

Institution: Cardiff University		
Unit of Assessment: Psychology, Psychiatry and Neuroscience (4)		
Title of case study: Transforming national operational guidance for the UK emergency services		
Period when the underpinning research was undertaken: 2015 - 2020		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s): Rob Honey Sabrina Cohen-Hatton	Role(s) (e.g. job title): Professor Honorary Research Fellow	Period(s) employed by submitting HEI: 01/09/1994 – present 01/08/2016 – present
Period when the claimed impact occurred: 01/01/2016 – 31/12/2020		
Is this case study continued from a case study submitted in 2014? No		
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>Effective decision-making by emergency services personnel is vital for their safety and the safety of others. Research co-produced by Cardiff University and the National Fire Chiefs Council (NFCC) developed a 'decision control' process for firefighters after identifying that they relied on instinct and experience, contrary to assumptions made within NFCC guidance for Fire and Rescue Services. The research transformed the National Operational Guidance for Incident Command and the doctrine of the Joint Emergency Services Interoperability Programme, which directs UK emergency services response, and is now used across the UK Fire and Rescue Services. These changes to the National Operational Guidance also influenced formal evaluation of incident command skills and informed training of the Strategic Co-ordinating Groups convened for major incidents across the UK.</p>		
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>Ineffective decision-making in emergency settings has both societal and economic impacts. For example, human error is cited as the cause of most firefighter injuries (Department for Communities and Local Government, 2013, <i>Fire and rescue authorities health, safety and welfare framework for the operational environment</i>); and recent history is beset by high-profile cases where the capacity of different agencies (e.g., emergency services, civil resource organizations, health boards, and local government) to work together has been suboptimal, resulting in injury and loss of life. To address these issues, Cardiff University and the National Fire Chiefs Council (NFCC) co-produced research on decision-making in individual firefighters (specifically incident commanders, who co-ordinate 'on scene' activity at emergency incidents) at real and simulated incidents involving the UK Fire and Rescue Service (FRS). This UK-wide research is unique in assessing the efficacy of decision controls on decision-making processes in the emergency services. The research provided unique insights into both individual and group decision-making in emergency settings:</p> <p>2.1 Individual decision-making</p> <p>The research used live video footage from helmet-mounted cameras worn by Incident Commanders at real incidents. It was assumed that decisions to act were arrived at through a linear process: assess the situation, evaluate the merit of different courses of action, and then act. However, analysis of the footage revealed marked departures from this linear process, showing that assessment of the situation was most often followed by 'directives' to fire crew members to act as opposed to a process of plan formulation. The Cardiff research demonstrated that Incident Commanders relied on intuitive, procedural knowledge based on past experiences with similar incidents, rather than an analytical process of plan formulation for the current incident [3.1]. This research was awarded the FIRE/Gore Research Excellence Award 2014.</p> <p>The research proceeded by developing processes that would enable Incident Commanders to balance the use of prior knowledge with an evaluation of the current incident through the</p>		

use of 'decision controls': a rapid mental checklist highlighting goals, anticipated consequences, and risks versus benefits [3.2]. Extensive experimental work was conducted involving: reproducible simulated incidents (e.g., a house fire) created using immersive VR; fire ground re-creations (at the Fire Service College, Moreton-in-Marsh); and 'live burns' of property due for demolition.

The research confirmed that Incident Commanders given traditional training showed a bias toward intuitive decision-making processes. Importantly, use of such intuitive decision-making was reduced, and analytical processes increased, when commanders implemented the Cardiff decision-control training. Commanders given decision-control training had higher levels of situational awareness, undertook more explicit planning and shared goals with colleagues more. Crucially, this training did not slow down decision-making [3.2]. This research received awards from the American Psychological Association, the Biotechnology and Biological Sciences Research Council, and the Business and Education Partnership Awards (see Section 3).

Further research enabled the development and implementation of the first nationally endorsed system (called THINCS: The INCident Command Skills system) to evaluate command skills, including intuitive and analytical decision-making [3.3].

2.2 Group decision-making

Cardiff research also investigated decision-making in Strategic Coordinating Groups, which consist of senior representatives of the local emergency services, civil resource organizations, health boards, and government. These groups are brought together to develop a unified strategic response when there is a major incident emergency in the UK (e.g., a terrorist attack or a natural disaster). The research was based on analysis of footage of the responses of these groups to simulated major incidents at training exercises across Wales in 2015 and 2016, as well as a large-scale exercise in London funded by the EU (€1.8M) and led by the London Fire Brigade. This research demonstrated that contrary to the recommendations of the UK public-sector standard Joint Decision Model, groups engaged in limited consideration of different options and contingencies: a key component of effective decision-making. There were also marked between-group biases in the decision-making processes across groups who faced the same simulated incidents, with limited identification of alternative courses of action or horizon-scanning [3.4]. To date, this is the only detailed in situ analysis of decision-making in Strategic Coordinating Groups.

3. References to the research (indicative maximum of six references)

[3.1] Cohen-Hatton, S.R., Butler, P.C., & Honey, R.C. (2015). An investigation of operational decision-making in situ: Incident command in the UK fire and rescue service. *Human Factors*, 57, 793-804. DOI: 10.1177/0018720815578266.

[3.2] Cohen-Hatton, S.R., & Honey, R.C. (2015). Goal-oriented training affects decision-making processes in virtual and simulated fire and rescue environments. *Journal of Experimental Psychology: Applied*, 21, 395-406. DOI: 10.1037/xap0000061.

This research received the following awards:

- the American Psychological Association 2016 Raymond Nickerson Best Paper Award;
- Biotechnology and Biological Sciences Research Council Innovator of the Year 2018 (Overall Winner and Social Impact Winner), with £20K research and impact award;
- New Process Award at the Business and Education Partnership Awards, Insider Media (2017).
- Cohen-Hatton also received the American Psychological Association (APA) 2016 New Investigator Award for this paper.

[3.3] Butler, P.C., Honey, R.C., & Cohen-Hatton, S.R. (2020). A behavioral marker system for incident command in the UK Fire and Rescue Service: THINCS. *Cognition, Technology & Work*, 22, 1-12. DOI: 10.1007/s10111-019-00539-6.

[3.4] Wilkinson, B., Cohen-Hatton, S.R., & Honey, R.C. (2019). Decision-making in multi-agency groups at simulated major incident emergencies: In situ analysis of adherence to UK doctrine. *Journal of Contingencies and Crisis Management*, 27, 306-316. DOI: 10.1111/1468-5973.12260.

4. Details of the impact (indicative maximum 750 words)

The research co-produced by Cardiff University and the National Fire Chiefs Council (NFCC) transformed decision-making guidance, doctrine and training for individuals and multi-agency groups in emergency settings.

4.1 Individual decision-making in the UK Fire and Rescue Service

The research was conducted in close collaboration with the NFCC, and it affected Fire and Rescue Services through integration into **a.** policy, **b.** training, **c.** evaluation, and **d.** operational recommendations.

a. Policy

The Cardiff research findings were extensively reported in the 2015 NFCC publication *The Future of Incident Command* [5.1, pp. 12-22] and the outcomes of the research had a transformative influence on the *National Operational Guidance for Incident Command* [5.2a, p.19-26]. The guidance cites [3.1] to illustrate the differences between practices assumed by previous UK guidelines and actual UK practices, and the importance of recognising the influence of intuitive and analytical processes in high-pressure decision-making situations. It contains a detailed description of [3.2] designed to support the adoption of the Cardiff decision control process during emergency incidents. This guidance underpins the response and training of frontline personnel within the UK Fire and Rescue Services (FRS), and went live across all UK FRSs in January 2016 [5.3].

b. Training

After the guidance went live, a survey of incident command training was fully completed by 56% of UK FRSs. This survey confirmed that **100% of FRSs who fully completed the survey provided theoretical command decision-making training using the new Operational Guidance**; this contrasts with only 52% providing comparable training in resilience, stress, and fatigue management [3.3].

London Fire Brigade, the busiest FRS with the largest number of full-time firefighters, did not initially adopt the decision control process from the new Operational Guidance. In its routine inspection of the London Fire Brigade in 2019, Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services noted: "The brigade is the only service not to use the national incident command decision control process...This situation needs immediate attention" [5.4, p.19]. The London FRS subsequently adopted the use of decision controls in 2020, and as such, **all FRSs in the UK now use the decision control process developed by Cardiff**.

The decision control process is also included in the NFCC Training Specifications, which underpin UK FRS training for Incident Command to drive consistency [5.3].

c. Evaluation

The Incident Command Skills system (THINCS) developed by Cardiff [3.3] is used to evaluate command skills, including intuitive and analytical decision-making. It was rolled out across the UK FRS in 2019 together with accompanying guidance, training packages, and a tablet-based app, which enable its use in both training and operational contexts. The 2019 edition of the *National Operational Guidance for Incident Command* expanded the adoption of decision controls by explicitly recommending the THINCS system to evaluate and reinforce their use [5.2b]. THINCS licenses have been issued to the Fire Service College [5.5], which is a commercial training organization for emergency services personnel from the UK and internationally.

d. Operational Recommendations

In addition to these direct impacts of the research on operational guidance, *The Future of Incident Command* also recommends the use of helmet-mounted video cameras as a tool for supporting training and development [5.1, p.40], based on the value of this resource from the research. This recommendation has now been implemented in Hampshire and was also incorporated as part of the approach recommended for the Scottish FRS in 2015 [5.6].

4.2 Group decision-making in the extended emergency services

The Cardiff research on decision-making in Strategic Coordinating Groups also changed guidance on how emergency services work together in high-pressure situations. The Joint Emergency Services Interoperability Programme (JESIP) is a programme of recommendations made to emergency services to improve decision-making across the services. JESIP is overseen and supported by the Home Office, Department of Health, Department of Communities and Local Government, and the Cabinet Office. It has the full support of the Association of Ambulance Chief Executives, Association of Chief Police Officers and Chief Fire Officers Association. Decision controls, developed through the Cardiff research [3.1], were incorporated into Edition 2 of the Joint Emergency Services Interoperability Programme (JESIP)'s *Joint Doctrine: The Interoperability Framework*, July 2016 [5.7, pp. 21-22]; and in the revised Aide Memoire for Commanders [5.8]. This doctrine underpins how emergency services work together, particularly in the context of large-scale or complex emergencies.

Through JESIP, the decision control process developed by the Cardiff team has now been adopted more widely across UK emergency services. For example, the NHS England Emergency Preparedness, Resilience and Response Framework [5.9] recommends that decision-makers use the JESIP joint decision model to support high-pressure decision-making processes. The Cardiff team also produced summaries and a video overview of the Cardiff research [3.4] to inform the Wales Gold III training course for all emergency responder agencies in Strategic Coordinating Groups [5.10].

4.3 Summary

Cardiff University research with the NFCC changed the guidance doctrines, training and qualifications framework that underpin decision-making by firefighter Incident Commanders. Every FRS in the UK has now adopted the Cardiff team's new decision control process designed to support more effective decisions in emergency situations. The decision control process has also been adopted by broader emergency decision-making groups through the Joint Emergency Services Interoperability Programme, changing how NHS, Ambulance Service and multi-service groups react to emergency incidents across the UK. The Cardiff research and impact is a Case Study in the first UKRI strategy document (*Strategic Prospectus: Building the UKRI Strategy*; p. 40; 2018). [5.11]

5. Sources to corroborate the impact (indicative maximum of 10 references)

[5.1] *National Operational Guidance: The Future of Incident Command* (2015)

[5.2] *National Operational Guidance for Incident Command* a. 2016 release, b. 2019 release

[5.3] Letter from NFCC (now the Chief Fire Officers Association) to all UK Fire and Rescue Services announcing new National Operational Guidance to "go live" on 1 January 2016

[5.4] Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services, *An inspection of London Fire Brigade* (2019)

[5.5] Corroboration of the Fire Service College license for THINCS

[5.6] Response of Scottish Fire & Rescue Service to Incident Command Research (12 February 2015)

[5.7] *Joint Doctrine: The Interoperability Framework*, Edition 2, July 2016; incorporating decision controls

- [5.8]** JESIP's revised Aide Memoire for Commanders incorporating decision controls
- [5.9]** NHS England Command and Control Guidance incorporating decision controls
- [5.10]** Letter from Wales Gold Training for Strategic Coordinating Groups about use of **[3.4]**
- [5.11]** Strategic Prospectus: Building the UKRI Strategy; p. 40; 2018