following quote from a woman who survived the King’s Cross bomb, illustrates how people helped prevent panic;

‘We all rallied together helping one another get through it - holding hands, sharing water, calming those who were panicked’

**7.7 Co-operation and helping were common.** There were many accounts of mutual co-operation and even heroism amongst the individuals involved. In the personal accounts we gathered, 42 people reported helping others (most of them helping more than one other), 29 reported being helped by others, and 50 reported witnessing others affected by the explosions helping others (most of these again, helping more than one other). 40 people referred to general co-operation, and only one denied that there was any such co-operation.

‘this Australian guy was handing his water to all of us to make sure we were all right I I was coughing quite heavily from smoke inhalation and so [ ] I’d got a bit of a cold anyway which aggravated it [ ] and also I mean he was really helpful but when the initial blast happened I was sat next to an elderly lady a middle aged lady ... and I just said to her “are you all right?”’

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<sup>43</sup> This is based on the London Assembly (2006) estimate that 3000 people were directly affected by the four explosions.



(Edgware Road)

**7.8** Most of the people affected were amongst strangers; for example in the personal accounts, nearly 60 people reported being amongst people they didn't know (including 48 people who were actually on the trains or bus that exploded) while only eight were with family or friends at the time of the explosion. Yet, not only was helping commonplace, some people helped others even at considerable risk to themselves. There was a widespread fear of danger or death through secondary explosions or the tunnel collapsing. Yet many people continued to care for those who needed help. Nine of our respondents gave examples of where they had helped other people despite their own fear of death. In addition, three others described helping behaviour by professionals they witnessed as brave or heroic because they saw it as involving a clear risk of death – usually attributed to possible secondary devices:

'People outside our carriage on the track were trying to save the people with very severe injuries - they were heroes.

The driver of our train did his utmost to keep all passengers calm - he was a hero. If he knew what had happened he gave nothing away.'

(King's Cross)



**7.9 Selfish behaviour was rare** There were some reports of selfish behaviour by individuals, but these were not usually by people directly caught up in the blasts, were relatively minor, and tended to be the exception rather than the rule. Indeed, from the personal accounts, we found only four cases of people's behaviour that could be described as personally selfish, and six cases where the speaker suggested that another victim behaved selfishly to them or to someone else.

**7.10** Seven people referred to their own behaviour as selfish - in most cases this seemed to be more a case of 'survivor guilt' than competitive behaviour; such

expressions usually referred to cases where the person wasn't actually able (rather than chose not) to help much anyway. Indeed, we found little evidence that feeling concern for oneself translated into overt displays of personally selfish behaviour. That is, people reporting that they were 'selfish' does not necessarily mean that they actually behaved in way that hindered others' evacuation to safety. Moreover, when people did not help, it was often because they were not physically capable of doing so, or were still in shock; as soon as they were able to help, they usually helped in some way.

**7.11 Process: unity through shared fate.** We have seen that there was a widespread perception of danger to all those caught up in the explosions – i.e., on the trains and near the bus. That is, even after the bombs had gone off many people felt that they were all in danger. We have also seen that most people affected were amongst strangers, and so would not have had any existing affiliation with them. Thus if people still report a sense of unity or togetherness, then we can say that the widespread helping noted above was not due to pre-existing bonds (or to a lack of perceived threat) but was at least partly due to emergent shared social identity.

**7.12** In the contemporaneous accounts from public figures, there are frequent references to a common identity (43) and unity (28) in those affected by the bombs, sometimes expressed in terms of nationalistic discourses of a 'resilient' UK (6) or London identity (19) and with metaphors of the 'Blitz spirit' (11) – a commonplace metaphor for unity and resilience in times of external attack. Journalists' accounts were broadly similar, with numerous references to unity (6), a common identity (6), the 'Blitz spirit' (20), and a resilient UK (5) and London identity (20). These types of expressions were less evident in the eye-witness accounts: unity (6), 'Blitz spirit' (1), and common identity (1). This contrast suggests that the reference to unity may be a rhetorical strategy by those in power who sought to rally the nation. Yet, the rhetorical functions of these references do not preclude the possibility that they may also have had some resonance in the experience of survivors. This suggestion is given some support in the analysis of the personal account and interview data. Indeed, the more detailed the quality of the data, the more evidence there is of a shared identity in the crowd.

**7.13** Thus in the personal accounts, eleven survivors or witnesses described a 'shared fate' with others caught up in the bombing and 18 to a sense of unity during the event. Just seven survivors or witnesses were explicit that there was no such unity. For eight people, unity was described in terms of a UK identity, and for thirteen people in terms of a London identity. (Each of these were divided roughly evenly between those who were and who were not actually on the bombed trains and bus.)

**7.14** Almost all of our interviewees were amongst strangers. But nine out of twelve of them were explicit that there was a strong sense of unity in the crowd; i.e. that they felt unity themselves (eight of them) and/or saw it in others (seven of them). Indeed some of them mentioned this before the topic was introduced by the interviewer. They used a variety of their own terms to describe the experience: 'empathy', 'unity', 'together', 'similarity', 'affinity', 'part of a group', 'you thought these people knew each other', 'vague solidity', 'warmness', 'teamness', 'everybody, didn't matter what colour or nationality'. Such rich descriptions, and the numerical ratings that some of them were able to provide for the strength of this feeling (8/10, 9/10, 100%, 10/10), suggests that this sense of togetherness with others around them was cognitive (in the sense of

categorizing themselves with others as a group) but also emotional (in that it entailed warmth, sympathy and concern for these others even though they were complete strangers). As with the comparative interview study (6.9, above), some speakers explicitly contrasted this with the everyday feeling of separation and atomization with other public transport users they normally experience on public transport.

**7.15 In summary**, there was no evidence of mass panic on July 7<sup>th</sup>, almost no personally selfish behaviour amongst survivors (despite survivor guilt), and plenty of evidence of mutual helping and even self-sacrifice. Since most people were amongst strangers yet still displayed concern and helping, while the perceived threat was hanging over them all, the evidence we found of unity amongst some in the crowd seems to be explicable in terms of this shared fate. Through its effect on creating a common identity, this shared fate appears to be the main cause of the mutual concern, helping and co-ordination on the day.

**7.16 In conclusion**, this study of the July 7<sup>th</sup> bombings would suggest that people in crowds cope during disasters better than is implied in popular discourse. The observation here and elsewhere that people in emergencies have natural coping mechanisms, rather than being passive victims in the face of danger, is the basis of the 'resilience' approach in the study of public health and disasters.<sup>44</sup> What the present study adds is some detail of the psychological processes (i.e. self-categorization) which might be the basis of such resilience. What is different and indeed original about the present approach is that it is the very reverse of the panic model: (i) disaster and emergency can bring people closer together rather than set them against each other; (ii) it is because (not in spite of the fact that) people are in crowds that they cope. Crowds appear to be an adaptive source of mutual support.

**7.17** The concept of resilience has so far mostly been applied to the aftermath of disasters, and, in particular to the emergence of support networks amongst rescuers and other emergency teams— as was seen with fire-fighters and police officers in and after 9/11.<sup>45</sup> Thus it is worth noting that we also found post-event mutual support amongst victims of the July 7<sup>th</sup> bombings in the form of on-line survivor support groups, such as King's Cross United (which was set up by survivors of the Piccadilly line bomb). There were similar examples of this from the comparative interview study too. Many interviewees said they derived psychological benefits from sharing their feelings with others who had had the same experiences. Potentially such networks may perhaps enhance resilience and shield survivors of trauma from some of its worst psychological consequences. The importance placed by survivors on these mutual support networks clearly points to the need for further research on their psychological basis, significance and consequences. The implications for after-care could be radical and far-reaching.

## **8. Summary of the research findings**

Taken individually, each of our studies provides partial support for aspects of the social identity approach to mass emergency evacuation behaviour. However, taken together

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<sup>44</sup> e.g. Durodié & Wessely (2005), Furedi (2007)

<sup>45</sup> Tierney (2002) Tierney & Trainor (2004)

the pattern of results converge to provide better support for this approach than previous models.

- In the experimental studies, where there were opportunities to help (or ignore) others in need, the greater the sense of shared sense of identity the greater the amount of concern for others and help given.
- The comparative interview study found almost no evidence of 'mass panic'.
- Across the different real and perceived emergencies studied, orderly behaviour, mutual concern, co-operation and helping behaviour were common.
- Where panic and/or personally selfish behaviour did occur, it tended to be confined to individuals, it did not spread to the crowd, and it was usually moderated by others.
- While there was some evidence of pre-existing affiliation bonds, norms and roles, at least some of the co-operative behaviour was explicable in terms of a common identity amongst those caught up in the emergency.
- The basis of the common identity in the crowd was the crowd members' shared fate in relation to the perceived threat posed by an emergency.
- The archive, interview and questionnaire study of the July 7<sup>th</sup> London bombings confirmed the pattern identified in the comparative interview study:
- There was no evidence of mass panic; rather, behaviour was generally orderly and restrained.
- Mutual concern and helping was widespread while personal selfishness was rare.
- People were mostly amongst strangers but there was some evidence of a strong sense of shared social identity at least amongst some people.
- This sense of shared identity seemed to arise from the survivors' shared fate in relation to the emergency itself, and was the basis of their mutual concern and helping behaviour.
- Some survivors describe seeking out contact with and/or support from other survivors. For some at least, the common identity that arose during the disaster had enduring consequences.
- Future research needs to investigate the possible psychological and health implications of this enduring sense of identification. There is a prima facie case that the mutual support groups that high identifiers get involved in may help survivors cope with psychological trauma.

- Overall, this research makes the point that mass behaviour in disasters and emergency evacuations is not random, instinctual and individualized. Rather, above all, it is socially structured, collectively patterned and meaningful.
- The occurrence of the same kinds of patterns across different scenarios, different kinds of disasters and emergencies with different populations of survivors suggests that the psychological processes we are discussing here are universal.
- These findings have a number of implications for policy and practice in terms of the safe management of large numbers of people in any future emergencies. This point is developed in the final section of this report (below).

## 9. Implications for practice

**9.1** The research summarized here is in line with a growing body of work that argues that crowd behaviour is meaningful and that crowds can be positive, constructive and progressive in their actions.<sup>46</sup> Indeed, the studies described here in many ways go further than previous social identity studies of collective phenomena by showing how disasters and emergency events, where there is extreme danger even death, are the occasions for the display of the noblest intentions and behaviours rather than the basest instincts. Not only do social rules and bonds rarely break down, but people appear often to show more humanity and mutual concern for others than they do in everyday life. Indeed, stories of heroism are common in emergencies and disasters.

**9.2** Just as the older (panic) models of mass emergency evacuation behaviour had clear implications for policy and practice (see 1.3, above), so does the social identity approach we have presented here. While new and different in certain ways, the social identity approach is also broadly consistent with other recent findings and perspectives. We outline the implications that follow from the broader literature we reviewed as part of this research project (2, above)<sup>47</sup> as well as the specific recommendations that flow from our own empirical studies.<sup>48</sup>

### **9.3 *Mass emergency evacuation behaviour is cognitive.***

The evidence here and elsewhere suggests that people's behaviour in emergency evacuations is affected by their knowledge of the nature of the emergency, the physical layout of the site of the emergency, and that they will seek further information and guidance before but especially during the event. This has a number of consequences for those with responsibility for planning for such contingencies

- Those involved in the management of crowds need to take the possibility of an emergency seriously and **be prepared for the worst case scenario**, regardless of how likely they believe it is to happen. We noted earlier that it is not over-reaction that

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<sup>46</sup> e.g. Reicher (2001) Stott & Drury (2000)

<sup>47</sup> For example Chertkoff & Kushigian (1999) present a comprehensive account of guidelines for encouraging safe evacuations in emergencies for planners, government, and members of the public.

<sup>48</sup> For our published response and recommendations in relation to the July 7<sup>th</sup> 2005 London bombings, see <http://www.london.gov.uk/assembly/resilience/2006/77reviewnov22/04u-univ-sussex.pdf>

tends to lead to deaths in an emergency but under-reaction as people fail to take the signals seriously. There is evidence that people assess risk inaccurately,<sup>49</sup> such as being in denial that negative events can occur or that they are more likely to happen to others than themselves. Therefore, planners need to be aware of these processes and pre-empt them, by considering how they would respond to every possible type of emergency (especially the most extreme events), rather than convincing themselves that it 'couldn't happen to them'.

- **Instructions for emergencies** need to be clear, informative and easily accessible to the public. This is something for example that arose from comments on the July 7<sup>th</sup> bombings in London. Many of those we heard from searched for but couldn't find enough information on the tube trains.<sup>50</sup> There is some evidence that those who access emergency information in trains and planes are more likely to survive in emergencies such as crashes.<sup>51</sup>
- **Practice evacuations.** Practicing evacuation drills can help save lives. A clear example of this was the comparison in response times to the attacks on the World Trade Center of 1993 and 2001.<sup>52</sup> The average exit time in 1993 was much slower than in 2001; if the bombs had had the same effect on each occasion many more people would have died on September 11<sup>th</sup>. But after the 1993 bombing, a proper fire drill was put in place, and rehearsed properly. Therefore, over 99% of those below the point of impact of the planes survived in 2001, as they were able to get out before the towers collapsed. The vast majority of fatalities were among those who were trapped above the impact points and could not get out, making it a remarkably efficient evacuation despite the human tragedy involved. In sum, knowing what to do when disaster strikes can make the difference between life and death.
- For fire and other emergency procedures in buildings, dedicated **fire wardens** who know the building and its exits can be crucial. In public areas, other public or authority figures (such as police officers or stewards) will play the same role. In the case of the July 7<sup>th</sup> bombings, the train drivers played this role. The general point is that there may be some (sometimes ad hoc) **leader influence** in emergencies.<sup>53</sup> During uncertain or confusing situations, people will often look to those they think should know what to do. Those who might play a role in directing people need to be trained so they can confidently deliver consistent information and guidance to crowd members in a way that it will be believed and acted upon. They also need to be familiar with the venue and available exits so they can direct others. This is especially the case when not all exits may be immediately apparent to crowd members if there are large numbers of people unsure of what to do, and there are environmental factors (such as smoke obscuring vision) that may create uncertainty about how to act or where to go.

#### **9.4 Mass emergency evacuation behaviour is meaningful.**

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<sup>49</sup> Plous (1993)

<sup>50</sup> See Katie Harris's design suggestions for passenger information during Underground emergencies: <http://www.sussex.ac.uk/affiliates/panic/InCaseofEmergency%20-%20Katie%20Harris.ppt>

<sup>51</sup> Muir (2004) Ripley (2005)

<sup>52</sup> Fahy & Proulx (2002)

<sup>53</sup> Chertkoff & Kushigian (1999)

This is the over-arching and key message of the research described in this report, and represents a crucial difference from the older panic tradition. Crowd behaviour even in the most stressful situations is socially structured and limited; it is defined by norms and shared identities. People's behaviour in crowds is therefore determined by their understandings of the world. There is one very clear practical implication of this argument that stands in contrast with a long tradition of practices amongst those whose job it is to manage crowds:

- If crowd panic is a myth and crowd behaviour is not only cognitive but also meaningful, this suggests that the public will respond effectively (i.e. co-operatively and in an orderly manner rather than anti-socially or over-emotionally) if given more rather than less information about the nature of the threat.<sup>54</sup> In short, **communication with the crowd is crucial**. It was because crowd behaviour was regarded as meaningless or at best lacking critical judgement that in the past there has been a tendency to withhold information from the public in times of emergencies.
- If communication is crucial this in turn means prioritizing systems of communication (e.g. public address systems) over physical features such as exit widths. The emphasis on the latter is based on the assumption that the crowd can in effect be treated as so many billiard balls rather than as people making meaningful judgements about appropriate action.<sup>55</sup>
- Tying this point in with issues of decision-making and information (2.2 and 9.4, above) this in turn means that the form of the communication should be explicit and unambiguous. The more clear and explicit the information about the location and nature of the danger, the more efficient and effective the collective evacuation. Public address systems are better than sirens.<sup>56</sup> Video screens providing information could also be usefully employed.

### **9.5 Trust between the crowd/public and the source/authority affects the nature of evacuation behaviour.**

This point follows from the previous one. The crowd can be trusted with information; but the crowd needs to be able to trust the source. In our studies, leadership figures were found to emerge from within the crowd itself where they are perceived to be representative of the crowd and offering practical guidance that other crowd members could follow. This was particularly noticeable in the tube trains bombed on July 7<sup>th</sup> 2005, where some people intervened to calm down those who were distressed or fearful and helped create a calm, ordered atmosphere.

- The long-established practice of withholding information from crowds during emergencies not only risks delaying people's safe evacuation, it can also lead to a distrust of the authorities in the long run. Thus, if it becomes public knowledge that information was deliberately withheld, then the authorities may not be trusted to provide

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<sup>54</sup> Proulx & Sime (1991) Wessely (2005)

<sup>55</sup> Sime (1990, 1995)

<sup>56</sup> Proulx & Sime (1991)

full, accurate information in any future emergencies. Thus it is crucial to **build and maintain trust** with the public and the crowd.<sup>57</sup>

- Emergency planners should consider using **sources of information that the public or crowd in question can identify with**. If the source is seen as representative of those to whom the message is targeted, then people are more likely to trust, and so act upon that information. For example, local community radio stations can be useful in conveying information in emergencies to specific areas of the community that may not listen to, trust, or even understand information from the mainstream media or from government spokesmen.

### **9.6 The crowd is a source of endogenous resilience.**

The ability of the crowd to provide mutual aid, to co-ordinate and co-operate, to deal with individual distress and panic, to take initiatives and play a leadership role should not be underestimated. The July 7<sup>th</sup> bombings were replete with examples of those in the midst of the bombings co-ordinating the relief effort, liaising with the emergency services and so on. This was a necessity given that the survivors were alone and not reached by the emergency services for some time.

- Recent counter-terrorism policy debates and planning proposals have tended to discount the capacity for civilians to participate in a purposeful response, on the implicit assumption that the public tends to be unco-operative and prone to panic.<sup>58</sup> The implication of the present research is in line with recent suggestions that the public and **the crowd seen as 'part of the solution' rather than 'part of the problem' by the authorities.**

- Indeed, the neglect of the mass emergency crowd's natural resilience in current policy and practice misses an opportunity to make use of a positive resource. Rather than seeing the public as potential obstructions that need to be moved on, **acknowledging and making provision for people's willingness to help others could provide emergency services with a large pool of potential volunteers.**<sup>59</sup> This is not to say that all helping is effective, for some efforts may cause delays,<sup>60</sup> but it is an argument that the blanket exclusion of the public from emergency planning, and the treating of crowd members simply as victims, may be counter-productive.<sup>61</sup>

- The natural resilience of the crowd (and indeed the wider public) and its active involvement in its own protection may be inter-related. The **over-protective responses of the government may stunt the public's own natural resilience.**<sup>62</sup>

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<sup>57</sup> Durodié & Wessely (2002) argue that telling people 'not to panic' may have the opposite effect as it can increase anxiety as people could feel that it is expected of them to panic in an emergency. The authorities' instruction not to panic is a reflection of the same lack of trust in the crowd (i.e. fear of panic and irrationality in the crowd) that leads to the withholding of information.

<sup>58</sup> Glass & Schoch-Spana (2002)

<sup>59</sup> Durodié & Wessely (2002)

<sup>60</sup> Aguirre, Wenger, & Vigo (1998)

<sup>61</sup> Glass & Schoch-Spana (2002)

<sup>62</sup> Furedi (2007) Wessely (2005)



### **9.7 Mass emergency evacuation behaviour is more effective the greater the shared identity in the crowd.**

This point follows from the last; but it goes further by suggesting at least some of the process behind the resilience observed in emergency crowds, as well as offering some particular recommendations for practice and policy.

- A shared identity can be encouraged in public spaces (such as Underground stations) on an everyday basis. This might be achieved via public information campaigns and the wording of public addresses, advertisements, notices and so on. For instance, addressing passengers as 'customers' stresses the money nexus which in turn has been found to encourage individualized and selfish behaviour.<sup>63</sup> Instead any **messages on public transport that appeal to passengers' collective spirit** (rather than seeing them as isolated individuals or 'customers'), would be more effective in fostering a shared identity.
- By the same token, how the emergency services address the crowd at the time of any emergency would need to be worded to address people in their collectivity rather than their individuality, to enhance and foster collective and co-operative behaviour.
- It may be necessary to move crowds of people quickly away from any suspected danger. However, planners should bear in mind that because of the shared identity that can develop, survivors may wish to help others and/or provide information about the incident to other members of the public, even at risk to themselves. As discussed above, this process could be facilitated if it doesn't hamper the emergency services' efforts, as this potential resource of volunteer helpers could free up qualified personnel for more specialized tasks necessary at the time.

### **9.8 Groups may have therapeutic consequences after the emergency itself.**

The finding that some survivors sought and claimed to have benefited from mutual support groups suggests that sharing one's traumatic experiences with others in the group may be beneficial. This is an area we are seeking to research further. If the evidence supports the suggested therapeutic role of mutual support groups for survivors – for example in ameliorating the effects of PTSD – this is a practice that should be facilitated by the health and social services.

### **9.9 The psychological role of the group needs to be built into predictive models of crowd dynamics.**

Mathematical (computer) models of crowd flow are widely used in the planning engineering, and architecture of large public spaces such as sports stadiums, bridges and public squares.<sup>64</sup> These have become increasingly sophisticated. However, there is a growing argument for including more psychological input in these models.<sup>65</sup> While techniques have developed that allow the simulation of individual variety within a crowd, the data presented here – as well as numerous observations of non-emergency crowd flow behaviour, such as football matches for example – points to the need to

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<sup>63</sup> Vohs, Mead & Goode (2006)

<sup>64</sup> e.g. Galea & Galparazo (1993) Helbing, Farkas & Vicsek (2000) Still (2000)

<sup>65</sup> e.g. Galea (2006) Gerodimos (2006) Sime (1995) Still (2000)

include psychological groupness as a possible variable in any crowd model.<sup>66</sup> Groupness emerges within fragmented crowds; a physical crowd may be psychologically divided between two rival factions who act in relation to each other collectively; large masses often collect and act in the form of numerous small sub-groups; and crowd members behave collectively differently from small groups in the crowd such as stewards and police officers. **Building in groupness, not just individual differences, therefore could improve the psychological realism of existing computer models of crowd flow and crowd dynamics.**

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<sup>66</sup> Smith, James, Jones, Langston, Lester & Drury (in submission, 2007).

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## **Appendix1: Further work and cConsultancy**

**The research project website – background, research, applications, contacts, links, publications:**

<http://www.sussex.ac.uk/affiliates/panic/>

**For presentations and further information on this project, contact:**

Dr Chris Cocking: [cpc20@sussex.ac.uk](mailto:cpc20@sussex.ac.uk)

or

Dr John Drury: [j.drury@sussex.ac.uk](mailto:j.drury@sussex.ac.uk)

**John Drury's home page:**

<http://drury.socialpsychology.org/>

**London bombings stress and social support questionnaire:**

<http://www.sussex.ac.uk/affiliates/panic/lb/questionnaire.htm>

**Brighton Beach party 2002 survey:**

<http://www.sussex.ac.uk/affiliates/panic/Fatboy%20slim%20questionnaire.htm>

**Aims Solutions (Prof Damian Schofield). Emergency procedures training software:**

<http://www.aims-solutions.co.uk/>

**University of St Andrews immersion lab (Prof Steve Reicher). Laboratory for simulation of crowd experiences:**

<http://psy.st-andrews.ac.uk/facilities/immersion.shtml>

## **Appendix 2: Resources and relevant organizations:**

**7th July Assistance.** Support and assistance group for those affected by the 7/7 London bombings:

<http://www.7julyassistance.org.uk/>

**Birmingham City Council Emergency Planning**

<http://www.birmingham.gov.uk/emergency.bcc>

**Crowd Dynamics Ltd.** Crowd modeling consultants:

<http://www.crowddynamics.com/>

**Crowdsafe:** website dedicated to improving crowd safety at concerts (and public gatherings of all kinds) worldwide

<http://crowdsafe.com/>

**Disaster Action.** Independent advocacy service that represents the interests of those directly affected by disaster.

<http://www.disasteraction.org.uk/>

**Disaster Research Centre,** University of Delaware

<http://www.udel.edu/DRC/>

**King's Cross United:** Mutual support group set up after July 7th by survivors of the Piccadilly line bomb:

[kingscrossunited@yahoo.co.uk](mailto:kingscrossunited@yahoo.co.uk)

**London Resilience Team.** Government Department within the Office of the Deputy Prime Minister that was formed in the wake of 9/11 to co-ordinate a response to a similar attack on London or another British city:

<http://www.londonprepared.gov.uk/index.jsp>