

Incident Commanders in UK Fire and Rescue Services are using guidance underpinned by BBSRC-funded neuroscience research to improve their decision-making at incidents. The research led to the development of a decision control process; a rapid mental checklist to help Incident Commanders to make decisions appropriate for the situation. This was incorporated into national guidance, which cites the BBSRC-funded research. The guidance came into force on the 1st January 2016 and is being used daily by Fire and Rescue Services across the UK.

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“It was very well received. It’s now thoroughly embedded in UK Fire and Rescue Services,” says Dr Sabrina Cohen-Hatton, Deputy Assistant Commissioner in the London Fire Brigade and one of the researchers who led the study¹.



Fire fighters are attending fewer incidents every year.
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The policy change was enabled by initial BBSRC research into mediated learning, led by Professor Rob Honey at Cardiff University², alongside Cohen-Hatton’s self-funded PhD in Honey’s lab. This led to funding from the Chief Fire Officers Association for Cohen-Hatton and Honey to investigate decision-making in Incident Commanders.

Their findings have also been incorporated into the doctrine of the Joint Emergency Services Interoperability Programme (JESIP), which provides integrated guidance on how the emergency services should work together at large-scale or complex incidents. There is also substantial international interest in the new guidance.

Better firefighter safety

Honey’s BBSRC-funded research was focussed on identifying the areas in the brain involved a form of learning known as retrieval-mediated learning³. Cohen-Hatton’s interest in decision-making stemmed from her personal experience as a firefighter with the South Wales Fire and Rescue Service. This led her to a self-funded PhD in Honey’s lab to study how cues in the environment can influence decision-making.

“Sabrina, at the time, was very interested in the relationship between the sort of processes that we

IMPACT SUMMARY

BBSRC-funded behavioural neuroscience research at Cardiff University underpinned changes to the national guidance provided to Incident Commanders in the UK Fire and Rescue Services. The guidance provides a rapid mental checklist that aims to ensure Incident Commanders are making the best decisions to protect firefighters and meet incident objectives.

The new decision control process has also been incorporated into the doctrine of the Joint Emergency Services Interoperability Procedures used when UK emergency services come together to tackle large complex incidents. It has also attracted significant interest from Fire and Rescue Services in other countries.

Fire and Rescue Services have also incorporated the research methods into their own evaluation and training processes by equipping Incident Commanders with small digital cameras, as used in the research, to record their actions and review performance.

talked about with respect to rat behaviour, and their counterparts in human behaviour. They’re not directly analogous, but they have a fair amount in common,” says Honey.

Building on tools and models developed for the BBSRC-funded project, Cohen-Hatton and Honey found that what may appear to be a goal-directed decision-making process can sometimes rely on a simpler (mediated) learning process that involves no goal-directed planning⁴.

“That work helped springboard the next piece of research we did that actually helped us to change national incident command policy and processes

throughout the UK,” says Cohen-Hatton. “That never would have happened if it wasn’t for that first piece of research we did identifying the role of those very intuitive, very reflexive forms of decision-making,”

Mental shortcuts and decision traps

Following that work, the researchers began a second piece of research supported by the National Fire Chiefs Council⁵ (previously known as CFOA), which was focussed directly on decision-making in Incident Commanders. “They felt they didn’t have any very good evidence about how decisions were made on the ground. We agreed to study that, because no-one had done so previously,” says Honey.

National guidance at the time assumed Incident Commanders were consciously weighing options and formulating plans. To test this, the researchers fitted Incident Commanders with small portable cameras to capture everything that happened at an incident.

Data from the cameras showed that around 80% of the decisions made by the Incident Commanders appeared to rely on some of the more intuitive forms of decision-making^{6,7}. In effect, they were relying on mental shortcuts developed and reinforced by their experiences of similar incidents.

Improvements to fire safety mean that there are fewer incidents that require the Fire and Rescue Service to attend. This is an immensely positive development, but it does mean that Incident Commanders have less experience to call upon when making decisions. It also means that the influence of learned associations between cues in the environment and a course of action are weaker.

Exercise Unified Response

In early 2016, the UK emergency services conducted Exercise Unified Response⁹. At a disused power station the organisers simulated a building collapse at a major railway station using seven tube train coaches, thousands of tonnes of rubble and more than 1,000 people playing casualties. It was the largest disaster training exercise ever run by London Fire Brigade, and it included firefighters, police officers and ambulance personnel from across London, as well as international teams of specialists from Hungary, Cyprus and Italy.

Building on their experience of studying decision-making in the Fire and Rescue Service, Honey and colleague used ESRC Impact Acceleration Account funding to evaluate the exercise.

In particular, they investigated decision-making in the high-level strategic groups that coordinate the response to such major incidents, and which operate just one level below the UK Government’s emergency response committee, known as COBRA.



Better decision-making can help Incident Commanders save lives.
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“When they say the fire officers are operating on the basis of intuition, what they mean is that it is guided by what they’ve done before, often, which is prompted by what they see,” says Honey. “Rather than going through a process of working out what the goals should be in that scenario they just do what they did before.”

While this is a very quick form of decision-making, it can lead to what are known as decision traps. There are several forms of decision trap recognised within the Fire and Rescue Service guidance. For instance, intuitive decisions may skip planning processes. This means the decision is not the best choice in the context of a tactical plan or broader incident objectives. Similarly, intuitive decisions may be made in isolation, based on a single environmental cue, without considering the full context of the incident.

To help Incident Commanders avoid these traps, the researchers introduced a decision control process. By following a simple series of checks such as ‘Why am I doing this?’, ‘What do I think will happen?’ and ‘Are the benefits proportional to the risks?’ Incident Commanders can rapidly challenge their own decision-making, especially at high-risk incidents where time is short.

The national guidance, which cites the BBSRC-funded research, has been adopted by Fire and Rescue Services and other UK emergency services. It has also been incorporated into the UK’s Joint Emergency Services Interoperability Programme (JESIP) that guides the work of the emergency services when they come together to tackle a major incident⁸.

Cohen-Hatton has travelled to several European

countries, Texas, Washington, Colombia, and is going to Australia, to talk about the decision control process. Representatives of the Hong Kong Fire and Rescue Service have also visited the UK on a fact-finding mission.

Several Fire and Rescue Services around the country have also now adopted the head- or body-mounted cameras as part of their on-going evaluation processes. “It wasn’t just the results that had impact but the methods we were using as well,” says Cohen-Hatton.

REFERENCES

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- 4 Cohen-Hatton, S.R., Haddon, J.E., George, D.N., & Honey, R.C. (2013). Pavlovian-to-instrumental transfer: Paradoxical effects of the Pavlovian relationship explained. *Journal of Experimental Psychology: Animal Behavior Processes*, 39, 14-23.
- 5 National Fire Chiefs Council: <https://www.nationalfirechiefs.org.uk/>
- 6 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. [The research reported in this paper was awarded the FIRE/Gore Research Excellence Award 2014.]
- 7 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. [Awarded the Raymond S. Nickerson 2015 Best Paper Award for the *Journal of Experimental Psychology: Applied*. The prize recognizes an article as having the potential for enduring impact in the area of applied experimental psychology. Dr. Sabrina Cohen-Hatton also won the 2015 APA New Investigator award for *Journal of Experimental Psychology: Applied*.]
- 8 JESIP: <http://www.jesip.org.uk/home>
- 9 Exercise Unified Response, London Fire Brigade: <http://www.london-fire.gov.uk/exercise-unified-response.asp>