

Impact case study (REF3)

Institution: University of Sussex		
Unit of Assessment: 4 – Psychology, Psychiatry and Neuroscience		
Title of case study: Improving crowd safety procedures and reducing risk through social psychology		
Period when the underpinning research was undertaken: 2004 – 2016		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	Role(s) (e.g. job title):	Period(s) employed by submitting HEI:
Prof John Drury	Professor of Social Psychology	1997 – present
Dr Chris Cocking	Postdoctoral Research Fellow	2004 – 2007
Dr David Novelli	Postdoctoral Research Fellow	2010 – 2012
Prof Rupert Brown	Professor of Social Psychology	2004 – 2019
Period when the claimed impact occurred: 1 Aug 2013 – 31 Jul 2020		
Is this case study continued from a case study submitted in 2014? N		
1. Summary of the impact		
<p>This research on crowd psychology has enhanced crowd safety management policies, practices and training which have kept hundreds of thousands of people safer. Findings on crowd self-regulation in emergencies have informed the UK's National Risk Assessment and the emergency plans of Local Resilience Forums. Over 700 professionals involved in emergency preparedness in the UK have thus changed how they incorporate behavioural impacts of emergencies in their planning and approach. The research has transformed guidance and training for crowd safety professionals (more than 77,000 stewards) at European football matches (average 50,000 attendees), as well as at major live events, such as large-scale music festivals (e.g. 135,000 attendees). It has also changed public health guidelines – and shaped procedures and training – for mass decontamination responses to chemical, biological, radiological and nuclear (CBRN) incidents across the UK and USA. Implementing these communication techniques has significantly improved the effectiveness of decontamination practices of hundreds of UK Fire and Rescue Service personnel.</p>		
2. Underpinning research		
<p>Disasters are regularly cited among the World Economic Forum's list of the top five global risks. Mass gatherings need to prepare for such contingencies; in the UK alone, more than 7,000 major outdoor events are held each year. It is recognized by government departments, crowd safety organizations and emergency services that there will not always be sufficient trained personnel on the ground. Thus there is a practical need for an alternative to reliance on top-down control and coercion. One alternative is to make more use of the capacity of crowds to respond adaptively and self-regulate; therefore, greater understanding of the psychological underpinnings of this collective self-regulation is required. Drury's research on crowd psychology responds to these needs, increasing safety for the public.</p> <p>Drury and colleagues' interview studies with survivors of the London bombings and other emergencies showed that emergent shared social identity is the basis of the cooperative and coordinated behaviour frequently observed in disasters (R1, R2). The research findings suggested that emergencies can create a sense of common fate leading to a new shared identity which increases cooperation. This research was the basis of a new way of thinking about crowd behaviour in emergencies, the social identity model of collective resilience.</p> <p>The social identity model was extended in two ways. First, surveys and interviews with those involved in a near-disaster at an outdoor music event (R3) and the 2010 Maule (Chile) earthquake (R4) showed for the first time the role of expected support within the crowd in the resilience process and the way that crowd professionals can work with social identities. These studies also served to validate and show the relevance of the social identity model to a range of emergencies and mass gatherings.</p>		

Second, the social identity model was the basis of a series of studies of behaviour during mass casualty decontamination in response to chemical, biological, radiological, and nuclear (CBRN) incidents (R5-R6). This work was part of a collaboration between Sussex and Public Health England (PHE) in the form of a PhD studentship which Drury supervised at Sussex. Following a CBRN incident, the speed and efficiency of mass decontamination can save lives and minimize casualties. Traditionally, guidance relating to this process has focused on technical aspects and has ignored the social relationship between the public and emergency professionals. With his student Carter and PHE colleagues, Drury designed studies using multiple methods (interviews, field surveys, and quasi-experiments), which established that poor communication by responders was a factor in reduced public compliance during these crucial life-saving procedures, limiting the efficiency of the decontamination process, and potentially leading to fatalities. The research showed that responders' use of communication could enhance shared social identity between crowd and responders, leading to cooperation and compliance, and so to improved decontamination throughput times (4 minutes quicker than when using standard practice) (R6). In effect, the research demonstrated how a simple intervention, based on the notion of shared social identity in a crowd, could improve outcomes and therefore potentially save lives.

3. References to the research

- R1. Drury, J., Cocking, C., & Reicher, S. (2009). The nature of collective resilience: Survivor reactions to the 2005 London bombings. *International Journal of Mass Emergencies and Disasters*, 27, 66-95. <http://www.ijmed.org/articles/113/download/>
- R2. Drury, J., Cocking, C., & Reicher, S. (2009) Everyone for themselves? A comparative study of crowd solidarity among emergency survivors. *British Journal of Social Psychology*, 48, 487-506. <https://doi.org/10.1348/014466608X357893>
- R3. Drury, J., Novelli, D., & Stott, C. (2015). Managing to avert disaster: Explaining collective resilience at an outdoor music event. *European Journal of Social Psychology*, 4, 533–547. <https://doi.org/10.1002/ejsp.2108>
- R4. Drury, J., Brown, R., González, R., & Miranda, D. (2016). Emergent social identity and observing social support predict social support provided by survivors in a disaster: Solidarity in the 2010 Chile earthquake. *European Journal of Social Psychology*, 46(2), 209–223. <https://doi.org/10.1002/ejsp.2146>
- R5. Carter, H., Drury, J., Rubin, G. J., Williams, R., & Amlôt, R. (2012). Public experiences of mass casualty decontamination. *Biosecurity and Bioterrorism*, 10(3), 280-289. [doi: 10.1089/bsp.2012.0013](https://doi.org/10.1089/bsp.2012.0013)
- R6. Carter, H., Drury, J., Amlôt, R., Rubin, G. J., & Williams, R. (2014). Effective responder communication improves efficiency and psychological outcomes in a mass decontamination field experiment: Implications for public behaviour in the event of a chemical incident. *PLoS One* 9(3): e89846. <https://doi.org/10.1371/journal.pone.0089846>

R1, R2 funded by ESRC ('Effects of social identity on responses to emergency mass evacuation', PI: Drury, £160,935, 04/2004-03/2007, RES-000-23-0446); R3 funded by Leverhulme Trust ('Representations of crowd behaviour in the management of mass emergencies', PI: Drury, £83,075, 09/2010-08/2012, F/00 230/AO). R4 funded by CONICYT (FONDAP/15130009). Total citations for R1-R6 = 287; average field-weighted citation index for R1-R6 = 2.436 (Scopus).

4. Details of the impact

The research has three key areas of impact.

1. Informing UK policy on emergency planning, preparedness and response

Local Resilience Forums (LRFs) – over 44 across the UK – bring together police, local authority, fire, and health service in a particular area and enable them to coordinate emergency preparedness and response. UK LRFs' preparedness and response plans are informed by the National Risk Assessment (NRA), a restricted but required reference document for their risk

assessment obligations under the Civil Contingencies Act (2004). The NRA, and hence LFR practice, has been enhanced by Drury's research (C1).

Drury was invited to be part of the Behavioural Science Expert Group, set up in 2015 to advise the Civil Contingencies Secretariat of the Cabinet Office, and to provide expertise on behavioural reactions in order to inform emergency plans. As part of this work, Drury co-authored two reports for the Cabinet Office: Deeming, H. et al. (2015), *Lessons learned from international case studies*; Drury, J. & Pearce, J. M. (2015) *A review of how best to represent 'mass participation' events in terms of public responses within the National Risk Assessment*. These reports drew substantially on the insights published in R1, R2, and R4. They informed the revised National Risk Assessment and 'reached over 200 policymakers across HM Government, ranging from permanent secretaries and chief scientists of most government departments to specialists and analysts within Executive Agencies such as Natural England and Public Health England' (C1).

In 2014 and 2016, the NRA was revised to take account of evidence from Drury's research that cooperation is common and irrational anxiety or panic is less common in emergencies (R1-R4). Drury's research has therefore shaped the way LRFs across the UK 'take into account the psychological impacts of emergencies when assessing their local risks. Over 700 specialists from local authorities, police forces, fire and rescue services, ambulance services and utility providers have used the output from Professor Drury's work to inform local preparations for dealing with emergencies' (C1). The research 'has been crucial to ensuring that the government and local emergency responders are able to anticipate and plan for the behavioural impacts of emergencies. Professor Drury has helped make sure emergency responders can factor in how people perceive events and how this may place additional burdens (or not) on emergency services or helplines. His contributions have placed the UK at the forefront of this field' (C1).

2. Improving effectiveness of crowd safety management at live events

There were two pathways whereby the research has had impact in the event safety industry. First, across the review period, Drury delivered CPD modules on crowd psychology for crowd safety professionals (at Bucks New University, the Event Safety Academy (Netherlands), and Safe Events (Ireland)). These modules included his own research findings and conclusions (R1-R6) which were presented in a format accessible to crowd safety professionals. Teaching on the modules brought him into contact with crowd safety managers, both from the UK and internationally, responsible for safety at both music events and sports events. Subsequently, managers who attended the module used Drury's concepts both in their practice and in the training they provide nationally and internationally (C2, C3). Second, Drury was invited by the Emergency Planning College in April 2016 to give a lecture on his research (in particular R3) for crowd safety professionals. [text removed for publication] was one attendee, and subsequently included some of Drury's social identity research in the [text removed for publication] (C4). Through these various engagement activities, Drury's research impacted on crowd safety measures and on training for safety staff at crowd events.

Enhancing crowd safety measures at major music events: Since 2014, Drury's research on the role of shared social identities in shaping crowd behaviour (R1, R2) has been increasingly used by organizers at music events in Denmark, most notably the Roskilde festival (catering for 135,000 people annually), to change crowd management practices for ingress, therefore keeping thousands of people safer and improving customer service. The changes implemented entailed removing fences where people were queuing and instead, based on knowledge of the role of identities in crowds, using communication to improve relationships of trust with the crowd and achieve a safer outcome. Attesting to years of consistent success using this approach, the Head of Security wrote in 2019: 'As a part of our planning process we are very aware of Dr John Drury's research and have used it often... For several years we had issues with the guests tearing down our fences up to 16 hours before the festival opened. This was done in order to rush in and get their wanted position at the site' (C2), 'We created line [queuing] systems that supported the audience expectations, and we created communication systems that made sense for them. We also took away the fences in front of the visitors and used police tape to keep people out. The fundamental way of working with the audience has changed significantly after this opening. Now Roskilde Festival generally work in a way where "we trust in the audience" is the main idea. We believe in people and all of our planning is created on the research arguing

that you can work with the audience, and that they never panic or spin out of control, but it is up to the organizer to support the group mentality and protect it from people who are not following what the rest of the group wants.' (C2). This has had observable positive impacts at Roskilde: *'When we implemented Dr John Drury's research in our planning, and worked focused with the guests' social identities and how that shaped behavior in the crowd, we found that the audience waited nicely in line until we opened the doors. This created a less stressed entry and also a more relaxed opening day with the result of less crime and conflicts'* (C2). In addition: *'The research of John Drury, and others, are not only changing Roskilde Festival. We are also a part of the safety at 200 other shows a year, and we train police, promoters and other safety teams in Denmark. And all that we do and teach are based on the modern way of thinking'* (C2).

Drury's research on crowd behaviour (R1) is also cited in and informs Indian government guidance on managing crowds for local authorities and organizers (C5), indicating further international reach.

Improving training for crowd safety personnel: Drury's research on the role of social identities in shaping behaviour in emergencies has been used for *'circa 1000 students per year in security/crowd safety stewarding qualifications'* between 2014 and 2020 (C3). Some courses use the 2017 Highfield training guide for crowd safety stewards (C6) which cites Drury's work (p. 30). In 2014/15, The Square Metre Group delivered training for stewards at Manchester United and Wembley Stadium: *'The two stadiums hold around 80,000 people an event. These statistics demonstrate that your work impacted the safety of more than a million people in this period over multiple events'* (C3). Square Metre have also used Drury's research in training internationally, including for the 2018 Commonwealth Games in Australia and South Korea's Theatre Safety Center in 2019. The CEO of Square Metre states, *'As a crowd manager myself, your training and research have helped me manage the safety of crowds at several high-profile events ... [e.g.] The Rugby World Cup 2015, Dunsfold Wings & Wheels Airshow 2014-2018 and the South East Corner of Glastonbury Festival 2017 & 2019'* (C3).

[text removed for publication] through Dr Steve Frosdick's role designing all relevant training materials, Drury's research showing that shared social identity is the basis of social support and coordination in emergencies (R1-R3) is now part of [text removed for publication] training materials (C4). These have been delivered to stadium safety officers, police match commanders, and match stewards for *'27 national associations in Europe and two in Asia'* (C4). A total of 838 trainers have trained *'about 77,000 stewards'* with these materials (C4), changing crowd safety practices so that crowds are no longer seen as irrational. As an example indicator of reach, the 2017-18 [text removed for publication] involved 124 games and 5,760,112 attendees.

3. Changing CBRN mass decontamination protocols, training, and practice

Decontamination needs to be carried out very soon after a CBRN incident. Therefore, optimising the speed and efficiency of the shower process can help avoid mass fatalities. Drury's research with PHE led to changes in procedure that optimised the efficiency of the decontamination shower process via crowd management principles. These changes, informed by the research, will therefore have substantial impact in the event of a CBRN mass emergency, saving lives.

There were a number of different pathways through which the research on social identity processes in mass decontamination led to changes in policy, practice, and training. First, the peer-reviewed publications (e.g., R5) were independently picked up by public health organizations internationally (C7). United States official guidance, including from the Department of Homeland Security (C8), has now been changed to cite Drury and colleagues' research (R5) and to reproduce the research recommendations on communication in legitimizing responder behaviours (R5).

Second, Drury's collaboration with PHE meant that the research was known when new guidance was produced by that body (C9). Changes to government thinking about CBRN decontamination, based directly on Drury's research, had already been evident, for example, in the 2016 Commons Science and Technology Committee hearing and report (C10). In the transcript of the Committee hearing, Chris Green MP directly quotes from Drury's written submission that *'[Decontamination] is not only a technical procedure but a social relationship between the responders and the public'* (p. 14). These changes to policy have led to enhanced

performance (C10). In the same transcript, Andy Bell of the Chief Fire Officers' Association states that the FRS are using the principles of communication from the research: *'it was clear that the decontamination processes were much slicker and effective the more we communicated with the casualties... It made the casualties much more compliant, which meant that the decontamination process was faster and we could put people through it more quickly'* (p. 15).

Third, PHE communicated the research and recommendations to senior personnel and training managers in the UK Fire and Rescue Service (FRS) National Resilience. From 2018, the UK FRS incorporated the recommendations in their training: Drury and colleagues' *'work on mass emergency behaviour and their specific recommendations on communication during mass decontamination to enhance the efficiency of the decontamination process are now embedded in the ... course syllabus... this is an important practice to ensure operations run smoothly and will potentially save lives in the event of a large-scale CBRNe event'* (C11). Every UK firefighter trained in decontamination (180 firefighters a year) is now trained to use communication in the decontamination procedure, based on the research (C11). Around half of these are tactical advisors and instructors who have responsibility for cascading the information to the wider workforce. Testimony from the Deputy Assistant Commissioner of the National Fire Chiefs Council adds that Drury and colleagues' research on communication in emergencies has been *'instrumental in informing the recent Home Office CBRN Capability review'* (C11), which has led to communication materials being developed for all staff working in decontamination.

5. Sources to corroborate the impact

- C1. Civil Contingencies Secretariat: Testimonials from Assistant Directors, National Risks (2017, updated 2018)
- C2. Morten Therkildsen (Head of Security, Safety & Health at Roskilde Festival, Denmark) testimonials: Letter (2016) and email (2017)
- C3. Andy Hollinson (Director of eResponse Crowd Safety Worldwide; CEO, The Square Metre Group) testimonials: Letter (2016); Letter (2020)
- C4. Steve Frosdick (Independent Expert [text removed for publication]: Testimonial (2020) and tweet (2016)
- C5. National Disaster Management Authority, Government of India. (2014) [Managing crowd at events and venues of mass gathering: A guide for state government, local authorities, administrators and organizers](#). (p. 63)
- C6. Highfield training guide: *Understanding stewarding at spectator events* (2017) (p. 30)
- C7. Harvard School of Public Health Emergency Preparedness and Response Exercise Program. (2014). [Proposed minimum decontamination capabilities for hospitals in Massachusetts](#). Boston, MA: Harvard School of Public Health. (pp. 21, 22, 34, 45)
- C8. Department of Homeland Security, US Department of Health and Human Services. (2014). [Patient decontamination in a mass chemical exposure incident: National planning guidance for communities](#). Washington, DC. (pp. 42, 53, 86, 92, 94)
- C9. Chilcott, R. P., Larner, J., & Matar, H. (Eds) (2018) [Primary Response Incident Scene Management \(PRISM\): Guidance for the operational response to chemical incidents. Volume 1. Strategic guidance for mass casualty disrobe and decontamination](#). Second edition. (pp. 120-29)
- C10. [Science and Technology Committee 12th report](#) (2017), with links on p. 36 to Drury's submission of written evidence. Science and Technology Committee Oral evidence: Science in emergencies: chemical, biological, radiological or nuclear incidents, HC 163 (2016)
- C11. Fire and Rescue Service National Resilience testimonials. Letter (14 September 2020) from [text removed for publication] CBRN(e) Mass Decontamination National Resilience, and letter (29 May 2019) from Daniel Cartwright, Deputy Assistant Commissioner, Deputy Lead for CBRN(e)