Redundant Deliberation about Negative Consequences: Decision Inertia in Emergency Responders

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Abstract

Major emergencies are high-stakes, ambiguous, dynamic and stressful events. Emergency response commanders rely on their expertise and training to mitigate these factors and implement action. The Critical Decision Method was used to interview n=31 commanders from the *Police* (n=12), *Fire and Rescue* (n=15) and *Ambulance Services* (n=4) in the UK about challenges to decision making. Transcripts were analysed in two ways: (i) using thematic analyses to categorise the challenges to incident command; and (ii) grounded theory to develop a theoretical understanding of how challenges influenced decision processing. There were nine core challenges to incident command, themed into two categories: (i) those relating to the perceived characteristics of the incident itself; and (ii) those relating to uncertainties about (inter)personal dynamics of the team(s) responding. Consideration of challenges featured prominently in decision makers' prospective modelling, especially when thinking about goal accomplishment (i.e., 'What if I deploy now? What if I don't?'). Commanders were motivated to 'save life' (attack/approach goal), yet also sought to 'prevent harm' (defend/avoid goal). Challenges led commanders to redundantly deliberate about what to do; their prospective modelling was related to the anticipation of potential negative consequences that might arise both for acting (attack) and not acting (defend). Commanders identified this difficult trade-off, yet described how experience and their 'responsibility as a commander' gave them confidence to overcome decision inertia. Future research is needed to identify whether decision making training on how to anticipate and overcome difficult cognitive trade-offs would lead to more flexible and expedient commanding.[1]

Keywords: decision inertia; redundant deliberation; anticipated consequences; prospective modelling; emergency services

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[1] AUTHOR NOTE: The data presented in this manuscript has been previously disseminated as part of a PhD thesis, which is stored by the library at the University of Liverpool, UK. It has also been described in a non-academic practitioner report of the research, which was provided as a thank you to practitioners who were involved in the research and is available to download on ResearchGate.

The Police, Fire and Rescue, and Ambulance Services are responsible for responding to a wide variety of emergency incidents. These range from relatively low-impact incidents (e.g. trips and falls, shop lifting) to large-scale major disasters (e.g. earthquakes, terrorist attacks). Major disasters are characterised by unknown and ambiguous information (Bharosa, Lee & Janssen, 2010), involve high risk, high-stakes and time pressure (Chen, Sharman, Rao & Upadhyaya, 2008) and often cause cognitive overload and stress to the responders involved (Paton & Flin, 1999). The need for joint coordination between the response agencies, who each have independent roles, responsibilities and operational objectives, has increased as research has recognised the importance of collaborative disaster response (Janssen, Lee, Bharosa & Creswell, 2010). Yet, so-called 'interoperability' adds complexity to the emergency because it can blur professional boundaries (Brown, Crawford & Darongkamas, 2000) and increase confusion about roles and responsibilities within the networked team (Curnin, Owen, Paton & Brooks, 2015). Taken collectively, major emergency incidents are extreme environments that place demands on the physical, psychological and interpersonal skills of the decision maker (Orasanu & Lieberman, 2011), creating difficulties for performance. Psychological research can help to identify these demands and offer solutions to mitigate them.

In extension of previous research, this paper has two goals: (i) to identify and extend knowledge on the core challenges to emergency responding via the retrospective interviewing of expert emergency commanders in the UK; and (ii) to explore how these challenges influence decision making with regards to prospective modelling and goal accomplishment. A number of studies have taken a broad-brush approach to identify the challenges to emergency responding. Salmon, Stanton, Jenkins and Walker (2011) explored the multi-agency response to a training exercise of a widespread flooding disaster, involving the emergency services, the military and local/civilian authorities. They identified seven barriers to coordination, including organisational problems (i.e., ambiguous command structure), poor information management, inefficient communications, inadequate situation awareness, insufficient equipment, poor understanding of cultural differences, and limited inter-agency training exposure. Similarly, Chen et al. (2008) identified how uncertainty, time pressure, casualty risk, resource shortages, large-scale damage, infrastructure disruption, multiple authorities, conflicts of interest and the demand for timely information can impede emergency responding. Taking a more reflective approach by reviewing post-mortem reports from large-scale disasters, Boin and 't Hart (2010) identified six 'avoidable pathologies' to

disaster response, related to bad planning, an obsession with full information, communication breakdowns, overreliance on command and control, underestimating the usefulness of the media, and a lack of concern for post-incident consequences. This paper goes beyond these studies by using a novel methodology to explore the real-world and (inter)personal issues related to incident commanding, which are difficult to replicate in simulated or training environments where the long-term, real-life consequences of behaviour are significantly reduced. This paper also explores *how* challenges influence perceived uncertainty and decision processing. Major incidents are inherently ambiguous and complex; it is the associated experience of uncertainty that makes decision making difficult.

Decision inertia is a maladaptive cognitive processing pattern that has been used to explain why decisions can derail during emergencies (Alison, Power, van den Heuvel, Humann, Palasinksi & Crego, 2015). It describes how action derails, not by choice deferral or disengagement with decision processing, but as a result of continued cognitive processing and redundant deliberation over the problem. The decision maker is motivated to take action, yet the situation is so ambiguous and complex that they struggle to process the situation and redundantly deliberate about their choice instead. It seems that decision inertia occurs when the decision maker does not have the luxury of avoiding their choice. Indeed, the purpose of the emergency commander is to take control of the emergency and so they cannot simply avoid or defer their choice. Decision making derails as commanders fail to commit to a choice as they continue to reassess the situation, goals, options and anticipated consequences, fundamentally failing to take any action at all.

Decision inertia is more likely when *goals* are lacking or ambiguous. During a simulated training exercise of a large aeroplane crash over a major city, decision inertia occurred when there were unclear goals, multiple teams involved and no set deadline for a decision (Alison et al., 2015); rather than coordinate efforts and work at the multi-team level, decision makers redundantly sought within-agency information. Goals are defined as an individuals' desired end-point, which motivate and direct behaviour towards purposeful outcomes (Locke & Latham, 1990). It is important that goals are concrete ('achieve X') rather than abstract ('do your best') (Locke & Latham, 2002) and that individuals have clear 'implementation intentions' that provide knowledge on *how* to achieve one's goal under different circumstances (e.g. 'If Y happens, do X') (Gollwitzer, 1993; 1999). In emergency contexts, goals can be themed into two categories: 'attack' goals that focus on achieving positive outcomes (e.g. 'treat casualties') and 'defend' goals that focus on avoiding negative

consequences (e.g. 'prevent harm to responders') (Power & Alison, in press), with different agencies prioritising different goals depending upon their roles and responsibilities (e.g. ambulance tend to prioritise 'attack' goals due to their role to 'treat casualties'). Power and Alison (in press) likened this attack-defend trade-off in emergency contexts to the goal trade-off outlined by the approach-avoid model of general behaviour. At the behavioural level, approach motivation is associated with the experience of *positive* emotions that induce movement *towards* a stimulus, whereas avoidance is linked to the movement *away* from a stimulus due to the experience of *negative* emotions (Carver & White, 1994). At the goal setting level, approach goals reflect the desire to achieve positive outcomes, whereas avoid goals are associated with the avoidance of negative outcomes (Bossuyt, Moors & DeHouwer, 2014; Elliot, 2006; Elliot, Eder & Harmon-Jones, 2013). Power and Alison (in press) suggested that 'attack' goals in emergency contexts were linked to approach motivation, whereas 'defend' goals were linked to avoid motivation. These 'cognitive trade-offs', which move beyond the trade-off of goals to also include the trade-off off options and task demands, are important to study in the context of emergencies as commanders are frequently faced with multiple competing goals, options and task demands that dynamically shift during the course of the incident.

Present Study. The majority of research exploring emergency decision making has focussed on catastrophic disasters, acknowledging that although they may be rare, they can lead to cataclysmic consequences that can far outlast the incident, making them noteworthy of research (Boin & 't Hart, 2010). Yet, their rarity and the difficulty for researchers to collect data from such events makes them difficult to study; instead researchers have relied upon training exercises and simulations (e.g. Alison, et al., 2015; Bharosa, et al., 2010; Salmon, et al., 2011). Although data from training events can contribute to an understanding of general challenges to incident responding, there is less scope for insight into the *real-world* subjective experience of responders. Even when simulations are incredibly immersive (e.g. Alison, van den Heuvel, Waring, Power, Long, O'Hara & Crego, 2013) responders are aware that the exercise is fictitious and so the personal impact of such events, especially with regard to the salience of potential aversive long-term consequences (e.g. job loss), will be reduced.

We sought to address this gap by adopting a methodology that would allow us to not only facilitate the exploration of general challenges to incident responding, but to also unpack the experiential and (inter)personal challenges associated with emergency responding in the real-world. We used retrospective interviewing with experienced commanders about the core

challenges to incident command across a broad spectrum of incidents. Although the interview questions were designed to incorporate some of the challenges identified by previous literature, our use of prompts was semi-structured and exploratory. This meant that we mainly used prompts in response to topics that were identified by the interviewee, rather than using them as structured questions to lead the interview. We were especially interested in incidents that commanders identified as being challenging themselves, rather than asking them to only consider large-scale incidents, which in reality may be perceived as less challenging due to the large amount of pre-designed policy that is already in place for such emergencies. This meant that we were not necessarily focussing on 'once in a lifetime' type incidents, but on any incident that the responder perceived to be challenging themselves, no matter what the scale. However, as our sample consisted of commanders only, we were specifically focussed on the challenges to *command* rather than everyday responding. There were two core research questions:

- *Research Question 1 (RQ1): What are the main thematic challenges to emergency commanding?*
- *Research Question 2 (RQ2): How do the challenges associated with commanding influence decision processing and behaviour?*

Methodology

Participants

A total of n=31 commanders from the UK *Police* (n=12), *Fire and Rescue* (n=15) and *Ambulance* Services (n=4) participated in this study. Participants were from the North West region of England and were recruited via email. Sampling was opportunistic as emails were sent using work emails, which were disseminated via contacts within each organisation, and commanders asked to contact the authors if they wished to participate in the study. Participants were mainly male (n=30) and age ranged from 37 to 54 years (*M*= 44 years). All participants were qualified at 'tactical' command level (with many qualified at 'strategic' level), meaning that they were experienced at being in charge of emergency incidents and senior to the 'operational' command level. They each had a minimum of 15 years' experience and a mean length of service of 24 years. As such, despite the (relatively) small sample size, their expertise and collective breadth of experience included hundreds, if not thousands, of incidents.

Data Collection

Data was collected using qualitative, semi-structured interviews to facilitate the discovery of new conceptual and theoretical knowledge about the challenges to incident command (DiCicco-Bloom & Crabtree, 2006). The 'Critical Decision Method' (CDM) interview technique was used (Table 1), which has been used to identify the goal structures, knowledge requirements and expertise used by experts who operate in challenging work domains (Wong, 2003). This method has been utilised regularly by researchers who seek to generate an understanding of 'real-world' psychology (Crandall, Klein & Hoffman, 2006; Klein & Militello, 2004). The interview probes were mainly based upon those that have been previously used in CDM interview protocols (e.g. Crandall, et al., 2006) and extended to incorporate challenges to emergency decision making that were identified in the literature (e.g. trust issues, information complexity, etc.). Prompts were used to *probe* the interviewee, and so their use varied between participants depending upon what the participant chose to discuss. As such, prompts were used to unpack the issues that were identified by the participant, rather than to lead the participant to discuss specific issues. This meant that the quantification of themes was not appropriate; just because a participant didn't identify a perceived challenge during their recall doesn't mean that it is not a pervasive issue more generally. We thus provide a purely qualitative interpretation of these themes.

We interviewed experienced commanders (as opposed to novices) as 'expert interviewees' are better able to provide rich real-world descriptions about novel or under-researched topics, such as incident command challenges (Bogner & Menz, 2009). Experts don't only possess the knowledge required to operate in their work domain, but they are also able to describe this knowledge in an analytic and reflective way (Klein & Militello, 2004). A key requirement of CDM interviewing is that researchers are familiar with the organisational context (e.g. terminology, work processes) (Crandall, et al., 2006), having 'quasi-expert' status (Pfadenhauer, 2009). Not only does this help with data interpretation but it also facilitates data collection as the participant can communicate in an organisationally-informed, yet non-competitive, environment (Trinczek, 2009). The researcher who conducted these interviews spent twelve months prior to data collection immersing themselves in the work environment of the emergency services, reading policy documents, attending training events and establishing a working relationship with each organisation.

Procedure

The majority of interviews (n=29) were conducted at the participant's place of work, with the remaining two taking place at a University. All interviews were conducted in a quiet location, with three people present: the participant and two researchers. The primary researcher led the interview and the second interviewer took notes to help with transcription and asking additional questions based on their notes. The CDM interview protocol involves four 'sweeps' for information: (i) incident identification (selecting a relevant incident); (ii) timeline verification (establishing the timeline for what happened); (iii) deepening probes (key questions about the cognitive processes used during the incident); and (iv) 'what if?' probes (hypothetical questions about, for example, what a 'novice' would do differently) (Crandall et al., 2006). Participants were asked to identify a *'difficult decision'* that they had made in the past, where the incident was *'especially challenging'* with *'high consequences'* that would be *'very difficult to reverse'.* These boundaries were used to identify an incident that challenged the participants' capacity to *command,* as opposed to general operational responding. Interviews ranged from 58 to 155 minutes in length, with a mean length of 99 minutes.

Data Analyses

Interviews were recorded on a Dictaphone and anonymously transcribed by the primary researcher with all identifiable details (e.g. names, locations) removed. Preliminary analyses were conducted immediately following each interview, where the primary and secondary interviewers discussed and reviewed the notes that were taken during the interview. This was to develop an early understanding of the types of 'challenges' identified by participants. Analyses continued during interview transcription by keeping notes on the key themes that emerged during transcription. The general process of qualitative analyses of text (i.e., transcripts) involves four stages: (i) initial reading of transcripts; (ii) early coding of transcripts; (iii) refinement of codes (possibly into higher order 'themes'); and (iv) creation of a theoretical argument that links codes and themes together (Liamputtong, 2009). Generally, coding is inductive, whereby the researcher derives codes from the 'bottom-up' analyses of the text, or deductive, whereby the text is coded in a 'top-down' manner in line with prior theories or coding dictionaries (Braun & Clarke, 2006). It is important that researchers self-monitor their progress during analyses to ensure that their conclusions remain grounded in the data (Mueser and Nagel, 2009). They should also remain flexible during coding so that they can adapt to novel findings (Braun & Clarke, 2006; Liamputtong, 2009).

Both ‘grounded theory’ and ‘thematic’ analyses are similar techniques that combine inductive and deductive processes. The main difference is that grounded theory seeks to generate a theoretical model from the data that can be generalised to wider psychological phenomena (Glaser & Strauss, 1965; Lo, 2014), whereas thematic analyses seek to provide a rich and detailed description of the data set that is being studied (Braun & Clarke, 2006). Recent advances in qualitative methodologies have suggested that *pluralistic qualitative analysis,* whereby the same data set is analysed using different qualitative techniques, can help to enrich our understanding and produce multi-layered and multi-dimensional conclusions (Frost & Nolas, 2011). As we sought to explore the data fully, to develop an understanding of both challenges and how they influence decision processing, a pluralistic approach was adopted by conducting both thematic and grounded theory analyses.

RQ1. Thematic analyses were conducted to identify the perceived challenges to emergency commanding. This involved six phases: (i) familiarisation with the data through transcription and re-reading of the text; (ii) generation of initial codes across the data set; (iii) collation of codes into themes and patterns; (iv) revision of themes and refinement of categories; (v) definition and naming of themes; and (vi) production of a detailed report of analyses (Braun & Clarke, 2006). Importantly, the authors did *not* quantify these themes. The reasons for this are threefold: firstly, the aim of the research was to identify and explore challenges to decision making, rather than test their prevalence; secondly, to achieve this exploratory research aim, the interview style was semi-structured, meaning that not all participants were asked the same questions as prompts were used to probe discussion rather than lead it (i.e., just because the participant didn’t perceive ‘trust’ as an issue in their chosen incident, it does not mean that they don’t perceive it as a pervasive challenge more generally); and thirdly, due to points one and two, the authors were concerned that the generation of quantified percentages for themes could be potentially misleading. We do, however, believe that the identified themes could be used to guide future quantitative research that asks commanders about the prevalence of challenges, possible across different emergency contexts and with comparison to individual differences in decision making styles.

RQ2. The second aim of this research was to develop a theoretical explanation of how challenges influenced cognitive processing and decision making during incident command. Grounded theory analyses were performed (Glaser & Strauss, 1965). This involved initial inductive coding of the data, with a view to explain *how* challenges seemed to interacted with cognitive processing. This was followed by further refinement and deductive coding of the

data, based upon the original themes that emerged during inductive coding. This process of refinement and further coding continued until 'theoretical saturation' was reached; a point during analyses where no more conceptual insight can be derived from the data and a theoretical model is developed (Bloor & Wood, 2006). Analyses were conducted by the primary researcher, who discussed coding with the second coder to reach mutual agreement and consensus.

Results

RQ1: A thematic analysis of the main challenges to emergency incident command

There were nine types of 'challenging incident' that were discussed by commanders. These were: public protests and rioting (n=5); large urban search and rescue disasters (e.g. building collapse; train derailments) (n=5); firearms and hostage negotiation incidents (n=4); gas/chemical leaks (n=4); large fires (n=3); multi-vehicle road traffic collisions (n=3); crowd management and crushing (n=3); terrorism (n=2); and flooding (n=2). Interviews were thematically analysed to identify the challenges to incident command. Nine challenges were identified and grouped under two thematic headings: (i) endogenous uncertainties (the perceived uncontrollable characteristics of the emergency incident); and (ii) exogenous uncertainties (the characteristics of the operating system (i.e., team) responding to the incident) (Alison, Power, van den Heuvel & Waring, 2015). Details of thematic categories and associated quotations are provided in Table 2. A visual depiction of themes is displayed in Figure 1.

Endogenous challenges to commanding

Information issues. Commanders described how unavailable or unknown information limited their ability to command the emergency. *Lack of information* was a key inhibitor to decision making as it was associated with uncertainty and increased deliberation: *"what we live and breathe on in this organisation is information and intelligence and without information we can't make a decision" (P4)*. Lack of information was particularly problematic for commanders who were remote to the incident and had to rely on information provided by others. This was especially challenging for *Fire Service* commanders, who rely heavily on visual information to perform their role. Decision making was also challenged when there was *too much information*. When information was rich, dynamic and rapidly changing, commanders struggled to keep pace with the situation as they were unsure *which*

pieces of information were most relevant. Information overload caused difficulties between attending to new information and focusing on current tasks. Commanders did however express an awareness of information overload and took steps to dilute information processing demands across their team, such as limiting their 'spans of control' by only creating a communication chain that limits the amount of people that any one individual is expected to communicate with: *"I could've potentially could've left the whole job with the group manager but it would've been right on the limits of spans of control" (F15).*

Resource issues. Resources (e.g. staff, equipment) caused issues for commanding when they were needed but *unavailable*. This was especially problematic when incidents were novel or extreme and so required specialist assets or expert knowledge that would take time to arrive and may be in operation elsewhere: *"maybe a difficult part of that was to ensure that we had the appropriate level of resources and also the appropriate level of trained resources" (A2).* When resources were made available, they could also contribute to uncertainty if their *reliability* was questionable. Commanders expressed cynicism over the technological capacity of seemingly basic tools such as mobile phones as they often failed to work in remote locations. This caused issues for commanders when they incorporated the use of resources into strategic plans, but they failed to work effectively.

Time management issues. Respondents described difficulty in the ability to estimate the passage of time during incidents, suggesting that it subjectively passed more quickly than in reality. This led to increased feelings of *perceived time pressure*, which seemed to exacerbate anxiety over other endogenous challenges such as the coordination and availability of resources. Perceived time pressure was also associated with feelings of helplessness as commanders feared that the rapidity of changes on the incident ground exceeded the time it took for them to make decisions and coordinate action:

"when it's going wrong there's a certain period where you are helpless. You are helpless and whatever is going to be is going to be because you can't catch it up quickly enough. What I mean by that is by the time you've made a decision about something the circumstances have changed. So by the time you say well actually right let's try and put a cordon on them there. You try and get that out to the operational or bronze commander or via your own radio and it's too late. Something else has happened somewhere else" (P3).

Commanders described how *administrative demands* to complete paperwork also increased time pressure. They described frustration at having to document their actions whilst juggling the demands of the ongoing incident. Interestingly, *Police* commanders were less critical of

the need to complete paperwork and seemed to gain confidence from it, however *Ambulance* and *Fire* commanders described how the need to complete logs in real-time was impractical for their role.

People management issues. Uncertainty was also attributed to the behaviour of the general public during emergencies. The initial stages of an incident were associated with concerns about the numbers of *public inside the risk area* whilst also protecting the *public outside the risk area.* This issue was especially challenging for the *Police* whose role requires them to protect the public inside the risk area whilst also protecting those outside the area via cordon management. *Police* were uniquely challenged in dealing with members of the public who were actively hostile towards them: *"it was the unknown and we didn't know what type of hostility we were faced with" (P1).* This created additional uncertainty as they were cognisant of the potential for negative reactions of the public to their actions, which could have long-term consequences for their relationship with the public. Commanders also described challenges managing *social media*. They expressed anxiety about feeling exposed and how it could lead to wider pubic criticism. Positively, commanders acknowledged that the media could facilitate information gathering and the distribution of public information. However, they also described misinformation via the media, which could make the situation worse. Interestingly, when commanders discussed the negative impact of the media, they tended to describe it vicariously by referencing famous media stories: *"you know you look at Hillsborough – it's left a sort of mark for 25 years hasn't it? It hasn't ended. It's still going on. You know Dunblaine. You can think of all of those things – there's always a legacy" (F1).* Anxiety about the media seemed more closely related to previous events than the ongoing incident dynamics.

Budget Cuts and Austerity. A final endogenous challenge that emerged from the data was the negative impact of government budget cuts. Budget cuts were associated with feelings of pressure due to reduced capacity and increased demands. Commanders felt pressure to resolve incidents as quickly as possible in order to free up resources. They described how organisational streamlining had limited their ability to 'go the extra yard' with the public as responders were needed elsewhere: *"so it's about 'where do you draw the line?' And like whereas we'd always go the extra yard and I think in some cases we still do – but I think eventually you'll go 'well now that's not, we've done our bit now and we'll have to push it back" (F1).* Commanders also described emotional demands such as their concern for the welfare of team members with regards to overworking and burnout. Commanders expressed anxiety about the capacity of the emergency services to cope in the future. Budget

cuts and austerity measures not only affected processing at the incident ground, but contributed to general feelings of fear for the future.

Exogenous challenges to emergency incident commanding

Communication issues. Communication issues were a prevalent source of uncertainty at emergencies: *"that'll come time and time again communications is the biggest bug bear. We never ever seem to get it right" (F5).* Commanders described how *insufficient updating* from other team members led to significant delays in decision making. This occurred at intra-team levels, when crews failed to communicate relevant information to their own commander, and also at inter-team levels when other agency representatives were unavailable. This was especially problematic when coordinating with non-blue lights agencies due to differences in working and organisational cultures meaning that others were often unavailable or did not pass on the right information, leading to feelings of frustration. When information was shared, there were also challenges associated with *miscommunication* as a result of confusing, ambiguous or contradictory messages. Miscommunication arose both when receiving messages and also when delivering messages to team members. Generally, poor communication of task relevant information induced uncertainty in the team network, creating inaccurate and conflicting assumptions that delayed action. This was exacerbated at the multi-team level due to differences in organisational language and terminology.

Poor role understanding. A poor understanding of one another's roles was problematic for the command team as a whole. Commanders felt that *external agencies* were often unaware of their their capabilities, meaning that opportunities to coordinate skills and expertise were missed: *"the level of understanding around capability needs to improve. Capability awareness is a big one" (F2).* Poor role understanding not only led to a lack of knowledge of potential opportunities for collaboration, but was also linked to unrealistic expectations from other agencies about what could be reasonably achieved. A lack of collective role understanding was associated with poor coordination with agencies who then focussed on agency-specific tasks, risking duplication and contradictory efforts. Decision making was also derailed when other agencies were perceived to lack an understanding of their own *internal agency role*. Poor *own* role understanding was associated with the avoidance of responsibilities. For example, it was often (wrongly) assumed that the police would take responsibility at all incidents and so other agencies, especially non-blue light, deferred their responsibilities to the police, which frustrated police commanders.

Trust issues. Commanders described how *distrust* might arise if they lacked faith in the abilities of other team members to perform a given role. Distrust arose due to either having not previously worked with a team member or when they'd had a previous negative encounter with that individual. Interestingly, distrust in others did *not* derail decision making as commanders knew not to rely upon those individuals. They acknowledged the poor suitability of the individual for the role and tried to assign them to a different responsibility: *"there's a difference between trusting an individual and the expectation that that person at that level will be able to do what I'm asking of them" (F15).* Instead, decision making was derailed by '*trust uncertainty'* as commanders were distracted by questions about the reliability of others rather than focussing on the emergency incident. Trust uncertainty led to suspicion of potential ulterior motives and fear of being held to account for the poor actions of others at both intra- and inter-agency levels. There also seemed to be a *'trust paradox'* effect, whereby too much trust in another led to rigidity. Commanders were wary of over-familiarisation and feared that their command decisions could be biased by the opinions of trusted others. They found it difficult to make decisions when they disagreed with advice from trusted others, increasing doubt in one's own judgement. Commanders tried to avoid decisions that could cause interpersonal issues with trusted others and expressed concern that less experienced commanders might especially struggle when they are unwilling to break trusted friendships.

Competition. *Inter-agency* competition was linked to competition between commanders to take primacy at an incident. Respondents described how competitive *personalities* caused difficulties for decision making when working with dominant egos who were unwilling to share authority: *"all very you know power based and lots of boys with their toys and not handing over when they should be handing over. And I get really frustrated" (A4).* Competition was exacerbated by a lack of procedural guidance about inter-organisational structure as each agency brings its own, sometimes conflicting, expertise. Interestingly, inter-agency competition was exacerbated by budget cuts, as agencies fought to justify their own worth by stepping outside the remit of their role. *Intra-agency* competition also derailed choice when commanders felt pressure from their superiors to hand over control of an incident. Interestingly, intra-agency competition arose when commanders felt the need to curtail the efforts of overly enthusiastic and more novice team members. Although commanders acknowledged that a proactive approach was useful, they described how it was their responsibility as a commander to moderate the actions of emergency workers to protect their safety, however this might lead to poor intra-team relations.

RQ2: How do the challenges associated with incident command influence decision making and behaviour?

Grounded theory analyses suggested that the challenges identified by RQ1 contributed to decision inertia. Commanders described two core goals to emergency responding: *approach* 'save life' goals to *attack* the situation and make a *positive* impact on the emergency and *avoid* 'prevent harm' goals to *defend* the situation and avoid causing further harm. They wanted to take action to make the situation better ('save life'), but equally sought to avoid making the situation worse ('prevent harm'). The consideration of challenges in the decision environment was associated with prospective modelling about the potential negative outcomes that might violate these goals (e.g. What if I act too quickly when I don't have enough information? What if I act too slowly by waiting for information and the situation gets even worse?). Rather than commit to a choice, commanders redundantly deliberated over their choice as they anticipated negative consequences for both taking action and not taking action. This delayed choice as they tried to avoid negative consequences through redundant reassessment of the situation, their goals and potential options. Anticipated negative consequences were temporally anchored to either the short- or long-term. Short-term negative consequences included: (i) harm to emergency responders; (ii) escalating risk to the citizens inside the risk area; and (iii) further disruption to normality. Long-term consequences included negative consequences for: (i) oneself; (ii) the team; and (iii) the organisation.

The 'save life' goal. 'Save life' is a well cited goal during emergencies: *"You must look at what we do and why we do it and that's to save life" (F9).* The goal to 'save life' was coded as an 'approach/attack' goal as it was associated with the desire to take positive action: *"if I can do something to control and reduce the risk as much as I can to enable me to do that then I will do" (F14).* This approach oriented goal was driven by feelings of time urgency and the desire to take fast action: *"I've got to make the decision now. I'm going to do something now" (P9),* in order to rapidly save or preserve the lives of the public*: "you get a mass number of casualties in a short space of time if you don't get treatment to them" (A1).* However, although all three agencies acknowledged 'save life' as a primary goal, they were often unclear about how to translate this goal into action, referring to 'save life' in a redundant, rote repetitive, and at times even cynical, manner: "*it's like your objectives of what you're trying to do – save life and blah blah blah" (A4); "it was our responsibility as a search and rescue as a fire and rescue service to take, what's the expression? A calculated risk to save what we consider to be a saveable life" (F10).* This suggested that although 'save

life' was an acknowledged *strategic* goal for agencies, the specific meaning of this *"standard tag line" (A4)* with regards to behaviour was not always clear.

The 'prevent harm' goal. Action seemed to derail when commanders had to trade off 'saving lives' with 'preventing harm': *"but it had to be reasonable because you've got to bear in mind maximise safety of the officers as well as a strategy" (P8).* 'Prevent harm' was coded as a defensive *avoid* goal and linked to the mental simulation of potential negative consequences that could arise should action go wrong: *"I'll be quite frank there's no incident that you deal with that is easy. And the reason is because as part of your training you have to look at what the outcomes you want are – what are the desirable and what will you actually tolerate" (P12).* This caused commanders to redundantly deliberate, as they sought to take action to 'save life', yet feared action could counterintuitively cause further harm: *"at a minimum don't make it worse and as best case scenario you actually make it better" (F10).*

Anticipated short- and long-term negative consequences. Negative consequences were linked to both short- and long-term outcomes (Figure 2). Short-term (i.e., incident related) negative consequences were themed into three potential outcomes: (i) harm to emergency responders*: "that was what was the risk to us and taking into its worst case scenario you know we could come under fire, our team could come under fire" (A1);* (ii) harm or injury to citizens inside the risk area: "*I would prefer to be cautious and not risk any further injury by bringing him out in a way which I know to be a lot safer" (F2);* and (iii) disruption to normality: *"I think the danger was if we started saying the national front were coming then the local community might start rallying themselves to escalate as well" (P1).*

Commanders also feared negative consequences in the long-term. These were associated with (i) personal consequences; (ii) team consequences; and (iii) organisational consequences. Anticipated personal consequences included anxiety relating to personal pride: *"that does kind of go through your mind. Am I going to be professionally embarrassed by this?" (P11);* criticism from colleagues: *"You know you've got the gold commander looking down on you, you've got your bronze commander and your PSU commanders and all the staff looking up" (P3);* the potential for personal legal fallout*: "one decision by a police office can have years of people unpicking it in the clinical warm surroundings of an officer where everyone can study well why did you do this? Well what about this, what about that?" (P4)*, and personal accountability as a commander: *"I think that's the biggest worry because*

you can oh well I've done this loads of times but then that one time something goes wrong" (A3).

Negative team consequences were associated with the legacy of inter-agency relationships: "*I think you've got to maintain relationships with people in the future and I just think that there'll be other times when we will work together in a similar environment" (P7);* intra-agency relationship: *"it depends on being prepared to compromise your friendship to make sure the job gets done. So you know I think you've got to be honest if you're going to be a commander you've got to be prepared to be unpopular – it goes with the territory really" (P11);* and the welfare of team members*: "It feels really mean as well going back to someone who's had a really shit few hours dealing with something like that which is pretty traumatic and then saying you need to do this and you need to do that" (A4).*

Organisational consequences included anxiety about public perception*: "we had to have a real sort of grown up conversation about not leaving the scene because how would that look? To the public" (F1);* the reputation of organisation: *"It was getting away from us and there was a reputational issue there around we effectively made world-wide news" (F13);* relationships with the local community: "*I'm in a no win situation because the local community are just constantly why are you letting this happen? Why are you letting this happen?" (P1);* and financial consequences for the organisation: *"I recall it being 6 o clock and in my mind the big issue then was overtime because I had all these assets in that were changing shifts at 6 o clock and there was a massive overtime bill to consider but you put that to the back of your mind because you can't really change your tactical plan based on the fact that you're paying overtime" (F3).*

Fundamentally, commanders struggled to make a choice when they anticipated potential negative consequences for action: *"I think sometimes we delay, we delay decisions because we are always all the time clouded by some of the consequences, which are not really about public safety as such, but about other things you know about what happens if it goes wrong?" (P10);* but also for inaction: "*you've got to go well we've got to get into this building because you know if we don't do this then the consequences are greater" (F1)*. Commanders seemed to redundantly deliberate about the best timing for action, anticipating whether action or inaction would lead to 'least-worst' consequences at that point in time: *"what you have to avoid is delaying making your decision about anything which then leads to somebody getting hurt, but by the same token you don't want to kneejerk and rush into a decision that is not*

properly considered" (P10). The anticipation of negative consequences derailed decision making as commanders were unable to judge the right time to take action in a context whereby the consequences for action were irreversible: *"you're at the point of no return. You can't then claw that back. You can't raise it – you've reached the ultimate now so that's it. You can't go back on that" (P4).*

Overcoming decision inertia: the importance of experiential learning. Although respondents described these challenges to commanding, they also seemed to draw strength their 'responsibility as a commander': *"had I not taken that action at that time then you'd have had thousands and thousands of litres of ammonia leaked out into the surrounding area and the impact would've been devastating" (F8).* This was further associated with confidence in one's professional integrity: *"you must look at what we do and why we do it and that's to save life so it's putting a provision in" (F9).* It is possible that these feelings of responsibility might be associated with expertise and confidence, enabling commanders to acknowledge challenges, yet overcome them: *"I've never been to an incident where I felt I've had enough information to do anything. There is never a situation where there's absolutely no risk ever really, so wouldn't you just, you've got to have, you've got to trust your own judgement I think really and a lot of that is about experience and a degree of self-preservation I suppose as well that you're not going to be reckless" (P11).*

Discussion

There were two core research questions that we sought to answer by interviewing experienced commanders from the emergency services. In response to RQ1, a thematic analysis identified nine core challenges to incident command, which were themed into two overarching categories of uncertainty (Alison et al., 2015). Five *endogenous* challenges emerged, associated with: (i) information problems (ii) resource limitations; (iii) time management issues; (iv) social management issues; and (v) budget cuts. Four *exogenous* (team) challenges associated with: (i) communication; (ii) role understanding; (iii) trust; and (iv) competition. In response to RQ2, grounded theory analyses suggested that challenges were associated with redundant deliberation about the potential negative consequences that might arise both whether they decided to act or not. Commanders were motivated to 'attack' the situation by taking positive ('save life') action, but also motivated to 'defend' the situation to 'prevent harm', which induced a cognitive trade-off between risk-seeking and risk-averse goals. Decision inertia occurred as a result of redundant deliberation about

potential negative consequences. Prospective short-term consequences were associated with the incident and linked to: (i) harm to emergency responders; (ii) harm to citizens inside the risk area; and (iii) further disruption to normality. Long-term negative consequences were linked to: (i) personal consequences; (ii) team consequences; and (iii) organisational consequences. However, although commanders acknowledged these difficulties, they drew strength from their feelings of 'responsibility as a commander', which gave them confidence overcome inertia. This discussion will firstly describe how thematic challenges fit with the psychological literature and their implications for research. We will then discuss the theoretical and practical implications of *how* these challenges seemed to influence behaviour, with reference to: (i) 'attack' and 'defend' goal trade-offs; and (ii) the anticipation of short- and long-term negative consequences.

Challenges to emergency responding

Endogenous challenges. Challenges were associated with both the characteristics of the emergency incident (endogenous) and to management and team processing (exogenous) (Alison et al., 2015). Many of the perceived endogenous challenges supported previous literature on decision making. For example, commanders acknowledged that both too little and too much information derailed choice, supporting research that an 'obsession with full information' is an 'avoidable pathology' that degrades emergency responding (Boin & t'Hart, 2010). Resource challenges and time pressure also impeded decision making, which have both been previously associated with poor coordination in emergency management teams (Chen et al., 2008). Time pressure remains a relatively under-explored topic in disaster management (Janssen et al., 2010) with contradictory findings. Not only did *increased* time pressure inhibit the ability to make choices by increasing stress and cognitive load, but a *lack* of time pressure has also been found to impede decision making by increasing redundant information seeking (Alison, et al., 2015). These contradictory findings are intriguing, suggesting that both too much and too little time pressure degrades decision making. It would be useful to explore *how much* time pressure is needed to optimise action, as research on general time pressure has identified a U-shaped effect, facilitating performance up to a point before degrading action when levels get too high (Baer & Oldham, 2006).

Two of the perceived endogenous challenges reflected contemporary issues for emergency responding: (i) 'people management issues'; and (ii) 'budget cuts'. Commanders described how it was increasingly difficult to manage the public during emergencies, as they

were pressurised by ‘the gaze of the public’ trying to ‘film it on their smartphones’ to upload to ‘youtube’. Although social media can facilitate dialogue between the emergency services and the public (e.g. location of public rest centres) (Houston, Hawthorne, Perreault, et al., 2015), it must be used carefully. During a simulated bioterrorism incident, social media messages from the authorities *increased* public perceptions of risk, leading to greater frustration with the emergency services (Malet & Korbitz, 2015). Another contemporary challenge was the impact of budget cuts on responding. During data collection for this study, the UK government implemented unprecedented budget cuts across the blue lights services (McCartney, 2015). By the end of Parliament in May 2015, the average cut to each Fire and Rescue authority in the UK was 28%, with a further 10% of cuts planned in 2015/16 (Hammond & Taylor, 2014). The Ambulance Service received a 19% cut in funding and the closure of five A&E departments in London (McCartney, 2015). Between 2011-2015, the Police had a 23% cut in funding across forces, leading to a total loss of 17,000 front line police officers (ACPO, 2015).

Cuts seemed to exacerbate other endogenous challenges as commanders felt pressure to, for example, free up limited resources, limit financial expenditure and reduce the time spent at incidents. Commanders were anxious about the future of the emergency services and were concerned about team morale, especially when dealing with emotional incidents where team members were overworked with little capacity for effective debriefing. This is despite evidence that ‘critical incident debriefs’ following emotionally challenging events are extremely important for future working effectiveness (Theophilos, Magyar & Babl, 2009), especially for psychological and emotional issues (Ireland, Gilchrist & Maconochie, 2007). Budget cuts have reduced the opportunity to perform debriefs, yet increased their need due to associated stress. Further research to investigate the psychological impact of budget cuts on the decision making and emotional wellbeing of the emergency services is needed.

Exogenous challenges. An exogenous challenge linked to team processing was poor communication between team members. There is a high risk of miscommunication during emergency incidents due to the use of specialist terminology and agency-specific acronyms, which can cause confusion at both intra- and inter-team levels (Bharosa et al., 2010; Laakso, 2013). Relatedly, multi-team coordination was complicated by a poor understanding of one another’s’ roles and responsibilities (Weller, Janssen, Merry & Robinson, 2008) and competition between team members. Commanders described how other agencies were often unaware of their role-related capabilities, which has been found to diminish capacity for

lateral thinking during novel and unanticipated tasks (Curnin et al., 2015). Effective multi-team environments are characterised by coordination between team members to transform intra-agency goals into collaborative inter-team action (Marks, Mathieu & Zaccaro, 2001; Mathieu, et al., 2000; Millward, Banks & Riga, 2010). Multi-team coordination must therefore be underpinned by a clear understanding of roles and objectives in order to avoid hyper-competition and facilitate teamwork. In an attempt to address these issues related to inter-agency working, the UK's 'Joint Emergency Services Interoperability Programme' has provided guidelines to improve multi-team work by, for example, encouraging the use of 'plain English' when working with other agencies (JESIP, 2013; 2016). This is a positive move that might facilitate multi-team coordination, albeit evidence to evaluate the effectiveness of such interventions is needed.

Poor trust also emerged as an exogenous challenge. Trust is defined as a willingness to be vulnerable to advice that is provided by others (Mayer, Davis & Shoorman, 1995) and can expedite decision making in high-risk settings (Das & Tend, 2004). McAllister (1995) distinguished between two types of trust: 'cognitive trust'; which describes faith in another's abilities to complete a task, and 'affective trust'; the emotional faith one holds in another. Trust is related to, but distinct from, confidence, which describes one's certainty that events will occur as expected based on previous experience or evidence (Earle & Siegrist, 2006). Emergencies often involve temporary teams who are unfamiliar to each other but brought together in response to an incident. Such teams rely on 'swift trust', which is derived from a clear understanding of roles (Curnin et al., 2015; Meyerson, Weick & Kramer, 1996). Taken together, a clarification of role-related capabilities in emergency teams could enhance cognitive trust and lead to greater confidence, independent of interpersonal experience (i.e., affective trust).

Interestingly, distrust in team members (i.e., belief that another cannot be relied upon) did not seem to derail choice in this study. Distrust might be linked to poor confidence as commanders identified another's lack of skills based upon past experience with the individual or assumed competencies of their rank/role, and adapted their decision making in accordance to this (e.g. they asked someone else). Instead, difficulties arose from *trust uncertainty*, when commanders were unsure about whether they could rely on another. A better understanding of roles, both within and between agencies, can reduce uncertainty by providing greater confidence in the capabilities of others (Meyerson et al., 1996). A unique finding of this paper was coded as a 'trust paradox'. Commanders described how high levels of emotional

trust in other team members made decision making more challenging when opinions differed. Indeed, highly trusting organisations were found to perform worse due to organisational rigidity and inertia (Thorgren & Wincent, 2011). Further research to explore how different types of trust interact with decision making in high-risk, multi-team organisational environments would be useful.

Implications and recommendations from RQ1. This paper has provided a visual model of the core challenges to emergency responding as identified by expert practitioners. It extends beyond previous research, which identified endogenous challenges following simulated exercises (e.g. Chen et al., 2008; Salmon et al., 2011), by collecting data from in-depth retrospective interviews with commanders. This allowed for the inclusion of exogenous challenges linked to real-world and (inter)personal issues, which are difficult to replicate in simulated environments due to the absence of any real-life, long-term implications for behaviour. Alison et al. (2015) suggested that interventions to reduce 'exogenous' challenges can indirectly reduce 'endogenous' challenges. For example, a fluid and well managed team would respond to a complex situation more effectively than a poorly managed team. We suggest that practitioners should use the visual model from this study to guide training to reduce challenges (e.g. training to enhance greater multi-team role understanding). From a research perspective, it would be useful to explore the differences between *perceived* uncontrollable endogenous characteristics (e.g. trust issues) and *systematic* uncontrollable endogenous characteristics (e.g. budget cuts). It is possible that training might have a greater positive effect on perceived challenges than systematic challenges that are beyond the control of the individual. This would help to provide clarity between challenges that can be mitigated by skills and expertise, and those that need addressing from a policy or procedural angle. The identified challenges also provide a basis for further research to explore theoretical questions. For example, research to explore the contradictory effects of 'time pressure' in emergency contexts, the identification of a 'trust paradox' in organisational settings, and the impact that budget cuts can have with regards to decision making and team welfare. Thus, the identification of these challenges does not only inform RQ2, but offers a platform upon which to build future training and research.

How challenges influence decision making and behaviour: the anticipation of negative consequences for action and inaction

Not only has this paper identified challenges associated to emergency responding, but it has also described *how* challenges seemed to derail decision making. Decision inertia was underpinned by the anticipation of negative consequences related to goal violation. For example, should I take action to 'save life' even if it might risk harm to emergency responder safety, or should I delay action in order to 'prevent harm' to responders even if it might risk saving life? Anticipating the consequences for behaviour can be useful to ensure that behaviour isn't reckless or too risky. The recognition primed decision (RPD) model (Klein, Calderwood & Clinton-Cirocco, 1986) describes how experts are able to quickly recognise critical cues in the environment, which activate analogues of previously experienced situations, enabling experts to quickly make appropriate decisions by recognising the appropriate course of action. It is possible that the recognition of challenge-related cues could be adaptive in crisis environments; experts have learnt from their past mistakes and so the recognition of challenges might help them to make better decisions (e.g. "I know the public might criticise this behaviour and so I will discount it and generate another solution"). However, commanders struggled when they were unable to move beyond cue recognition and focused on negative consequences instead. Rather than reacting to cues intuitively, they consciously deliberated about potential negative consequences, inducing decision inertia.

Goal-directed anticipatory thinking: Attack versus defend goals. Commanders were driven by two goals: (i) to 'save life' and (ii) 'prevent harm'. As identified in previous research in emergency contexts (Power & Alison, in press), these align to the approach-avoid distinction for goal-directed behaviour (Bossuyt et al., 2014; Elliot, 2006). Generally, avoid goals are considered to be less adaptive than approach goals (Bossuyt et al., 2014; Elliot, 2006). Avoid goals reflect the desire to avoid failure and are associated to negative affect, anxiety and depleted self-regulatory resources (Oertig, Schuler, Brandstatter, Rosekes & Elliot, 2013). For example, the anticipation of and desire to avoid negative emotions, such as regret, degrades decision making as individuals focus on how to avoid regret rather than how to make a rational choice (Mourali, Pons & Hassay, 2011). Although not explored in this study, redundant deliberation over a problem could contribute to mental fatigue and tiredness, which have been found to degrade performance in police settings (James & Vila, 2015) and increase regret in clinical decision settings (Scott, Arslanian-Engoren & Engoren, 2014). Future research to identify how goal focus and deliberation interacts with mental fatigue and decision outcomes would be interesting.

Omission bias describes how individuals irrationally perceive harm by commission (action) to be worse than harm by omission (not taking action) because they feel more personally responsible for the negative consequences of behaviour than they do for non-behaviour (Inman & Zeelenberg, 2002; Ritov & Baron, 1995). Omission bias has been found to increase in high risk settings (Bartels & Baron, 2007). Interestingly, our study found that commanders were not only worried about the negative consequences for taking action, but were also concerned about the negative consequences that might arise if they failed to act. They were worried about harm that could arise both from action and inaction. This unusual finding could be linked to the context of the research, as commanders had an organisational responsibility to act. This context might prime a *commission bias;* a biased preference for individuals to act because they feel responsible for the potential negative consequences of inaction. Commanders rarely have the luxury to 'do nothing' as their core responsibility is to resolve the emergency incident. Omission bias is the result of anticipated blame or regret for poor outcomes of behaviour (Kordes-de Vaal, 1996). In situations where the individual is responsible for taking action to prevent negative outcomes, anxiety may be equally associated with anticipated blame or regret for poor outcomes linked to inaction. Future research to explore the concept of commission biased processing in other organisational settings is encouraged.

Anticipating negative consequences: Short- versus long-term outcomes. A unique contribution of this research was the use of retrospective interviewing to explore real-world pressures on decision making. This meant that commanders not only considered incident-related (i.e., short-term) outcomes for decision making, but also discussed the anticipation of negative real-world consequences that could outlast the incident (i.e., long-term). In analysing these more closely, it seemed that short-term consequences were concrete and related to the incident (e.g. harm to citizens), whereas long-term consequences were vague and related with poor (inter)personal outcomes for oneself, one's team and one's organisation. This aligns with construal level theory, which suggests that people make different judgements about the world depending upon their perceived psychological distance to stimuli (Liberman & Trope, 1998). When people think about events (or outcomes) in the future, they tend to consider them in more abstract ways and focus on what they desire outcomes to be; whereas temporally nearby events are processed in more concrete ways and individuals focus on the feasibility of outcomes (Lutchyn & Yzer, 2011; Trope & Lieberman, 2003). In linking this to our findings, it is possible that short-term negative outcomes (i.e.,

harm to citizens, harm to responders, disruption to normality) were considered as feasible outcomes that commanders hoped to avoid; whereas long-term negative outcomes (i.e., criticism of oneself, one's team, or one's organisation) were considered in more abstract and desirable ways. It would be interesting to manipulate one's focus on these different temporal outcomes (i.e., short v long-term) to see whether it changes the way an individual processes their choice. For example, does the consideration of long-term outcomes (e.g. negative accountability) lead to greater redundant deliberation in order to achieve more desirable outcomes, compared to short-term outcomes, which might lead to more task-focussed processing on how to feasibly overcome obstacles?

Temporal focus has been found to vary between individuals; some people chronically focus on immediate outcomes compared to others who focus on distant outcomes (Stathman, Gleicher, Boninger & Edwards, 1994). For example, future focussed individuals tend to strive towards the achievement of future goals and rewards; whereas present focussed individuals can be present-hedonistic (i.e., risk-takers who focus on pleasure) or present-fatalistic (i.e., helpless individuals who feel powerless) (Zimbardo & Boyd, 1999). It would be interesting to identify whether an individuals' temporal focus predicts their tendency to anticipate short- or long-term outcomes, and how that interacts with behaviour. It has also been suggested that dispositional temporal processing is context specific. It was found that general dispositional measures on the 'consideration of future consequences scale' were unrelated to healthy eating behaviour, whereas those a food-specific future orientation was associated with healthier eating behaviour (Dassen, Houben & Jansen, 2015). What is unique about our findings with regards to temporal processing is that commanders tended to consider both short- and long-term negative consequences. Future research could unpack these findings in three ways: firstly, to identify whether individual differences in general temporal orientation influences decision making; secondly, to identify whether individual differences in emergency-context specific temporal thinking influences decision making; and thirdly, to explore whether temporal priming (i.e., focus on short- or long-term consequences before responding) interacts with decision making; specifically the time it takes to make a choice and decision inertia.

Implications and Recommendations from RQ2. Qualitative analyses suggested that commanders struggled to make decisions due to negative anticipatory thinking. Unlike previous research, which suggested that individuals have a tendency to avoid action when faced with high-risk choices (Bartels & Baron, 2007; Ritov & Baron, 1999), commanders

described an organisational responsibility to take action despite high risk. However, due to the complexity of the emergency incident, they anticipated negative outcomes both for action and inaction, thereby redundantly deliberating over their choice. Negative outcomes were not only anticipated to arise during the incident but also in the long-term. This is an important contribution of this research, as the majority of research exploring emergency decision making has focused on incident-related (i.e., short-term) processing; this paper has extended knowledge to incorporate real-world long-term considerations relating to, for example, personal fallout from poor decision making.

Positively, commanders described how they were able to overcome challenges by drawing strength from their experience of and responsibility to command. According to the RPD, experts would be able to use challenges as cues for recognition-primed solutions (Klein et al., 1986). Experienced decision makers have 'adaptive expertise', which allows them to recognise when standard procedures are no longer appropriate and so shift their behaviour (Mercier & Higgins, 2013). For example, experienced authorised firearms officers were found to show greater 'adaptive flexibility' in comparison to novices, which allowed them to be more reactive and flexible to situational changes compared to novices who relied heavily on linear thinking and standard operating procedures (Boulton & Cole, 2016). Expertise has also been found to have a psychophysiological basis as expert Police officers indicated different responses (e.g. lower heart rate) to novices during a simulated shooting task (Johnson, Stone, Miranda, Vila, James, James, Rubio & Berka, 2014). A greater understanding of *how* adaptive flexibility develops in experienced commanders would be useful in order to inform command-level training. Although we did not objectively test the role of experience on decision making, it is suggested that specific training on decision making skills, as opposed to technical skills, could enable commanders to develop greater adaptive flexibility. This might speed up the acquisition of decision skills and empower commanders to limit their negative prospective modelling. Training might include contextualised thought problems to expose commanders to challenging situations and develop confidence. Indeed, poor confidence in one's abilities has been linked to 'amotivation' and the use of maladaptive avoidant goals (Lee, Sheldon & Turban, 2003). Thus, early training for commanders on how to deal with difficult cognitive trade-offs could enable greater adaptability to these types of tasks, greater confidence in one's skills to command and overall faster and more flexible reactions to complex emergencies.

Limitations

There are a three main limitations to this study. Firstly, the sample of commanders who participated in this study were recruited opportunistically from the North West of England, meaning that some response agencies had fewer participants and that the sample was from one region of England. It would be useful to extend this study to other areas in the UK (and internationally) to see if findings are comparable, and to also explore a more balanced sample of practitioners across agencies. It would also be interesting to compare different levels of experience; a more systematic sampling procedure would be useful to compare perspectives between operational, tactical and strategic levels. Secondly, although we were interested in exploring decision delays and inertia, we did not explicitly ask participants how long they delayed their choices as a means of comparison. It would be interesting to unpack this in more controlled simulation settings to see how different types of endogenous or exogenous challenges interact with decision speed. Thirdly, there are limitations with the purely qualitative approach of this study as its conclusions are arguably less scientific than those derived from more stringent quantitative research (Crandall, et al., 2006; Laubschagne, 2003). Different researchers can generate different conclusions about the same data set depending upon their ability, experience and research focus, which suggests subjectivity and bias in analyses (Gläser & Laudel, 2009). However, as we sought to explore the challenges to decision making as perceived by experienced commanders, rather than test hypotheses, qualitative methods were appropriate as traditional quantified techniques tend to reduce behaviour and cognitive processing to numerical values that can strip the data of its meaning (Bogner & Menz, 2002). As such, we avoided the quantification of challenges (e.g. percentage values of how many commanders identified each theme) because this would have been misleading due to the flexible interviewing style that we adopted. Thus, the results from this exploratory study can be used to guide subsequent context-rich (i.e., emergency response settings) and context-general (i.e., decision making in high-risk organisational settings) research to better understand how individuals process challenges and make decisions in complex choice environments.

Conclusion

Endogenous challenges in emergency contexts related to issues with: (i) information; (ii) resources; (iii) time pressure; (iv) people management; and (v) adapting to and coping with budget cuts and austerity; and exogenous challenges related to issues with: (i)

communications; (ii) role understanding; (iii) trust; and (iv) competitiveness. Practitioners can use these categories to inform targeted training sessions, and researchers can use them to guide future psychological research on decision making in high-stakes, multi-team environments. Commanders discussed how challenges interacted with decision processing, leading to decision inertia. Decision inertia was driven by prospective modelling of the potential short- and long-term negative consequences that might arise from both action and inaction. Commanders sought to 'save life' and 'prevent harm', but the inherent high-risk of the emergency made the achievement of both of these goals difficult. However, although goal conflict was identified by commanders as being challenging, they described how their feelings of responsibility as a commander helped to galvanise action. We recommend that future research should explore whether training that specifically focusses on the development of decision making skills and flexible cognitive processing would help to facilitate greater decisiveness on the incident ground.

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Table 1: Deepening probes used during CDM interviews

DEEPENING PROBES **INSTRUCTIONS:** Now I want to go through the incident again but this time we want to look at it in a little bit more detail. I'm going to guide you with some questions.	
PROBE TOPIC	**PROBE**
Basis of choice	Why did you select/reject this course of action? • What did you believe the consequences of your choice may be? • What were these beliefs based upon? • How did you feel when making this decision? Were you following any standard rules or operating procedures? • Had you been trained to deal with this type of event? • What specific training or experience helped you make this choice? • Were you reminded of any previous experiences? Did you consider any other courses of action?
Goals	What were your specific goals or objectives? What was the most important priority for you at this point in time?
Information and Cues	How did you know that you needed to make the decision? • How did you know when to make the decision? What information did you use in making your decision? • What were you looking at? What did you do with the information you had? • Did you use all the information you had available to you? • What was the most important piece of information you used? Where did you get this information? • Did you seek guidance from someone else at this point? • How did you know to trust the information? Was there any additional information that you would have liked?
Influence of uncertainty	Were you uncertain about either the reliability or the relevance of the information that you had available?
Decision barriers	In your opinion what were the biggest barriers to your decision making on that day? Were there any organisational or social barriers which made your decision more difficult? • Within your own organisation? • From external organisations? Did complexity or uncertainty in the decision making environment make your decision making difficult? • At any point did you find it difficult to process the information you had? • Were you uncertain about the appropriateness of your decision? Were you expecting to have to make this type of decision during the incident?

	• How long did it take to reach the decision? • Did you feel time pressured at all?
Decision strategy	Did you try and avoid making this decision at any point? What types of actions did you take to try and make this decision? • Do you think that you could develop any rules which could assist another person to make this decision successfully?

Table 2. Quotations to support thematic categories of the challenges to incident command

Type of uncertainty	Source of uncertainty	Reason for uncertainty	Example quote
Endogenous Uncertainty: Uncertainty that derives from the uncontrollable characteristics of the emergency	Information	Lack of information	*"the lack of information was quite – because well how many patients?" (A4)*
		Too much information	*"It's difficult to make command decisions remotely. I mean police are better at it because they will use verbal reports or effective use of CCTV or other visual images" (F7)* *"you're getting information from the police, you're getting information from the local authority from the people, the company… So it's a whole range of information – the key is to be able to sort out the bits that are relevant and then come up with a command structure so that you don't get overwhelmed" (F10)*
	Resources	Lack of resources	*"lack of resources… you know if I'd have turned up there with our full turn out my decisions would've been different" (F5).*
		Unreliable resources	*"the biggest complaint we have post-incident is communications… Not so much individuals it's the technology" (F11)*
	Time management	Perceived time pressure	*"there was a constant flow and these decisions were coming thick and fast all the time. So talk about being under pressure. It was probably the most pressurised position that I have ever been in" (P4)* *"you could be like there 10 hours but it feels like 20 minutes because it's just one decision after another" (A3)*
		Administrative demands	*"every patient that you have you're supposed to have a patient report form and that's the only thing with a major incident is the audit trail is never as good as it could be because everyone gets ahhh" (A4)* *"I made copious notes on the log on my rationale so that people knew the best interests were at the hearts and there was a balance" (P8)*
	People management	Public inside risk area	*"thinking about it there was this thing of like how do we know how many people we've got? Because there's one dead on the embankment and there were bits of fires going off everywhere you know and it's like how do you know there's not more people?" (A4)*
		Public outside risk area	*"when you've got lots of people in what becomes a confined space the fear that someone is going to get injured is fairly significant" (P10)*

		Social media/potential criticism	*"it was a Friday afternoon, which is probably quite important in terms of some of the logistical difficulties" (P5)* *"with the media and the public perception these days we are more accountable for everything that we do than ever before" (P4)* *"I accept that we shouldn't really be worried about what press headlines read because that's the least important …But you can see how those pressures around press and media finance and all the other things that come on and necessarily at the back of your head when you're trying to make sort of decisions on what to do" (P10)*
	Budget cuts and austerity	Reduced capacity and increased demand	*"I guess because of austerity none of us have been immune from that. You know we've all been challenged by austerity" (F1)* *"massive implications around the availability of ambo and fire and obviously you're aware that fire and ambo are reducing in their resources" (P6)* *"so it's about 'where do you draw the line?' And like whereas we'd always go the extra yard and I think in some cases we still do – but I think eventually you'll go 'well now that's not, we've done our bit now and we'll have to push it back" (F1)*
		Emotional demands (Hopelessness, fear)	"*you've got the initial people there for the stages but don't forget those people need to get a break at some point throughout the day and have got to get replaced by somebody else" (P12)* *"I don't think austerity's ended. I think we're in this for another 4 years so you know I think it's what happens in the future with our – where do we end up?" (F1)*
Exogenous Uncertainty: Uncertainties about the abilities and capabilities of the team(s)	Communication	Insufficient updating	*"people get frustrated because they're not finding out all the information" (A4)* *"I'm still relying on other people to give me information. I am not seeing all and doing all and – so that reliability sometimes it can put a bit of pressure on you" (F7)*
		Miscommunication	"*I just remember it sticks in my mind it was just the conflict of information… where's that information coming from?" (F4)* *"it taught us a lesson afterwards that people were making decisions or trying to make decisions who didn't understand what was going on" (A1)*

responding			*"but it was also delayed because we had contrary views. So he was thinking one thing and I'm thinking something else" (P7)*
	Role understanding	External understanding of role	*"well the police told us to wait but in reality the police don't know what we've got and what we can do. That became apparent when I speaking to the police and the incident negotiators afterwards"(F8)*
		Internal understanding of role	*"I briefed the health protection agency that's not for me to – I can contribute to the public safety message but it's not for me as a fire and rescue service commander to release the public safety message. That's their responsibility" (F7)* *"there's a tendency from some commanders just to be led by the police" (A2)*
	Trust	Distrust abilities	*"they weren't my firefighters so I didn't know their skills and competencies" (F8)* *"I'd worked with him in the past but I got the impression that they didn't have at the time when by that afternoon they didn't have as much dynamism and get up and go and knowledge as what I thought they had initially" (P5)* *"there's a difference between trusting an individual and the expectation that that person at that level will be able to do what I'm asking of them" (F15)*
		Mistrust intention	*"he was untested in terms of does he know about health and safety? Does he know about crowd dynamics?" (P2)* *"I mean they're very well trained professional people so you know we work well with them and I respect what they do and what they say but I don't think – you know it's your I'm the decision maker – it's my head on the line" (P8)*
		Trust paradox	"*because we got a good working relationship and because he knows what he's talking about for me to give him an opposing view probably made it slightly more difficult for me because I'm having to think well hang on I trust his decisions" (P7)* *"it depends on being prepared to compromise your friendship to make sure the job gets done. So you know I think you've got to be to be honest if you're going to be a commander you've got to be prepared to be unpopular – it goes with the territory really" (P11)*
	Competition	Intra-agency command	*"they were ringing the control and trying to put pressure on the control manager to say right we'll hand over to you and I was like no" (A4)*

		"you know there's always a willingness from any probably blue light responder ambulance inclusive that it's their natural instinct that when I see a patient to want to help that patient whereas in a lot of situations it's not always the best thing for their own safety" (A2)
	Inter-agency primacy	"*if you get away with it then great they're heroes, if they don't then they're not coming home" (F11)* *"sometimes whoever shouts the loudest gets their own way – in my experience" (F2)* *"there's also conflict with the ambulance service about the best way to get people out of a vehicle: we think we know best and they think they know best. And it's hard. It's being going on for some time that one but we're getting there" (F4)* *"they were being threatened by big cuts so I suppose if someone else another organisation can come and do what you're doing it maybe justifies the cuts whereas if you say well I'm an expert in this and no one else can do this it protects you role and position and job ultimately" (F2)*
	Personalities/egos	*"you can get a bit of a rub between personalities that command might break down as well" (P1)*

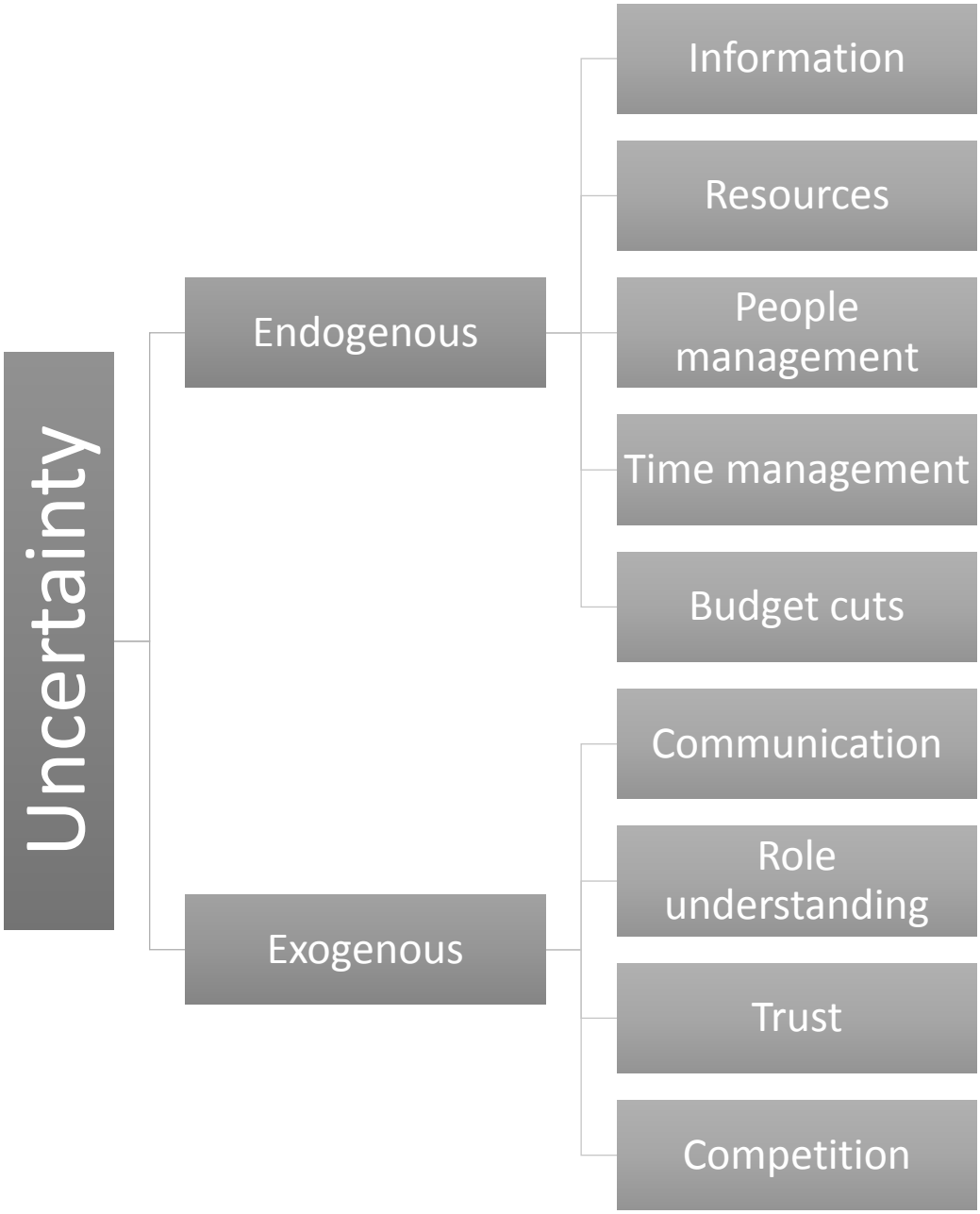

Figure 1: A taxonomy of endogenous and exogenous uncertainty during emergency incident command

Tables and Figures

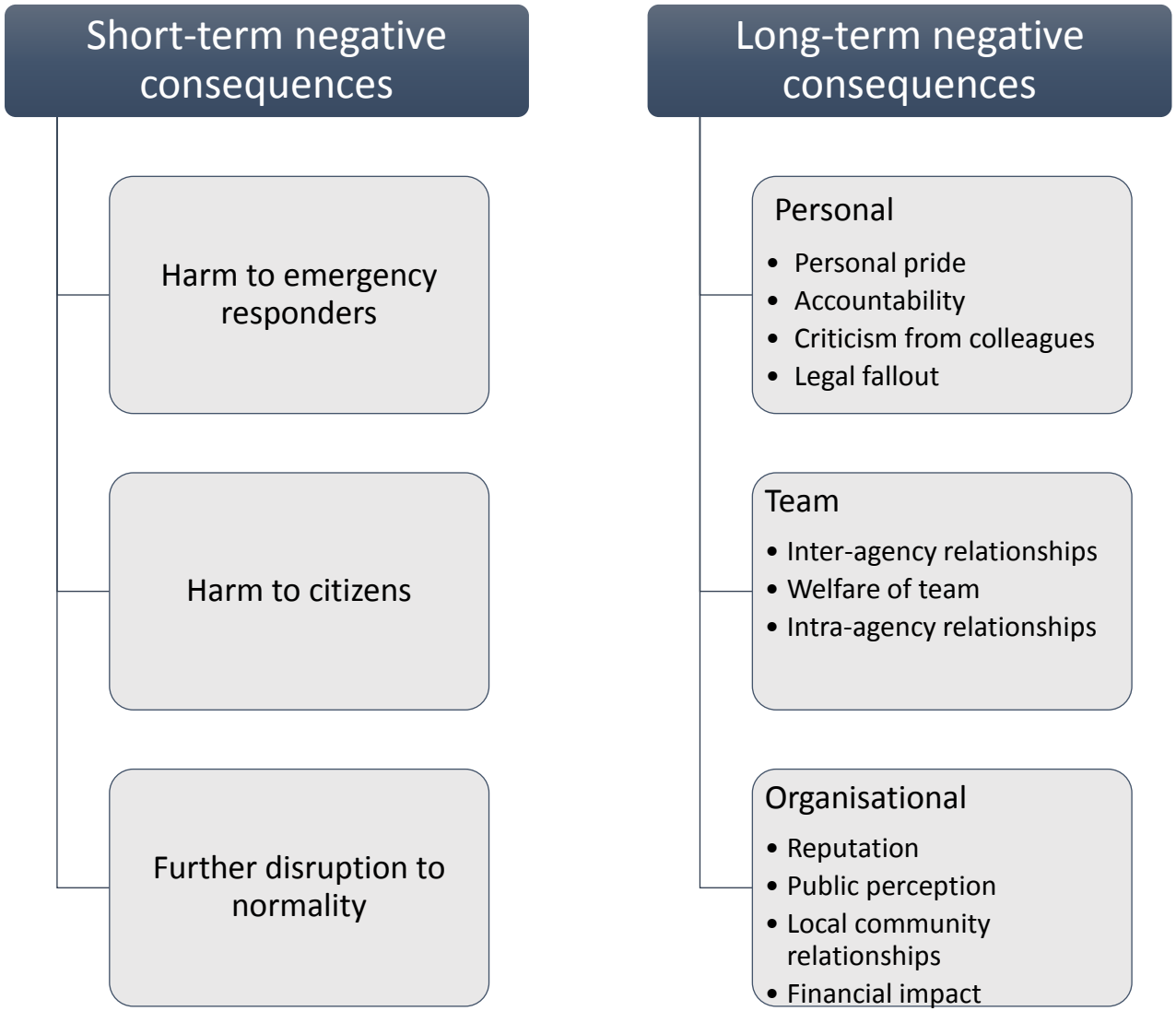

Figure 2: Short- and long-term negative consequences for both 'action' and 'inaction'