Understanding distributed sensemaking in crisis management: the case of the Utrecht terrorist attack

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Understanding distributed sensemaking in crisis management: The case of the Utrecht terrorist attack

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Abstract

On Monday morning March 18, 2019 a terrorist opened fire inside a tram in the middle of the city of Utrecht. A key challenge in the Utrecht attack was making sense of the situation and organizing a coherent response in a distributed command and control structure. This is a recurrent challenge in crisis management. As command structures expand, sensemaking becomes distributed when groups at different locations develop partial images of a complex environment. While most sensemaking studies focus on how specific groups attempt to collectively construct a plausible representation of the situation, few accounts of distributed sensemaking have appeared. This study explains how crisis managers made sense of the volatile situation across different command structures. Twenty-five crisis managers from different teams were interviewed by making use of the critical decision methodology. The analysis points to five factors that influence the quality of distributed sensemaking: type of interdependence, sensitivity to operations, plausibility, hierarchy, and identity. It signals that updating one's sensemaking does not only require noticing discrepant cues but is especially related to key social-cognitive and organisational processes that stimulate doubt, questioning, and a plurality of perspectives.

KEYWORDS
command & control, coordination, decision-making, sensemaking

1 | INTRODUCTION

On Monday morning March 18, 2019 a terrorist opened fire inside a tram in the middle of the city of Utrecht. Within 5 min after the first 112 calls, police and ambulance units arrived at a scene of chaos and hurried to provide aid to the victims. Six people were shot in the attack on multiple locations, of which eventually four would lose their lives. Shortly after the first responders arrived, the police Special Interventions Unit secured the scene and started a manhunt for the terrorist(s). Several witnesses described their experiences, which cumulated into the frame of four gunmen roaming around the city. This frame pressed the strategic level team to issue a lockdown of the city during the entire afternoon while contrasting information was readily available in other parts of the command structure. Where teams at the tactical and strategic level got stuck in the frame of a marauding terrorist attack, frontline units were able to quickly update their sensemaking, break away from the frame and locate one of the perpetrators, which eventually turned out to be the only suspect.

A key challenge in the Utrecht attack was making sense of the situation and organising a coherent response in a distributed command and control structure. The sensemaking literature

describes how people give meaning to a situation when it is difficult to interpret, or when an expected outcome is suddenly invalidated (Weick, 1995). In response, cues (i.e., signals) must be reinterpreted to provide a plausible explanation of what is going on. One of the key challenges is to not get stuck in an inaccurate framing of the situation, which results in the collapse of sensemaking (Weick, 1993). In doing so, the literature describes the escalation of commitment and loss of meaning during critical incidents (referred to as 'cosmology episodes'; Cornelissen et al., 2014; Maitlis & Christianson, 2014; Snook, 2002; Weick, 1993). The level of analysis predominantly focuses on individuals inside teams, but few studies have looked at how meaning is distributed among different command and control teams (Maitlis & Sonenshein, 2010; Weick, 2005). Such *distributed sensemaking* focuses on how individuals holding different, segmented or partial pieces of information attempt to collectively induce new meaning while being at different locations (Maitlis & Christianson, 2014; Weick et al., 2005).

Distributed sensemaking problems especially feature in a series of counter-terrorism operations. In these operations, the initial framing of the events lingered on, while new or conflicting information was available (Cornelissen et al., 2014). For instance, after Breivik's attack in Norway, the suspect was able to go through two roadblocks on his way to Utøya, while the license plate of the suspected car was already known in the command centre (Bye et al., 2019; Renå, 2019). Similarly, after the Manchester Arena bombing, the Fire Department stayed away for over 2 h after being falsely convinced of a marauding terrorist attack (Kerslake Report, 2018). This also occurred after the 2017 attack at London Bridge and Borough Market, where medics retreated from the scene for more than 3 h in fear of a marauding attack, leaving behind critically injured patients (London Bridge Inquests, 2019). Agonizingly, it turned out the terrorists had already been neutralized by armed police after approximately 10 min. These operations show that distributed sensemaking proves to be a major challenge in counter-terrorism operations. This process is vital to understand, because also in other types of crisis, information flows become more complex and key decision-makers are increasingly distributed in transboundary settings (Ansell et al., 2010; Hermann & Dayton, 2009).

In this study, the focus lies on the Utrecht tram attack to explain how meanings are constructed in a geographically distributed command and control structure. This warrants the following research question: *how did crisis managers make sense of the Utrecht tram attack and how did they distribute their sensemaking?* To study distributed sensemaking, 25 crisis managers from multiple teams that operated in different in incident command structures were interviewed with the critical decision method (Hoffman et al., 1998). The analysis points to five factors that play a vital role in enabling and constraining distributed sensemaking. Hereby, this study contributes to debates on sensemaking in crises (Maitlis & Sonenshein, 2010) and command and control (Boersma et al., 2014).

2 | THEORY

Sensemaking is a critical component of crisis management which helps to produce meaning and stimulate mindful action in uncertain circumstances. The process of sensemaking is evoked when a situation is difficult to interpret, or when the expected outcome of a response is suddenly invalidated (Weick, 1995). In response, cues or signals must be (re)interpreted and contextualized in an explanatory frame to provide a plausible explanation of what is going on (Maitlis & Sonenshein, 2010). Sticking to a frame helps crisis managers to provide clarification and direction in an ambiguous situation (Weick, 1993). As such, sensemaking is driven by '*plausibility rather than accuracy*' (Weick, 1995, p. 55). Sensemaking is an ongoing process in which both the existing understanding about what is going on continues to guide action, while new signals must be tested that may indicate a different interpretation. As such, sensemaking scholars speak of interweaving interpretation and action through the process of enactment, thereby also imparting organising structure that steers the mode of operating during crisis management (Cornelissen et al., 2014; Maitlis & Christianson, 2014).

A range of studies have shown that a rigid commitment to a frame can create blind spots that make rapid adaptation to the situation difficult, resulting in a collapse of sensemaking (Maitlis & Sonenshein, 2010; Weick, 1993). A key finding of these studies is that sensemaking fails when crisis managers continue to conform to a frame, despite new invalidating information coming to them. Well-known examples are the wildfire in Mann Gulch, in which 13 firefighters died because they were unable to identify the escalation of the fire in time (Weick, 1993). Similarly, in the Stockwell shooting an innocent civilian was wrongly regarded as a terrorist and killed (Cornelissen et al., 2014). Likewise, during a friendly fire incident in Iraq two US Black Hawk helicopters were downed by friendly F15's because they were mistaken as enemy Hind helicopters (Snook, 2002). In all these situations, individual operators were unable to override a dominant frame in view of a series of signals or cues that indicated otherwise.

What these studies also indicate, is that making sense of a crisis situation requires more than developing meaning at the individual or group level. It requires distributed sensemaking, where 'organizations as groups composed of individuals with segmented, partial-images of a complex environment attempt to construct a plausible representation through interaction, while being at different geographical locations' (Weick, 2005, p. 62). While the sensemaking literature of crisis situations predominantly describes what cues people miss, in studying distributed sensemaking the question shifts to how people can circulate their obtained meaning to different parts of the organisation.

The concept of distributed sensemaking is introduced within the mainstream organisation science literature in an agenda-setting paper to understand situations where 'new meaning is induced when information is distributed among numerous parties' (Weick et al., 2005, p. 417). Here distributed sensemaking is closely related to similar concepts that describe the importance of group cognitive processes

for aligning work, such as 'distributed cognition' (Hutchins, 1995) and 'heedful interrelating' (Weick & Roberts, 1993). By conceptualising the process of bringing together distributed information as a sensemaking processes, Weick (2005) adds to these concepts the idea that action and interpretation become interwoven through enactment, where people reproduce the setting they are interpreting.

Weick (2005) discusses the concept of distributed sensemaking more extensively in his study of the US Centre for Disease Control's (CDC) diagnosis of the West Nile virus in 1999. The emergence of a new disease in New York resulted in the death of several people and various birds. Consequently, several state laboratories around the country struggled to make sense of what virus they were dealing with. Initially, the CDC misdiagnosed the virus for a period of three weeks due to a poor interconnectivity among different laboratories, and for neglecting their role as network integrator (Weick, 2005). As a result, the CDC remained fixated on the wrong diagnosis, similar to how other sensemaking studies describe adhering to a dominant, but illicit frame. The study provides a powerful illustration of how difficult it is to bring together distinct perspectives in a distributed setting, resulting in a situation where discrepancies persist and are further pulled apart by the pursuit of different action trajectories (Maitlis & Christianson, 2014).

In crisis management, incident command systems represent the dominant arrangement for bringing together different perspectives and action trajectories (Bigley & Roberts, 2001; Comfort, 2007). When command structures are scaled up, new teams are formed in different locations that take up specific roles and responsibilities (Moynihan, 2009). Command and control structures are used worldwide to mobilize and direct various units, and offer predictability through unity of command, clear roles, and predefined task structures (Boersma et al., 2014). Their functionality is also commonly challenged, especially since actors struggle to keep overview in these structures when there are numerous bilateral updates (Comfort & Kapucu, 2006; Kendra & Wachtendorf, 2016; Waugh, 2009). This is related to a phenomenon that Turner (1976) describes as the 'variable disjunction of information', where each actor has access to a slightly different set of information, while the amount of information that can be combined and processed with available time and resources is less than the amount needed to capture the complexity of the situation. The result is a distributed setting in which a shared understanding has to be developed among geographically dispersed actors (Vlaar et al., 2008).

Current research into distributed sensemaking points to a number of factors that play into the ability to update a frame among different actors (Christianson, 2019; Kim, 2021). Weick (2005) points to the crucial role of interdependence and cognition. It relates back to the original work of Thompson (1967) who identifies three forms of interdependence: pooled, where a task is split among actors that work independently with no flow of work between them, requiring little contact. Sequential, where actors rely on one-directional pathways that contain predictable workflows codified into plans. Reciprocal, where actors work back and forth and mutually adjust their actions. Weick (2005) observes that each type of interdependence is tied to a specific type of cognition, where pooled is associated with automatic cognition through stereotypes, sequential is tied to heuristic cognition associated with memorized if–then rules, and reciprocal induces controlled cognition based on doubt, inquiry, and argumentation. The challenge is when groups are joined in a distributed network, the network itself tends to be dominated by a single form of interdependence (Weick, 2005). Reciprocal interdependence is costly and achieved on a local basis, thus as more groups collaborate the type of interdependence is likely to shift towards sequential or pooled, making network failure more likely.

As the type of collaboration in incident command structures is not static, types of interdependencies and related command processes may shift throughout an operation (Schakel & Wolbers, 2021). To navigate dynamism and ambiguity, decision capability is often delegated to frontline units that develop sensitivity to the dynamics of the operation (Barton & Sutcliffe, 2009; Groenendaal & Helsloot, 2016; Weick & Sutcliffe, 2011; Wolbers et al., 2018). This is important for distributed sensemaking because new cues that challenge existing frames are discovered through action where commanders have access to concrete situational details (Barton et al., 2015). This leads us to the question how sensemaking is distributed across teams in these dynamic incident command processes.

3 | METHODOLOGY

To study how crisis managers made sense of the tram attack in various command and control teams, key officials that played a relevant role were contacted in the first weeks after the operation. Initial exploratory interviews with senior management revealed that many teams had been active in different locations, both within the emergency management operation, as well as in the manhunt by the police. Respondents were selected for their role in the different teams to gain insight into their information position and sensemaking efforts. In this way, the operation was viewed from the perspective of the interdependencies between 10 different teams, by means of 25 semi-structured interviews. Table 1 illustrates the respective command structures in which these teams operated at the strategic, tactical, and operational levels. On the left side is the multiagency emergency management command structure, on the right side the police command structure which functioned in parallel during the operation.

The Dutch crisis management structure is principally organized around Safety Regions, in which municipalities collaboratively house the regional Fire Department and Emergency Medical Services. Formal authority still resides at the municipal level, with the mayor assuming supreme command in the event of a disaster, or in case of a serious fear of its occurrence (Safety Regions Act, art. 5). In case of police-related operations, a team of the mayor, public prosecutor and police chief assembles (the so-called local triad), in which actors have distinct, but interrelated, authorities (i.e., public order, legal order, and operational command). In parallel, the emergency services may

TABLE 1 Interview respondents in their respective command structures (detailed role descriptions are provided in Appendix S2)

Emergency management command structure	Police manhunt command structure	
Strategic level	**General Command Staff Utrecht**	**General Command Staff—Central Police Unit**
Operational leader and liaison officer	General commander	General commander
Police chief of operations	Head of criminal investigation	General commander Special Intervention Unit
	Counter-terrorism advisor	Operational commander Special Intervention Unit
Tactical level	**Criminal Investigation Unit Utrecht**	**Criminal Investigation Unit Central Police Unit**
Operational leader	Commander criminal investigation staff	Team leader High Tech Crime
Commander of medical care	Deputy commander criminal investigation staff	
Operational level	**Crime scene investigation**	
Incident commander	Team leader crime scene investigation	
Police commander 1 (coordination)		
Police commander 2 (operation)		
Medical commander		
Fire department commander		
On-scene commander Special Intervention Unit		
Dispatch centre		**Operations (dispatch) Central Police Unit**
Dispatch coordinator		Operational commander
Police dispatch commander		Operational commander Special Intervention Unit

operate within their own multidisciplinary structure (consisting in the basis of teams of police, ambulance, fire department, municipal services, and liaison agencies) that can be scaled up from the operational, towards the tactical and strategic level (Wolbers, 2016). Both authority structures connect at the strategic level, where the local triad will function adjacent to the multidisciplinary strategic team, both under the supervision of the mayor. Together this creates a complex local authority structure, in which the mayor has to combine multiple roles. In addition to these decentralized structures, the Police in the Netherlands is formally one national organisation consisting of 10 Regional Police Units and one Central Police Unit (Schakel & Wolbers, 2021). The functioning of all these structures is taken into consideration by interviewing key representatives.

The interviews were conducted according to the 'critical decision method', used by Gary Klein in the original study on fire ground decision-making (Klein et al., 2010). The method has been further elaborated in a series of handbooks for social psychological research into sensemaking and decision-making (Hoffman et al., 1998). Respondents were guided through the incident in multiple rounds, to unravel their perceptions, identify key decision-making moments and personal motives behind their decisions. The method entails several steps, in which the respondent was first asked for a global description of his/her experiences in the operation. These memories were contextualized by jointly reconstructing a detailed timeline. In this step, respondents were asked to bring and explain their own notes from the operation, often with timestamps. In addition, a number of official timelines from the evaluations of the police and the Utrecht safety region had been included for validation. Furthermore, a number of formal evaluations were consulted to provide context and served as an additional validation step after the initial analysis (COT, 2019; Crisislab, 2019).

In these first two steps, critical sensemaking puzzles in the operation were identified (Weick, 2005). Further questions were asked about the actor's information position, assessment of the situation, goals, expectations, and options considered. As a final step, the respondent was asked about a number of 'what-if scenarios' to better understand the rationale behind a particular decision by discussing alternative choices that were not made. This extensive reflection lasted between 1.5 and 2 h, after which the interviews were transcribed verbatim. The transcriptions were submitted to respondents for a member check to verify the information and validate the respondent's views. This resulted in a number of minor changes, or the addition of more detailed information.

In the analysis, the transcripts and timelines were coded in the program MaxQDA. Codes identified various dilemmas, key moments,

and sensemaking puzzles among different teams. The different codes were linked to specific timestamps to determine the sequence of events, in both the rescue operation and the manhunt. In the analysis, it became clear that different teams were aware of crucial information at different times. Subsequently, it was examined how crisis managers and their teams constructed their frames based on available information, and whether they were able to distribute their updated sensemaking. Through this careful analysis, key moments were identified that explained whether and how actors were able to adapt their sensemaking to ongoing events in a distributed command and control structure.

4 | FINDINGS

The analysis presents the progression of distributed sensemaking in different teams. It starts at the initial sensemaking on the operational level, moving on to sensemaking at the tactical and strategic command levels, and finally to the police manhunt. The following sections will detail how the operation unfolds and what distributed sensemaking challenges emerge by making use of interview quotes. This analysis is supported by Appendix S1, in which a chronological overview of the different sensemaking accounts in various teams operating in the distributed command structures is reconstructed. The key events that are discussed are visualized on the timeline in Figure 1.

4.1 | Initial sensemaking at the start of the operation

At 10.42 a.m. a police dispatcher receives the first call of a shooting at a tram stop. At the same time, his commanding officer looks at the live camera feed but does not immediately see any signs of a shooting. Shortly thereafter, several shooting incidents are reported at locations near and around a large traffic intersection. The initial 112 calls give the dispatchers several important cues. They get the impression of at least three crime scenes and a description of one perpetrator: a tinted man who fired several shots in a tram with a long weapon.

Five minutes after the first call, police and ambulance units arrive and start treating several seriously injured victims inside and around the tram. When the on-scene police commander arrives at 10:48 a.m., he requests support from the Special Intervention Unit. Special Intervention Units arrive 11 min later at 10:59 a.m. These teams work on the basis of frontline command to enable swift action and update their sensemaking as they progress.

> *The first report was: shots fired in a tram. Tinted man. 30 years old, sturdy build. Gray sweater, black jacket, pants unknown. At least 2 women injured. A person with a large gun, unknown whether it is an automatic weapon. There are injuries, probably no perpetrator on-scene anymore. That is in the first minute. When I get such a call, my instruction is: act! Don't wait for all kinds of interpretation: act!*—On-scene Commander Special Intervention Unit.

Once the intervention units talk to eye-witnesses their sensemaking shifts dramatically.

> *At the tram site our units hear about several suspects: 1) a witness in the tram sees a man shooting with a long firearm. 2) a witness sees a man getting into a car. 3) another witness sees a man getting into a car from the passenger side. 4) Construction workers [think] a man walks into a porch leaving behind a blood trail*—Operational Commander Special Intervention Unit.

Around the same time, an intelligence officer is analysing an announcement of a livestream on the internet from a man who is planning to film a deadly rampage. The intelligence officer is afraid of copycat behaviour similar to the Christchurch attack, which occurred just days before. He suspects that there is a connection with the tram

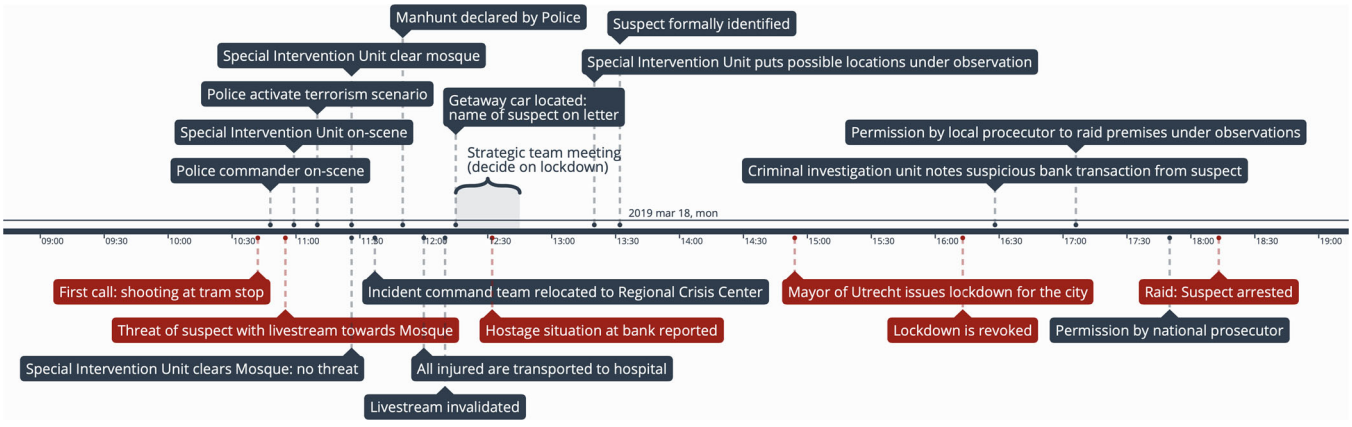

FIGURE 1 Timeline of key events

attack. This pushes the intervention squads to take immediate action and secure the mosque.

> *Then we learn about a livestream moving towards a mosque, that is a serious object to enter. I would really wait if there is time, but he sees the victims in the tram and judges its vital to act now. Christchurch was two days before. He's going to secure it*—On-scene Commander Special Intervention Unit.

At these crucial moments in the so-called 'golden hour' several new cues emerge that point to a complex attack of multiple suspects leaving in different locations, possibly on their way towards a mosque. With the vivid memory of the Christchurch attack 2 days before, the frame of a group of terrorists committing a marauding firearms attack emerges.

At 11:10 a.m., the terrorism scenario is activated in the Police Dispatch Centre based on these converging information flows. As a result, an elaborate command and control structure within the police is activated, calling in intervention, criminal investigation, and intelligence teams, under the lead of several specialized and one general command staff in Utrecht. Furthermore, 10 other police command staffs are also activated in other police regions and a command staff at the central police unit that directs specialized units like the Special Intervention Unit. This creates a complex distributed command and control structure within the police. As is reconstructed in Appendix S1 (Timeslot 2), for all these teams the starting information is quite different from that of the first responders (Timeslot 1), who hear about one suspect firing shots in a tram. When the police activate the counter-terrorism scenario, the frame of a marauding terrorist attack is reinforced and sustained through this procedure within the police operation.

4.2 | Sensemaking at operational command

At the dispatch centre, the activation of the counter-terrorism procedure is to be followed by the activation of the emergency response command structure. However, police and medical on-scene commanders are not able to get in touch with the dispatch centre as the communication channels become overloaded. In the meantime, the procedure to scale up the command structure stalls in the dispatch centre due to '*pluristic ignorance*' (Weick, 1990, p. 588). Pluralistic ignorance refers to the assumption that someone else is deciding, rather than acting oneself or raising concerns, resulting in decision-inertia (Alison et al., 2015).

> *In my view, the counter-terrorism procedure equals scaling up to the strategic level. I am not authorized to alarm that level. I saw no reason alarm the field command level, as it does not have to be done gradually. I was trying to form a picture and thought of the multiple attacks in Paris, what will happen now? The police were in full action. The ambulance service activated code 10 [which refers to scaling up field command]. Little support was needed from me. I had no reason to activate the command structure, because I felt that could be given at any time*—Coordinator Dispatch Centre Utrecht.

When the incident command structure is scaled up after approximately half an hour, a new location for the field command team is suddenly communicated at 11:37 a.m. Because the dispatch coordinator is worried about the threat of a marauding attack, he decides not to send the field command team to the incident site, but instead to the regional crisis centre. At the tram, the police and medical commander miss the incident command structure and are surprised by their pager alarm to move to a different location.

> *I got a pager message: go to the crisis centre. I thought do they really not know that I am here? They really don't know what we are doing here? In the end, I decided to drive to over there. I saw everyone from the field command team. I explained what was going on and that I would rather have them over there. You are left with a very uncomfortable feeling that you don't belong there at all. We decided to go the incident site. Yet, the victims were all gone. It was a completely different incident when I returned*—On-site medical commander.

This situation shows that making sense of a dynamic situation at a distance is a major obstacle for the teams in the incident command structure. It is difficult for both the dispatchers and the command team to make sense of the situation at the incident scene. When several on-scene commanders are advised to keep distance, it is also keeping them away from updating their sensemaking. Consequently, the dominant frame of a marauding terrorist attack solidifies further as cues that might tell them otherwise are not reaching them (Weick, 1993). As a result, inertia develops in the command structure. The deviation to the command centre causes a delay of 1.5 h before the field command team finally arrives on-scene. It means that the field command team cannot properly fulfil their role to coordinate the multidisciplinary response in the acute phase of the incident.

4.3 | Distributed sensemaking at the tactical and strategic level

Public life in the city of Utrecht is largely shut down in the afternoon when the mayor issues a lockdown in a video message at 2:54 p.m. This was decided previously in a meeting at 12:45 p.m., where the Mayor of Utrecht, Police Chief of Operations, and the Public Prosecutor in the 'local triad', are confronted with cues that signal a marauding terrorist attack (see Appendix S1; Timeslot 2: shooting at three locations, livestream to a mosque and a highjacked car). In addition, the national government raises the threat level to 'level 5: critical' for the entire region of Utrecht, pointing to the acute possibility of a follow-up attack. While this decision seems understandable based on the cues available to the strategic level, in the

meantime new information is gathered by the frontline police teams which results in a distorted sensemaking throughout the incident command structure.

The pooled interdependence between the numerous incident command teams results in vastly different sensemaking (Appendix S1; Timeslot 1–6). At the frontline, Special Intervention Units clear the mosque at 11:26 a.m. and learn from witnesses at the tram site that the suspect(s) have fled in a red Renault Clio. By 11:30 a.m. it is clear to the Special Intervention Unit that the attack is not occurring at multiple locations, but on one main location around the tram. This information also reaches the Criminal Investigation Units working in the police station at the tactical command level. After careful investigation, these teams also invalidate the livestream at 12:10 p.m., as it turns out to be an old post. At 12:15 p.m., the Special Intervention Units on-scene locate the abandoned getaway car. A formal letter from the justice department is attached to the car about terms of imprisonment, which identifies the suspect's name, including a handwritten motive: *'I do this for my religion, you are killing Muslims and want to take away our religion from us, but you will not succeed. Allah Akbar'*. In about 45 min, several cues that originally pointed to a marauding terrorist attack (i.e., attack on multiple locations, livestream) are invalidate by on-scene units and the Criminal Investigation Unit. Based on this information these teams start to break away from the frame of a marauding attack. However, this information does not reach the strategic level, where at 12:45 p.m. the decision of a lockdown is taken (see Appendix S1; Timeslot 3).

Complicating matters, during the Strategic Team's meeting at 12:32 p.m., a hostage situation in a bank is reported. At first glance, this cue corresponds the frame of a marauding attack throughout the city. While the Special Intervention Unit responds immediately and reports a false alarm 9 min later, this information does not reach the Strategic Team (see Appendix S1; Timeslot 3).

> *The lockdown made it appear that it was still very dangerous on the street. I assumed that it was information from the police and prosecution. The police could not confirm that we were dealing with 1 location and 1 suspect. People were still on-edge, because of the bank*—Operational Leader as Liaison in the Strategic Team.

The frame of a marauding terrorist attack lingers on in several teams operating at the tactical and strategic level until at least 15:00 p.m. in the afternoon (Appendix S1; Timeslot 5–6). Several teams are able to gradually break away from the frame of a marauding attack by invalidating various cues. In contrast, the strategic team's decision to break with the frame of a marauding attack occurs hours later, and can be pinpointed to a crucial moment (in Timeslot 6), when finally, the frame is falsified by a phone call with the commander from the Criminal Investigation Unit.

> *The police Chief of Operations called me and asked: 'can we revoke the lockdown?' I said 'is there a lockdown?' I had no clue, we had our focus on the investigation. I said, 'What are you talking about?' I started telling him our story. He responded like, 'wait a minute, I'll put you on speaker'. I told them the state of affairs with regard to the manhunt. This led to the lockdown being revoked*—Commander Criminal Investigation Unit.

The effects of the inertia that developed in the operation become clear when about 13 min after the lockdown is officially communicated to the general public, the Strategic Team decides to revoke the lockdown again in their meeting. The general public is notified at 4:38 p.m. that the measure to stay indoors is revoked.

4.4 | Distributed sensemaking in the police manhunt

The search for the perpetrator(s) by the police is organized according to the manhunt protocol. At 11:15 a.m. the commanders of the Criminal Investigation Unit are alerted while in a meeting, and immediately scale up their command structure and send three liaison officers to the crime scene. This form of frontline command ensured that crucial information is received early in the incident, whereby they gain a decisive information advantage over the general command staff. Throughout the afternoon, the coordination with the general command staff remains fragile.

> *What I found very difficult that day: I was both in the general command staff and I had to maintain contact with the Criminal Investigation Unit. I ran up and down the stairs. I just didn't have time to read and arrange things. At one point the meeting times also started to synchronize, which meant coordination was over. The Criminal Investigation Unit became completely independent*—Commander of Investigation in the General Command Staff.

The problems of connecting to the general command staff are also experienced by the on-scene police commander.

> *We continuously experienced that the link between the crime scene, criminal investigation and the general crisis staff was broken. There was no information exchange whatsoever. At one point I was able to get in touch with the forensic coordinator of the general command staff. He literally said: what do you want, I'm completely overworked, I don't have time for you*—On-scene police commander.

While the command structure breaks down into separate partitions that struggle coordinate based on pooled interdependence, the Special Intervention Unit continues their manhunt on-scene (see Appendix S1; Timeslot 3). After identifying the suspect's name on the letter on the getaway car, his known whereabouts are extracted from

information systems and put under immediate observation (see Appendix S1; Timeslot 4).

> *The suspect's address came into view around 12:30 p.m. Our preference was to enter immediately. Ultimately, someone else decides differently. But if you acted, you would have clarity at 1:30 p.m. You could have waited for the scenario of multiple perpetrators, but at least you had him*—Operational Commander Special Intervention Unit.

At the same time, the Criminal Investigation Unit, who authorizes raids together with the public prosecutor, pushes back. They engage in a very different type of sensemaking related to their team's identity of investigation (see Appendix S1; Timeslot 5).

> *We had the objective to prevent follow-up attacks. We believed that in order to prevent further attacks, we had to continue to make an incredible amount of investment to map the suspect's network. What does the focus on him cause to parties he might be working with? The moment you raid the wrong building, they could be warned*—Commander Criminal Investigation Unit.

This tension accumulates with the on-scene commander from the Special Intervention Unit that goes to the crisis centre to confront the general command staff.

> *I literally saw them sitting in a warm bath. Oh, let's have a talk. I witnessed a special phenomenon. You have all those commanders calmly consulting, and we're looking for a suspect. There is no feeling of 'we must act now!' That is unbelievable. Commander, I expect you to have that information. But he had no information at all, he had no solid contact with the Criminal Investigation Unit*—On-scene commander Special Intervention Unit.

This experience is also stressed by the commander himself, who had huge difficulties in connecting with the ongoing operation.

> *Communication did not go well there. We had a liaison from the Special Intervention Unit in our command team, who could simply listen live to his units on the street. He said things in a meeting where I was rattling my ears, I would have liked to know that too. Still, my own staff didn't provide any information to me until it was validated*—Commander of Investigation in the General Command Staff.

As a result, the police General Command Team also failed to update the Strategic Team through the formal communication lines (Appendix S1; Timeslot 6). This is an important part of the dynamic that explains why the strategic team remained fixated on the marauding attack, and later did not interfere with the decision whether or not to raid the premises under surveillance (as is visible in Appendix S1; Timeslot 5–6).

> On a number of points in the criminal investigation that picture was flawed. I think it's a crucial decision whether to raid the premises or not. But we didn't have that on the table in the Strategic Team. …There have been conversations with other commanders, where I said I want the information to get through faster. I don't need to know each detail, but it does matter a lot whether you assume there are one or more perpetrators. It makes a big difference whether you start from one or more incidents. Our decisions are based on that!—Police Chief of Operations.

These coordination problems continue throughout the afternoon, until at 4:13 p.m. the Criminal Investigation Unit traces a bank transaction to the IP address of one of the houses under observation. After obtaining permission, the Special Intervention Unit raids three locations simultaneously, whereby the terrorist is arrested and identified at 6:19 p.m. Typical of the coordination problems, the raids were conducted during the Strategic Team's national press conference, where the Police Chief of Operations, to his own surprise, is handed a note that the suspect is arrested. The national threat level is scaled down, while the Criminal Investigation Unit continues to work for a series of days to determine whether the suspect definitely acted alone. In the following weeks, the team will verify that the suspect acted alone. On March 20, 2020, the tram shooter is sentenced to life imprisonment.

5 | DISCUSSION AND CONCLUSION

This paper focused on the question: *how did crisis managers make sense of the Utrecht tram attack and how did they distribute their sensemaking?* The analysis of the tram attack highlights the challenge of synchronising partial images throughout a distributed command and control structure. At the start of the operation, multiple cues are interpreted and joined into a frame of a marauding terrorist attack, which is acknowledged and sustained by the activation of the counter-terrorism procedure. The analysis confirms existing ideas on how commitment to a frame can create substantial blind spots in an operation (Cornelissen et al., 2014). Once a frame is catching momentum it requires serious energy to be stopped. The more momentum a frame has, due to the number of cues assigned to it and the escalation of commitment, the harder it is to break.

This study indicates that noticing discrepant cues is not sufficient to foster re-evaluation, but the essence lies in the social (group) processes that stimulate doubt. New information was gathered by frontline teams who, driven by plausibility, were able to assess the validity of initial cues, adapt their sensemaking, and break away from the dominant frame. They were not able to distribute their updated

sensemaking throughout the command and control structure, as the interactions between teams operating in that structure became characterized by pooled interdependence. This entails that teams worked independently on tasks that were split between them, but had little direct contact. It resulted in the situation were frontline teams quickly adapted and contained the suspect, while teams at the tactical and strategic level, kept fixated on the frame of a marauding attack, resulting in a lockdown.

Based on the analysis of the tram attack, a number of key factors that either hamper or stimulate distributed sensemaking can be identified. The first factor is the *type of interdependence* that is used to coordinate between teams. Challenging a dominant frame requires reciprocal interdependence that is associated with cognitive processes of doubt, questioning, and a plurality of perspectives (Weick, 1993, 2005). In accordance, this study shows that command and control structures in essence rely on a form of sequential interdependence, but when more and more teams are activated, pooled interdependence is likely to become dominant as transaction costs for the communication between teams increase. This limits the capacity of teams to question the information they receive and restricts their capacity for adaptive sensemaking. To increase the capacity for adaptive sensemaking, reciprocal interactions are important for tapping into the so called 'conceptual slack', a divergence in analytical perspectives among actors, which is qualified as a distinctive feature of high-reliability organisations (Schulman, 1993).

The second factor is retaining sensitivity to operations by having a view on the frontline action (Weick & Sutcliffe, 2011). The speed of operations is increased in the frontline by directly testing cues, while decision-making cycles at the tactical and strategic level lag behind (Treurniet & Wolbers, 2021). Strategic teams that engage with operational units are often regarded as falling prey to 'operational fixation' (Boin et al., 2017). Yet, a too rigid stance to prevent operational fixation can also defer from sensitivity to operations (Weick & Sutcliffe, 2011). In that sense, Boin et al. (2017, p. 47) warn for the 'bunker syndrome', which describes the tendency of members to stick together and reify their own view of the crisis in relative isolation from their counterparts that adopt different perspectives. Similarly, Snook (2002, p. 173) warns for the 'fallacy of centralization', the belief to be at the centre of information, resulting in the idea that not receiving information is a sign that there are no new updates. In this study, we noted signs of 'pluralistic ignorance' (Weick, 1990) where the assumption is made that someone else will act, with little need to intervene oneself. All these different concepts point to cognitive problems with sensitivity to operations, which results in a situation where decision-inertia is likely to occur (Alison et al., 2015).

The third factor is the role of plausibility in the type of information that is considered. A strong belief in crisis management is working with *validated information*, which should be separated from unvalidated 'noise' that is imminent in any hectic operation. This study highlights that working with validated information triggers the logic of accuracy, instead of a sensemaking logic driven by 'plausibility' (Weick, 1995). Plausibility is vital for sensemaking, as it motivates people to search for additional cues, pulling them towards the realm of action, where information is made meaningful by actual use (Weick et al., 2005). Accepting only validated information may likely trigger a detached and clean situational understanding, in which context is lost. In this study that is clearly visible in the police general command staff, where vital insights into the progression of the manhunt are missed because the team accepts only validated information. In that sense, the institutional environment of a command and control structure pushes for closure, which makes these teams susceptible to a rigid framing. Instead, it is '*plausibility that gets people in action, which is helpful when accuracy is a moving target*' (Weick, 2005, p. 61).

The fourth factor is the importance of *hierarchy* to disrupt and break lingering frames. Weick et al. (2005, p. 414) propose that people are able to break away from a dominant frame when '*an expectation of continuity is breached, ongoing action becomes disorganized, and efforts are made to construct a plausible sense of what is happening*'. This is not a neutral process, as Barton and Sutcliffe (2009) note that the ability to voice concerns, incorporate a multiplicity of perspectives, and break away from institutionalized work practices is related to authority. A key finding that this study mirrors is that people refrain from speaking up out of deference to expertize to higher-ranking officers. The false assumption is that senior command also has the most overview (Barton & Sutcliffe, 2009). It is only when the high-ranking commander of the Criminal Investigation Unit explains his take on the events through a phone call with the Strategic Team, that this team asserts enough confidence to break away from the frame of a marauding attack.

The fifth factor concerns the role of *identity*. Identity is vital for sensemaking, as one's self-image shapes how events are interpreted and enacted, which in turn affects the image of outsiders (Weick et al., 2005). This dynamic also played a key role in the prolonged manhunt by the police. Special Intervention Units are known for a pragmatic hands-on approach that enables rapid improvisation in their raids. The Criminal Investigation Unit, instead, perceived this identity from a threat of 'rogue action'. They pushed back, enacting their identity of careful investigators and stalled the intervention. The resulting conflict resulted in inertia and a breakdown of sensemaking between these teams, as intervention units felt ignored, while being convinced of having the suspect within reach.

In sum, these five factors of interdependence, sensitivity to operations, plausibility, hierarchy, and identity play a key role in distributed sensemaking. It signals that breaking away from a dominant frame does not only require noticing discrepant cues, or merely updating information, but is influenced by key social and organisational processes that stimulate doubt, questioning, and the incorporation of a plurality of perspectives. Incident command structures naturally push for closure and validation within a framework characterized by sequential or pooled interdependence, while adaptive sensemaking requires reciprocity and a logic of plausibility. The key lesson is that how people make sense of a situation very much depends on the way in which they are organized.

This offers some practical implications for improving the cognitive properties of groups by looking for ways to rearrange their social

organisation (Hutchins, 1995). A major step to improve distributed sensemaking in incident command systems lies in trying to offset strong cognitive predispositions, such as confirmation bias, the bunker syndrome, and the fallacy of centralisation. In that respect, engaging in episodes that feature a richer interdependence among actors might help to induce different ways of thinking in command teams (Weick, 2005). The more radical option is exploring how to redesign a completely new flexible incident command structure, while the more pragmatic solution lies in 'repairing' its structural deficits. Such repairs might include assigning liaison officers to break through layers, appointing individuals in teams to monitor for social cognitive fallacies, or actively seeking moments to engage in reciprocal interaction between teams through telephone calls (Uhr et al., 2008).

The more radical idea is to rethink and experiment with the structural design of incident command systems so that it can better support distributed sensemaking and harness a plurality of perspectives. This offers opportunities for a renewed research agenda. The five factors that shape distributed sensemaking, as identified in this study, might be considered as important building blocks in this quest. Although designing new command systems is not unproblematic in an exceedingly institutionalized setting, it might be a crucial step forward, as several reviews indicate that sensemaking problems in command and control structures continue to impair the quality of crisis and disaster management (National Research Council, 2006; Treurniet & Wolbers, 2021; Wolbers & Boersma, 2013).

The quest for alternative structural forms may challenge conventional hierarchical structures and offer a new balance between stability and flexibility (Schreyögg & Sydow, 2010). For instance, the concept of 'heterarchy', may offer an alternative organisational form to support distributed sensemaking, in which the relational system among actors may shift over time depending on the resources that become relevant to address evolving demands and uncertainties (Aime et al., 2014). Another starting point is the concept of 'teams-of-teams', in which semi-autonomous units continue to reshape and flatten their own governance structure through shared purpose and empowered execution, while only interacting around specific goals (McChrystal et al., 2015). Future studies could focus on how to foster alternative structural designs that increase cognitive capabilities, so that actors can connect and represent their joint contributions, refine their judgements, and perceive a more nuanced context. In any case, the key challenge for improving distributed sensemaking lies in finding ways to actively stimulate sensitivity to operations, a logic of plausibility, and an attitude of being open to deviant cues in an interdependent network of interacting command teams.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of the article at the publisher's website.

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