

“A sight you’ll never forget”. Why firefighters experience certain incidents as critical and the impact of such incidents on individual firefighters and fire crews

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Abstract: Firefighters encounter critical incidents as part of their work. Little research has been conducted into the impact of critical incidents on firefighters’ well-being and performance. The goal of this study is to gain in-depth understanding of firefighters’ experiences with critical incidents and their impact on both individual firefighters and their crews. Data were collected by means of 20 participant observations and 72 interviews with Dutch firefighters from 37 different fire stations. Whether an incident is experienced as critical depends on the type of incident, the personal situation and the circumstances of the incident. Directly or indirectly, experiencing a critical incident impacts firefighters during and after the incident, both professionally and personally. Experiencing critical incidents affects the dynamics within a crew. Knowledge about their impact is necessary to tailor help and aftercare more effectively to firefighters’ needs.

Keywords: firefighters; critical incidents; impact; firefighter culture; critical incident stress; ethnographic field research.

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1 Introduction

First responders, e.g., police officers, firefighters and ambulance workers, inevitably encounter critical incidents as part of their work. Critical incidents are described in the literature as related to personal loss, a threat to a person’s well-being and potentially life-threatening; and are often unplanned and unexpected, taking place within a specific time frame (Bacharach and Bamberger, 2007; Lewis, 2003; Fraess-Phillips et al., 2017; Monnier et al., 2002). Their intensity and inherent unpredictability makes their management a challenge (Bacharach and Bamberger, 2007; Lewis, 2003; Mitchell, 1983). Incidents are also perceived as critical if the first response failed or mistakes were made, if a lot of media attention was given to the incident and/or if it involved children being seriously hurt or dying (Harris et al., 2002).

A critical incident causes a vehement, unpleasant stress response, referred to as critical incident stress (Fraess-Phillips et al., 2017), and overwhelms the individual’s capacity to deal with it (Monnier et al., 2002; Harris et al., 2002; Jacobsson et al., 2015). Experiencing a critical incident can have a negative impact on first responders’ lives (Halpern et al., 2009). A critical incident can also lead to serious mental health problems or operational stress injuries (Carleton et al., 2018), such as post-traumatic stress disorder

(PTSD) (Kehl et al., 2014), an acute stress disorder (Fraess-Phillips et al., 2017), or even suicide (Brazil, 2017). Critical incidents may also lead to positive changes or post-event growth (Kehl et al., 2014), such as changes in someone's sense of personal power, relationships and philosophy of life (Armstrong et al., 2016).

The experience of incidents as being critical depends on the person and the context. Three factors determine why some people are overwhelmed by a specific incident and others are not: personal beliefs about the world, support and coping mechanisms (Harris et al., 2002). Individual differences in resilience and vulnerability likewise play a decisive role in the intensity and duration of trauma-related symptoms (Regehr et al., 2000). How a person interprets an incident seems to be more important for the development of PTSD than the actual incident itself (Pinto et al., 2015).

Incidents that transgress moral beliefs and expectations are morally injurious experiences and could lead to moral injury (Litz et al., 2009). Moral injury may arise, for example, in incidents where first responders are confronted with complex life-and-death decisions that contravene or challenge their personal morals. Although there is no consensus definition of this construct (Griffin et al., 2019), moral injury is generally defined as "the inability to contextualise or justify personal actions or the actions of others and the unsuccessful accommodation of these potentially morally challenging experiences into pre-existing moral schemes" (Litz et al., 2009, p.705). Moral injury results in concomitant emotional responses (e.g., shame and guilt) and – comparably with critical incident stress and operational stress injuries – dysfunctional behaviours (e.g., self-harming behaviours: poor self-care, alcohol and drug abuse and suicidality) (Frankfurt and Frazier, 2016; Litz et al., 2009). Literature on moral injury has primarily focused on military-related issues (Griffin et al., 2019), yet is a more widespread phenomenon. It is therefore important that moral injury be understood in terms of the different contextual occupational factors of first responders (Lentz et al., 2021), which also applies to critical incidents.

First responders experience a different range of critical incidents under different circumstances – such as working conditions (e.g., length of shifts), the nature and frequency with which they are confronted with critical incidents, and collaboration with colleagues (Jones, 2017). Hence a proper evaluation of incidents and how first responders cope with them requires separate studies for different professional groups (Halpern et al., 2009). This paper focuses on the impact of critical incidents on firefighters. Firefighters are an under-researched group in academic literature, and studies on their wellbeing are lacking and inconsistent (Fraess-Phillips et al., 2017).

Monnier et al. (2002) developed the Critical Incident Inventory with a list of stressor categories and items that may apply to firefighters. Factors that make an incident critical are: being confronted with injury or death (especially multiple, bizarre or gruesome – and possibly fatal – injuries); knowing the victim personally; a failed intervention resulting in death; life-threatening situations for the first responder; incidents that involve children; working under unfavourable conditions; and dealing with a lot of media attention (Beaton and Murphy, 1993; Green, 1985; McCammon, 1996; Ørner, 1995). Critical incidents identified in the literature are: traffic incidents, casualties with severe burns, chemical hazards, drownings and suicide (Van der Velden et al., 2006; Jacobsson et al., 2015), as well as dangerous fire scenarios, a lack of medical training, being threatened or the death of a colleague (Beaton et al., 1999; Lim et al., 2000; Jacobsson et al., 2015). Most studies do not investigate *why* firefighters experience an incident as critical and which personal

and contextual factors play a role, and little research has been conducted into the impact of critical incidents on firefighters' working and private lives.

This study serves to gain a better understand of firefighters' experiences with critical incidents and their impact on them as individuals and on the fire service crew. The key focus in this paper is the following research question: *Why is it that firefighters perceive specific incidents that occur during their work as so critical that these incidents have an impact on them and their crew?*

2 Research method

The study we report on in this paper is part of broader research in the Netherlands into the role of fire service culture in coping with critical incidents. It emphatically expands on previous research, which was generally of a quantitative nature (Harris et al., 2002; Kehl et al., 2014; Brazil, 2017; Bacharach et al., 2008; Jacobsson et al., 2015; Jeannette and Scoboria, 2008; Monnier et al., 2002; Sattler et al., 2014; Milligan-Saville et al., 2018; Wagner et al., 2009). The study is based on ethnographic field research with a robust exploratory character and consists of participant observations and interviews. In the first place, ethnographic field research brings about more profound insight into the relationships and the group culture among fire brigades, by participating for extended periods in their reality, building trust, and talking about personal experiences and perceptions. Second, this method fits best because this study aims to better understand the impact of critical incidents experienced by firefighters and/or how they cope with them, which is a sensitive topic that is often considered taboo. Multiple studies describe how cultural stigma can inhibit firefighters from discussing mental health issues (Henderson et al., 2016; Stanley et al., 2017; Kim et al., 2018) or talk about their own vulnerability, as they fear being seen as weak (Wilmoth, 2014). Ethnographic field research offers possibilities to develop trust in the researcher and discuss confidential matters.

An important fact in this context is that the first author works as a researcher at the Dutch Fire Service Academy, plus, comes from a fire service family and is, therefore, an insider-researcher (Green, 2014). Research by an insider eases access of the investigator to the research population. In addition, this investigator possesses the relevant background and current knowledge that facilitates asking questions (Kniffin et al., 2015). A possible drawback of an insider-researcher is interviewer bias. The investigator could also be dealing with ethical and moral dilemmas (Floyd and Arthur, 2012), for example if there is both a personal and a professional relationship with participants (Perryman, 2011; Vass, 2017). The participants in this study were aware of this insider position, and many indicated that they considered the investigator as 'part of the family'. Because of the possible bias and dilemmas, there was also researcher's triangulation. In all study phases, the first author worked closely together with a content expert (second author) and two academic non-insiders (third and fourth authors).

2.1 Data collection

Data were collected using a three-phase process. The first phase consisted of open interviews with key figures: people with many years of fire service, career (professional) and noncareer (volunteer) firefighters, men and women, and people with various cultural backgrounds. These interviews were held to identify relevant themes for follow-up

research from different perspectives. The second phase consisted of collecting information through participant observations and semi-structured in-depth interviews. A total of 20 participating observations took place – throughout several 24-h shifts per crew, the researcher participated in all activities except for providing aid during incidents (career firefighters) and drill evenings (noncareer firefighters) – describing open behaviour (the visible part of fire service culture). An observation report was made during and directly after each participating observation. Besides an overview of some factual characteristics, this report mainly contains descriptions of the atmosphere, incidents (if applicable), valuable moments, management's role, group dynamics and informal aftercare.

To delve deeper into this descriptive behavioural level and understand the culture, semi-structured in-depth interviews were held in the third phase. These interviews focused on individuals' perceptions, thoughts, feelings, and experiences (cf. Schein, 1984). The list of topics for the interviews is based on the findings of the participating observations. The main themes are: description of the station and crew, sense of community, critical incidents, impact and social support. A total of 72 interviews were held, lasting one and a half to 2 h. All interviews were taped with a voice recorder and transcribed verbatim. All participants signed an informed consent document in advance.

2.2 *Sample*

The research population consisted of firefighting personnel: crew members, crew commanders and shift leaders. Participant observations were taken from six crews from six brigades. The in-depth interviews included both career and noncareer firefighters: 40 career firefighters (11 of whom had also been noncareer firefighters in the past), 20 noncareer firefighters, and 12 participants that had worked in both capacities.

2.3 *Analysis*

The analysis was an iterative process alternating data collection, analysis and theory formation processes. Induction and deduction took place simultaneously.

The Atlas.ti qualitative analysis program was used to analyse the data. Three coding steps were applied: open, axial and selective coding (Patton, 2015). Open coding took place primarily when analysing the participating observations and the open interviews (e.g., the codes 'critical incidents', 'impact' and 'processing'). In the subsequent step the data was axially coded, validating codes by splitting, merging and comparing them, and designating new codes. In addition, various codes were clustered into one or several group codes, based mainly on substantive considerations. These are some of the group codes created: 'critical incident: case', 'critical incident: circumstances', 'impact: individual', 'impact: crew' and 'processing: fire service culture'. Lastly, based on comparison of the group codes the connection between group codes was analysed (selective coding). The collection of data continued until signs of saturation appeared.

Method triangulation led to further deepening in the research results. The different forms of data collection elucidate various perspectives of the research object: through observations, that which is observable on the outside is mapped out, while the interviews gather more in-depth knowledge. The large number of participating observations and interviews, combined with the detailed, structured data collection and analysis method, strengthen the validity and reliability of the study.

Quotes from the interviews support the findings. The quotes have been edited for editorial reasons and to safeguard the anonymity of participants.

3 Results

Incidents frequently mentioned as critical are serious traffic accidents, drownings, cardiopulmonary resuscitations (CPR), suicides, and fire scenarios that participants considered exceptional. We discuss why participants consider these incidents to be critical. Subsequently, we describe the impact that these incidents have had, both on the participants (as first responders, but also in their private capacities) and on the fire crew (the collective).

3.1 Circumstances and the impact of critical incidents on firefighters

As soon as firefighters start their shift and/or receive an alert, they change mindset and assume the first responder mode. “The adrenaline starts pumping and a kind of shield comes up. Your first responder role takes over and you become less of yourself” [R.39]. This mindset enables firefighters to do their work despite possibly overwhelming circumstances, yet does not prevent them entirely from perceiving certain incidents as critical. This perception depends on the person, and also partly on the circumstances of the incident and of the person. The circumstances that determine whether an incident is interpreted as critical and the associated impact on the first responder are described below.

3.1.1 Unfolding of the first response

How the first response unfolds is perceived as critical if firefighters feel helpless or believe that the first response is failing.

Feelings of helplessness are experienced if, while rendering assistance, they realise that ‘nothing can be done’. Several participants reported that an inability to find the casualty is perceived as critical. Despite having tried very hard, it was to no avail. “You desperately want to find the person. It’s your goal, your task, your reason for going there. But you failed. And what’s really irritating is that the next team does find them” [R.91].

Firefighters also perceive an incident as critical if they feel that the first response did not go well. “What bothers me most are incidents where I blame myself. When we didn’t get it right. Or we could have done better. It’s not so much the intensity of the incident at times like that” [R.20]. An incident is also perceived as critical and frustrating if a death could have been avoided had assistance been rendered differently: “A boy died in my hands. The paramedics had come up with a new idea on how to free a casualty. But it was a very cumbersome process that took a very long time. I think things took too long, and that’s what killed the boy” [R.92].

3.1.2 Severe physical injuries and death

Firefighters will likely encounter severe physical injuries during their work. This does not necessarily mean that every incident involving physical injury is perceived as critical: “Civilians see it as overwhelming, because they’ve never actually experienced it

themselves. It's our work, we're focused, we're doing our thing" [R.9]. However, various circumstances can cause incidents with physical injury to be perceived as critical, for instance because of the sights and smells. To render assistance, firefighters sometimes have to touch bodies. "I think it's quite different once you've held a dead body or a casualty; that's a different feeling than only looking at the scene of the incident" [R.48]. Firefighters are sometimes caught unawares when touching a body. The lack of preparation adds to the impact: "There was this boy we lifted. When he was lying, there was still some structure to him. But he'd broken every bone in his body, so we lifted him up and everything seemed to cave in to the point where he could hardly be recognised as a human body. These are things that stick with you. All that was left of a human being was a pile of flesh and bones" [R.26]. Sometimes it is necessary to damage a body even more, for example if it's stuck and needs to be salvaged. Because of the intensity of seeing, smelling, touching and/or damaging a badly injured or disfigured body, the mindset and focus on technical action sometimes features very prominently, if not excessively: "A car hit a mast. My colleague felt the driver's pulse and felt a heartbeat, but he was squeezing so hard that he was actually feeling his own pulse. We could all see that the situation was hopeless" [R.3]. Sometimes personal belongings of the disfigured casualty remind firefighters that they are not dealing with an anonymous casualty, but with a human being. "At some point, you just see a body and some parts. What then made a difference to me was when you saw the bank cards, cash. It's a person lying there. That did change things for me" [R.44].

Several participants indicated that incidents where the casualty was still alive at first, but died while the firefighters were trying to save them, were perceived as critical. Casualties die in their hands. "He was so badly injured that he was going to die. And I was sitting there with him. His last moment, the moment when he drew his last breath, he was in my hands. That's a strange thing to take in" [R.66]. Victims dying while first responders are rendering them assistance is sometimes perceived as being so critical that participants admit they would have preferred the victim to have died immediately: "Honestly, if there's been a very serious accident, I prefer people to die than be severely injured. If only for the sake of peace and quiet at the scene" [R.26].

Participants have described the impact of severe physical injuries and deaths as "retinal pollution". They identified no added value in looking at possible casualties for firefighters who have no role in the first response. "Not being able to do anything, but seeing everything, that's the very worst" [R.14]. If possible, they try to avoid these horrific images as much as possible: "it will never go away, so I don't look if I don't have to" [R.1].

3.1.3 Circumstances at the scene of the incident

Bystanders and relatives obstructing the first response have an impact since firefighters are not able to do their job. The emotions of bystanders, particularly relatives, confront firefighters with the emotional consequences of the casualty's injuries or death and make it difficult or impossible for them to maintain their first responder mindset. "The casualty is dead. It's often the reaction of bystanders, the relatives, that can get to you. If you hear a child screaming 'daddy' or a woman slumped down in intense grief because she has lost her partner" [R.57].

Some participants recounted how relatives explicitly threatened them during the first response effort; that has an impact as well and an adverse effect on the first response

effort: "I was giving CPR once when someone stood behind me and said 'if he doesn't make it, you'll be in trouble as well'. That makes you feel seriously threatened, I can tell you" [R.57]. There may also be a threat from a group of bystanders, as happened in a stabbing incident: "I'll never forget it. It made such an impression. The boy had already died. The paramedics said: 'We're going to give CPR, things are so volatile here that we're just going to give CPR. We've got to do something or else all the aggression is going to be released on us'. Once we got him into the ambulance, we stopped" [R.48]. Some first responders prefer to leave the scene of the incident as quickly as possible if there are bystanders.

Firefighters can also be emotionally affected by a casualty's personal circumstances and the conditions they live in. The circumstances in which casualties are found trigger feelings of pity, particularly if it is apparent that they've suffered a great deal. A frequently mentioned circumstance is the casualty's home environment. "When you go to the scene of an accident, you know you can expect that shit and you mentally prepare for it. But CPR can be in someone's most personal environment, their own living room, surrounded by their defeated family" [R.72].

3.2 Incidents involving someone the first responder knows

Incidents that involve someone the firefighter knows, or a colleague's friend or relative, are experienced as very critical. In these situations, it can become difficult to fulfil a first responder role. If, while on the way to the scene of an incident, there is information that someone the first responder knows personally is involved, action is taken for that very reason: "We had to go to a very young child, CPR. We were in the tender and the atmosphere was quite tense. And then we heard that the family in question were friends of the commanding officer. We stopped and changed commanding officers. He didn't come in. This is a way to protect colleagues and to prevent trouble afterwards" [R.94]. Several participants mentioned an incident where a child of a fellow firefighter died; his colleagues searched for and found the child. "It took a long time for me to recover from that. It's one of those things that you wouldn't wish on anyone. Terrible. I was weeping like a child. You come to terms with such things, but they never truly go away. Some things come flooding back" [R.2]. Such incidents have a significant impact on the colleagues involved. The same applies when peers get injured while dealing with an incident.

3.3 Personal circumstances

Due to events or circumstances in their private lives, firefighters may feel more vulnerable and be overwhelmed by emotions during their work. Incidents that would normally not affect them can suddenly become quite distressing. Examples participants gave of such events include: divorce, an argument with family members, a relative's death or serious illness. The personal situation mentioned most frequently by far is fatherhood/motherhood. Virtually all the participants who have children reported that it had changed them. "You become more emotional. And that even happens when your wife is pregnant" [R.49].

3.4 *Personal association*

Personal associations make firefighters experience an incident as critical, for instance if they identify with the victim: “That’s something you’ll never forget either, you compare your situation to theirs. You find yourself in familiar territory, because you’re the same age, you have children too” [R.43]. Incidents with children are always experienced as critical and this is reinforced if the firefighters have children of their own.

Some participants referred to moments when they arrived at a scene and thought that their child was involved in the incident. “I saw a boy lying in the water: the same colour of hair, jacket, jeans, white shoes like my son and about the same height. And I knew that my son had been clubbing, so I knew he would have had to cross that bridge to get home. Actually, since that incident, I’ve made it a point to always look into my children’s bedrooms first whenever I receive such a call” [R.57].

3.5 *The first time*

The first time participants are confronted with a certain type of incident in the course of their work, the first turnout in a new job and the first turnout with a fatality have a major impact. Participants describe these ‘first times’ as a test of their suitability for the firefighting profession. They often remember every last detail of their first deployment as firefighters, especially if casualties were involved too. “It was my very first fire. A house fire. You go in for the first time and right away you find someone in there. I had to let that sink in. I had to come to terms with it” [R.84]. Most participants also remember their first turnout in a new job or specialism, e.g., as commanding officer or diver. “A car had driven into the water. I managed to free two boys and bring them to the surface in quite a short time. It was chaos. It’s everything you’ve learned but ten thousand times more intense. It’s always a tense moment: how am I going to react, because it’s your first deployment” [R.77]. They also remember the exact details of the first incident where they were faced with a fatality due to CPR, fire or suicide. “The one that always comes to mind is my first CPR. We arrived on the scene to find a car in the street with someone under the car. No pulse, no breath, so off you go, CPR next. He had eaten spinach and I’d already removed that from his mouth. I eat everything, but not spinach. I think that’s also one of the reasons why it sticks in my mind. An extraordinary situation, but one I’ll never forget” [R.42].

There is also a kind of curiosity about that first fatality. According to participants it is a way to determine what it takes to be a firefighter. A participant remembers the scene of a traffic accident: “My commanding officer said: ‘just wait in the vehicle, I’ll be right with you’. Once I was able to leave the vehicle I was allowed to take a look. I saw some things that made quite an impression on me. It’s something you have to experience. I now think that it was the ultimate test. But at that time I thought, ‘I’m done with the fire service’ [R.63].

3.6 *Experience*

More experienced participants are better equipped to put things into perspective and less likely they will be to perceive an incident as critical. “Because you’ve been through a lot, your professional mindset has changed, calming you down. I have noticed that I’m more relaxed about things and find it easier to put things into perspective” [R.68]. On the other

hand, participants also reported that incidents get to them more quickly the older they get. They experience more emotions because of the experience they have gained through their work and life. "As the years go by, more and more things get to me. Now you think about it more from an emotional perspective. When you're young, it's all about having fun. But you're being moulded without noticing" [R.67].

Not everyone thinks that having more experience is always positive. And that's not so much because they become more emotional, but actually because their emotions become blunted.

3.7 Frequency and period of time (cumulative effect)

Several incidents within a certain period are usually perceived as critical, because of the 'cumulative effect'. Incidents are stored away in one's memory – not only consciously but also subconsciously. "You commit them to memory. We forget a lot, but we do store it away, and there comes a time when you've memorised so much that it becomes very difficult to get things off your mind" [R.57]. It isn't always obvious that memories of incidents are piling up and that there will be a time when things become too much. In connection with this, participants not only referred to the cumulative effect, but also to the 'last straw'. "There's this film of intense things you've experienced playing in your head. It's not that you dwell on it, but the film suddenly starts playing again when you talk about it. It's imprinted on your memory. Everything can be going perfectly, until you get to that one incident: click, over and out. And suddenly it's all too much" [R.62].

3.8 Impact of critical incidents on personal lives

Critical incidents also impact on first responders' personal lives and development, especially if they joined the fire service at a young age. "It's given me a completely different outlook on life than other people my age. They went out boozing and clubbing and I was on duty. It shaped me" [R.20]. Some participants indicated that the firefighting profession shaped them as individuals, especially when it comes to putting things into perspective, the way they experience emotions and safety and how they perceive the fragility of life. "You recognise or become familiar with intense situations and that might be one of the reasons why I don't let things get to me too much in my private life. I display fewer emotions, experience fewer peaks and lows" [R.26].

The opposite was also mentioned: being a firefighter made a person more emotional: "You appreciate life, since you see quite a few young people die in accidents. I'm sometimes a little more emotional. I think that the things you experience shape you" [R.48]. Experiencing incidents has made participants aware of how fragile life is. "Things could have gone very wrong. One little thing and I wouldn't be here to tell the story. There's a point when you think, what's life truly about? You change. It comes closer" [R.43]. The fragility of life is also experienced as something positive: "I for one started enjoying things more, because I also know how easily things can go wrong" [R.57]. Another effect on private life that was frequently mentioned is observing all kinds of safety measures, because participants are more aware of the dangers and the consequences in daily life: "When accidents have happened you think 'so that's a place to watch out on this road' or 'so this could also happen to me'. It would be very strange if it didn't have any effect on you" [R.40].

3.9 Impact of critical incidents on the collective

Participants reported that critical incidents not only impacted on themselves, as firefighter and as private person, but also on the crew.

3.9.1 Positive impact

Critical incidents strengthen the bond with the crew and enable firefighters to get to know each other better. These incidents enhance the sense of belonging to a group because assistance is being provided jointly as a crew. “It definitely brings the members of the crew closer together. You sometimes go through very intense events where you trust each other implicitly” [R.26]. Frequently mentioned effects are camaraderie: “I think camaraderie is the key word. Sharing something together. It creates a bond and you can talk about it. That’s a great feeling” [R.67] and togetherness: “If you’ve had a fire and everybody has been able to do their thing and then you drive back feeling good, talking, joking if something strange happened. Chatting to unwind and then you see the sense of togetherness becoming even stronger; the bond gets stronger” [R.58]. The composition of the crew does not matter when it comes to developing a bond after having experienced a critical incident together. “The more shocking the incident, the more you will bond with colleagues you didn’t know before. It can be quite special” [R.40].

Going through a critical incident together may strengthen the bond with a specific colleague, or with the entire crew. That effect can last for years. However a ‘peak’ was also mentioned immediately after experiencing an incident, which gradually normalises again: “The bond can become closer, more intense, but they are peaks. We’re very close for a while and talk about it quite a lot, but gradually it lessens until things return to normal again” [R.48].

3.9.2 Negative impact

Occasionally critical incidents worsen bonds between firefighters, particularly if mistakes were made while responding to the incident. “If things got fucked up, you have a problem, there’ll be trouble. Especially if someone else made a stupid mistake that caused things to go wrong. Then you’ve got some explaining to do to your crew mates. And that’s part of the job too” [R.57]. In addition, several participants described how a lack of incidents actually caused unrest and irritation among crew members.

3.9.3 Not having been there but still feeling the impact

Incidents can also have an impact on participants who weren’t actually there, and, incidents experienced by one crew can also have an impact on other crews. “I wasn’t at the scene myself then, but I notice the impact on the station. CPR, for example, has a highly emotional impact on the station. This is shared across the crews” [R.20]. Sometimes, critical incidents have an impact on surrounding stations or even nationwide. One of the reasons for this is that people know the firefighters involved (e.g., they took the firefighter training course together, met each other on exercises or training courses, personal circumstances), and/or the incident took place in the local area. “I remember certain incidents where I wasn’t present, but I know what it’s like to go through them. I sympathise with the people in the other station. In my heart I know what it’s like, I know the people” [R.21]. This is also relevant if any firefighters get injured during a

deployment. They get support from fire service peers elsewhere in the country, in the form of get well cards and messages.

4 Discussion

This study aimed to provide a more in-depth understanding of why firefighters perceive certain incidents as critical and of the impact of such incidents on individuals and the collective. Consistent with previous studies (Monnier et al., 2002; Beaton et al., 1999; Van der Velden et al., 2006; Jacobsson et al., 2015), firefighters describe as critical severe traffic incidents, drownings, CPR, suicides and fire scenarios that are uncommon for firefighters. The results also confirm that firefighters perceive incidents as critical if they are confronted with injury or death; know the victim personally; consider the first response to have failed; experience life-threatening situations; have to lend assistance to children (Beaton and Murphy, 1993; Green, 1985; McCammon, 1996; Ørner, 1995), and if colleagues are threatened or die (Beaton et al., 1999). The majority of these incidents are also described as critical by other first responders such as police officers and ambulance workers (e.g., Donnelly and Bennett, 2014; Weiss et al., 2010). Working under unfavourable conditions, dealing with a lot of media attention (Beaton and Murphy, 1993), lack of medical training and chemical hazards (Beaton et al., 1999) were not mentioned as examples of critical incidents in this study.

Why and when firefighters experience incidents as critical depends on the individual, their personal circumstances both at work and at home, and the specifics of the incident. In addition to the findings from previous studies, firefighters in this study mentioned several factors and circumstances that determine whether an incident is perceived as critical and has an impact during and after the incident. These factors and circumstances are not exclusively related to the working context of the fire service, but are probably recognisable for other first responders such as police officers and ambulance workers. The first three are in the work field, the last three in the private sphere.

- 1 Death of a casualty during the first response is generally perceived as a more critical incident than death of a casualty before the first responders arrive at the scene or after the first response.
- 2 Looking at casualties while the firefighter has no role to play in the first response. Exposure to severe physical injury or a dead casualty and being unable to get rid of that image in one's mind.
- 3 The presence of bystanders and specifically next of kin, can distract firefighters, obstruct their duties, and/or make them feel threatened during the response effort.
- 4 Any first time is always critical, especially the first casualty who dies, but the first turnout for a certain type of incident and/or the first time in a new job can also be impactful.
- 5 The degree of seriousness, the frequency and period in which the same or different types of incidents take place determine whether an incident is experienced as critical. Participants' vulnerability may increase because of the cumulative effects of traumatic experiences (Bryant and Harvey, 1996). Little is known about the possible

consequences of repeated exposure to traumatic incidents (Levy-Gigi et al., 2015), for which additional research is needed (Jahnke et al., 2016).

- 6 Participants' personal circumstances, which make them feel consciously or subconsciously more vulnerable, and/or private association during incidents cause incidents to be experienced as critical sooner. Regehr et al. (2000) posit that individual differences in resilience and vulnerability affect the intensity and duration of trauma-related symptoms.

To expand on existing literature, CPR deserves special attention because it can be perceived as critical due to an accumulation of circumstances. An initial aspect is that the casualty is thought to have died and their body needs to be touched in order to provide assistance. Furthermore, CPR often takes place in the casualty's home environment and, compared to other first response tasks, there is a greater probability of bystanders and/or next of kin adversely influencing the first response effort because of threats and/or emotions. And finally, the frequency of CPR interventions experienced by firefighters can play a role.

This study likewise shows that an impact is also experienced when firefighters believe that they might know the casualty, even if it becomes clear at the scene of the incident that this assumption is false. Consistent with previous studies (Murphy et al., 2004), participants indicated feeling immediately overwhelmed by a critical incident at the scene of the incident, to such a degree that they cannot always fulfil their role as first responders.

Previous studies (Kehl et al., 2014; Armstrong et al., 2016) have shown that experiencing a critical incident can also have a positive impact, such as post-traumatic growth. The participants did not identify this growth as a direct, one-to-one consequence of a critical incident. However, they did indicate that the fire service profession in general had led to personal growth, the ability to put things into perspective, the perception of safety and an appreciation of the fragility of life. A positive effect described on the collective level is that bonds are strengthened.

This study has shown that critical incidents in particular, or their absence, influence the dynamics within a crew. The impact on the collective is described as a strengthened group feeling, camaraderie and togetherness and can be of both a long-term and a short-term nature. A negative impact is experienced if mistakes were made during the incident. Because of the collective nature and significance of some incidents, participants can also be exposed to a critical incident afterwards, when sharing their traumatic experiences with peers who weren't at the incident scene. Firefighters do not have to be present at the scene to experience distress (Murphy et al., 2004).

Firefighters may benefit from mental health counsellors having a better understanding of their unique work culture and the complexity of the firefighting profession (see also Johnson et al., 2020). More knowledge about the impact of critical incidents is necessary to tailor help and aftercare more effectively to their needs. When developing interventions, the focus needs to be on specific stressors for firefighters as described in this study, rather than universal stress reduction interventions and comprehensive measures.

5 Limitations and future research

Only Dutch participants were involved in this study, however, there is no reason to believe that this culture differs substantially with firefighters from other Western countries. The extent to which the participants developed serious mental health problems due to a critical incident and sought professional help in that respect, has not been investigated.

Scholarly studies do not always distinguish clearly between the terms critical incident and traumatic incident, as the mental consequences are comparable (Huddleston et al., 2006; Brazil, 2017; Fraess-Phillips et al., 2017; Lewis, 2003). However, according to Halpern et al. (2009) there is an essential difference between critical incidents and traumatising incidents that may be relevant to the aftercare or the interventions that are used. It is therefore important to further investigate the distinction between the two phenomena and to sharpen the definitions (Lewis, 2003; Halpern et al., 2009).

The association between critical incidents and moral injury also deserves further investigation, and future research into moral injury should involve emergency services such as the fire service. For example, what experiences do firefighters have with incidents where their own moral boundaries are transgressed? And to what extent are morally injurious experiences and moral injury comparable with critical incidents and critical incident stress?

First responders may avail themselves of both informal and formal peer support to deal with critical incidents. Firefighters often prefer informal peer support to help them cope with critical incidents (see e.g., Jeannette and Scoboria, 2008). However, it is not sufficiently clear how this support is given and experienced and whether there are differences between career and noncareer firefighters. Follow-up studies should focus on

- 1 the role of informal peer support in the fire service after experiencing a critical incident
- 2 possible differences between career and noncareer firefighters in experiencing critical incidents and opportunities for coping with these incidents.

References

- Armstrong, D., Shakespeare-Finch, J., and Shochet, I. (2016) ‘Organizational belongingness mediates the relationship between sources of stress and posttrauma outcomes in firefighters’, *Psychological Trauma: Theory, Research, Practice, and Policy*, Vol. 8, No. 3, pp.343–347.
- Bacharach, S.B., Bamberger, P.A., and Doveh, E. (2008) ‘Firefighters, critical incidents, and drinking to cope: the adequacy of unit-level performance resources as a source of vulnerability and protection’, *Journal of Applied Psychology*, Vol. 93, No. 1, pp.155–169.
- Beaton, R., and Murphy, S. (1993) ‘Sources of occupational stress among fire fighters-EMT’s and firefighter-paramedics and correlations with job-related outcomes’, *Prehospital and Disaster Medicine*, Vol. 8, pp.140–150.
- Beaton, R., Murphy, S., Johnson, C., Pike, K., and Corneil, W. (1999) ‘Coping responses and posttraumatic stress symptomatology in urban fire service personnel’, *Journal of Traumatic Stress*, Vol. 12, pp.293–307.
- Brazil, A. (2017) ‘Exploring critical incidents and postexposure management in a volunteer fire service’, *Journal of Aggression, Maltreatment and Trauma*, Vol. 26, No. 3, pp.244–257.

- Bryant, R.A. and Harvey, A.G. (1996) 'Posttraumatic stress reactions in volunteer firefighters', *Journal of Traumatic Stress*, Vol. 9, No. 1, pp.51–62.
- Carleton, R.N., Afifi, T.O., Turner, S., Taillieu, T., Duranceau, S., LeBouthillier, D.M., Sareen, J., Ricciardelli, R., MacPhee, R.S., Groll, D., Hozempa, K., Brunet, A., Weekes, J.R., Griffiths, C.T., Abrams, K.J., Jones, N.A., Beshai, S., Cramm, H.A., Dobson, K.S., Hatcher, S., Keane, T.M., Stewart, S.H. and Asmundson, G.J.G. (2018) 'Mental disorder symptoms among public safety personnel in Canada', *The Canadian Journal of Psychiatry*, Vol. 63, No. 1, pp.54–64.
- Donnelly, E.A., and Bennett, M. (2014) 'Development of a critical incident stress inventory for the emergency medical services', *Traumatology*, Vol. 20, No. 1, pp.1–8.
- Floyd, A., and Arthur, L. (2012) 'Researching from within: external and internal ethical engagement', *International Journal of Research and Method in Education*, Vol. 35, No. 2, pp.171–180.
- Fraess-Phillips, A., Wagner, S. and Harris, R.L. (2017) 'Firefighters and traumatic stress: a review', *International Journal of Emergency Services*, Vol. 6, No. 1, pp.67–80.
- Frankfurt, S., and Frazier, P. (2016) 'A review of research on moral injury in combat veterans', *Military Psychology*, Vol. 28, No. 5, pp.318–330.
- Green, B.L. (1985) *Overview and Research Recommendations*, National Institute of Mental Health, Role Stressors and Supports for Emergency Workers (DHHS Publication No. ADM 85–1408), U.S. Government Printing Office, Washington DC, pp.1–20.
- Green, M. (2014) 'On the inside looking in: methodological insights and challenges in conducting qualitative insider research', *The Qualitative Report*, Vol. 19, No. 29, pp.1–13.
- Griffin, B.J., Purcell, N., Burkman, K., Litz, B.T., Bryan, C.J., Schmitz, M., Villierme, C., Walsh, J. and Maguen, S. (2019) 'Moral injury: an integrative review', *Journal of Traumatic Stress*, Vol. 32, pp.350–362.
- Halpern, J., Gurevich, M., Schwartz, B., and Brazeau, P. (2009) 'What makes an incident critical for ambulance workers? emotional outcomes and implications for intervention', *Work and Stress*, Vol. 23, pp.173–189.
- Harris, M.B., Baloglu, M. and Stacks, J.R. (2002) 'Mental health of trauma-exposed firefighters and critical incident stress debriefing', *Journal of Loss and Trauma*, Vol. 7, No. 3, pp.223–238.
- Henderson, S.N., Van Hasselt, V.B., LeDuc, T.J. and Couwels, J. (2016) 'Firefighter suicide: understanding cultural challenges for mental health professionals', *Professional Psychology: Research and Practice*, Vol. 47, No. 3, pp.224–230.
- Huddleston, L.M., Paton, D., and Stevens, C. (2006) 'Conceptualizing traumatic stress in police officers: preemployment, critical incident, and organizational influences', *Traumatology*, Vol. 12, No. 3, pp.170–177.
- Jacobsson, A., Backteman-Erlanson, S., Brulin, C. and Hörnsten, Å. (2015) 'Experiences of critical incidents among female and male firefighters', *International Emergency Nursing*, Vol. 23, No. 2, pp.100–104.
- Jahnke, S.A., Poston, W.S.C., Haddock, C.K., and Murphy, B. (2016) 'Firefighting and mental health: experiences of repeated exposure to trauma', *Work: Journal of Prevention, Assessment and Rehabilitation*, Vol. 53, No. 4, pp.737–744.
- Jeannette, J., and Scoboria, A. (2008) 'Firefighter preferences regarding post-incident intervention', *Work and Stress*, Vol. 22, No. 4, pp.314–326.
- Johnson, C.C., Vega, L., Kohalmi, A.L., Roth, J.C., Howell, B.R. and Van Hasselt, V.B. (2020) 'Enhancing mental health treatment for the firefighter population: understanding fire culture, treatment barriers, practice implications, and research directions', *Professional Psychology: Research and Practice*, Vol. 51, No. 3, pp.304–311.
- Jones, S. (2017) 'Describing the mental health profile of first responders: a systematic review', *Journal of the American Psychiatric Nurses Association*, Vol. 23, No. 3, pp.200–214.

- Kehl, D., Knuth, D., Hulse, L., and Schmidt, S. (2014) ‘Posttraumatic reactions among firefighters after critical incidents: cross-national data’, *Journal of Aggression, Maltreatment and Trauma*, Vol. 23, No. 8, pp.842–853.
- Kim, J.E., Dager, S.R., Jeong, H.S., Ma, J., Park, S.S., Kim, J., Choi, Y., Lee, S.L., Kang, I., Ha, E., Cho, H.B., Lee, S., Kim, E.J., Yoon, S. and Lyoo, I.K. (2017) ‘Firefighters, posttraumatic stress disorder and barriers to treatment: results from a nationwide total population survey’, *PLoS One*, Vol. 31, No. 1, pp.1–14.
- Kniffin, K.M., Wansink, B., Devine, C.M., and Sobal, J. (2015) ‘Eating together at the firehouse: how workplace commensality relates to the performance of firefighters’, *Human Performance*, Vol. 28, No. 4, pp.281–306.
- Lentz, L.M., Smith-MacDonald, L., Malloy, D., Carleton, R.N., and Brémault-Phillips, S. (2021) ‘Compromised conscience: a scoping review of moral injury among firefighters, paramedics, and police officers’, *Frontiers in Psychology*, Vol. 12, doi: 10.3389/fpsyg.2021.639781
- Levy-Gigi, E., Richter-Levin, G., Okon-Singer, H., Kéri, S. and Bonanno, G.A. (2015) ‘The hidden price and possible benefit of repeated traumatic exposure’, *Stress*, Vol. 19, No. 1, pp.1–7.
- Lewis, S.M. (2003) ‘Do one-shot preventive interventions for PTSD work? A systematic research synthesis of psychological debriefings’, *Aggression and Violent Behavior*, Vol. 8, No. 3, pp.329–343.
- Lim, J., Childs, J., and Gonsalves, K. (2000) ‘Critical incident stress management’, *AAOHN: Official Journal of the American Association of Occupational Health Nurses*, Vol. 48, pp.487–497.
- Litz, B., Stein, N., Delaney, E., Lebowitz, L., Nash, W., Silva, C. and Maguen, S. (2009) ‘Moral injury and moral repair in war veterans: a preliminary model and intervention strategy’, *Clinical Psychology Review*, pp.695–706.
- McCammom, S.L. (1996) ‘Emergency medical service workers: occupational stress and traumatic stress’, in Paton, D. and Violanti, J.M. (Eds.): *Traumatic Stress in Critical Occupations: Recognition, Consequences, and Treatment*, Charles C, Thomas, Springfield, I.L., pp.58–86.
- Milligan-Saville, J., Choi, I., Deady, M., Scott, P., Tan, L., Calvo, R.A., Bryant, R.A., Glozier, N. and Harvey, S.B. (2018) ‘The impact of trauma exposure on the development of PTSD and psychological distress in a volunteer fire service’, *Psychiatry Research*, Vol. 270, pp.1110–1115.
- Mitchell, J.T. (1983) ‘When disaster strikes. the critical incident stress debriefing’, *Journal of Emergency Medical Services*, Vol. 8, pp.36–39.
- Monnier, J., Cameron, R.P., Hobfoll, S.E. and Gribble, J.R. (2002) ‘The impact of resource loss and critical incidents on psychological functioning in fire-emergency workers: a pilot study’, *International Journal of Stress Management*, Vol. 9, No. 1, pp.11–29.
- Murphy, S.A., Johnson, L.C. and Beaton, R.D. (2004) ‘Fire fighters’ cognitive appraisals of job concerns, threats to well-being, and social support before and after the terrorist attacks on September, 11(2001) *Journal of Loss and Trauma*, Vol. 9, No. 3, pp.269–283.
- Ørner, R.J. (1995) ‘Intervention strategies for emergency response groups: a new conceptual framework’, in Hobfoll, S.E. and de Vries, M.W. (Eds.): *Extreme Stress and Communities: Impact and Intervention*, Kluwer, Dordrecht, The Netherlands, pp.499–521.
- Patton, M.Q. (2015) *Qualitative Research and Evaluation Methods*. 4th ed., Sage, Thousand Oaks/London.
- Perryman, J. (2011) ‘The return of the native: the blurred boundaries of insider/outsider research in an English secondary school’, *International Journal of Qualitative Studies in Education*, Vol. 24, No. 7, pp.857–874.
- Pinto, R.J., Henriques, S.P., Jongenelen, I., Carvalho, C. and Maia, A.C. (2015) ‘The strongest correlates of PTSD for firefighters: number, recency, frequency, or perceived threat of traumatic events?’, *Journals of Traumatic Stress*, Vol. 28, pp.434–440.
- Regehr, C., Hill, J. and Glancy, G.D. (2000) ‘Individual predictors of traumatic reactions in firefighters’, *Journal of Nervous and Mental Disease*, Vol. 188, No. 6, pp.333–339.

- Sattler, D., Boyd, B., and Kirsch, J. (2014) 'Trauma-exposed firefighters: relationships among posttraumatic growth, posttraumatic stress, resource availability, coping and critical incident stress debriefing experience', *Stress and Health*, Vol. 30, No. 5, pp.356–365.
- Schein, E.H. (1984) 'Coming to a new awareness of organizational culture', *Sloan Management Review*, Vol. 25, No. 2, pp.3–16.
- Stanley, I.H., Boffa, J.W., Hom, M.A., Kimbrel, N.A. and Joiner, T.E. (2017) 'Differences in psychiatric symptoms and barriers to mental health care between volunteer and career firefighters', *Psychiatry Research*, Vol. 247, pp.236–242.
- Van Der Velden, P.G., Christiaanse, B., Kleber, R.J., Marcelissen, F.G.H., Dorresteyn, S.A.M., Drogendijk, A.N., Roskam, A.J., Grievink, L., Gersons, B.P.R., Olf, M. and Meewisse, M.L. (2006) 'The effects of disaster exposure and post-disaster critical incidents on intrusions, avoidance reactions and health problems among firefighters: a comparative study', *Stress, Trauma and Crisis*, Vol. 9, No. 2, pp.73–93.
- Vass, G. (2017) 'Getting inside the insider researcher: does race-symmetry help or hinder research?', *International Journal of Research and Method in Education*, Vol. 40, No. 2, pp.137–153.
- Wagner, S., McFee, J., and Martin, C. (2009) 'Effects of traumatic stress on firefighters' world assumptions', *Traumatology*, Vol. 15, No. 1, pp.75–84.
- Weiss, D.A., Brunet, A., Best, S.R., Metzler, T.J., Liberman, A., Pole, N., Fagan, J.A. and Marmar, C.R. (2010) 'Frequency and severity approaches to indexing exposure to trauma: the critical incident history questionnaire for police officers', *Journal of Traumatic Stress*, Vol. 23, No. 6, pp.734–743.
- Wilmoth, J.A. (2014) 'Trouble in mind', *National Fire Protection Association*, Vol. 108, pp.52–59.
- Bacharach, S.B. and Bamberger, P.A. (2007) '9/11 and New York city firefighters' post hoc unit support and control climates: a context theory of the consequences of involvement in traumatic work-related events', *Academy of Management Journal*, Vol. 50, No. 4, pp.849–868.