


# Situational awareness in a creeping crisis: How the initial phases of the COVID-19 pandemic were handled from a crisis management perspective in the Nursing Home Agency in Oslo

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## Abstract

In March 2020, the municipality of Oslo's Nursing Home Agency was hit by Norway's first COVID-19 outbreak. Being responsible for a very vulnerable group, they had to deal with a situation never before encountered and of which they had very limited knowledge. In this study, we explored how situational awareness (SA) changed from a creeping to an urgent crisis. We undertook a case study of the Nursing Home Agency's top management during the initial period of the COVID-19 pandemic (December 2019 through late March 2020). We conducted individual interviews with the management in charge of decisions. Thematic analysis yielded four main categories affecting SA: perception of event development, perception of available time, information, and cooperation and trust. We found that subjective experience of the geographical proximity of the crisis and subjective experience of time were essential in shaping SA. Perception of time was essential to the understanding of urgency, which was an important factor in reacting properly. Further, the perception of space was necessary for the crisis to be interpreted as critical. Time and space are objective factors but are perceived subjectively. Our model showed that the crisis must be perceived as urgent for proper actions to be decided upon.

## KEYWORDS

COVID-19, creeping crisis, decision making, management, pandemic, situation awareness, uncertainty

## 1 | INTRODUCTION

The novel coronavirus pandemic started in Wuhan, a major city in China's Hubei province. On 31 December 2019, the World Health Organization (WHO) registered that the Wuhan Municipal Health Commission in China had reported that several cases of viral pneumonia had been identified in the city (Huang et al., 2020). At this time, the background of the disease outbreak was unknown. Just over a week later, it was confirmed that the outbreak was due to a coronavirus, and that the probable root cause was the Huanan

Seafood Market (Chen et al., 2020; Huang et al., 2020). That same week, Chinese authorities reported the first corona-related death. However, many uncertainties still persisted (Buckley & Myers, 2020), and 2 weeks after the WHO's first registration, the virus was found outside of China. At the end of January 2020, it was confirmed in Europe—first in France, on 24 January (Spiteri et al., 2020), and within days in several European countries, including Sweden (TT, 2020), the Netherlands (NU.nl, 2020), and Italy (DiMascio et al., 2020).

Although the WHO declared a 'Public Health Emergency of International Concern' in late January, Europe was not properly

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alerted (Engstrøm et al., 2021)—as late as 13 February, the European Centre for Disease Prevention and Control stated that ‘the risk associated with SARS-CoV-2 infection for the EU/EEA and UK population is currently low’ (European Centre for Disease Prevention and Control, 2020, p. 1). However, at a press conference on 11 March, the WHO defined the corona outbreak as a pandemic and made a clear statement: ‘Find, isolate, test and treat every case and trace every contact: Ready your hospitals; Protect and train your health workers. And let’s all look out for each other, because we need each other’ (World Health Organization, 2021).

On 26 February 2020, the coronavirus was first detected in Norway. The first cases involved infections contracted abroad, but by the beginning of March, the first case without known close contact with a confirmed infected person had been reported. The National Institute of Public Health (NIPH) reported that the increase in the number of infections at the end of March in Norway was greatest in the area of Oslo, Norway’s capital (Norwegian Institute of Public Health, 2020). At this point, Oslo was thus described as the epicentre of the Norwegian epidemic (Kibar, 2020). The last serious pandemic context involving a large number of deaths in Norway was in 1918–1919, often referred to as the Spanish flu, during which approximately 15,000 people died (Borza, 2001). Other flu pandemic threats, such as the swine flu in 2009, partly laid the foundation for the national preparedness plan on pandemic flu that was passed by the Ministry of Health and Care Services and revised in 2014 (Norwegian Institute of Public Health, 2022). In the Oslo Municipality, the City Council—responsible for health, the elderly, and citizens’ services—revised its plan for infection control in 2009 due to the swine flu. This also led to a pandemic preparedness plan for the Nursing Home Agency (Oslo Municipality, 2019).

The Nursing Home Agency in the municipality of Oslo is Norway’s largest operator of around-the-clock healthcare services. Just before COVID-19 was detected in Norway, the agency’s management decided to reorganize its resources to deal with whatever might be coming. The arrival of the COVID-19 pandemic led to a total upheaval of everyday life for the administration and its institutions, as new working methods, reporting routines, statistics, procedures, and interdisciplinary working groups were established. In March 2020, the health authorities introduced strict measures to safeguard the lives and health of the elderly in health institutions. This entailed strict restrictions for employees, and, among other measures, health personnel were denied the ability to travel abroad in the summer of 2020. In addition, there was regular testing as well as strict rules for quarantine. Foreign employees also had major problems entering Norway. This was a great strain, and it required that the employees of the Nursing Home Agency had to live a significantly more restricted life than before the pandemic to comply with the rules that were introduced. Furthermore, to prevent infection among employees in the administration, work-from-home solutions were introduced, along with new digital supporting technologies. The Nursing Home Agency shifted from ordinary operations to establishing a contingency organization whose management needed to learn early on how to digitally conduct crisis management. The administration also published several guidelines and procedures to prepare its institutions to

properly care for residents of long-term homes, patients in health centres, and frontline staff.

When the COVID-19 situation began in Norway, it was not considered to be a crisis that would develop quickly. Rather, it had the characteristics of a slow-burning and more creeping crisis, which could make it harder for those involved to perceive its seriousness and how much time is available to take appropriate actions (Boin et al., 2020). In other words, the management’s situational awareness (SA) (Endsley, 1995) of the time available to make decisions could be influenced by the type of crisis they faced.

The current research presents a case study of Oslo’s Nursing Home Agency during the initial period of the COVID-19 pandemic, from December 2019 through the end of March 2020. To explore the development of the situation based on the management team’s perception of the crisis and contextual factors, we established the following research question: *How can the context of a creeping crisis affect SA for decision-makers?*

## 2 | THEORETICAL FRAMEWORK

### 2.1 | Creeping crisis

A creeping crisis can be defined as ‘a threat to widely shared societal values or life-sustaining systems that evolves over time and space, is foreshadowed by precursor events, subject to varying degrees of political and/or societal attention, and impartially or insufficiently addressed by authorities’ (Boin et al., 2020, p. 122). This implies that creeping crises pose a unique challenge in that they may be more difficult to detect than urgent crises. Creeping crises involve threats that often consist of a series of minor, seemingly manageable events. Due to the slow and creeping properties of such crises—wherein a problem develops gradually over months, years, or decades—the associated threat often does not attract sufficient attention early enough (Beamish, 2002).

Although this type of threat may raise concern among some professionals and experts, it often fails to generate a sense of danger among a larger audience (Boin et al., 2020). The concept of a creeping crisis is not new; however, while the term can be found in the crisis literature from decades ago, its meanings have often been varied (Beamish, 2002; Bruins, 2000; Hart & Boin, 2001; LaPlante & Kroll-Smith, 1988; Rosenthal et al., 2001; Seabrooke & Tsingou, 2019; Turner, 1978).

Research on crises and crisis management has largely focused on fast-burning crises (Hart & Boin, 2001). Rosenthal et al. (2001) presented a widely accepted and commonly used general definition of a fast-burning crisis: ‘a serious threat to the basic structures or the basic values and norms of a system, which under time pressure and very uncertain circumstances necessitates making critical decisions’ (p. 10). Rosenthal et al. (2001) further assumed that a crisis cannot be defined in absolute terms: a crisis for some may be an opportunity for others, and crises can give rise to several—even conflicting—perceptions of a situation. Significantly, this definition of the

phenomenon of a crisis recognizes that the experiences of danger and urgency are social constructions linked to human perception. It is only when a group of people perceives something as an urgent threat—that is, as something that must be addressed right now—that the threat can be defined as a crisis (Boin et al., 2020).

### 2.1.1 | Two dimensions of a creeping crisis

A creeping crisis has a time dimension and a space dimension. The threat develops as a dormant process over a long period of time, only to suddenly manifest as a seemingly isolated acute event. The dimension of time refers to the rate at which the crisis develops. Such development is not necessarily linear: it may accelerate at times, while stagnating or reversing in other periods. From a temporal perspective, the crisis can be said to degenerate in a slow burn with random 'sparks' (Boin et al., 2020).

The space dimension refers to the location in which the crisis develops. Locations can be purely geographical or can be part of a system. A creeping crisis can move from one location to another or manifest simultaneously in different systems or locations. In a society within which processes increasingly cross-national borders, a seemingly unrelated event in a faraway country can suddenly manifest as a regional or local crisis (Boin et al., 2020).

## 2.2 | SA

Research on SA has been conducted in a variety of settings, and several researchers have developed different definitions and theoretical perspectives to describe having and developing SA (e.g., Endsley, 1995; Fracker, 1988, 1991; K. Smith & Hancock, 1995; Salmon et al., 2009; Weick, 2001). While Endsley (1995, 1996, 2015) mainly focused on aviation, her theory has been used in many different contexts, such as maritime (Øvergård et al., 2015), military (Mitaritonna et al., 2020), nuclear (Reinerman-Jones et al., 2019), road traffic (Rasulo et al., 2020) and human interaction with automation (Endsley, 2017). SA continues to be one of the most widely used theories on making awareness in various contexts. Thus, the current study is based upon Endsley's (1995) definition of SA as 'the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future' (p. 36). Basically, SA is a term concerning the understanding that a person has throughout an event.

SA is divided into three levels (Endsley, 1995). The cognitive processes that take place at various levels are called situational assessments; they involve acquiring, achieving, and maintaining SA. Situational perception (Level 1) involves the perception of elements in the environment and the capturing of various signals that are relevant to the situation. Situational understanding (Level 2) is an understanding of the current situation. The signals constituted by the elements in the environment are put into context, beyond simply

registering the presence of the signals—one must understand and interpret the significance of the signals in relation to the current situation. Situation prediction (Level 3) is the projection of the interpretations into future events—a person's ability to predict the development of the situation in the near future (Endsley, 1995). Thus, the higher levels depend on the success of the lower levels (Wickens, 2008). In other words, the process of establishing an understanding of the situation and the actual SA are two different aspects.

Even though SA consists of three levels, gaining SA is not necessarily a strictly linear process; rather, it is composed of ascending levels. A simple progression is not an efficient processing mechanism in complex and dynamic realities (Endsley, 2015). This could be explained by the statement that 'SA presents a level of focus that goes beyond traditional information-processing approaches in attempting to explain human behaviour in operating complex systems' (Endsley, 1995, p. 32). This relates to how the process links to creating mental models, which guide interpretations of information in a given situation. This is further connected to the fact that people play an active part in obtaining SA, as they allocate their attention to gather information based on their mental models. It is not a passive process where people receive displayed information; rather, it is an active process where an individual perceives, understands, and projects to predict future incidents (Endsley, 2015).

Thus, the process of gaining SA can also be defined as a form of making sense (Weick, 2001). Hence, we refer to sensemaking as the process of establishing SA. This process is transitory, and it is influenced by factors such as design, training, and environmental and individual factors (Endsley, 1995). The interpretation of the situation will depend on individual factors such as people's natural tendency to search for order (Weick, 2001), as well as cognitive structures including perception, memory, and mental models. This means that although SA is defined as a person's knowledge of the environment at a given time, it only represents a temporary contextual image. This temporality suggests that to maintain SA, the ability to update the information held is important, as the situation is constantly changing. This is the time dimension. Additionally, SA will be influenced by a space dimension. The space dimension could be the physical distance between elements that are seen in relation to each other—for example, where an event such as COVID-19 takes place (e.g., in China) in relation to oneself at a given time (e.g., in Norway). Information about the development of various elements, such as how quickly something moves, changes, or expands, will determine which aspects of the environment are important (Endsley, 1995).

SA can also be applied to a group (Endsley, 2021; Salas et al., 1995; Stanton et al., 2007, 2017). Regarding safety and crisis management, there are often several people working together to make decisions. In such settings, it is conceivable that the shared SA consists of each individual team member's attention to different elements that they are concerned about, based on the person's area of responsibility in the team. However, to make good decisions, the group should have some degree of shared understanding of the contextual factors to coordinate the team's tasks. Shared SA is often

understood as the extent to which each team member has the SA required for their area of responsibility. If everyone needs to be informed about an element, it is not sufficient that one possesses all the knowledge while others have no knowledge at all (Endsley, 1995).

Situation awareness in groups is also closely related to distributed situation awareness (DSA) (Stanton et al., 2007, 2017). This concept is related to how situation awareness is shared or distributed in dynamic systems. This concept includes nonhuman agents in a sociotechnical system. In other words, technological artefacts are included as part of the awareness as a whole, as the technology also has some level of SA. This differs slightly from Endsley's (1995) concept of shared situation awareness. However, there is a resemblance, in that different agents have different views on the same context depending on their perspective. Thus, past experience, memory, training, communication and collaboration are highly relevant for achieving DSA in a system that is dynamic.

The ontological process of creating SA relates to the definition of the domain, which here is an abstract class 'situation', and the subclasses could be defined as 'goals', 'object', and 'relations' (Gruber, 1993). The goal is to minimize the effect of the virus, and the object is the virus, which at this point has unknown consequences and movements as attributes. The relations integrate classes and describe them, and the relation of the object is also unclear at this point; the people involved are dealing with a new unknown situation of which they do not know the speed or the consequences.

Even though Endsley's (1995) SA concept has been critiqued throughout the decades for various reasons—for instance, that it is a real concept without explanatory value or that it is not on an epistemological and ontological level (Dekker & Hollnagel, 2004), that mental models are not well-described phenomena in SA (Smith & Hancock, 1995), that the model is strictly linear and does not accord with real-life settings (Sorensen et al., 2011), or that it focuses only on the state of SA and not the process of getting there (Salmon et al., 2009). Nevertheless, it is still one of the top concepts used for exploring the comprehension of complex contexts. Thus, we find it interesting to compare the theoretical aspects of SA and creeping crisis in this study.

## 3 | METHODS

This case study used a qualitative explorative design. Thematic analysis was applied to categorize the data from an inductive perspective (Braun & Clarke, 2022).

### 3.1 | Researchers

The researchers' backgrounds are in safety and organizational psychology. Two hold PhDs in psychology and have several years of experience conducting and teaching qualitative research as well as working in safety management and human factors. Two hold a Master of Business Administration (MBA) degree in safety and crisis

management and work on a daily basis with safety processes in praxis.

### 3.2 | Context

The Nursing Home Agency in Oslo consisted of an administration with around 80 employees responsible for administering 42 institutions that are run either municipally or by private nonprofit and commercial actors on behalf of the municipality. There are approximately 4100 full-time places and 500-day places. In total, approximately 10,000 employees work at the agency's various institutions (Oslo Municipality, 2021).

### 3.3 | Data collection

#### 3.3.1 | Informant selection criteria

The case study was a single-case design with one analysis unit: emergency management in the Nursing Home Agency was defined as one analysis unit, and crisis management in the initial phase of the COVID-19 pandemic was defined as one incident or case (Yin, 2009). Given the analysis unit of emergency management in the Nursing Home Agency, a natural target group was people who were members of the emergency management team throughout the handling of the COVID-19 pandemic. Three selection criteria were defined: (1) played a role in crisis management in the early stages of the pandemic, (2) had the authority to make decisions on the basis of the Nursing Home Agency's defined action card, and (3) had been involved in key decision-making processes. Thus, the Nursing Home Agency's management group was considered the most appropriate analysis unit. In total, we invited eight people to participate in the study, of whom seven agreed to be interviewed.

#### 3.3.2 | Interviews

In total, we conducted seven semistructured individual interviews based on preprepared interview guides. Three interviews were conducted in person and four were conducted digitally using Microsoft Teams. The interviews were conducted in October and November 2020 and were all recorded and transcribed. Each interview lasted approximately 1 h.

#### 3.3.3 | Crisis Information Management (CIM)

In addition to interviews, the CIM log for the Nursing Home Agency in the municipality of Oslo was used. The CIM software is a comprehensive management system for quality, safety, and emergency preparedness (F24, 2020a) and has been chosen by the Directorate for Civil Protection and Emergency Planning as the

standard tool for emergency preparedness and crisis management (DSB-CIM) in Norwegian municipalities (F24, 2020b). The Nursing Home Agency used DSB-CIM as its digital crisis support tool in handling incidents. All members of the emergency management team were responsible for logging their own actions in CIM (Sykehjemsetaten, 2020). Furthermore, the minutes of all meetings conducted by the emergency management team throughout the handling of the pandemic were logged. This involved an extensive amount of data. The data we extracted from CIM were qualitative and textual in nature, and our analysis was based on the information we extracted.

### 3.4 | Analysis

Data were analysed using inductive reflexive thematic analysis, a method for identifying, analysing, and reporting patterns (themes) in data (Braun & Clarke, 2006, 2021, 2022). This is a flexible approach to data analysis that is implemented in phases based on critical realism (Braun & Clarke, 2021). Critical realism is a philosophy that defines an objective reality but, at the same time, recognizes subjective interpretations of reality—for instance, based on culture or zeitgeist. In this sense, it exists between the positivistic and subjectivistic paradigms. In general, critical realism is based on an ontology between empirical realism and transcendental idealism (or constructivism) (Taylor, 2018). Braun and Clarke (2022) state that their reflexive thematic analysis arises from ontological realism and epistemological relativism.

The coding process was mainly conducted by two of the researchers through transcription. The initial phase was conducted by thoroughly reading the transcribed interviews and CIM log until the researchers were well acquainted with the content of the data. While reading, the researchers took notes and made suggestions for meanings, themes and patterns. Next, coding was conducted. The coding process involved a systematic approach, labelling the topics that emerged in the text, line by line or section by section. The labels were thus grounded in the data material. A total of 53 codes were initially defined and then grouped into more abstract categories, which were given labels to reflect the content or themes. This was done by grouping the codes into categories, named according to the content or themes in the various categories. The project map function in NVivo was a useful tool in this phase, as we could more clearly visualize the codes, categories, and links between them. This was a dynamic process in which we went through the data material, the codes, and the categories in several rounds. Where new understanding through the process was gained, we could go back and make changes to the codes and categories to reflect new understanding and knowledge. Thus, some categories were merged where the content of the codes naturally belonged together, and some categories were split into new categories or subcategories (Braun & Clark, 2022).

The end result in this phase was nine categories, where each category consisted of several subcategories (codes) with associated data (coded text). Lastly, we critically reviewed the categories and

chose the themes we interpreted as being relevant to the research question. This phase consisted of further clarification of the various topics. Each theme was given a name that reflected the essence of the theme. In this way, the analysis went from descriptive codes to a more abstract level with interpretive codes and categories, which reflected the interpretation of the data material content to a greater extent. By conducting such an analysis of each theme, the concept of each theme was identified (Braun & Clark, 2006, 2022). The final result was four main categories.

The NVivo software was used to organize and systematize the content of the transcribed interviews. As this was an inductive reflexive thematic analysis approach based on critical realism, generalizability, reliability, and consistency in coding were not the main focus; rather, transparency in the coding process was key (Braun & Clarke, 2022).

### 3.5 | Validity

To ensure validity in our research, we used Yardley's (2000) four principles for quality in qualitative research. First, sensitivity to context involves being aware of the research and theory that already exist on the topic of the study, as well as the social context and reflexivity of the researchers. This principle was met by introducing a theoretical framework, our background as researchers, and the context of the Nursing Home Agency during the initial phase of the pandemic.

Second, commitment and thoroughness were ensured throughout the process of data collection, analysis, and report writing, as explained above. Data analysis was carried out according to the well-known method of thematic analysis (Braun & Clarke, 2006, 2022), and we followed the chosen methodology systematically.

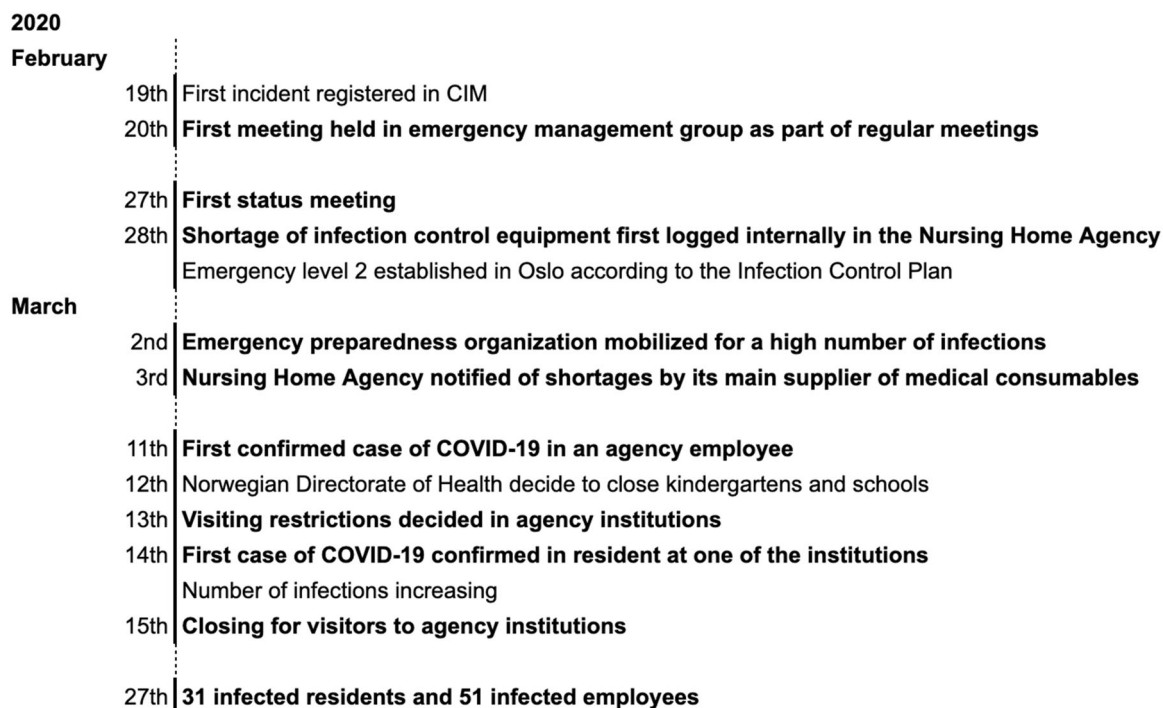
Third, we strove for transparency and coherence with regard to how we conducted the study by providing detailed descriptions of each step in the data collection and analysis, including how we coded and systematized the data. Additionally, we support the findings presented in the results section with direct quotes from the informants.

Fourth, with regard to influence and relevance, Yardley (2000) argues that the crucial criterion for which research must be assessed is its impact and usefulness. We describe this in more detail in the discussion section, where we present the theoretical and practical implications of our work and suggest directions for further research.

## 4 | RESULTS

### 4.1 | Context of development before and in the early phases of the COVID-19 pandemic

By reviewing the CIM log, we obtained a thorough contextual description that offered insight into when and how the pandemic affected the organization, what the informants knew, when they



**FIGURE 1** Timeline with highlights of events based on CIM logging. CIM, Crisis Information Management.

knew it, and what decisions they made on the basis of this information. We decided not to describe the context beyond 27 March 2020, mainly because our focus was on the initial phase of emergency management mobilization and crisis management (Figure 1).

On 19 February 2020, the first incident for COVID-19 was created in CIM. The next day, the first meeting was held among the management group in the Nursing Home Agency in connection with the management group's weekly management meeting. Those who were present were given information about the COVID-19 outbreak in China and the possibility of an outbreak in Norway. There was no known infection in Norway at this time. Furthermore, the management group was informed about the risk of spreading the virus, what symptoms the infected might exhibit, who was at risk for serious illness, and the virus's incubation time and mortality rate. In addition, a possible shortage of personal protective equipment was addressed. A survey had already been initiated, independent of the coronavirus, to obtain an overview of the Nursing Home Agency's total stock of personal protective equipment. The management team assessed the worst-case scenario and decided to appoint an internal group to follow the development of the COVID-19 pandemic, prepare an information campaign focusing on hand hygiene, and revise the agency's pandemic plan. In line with this proactive approach, it was also decided that a ward at an institution should be available in case the municipality or hospitals needed assistance in caring for COVID-19 patients.

Furthermore, several status meetings were held as part of the handling of the pandemic. These were initially informed by external information, as the Nursing Home Agency itself was not yet affected by the infection. In the first status meeting, on 27 February 2020, the

Nursing Home Agency relied on information from national health authorities and their assessments of risk. The minutes of the first status meeting show that the risk assessment from NIPH was reviewed, and the NIPH had asked the health service to prepare for a serious epidemic. At this time, Norway's first infection was registered in Tromsø. The contingency organization was partly established by handing out one of the function-based action cards in the contingency plan. The focus areas from the first meeting were continued, and the work intensified. As early as 28 February 2020, a shortage of infection control equipment was first logged internally in the Nursing Home Agency. The supplier of medical consumables had not delivered on an order of face masks and had announced that it would prioritize hospitals and clinics. The same day, news came that an employee at Oslo University Hospital (OUS) had been diagnosed with COVID-19, and the Nursing Home Agency sent out the first procedure for handling a possible case at the agency's institutions. On this day, emergency Level 2 was established in Oslo in accordance with the city's Infection Control Plan, meaning that the City Council Department had overall coordination responsibility. In the following days, the Nursing Home Agency received more information on the residents and patients who had visited OUS for treatment, and the imminence with which the agency would be affected by COVID-19 became clearer. Infection tracing was performed without identifying close contacts. Several of the Nursing Home Agency's employees were quarantined as a result of close contact with a confirmed infection, travel abroad, or cold symptoms. Early on, a concern was raised as to whether the emergency management would be able to capture all the relevant information and whether the information distributed by the Nursing Home Agency was captured.

On 2 March 2020, the entire emergency preparedness organization was mobilized to plan for a high number of sick employees, infections among residents, and the possibility of visitation restrictions. On 3 March 2020, the Nursing Home Agency was notified by its main supplier of medical consumables that the supplier could not guarantee the delivery of personal protective equipment because there was an international shortage and that it would be triggering force majeure, in accordance with their contract. The Nursing Home Agency wrote several situation reports, which it shared regularly with Oslo's City Council Department and Emergency Management Agency. Gradually, a routine was established wherein all businesses in the municipality of Oslo reported weekly. The reports described the Nursing Home Agency's internal preparations for being affected, as well as how the agency could support the hospitals in the event of extraordinary discharge. On 11 March 2020, the Nursing Home Agency was notified of the first confirmed case of COVID-19 in an agency employee, and the emergency management team met in person in the evening to handle the situation. This was the same day that the municipality of Oslo prepared for central crisis management. On 12 March 2020, the Norwegian Directorate of Health decided to close kindergartens and schools. This had a great impact on employees and had the potential to present a challenge to operations. To limit social contact and the potential spread of infections, the management team decided on 13 March 2020, that visitation restrictions should be established with access control at agency institutions. On 14 March 2020, the first COVID-19 case in a resident was confirmed. On 15 March 2020, the City Council Department notified the Nursing Home Agency that the agency's institutions would be closed to visitors immediately.

During the weekend of 14 and 15 March 2020, the emergency management and staff at the agency's institutions worked day and night to deal with a growing number of infections among employees and residents, escalating from one affected institution to 23 affected institutions within 2 weeks. By 27 March 2020, there were 31 infected residents and 51 infected employees. The context described here is drawn from a timeline consisting of 42 log entries from the period of 19 February 2020 to 27 March 2020. During this period, a total of 534 log entries were registered in CIM.

After 27 March 2020, the number of infected residents and employees increased. One year later, on 26 March 2021, a total of 206 residents and 589 employees had been infected. Several of the infected residents died, and several of the employees became seriously ill. At the most severe point, over 600 employees of the Nursing Home Agency were quarantined at the same time.

## 4.2 | Categories

Based on the thematic analysis, four main categories, each containing subcategories, were identified (Table 1).

### 4.2.1 | Main Category 1: Perception of event development

This category is related to the informants' subjective experiences of the development of the COVID-19 pandemic, from the first time they heard about COVID-19 to when they acknowledged that the COVID-19 pandemic was a serious crisis that had the potential to hit the Nursing Home Agency's institutions in full force. The below quotes show the development of this realization and demonstrate that there were relatively large individual differences with regard to when informants realized the seriousness of the situation.

I remember watching TV when it broke out in China. There was no awareness in the media that it would hit Norway. At least that's how I perceived it then, we watched it happen in China. (Informant 1)

But then, it was simply, in my head, so far away that I thought that, what can I say, to take it in—I thought, it is so far away, it's just a virus, yeah, it will turn out well. (Informant 7)

In the beginning, we probably considered the probability that this would hit us in the near future to be different than reality. We did not disagree that this could have consequences for us or that it would come to our country, but it was the time perspective we were probably most in disagreement with right at the start. (Informant 3)

No, I don't think I thought of it as a global threat and a threat to Norway, until we got to the end of February, the beginning of March, when you began to see how fast this was spreading. That was pretty certain. I did not think about it, or the potential of it, before seeing the spread to Europe. (Informant 6)

### 4.2.2 | Main Category 2: Perception of available time

This category deals with the shift in informants' experience of available time, from feeling that they had sufficient time to feeling that they were in a hurry or even were too late. This finding parallels the experience of risk recognition that we previously described. Initially, all informants experienced having sufficient time. The course of events was experienced as if it was developing slowly and stably. Although there were individual incidents during the course of events that produced an increasing sense of unease for some, it was only when a single incident occurred that was perceived to be sufficiently serious that the informant reached the turning point that resulted in their recognition of the pandemic's seriousness. At the same time—and, we interpret, as a consequence of—this realization, the

**TABLE 1** Categorization of findings including explanations and quotes.

Main category	Subcategory	Explanation	Quotes from participants
(1) Perception of event development	The first time the informant heard about COVID-19	Referring to when informants first heard about the virus, this indicates the time span for the realization of the crisis. All informants heard about COVID-19 between mid-December 2019 and early January 2020.	I remember watching TV when it broke out in China. There was no awareness in the media that it would hit Norway. At least that's how I perceived it then, we watched it happen in China. (Informant 1)
	Perceived risk	The perception of risk was initially low. Informants reported that they associated COVID-19 with China and thus perceived the virus as geographically far away from Norway. In February 2020, risk perception varied among informants, but by March 2020, the potential crisis was clear to all.	I thought, if we fail, and people out there are unable to shut out the virus and use face masks properly and infection control equipment properly, then our residents will die. I thought that. (Informant 7)
	Lack of political guidance	Resource prioritization was regarded as upholding daily routines rather than infection control. Lack of political guidance also resulted in disagreement within the management group during this period.	We had no mandate to stop other processes. (Informant 6)
	Acknowledgement of risk	Referring to when informants first acknowledged the seriousness of the situation, this was often one incident in which an informant understood that the Nursing Home Agency was facing a crisis. There were individual differences in what this incident was, as well as when it took place.	We had one employee infected, and then it turned out that we had one infected resident. Then the seriousness struck. (Informant 4)  It was the weekend when it came to the hospital's eye department. That was probably when [I thought] this can hit us hard. (Informant 3)
	Proactive or reactive	The informants reported an initial wish for proactiveness but experienced a reactive handling of the situation. It took a few months for a more proactive approach to be adopted.	In the beginning, it was very reactive. Then it was from day to day all the time. We tried to be proactive, but I don't think we succeeded. We were very much reactive, almost till the end of May more or less. (Informant 7)
(2) Perception of available time	N/A	This category deals with the shift in the informants' experience of available time, from experiencing that they had sufficient time to experiencing that they were in a hurry or too late.	It was because the infection came from Italy, and we saw that this is very likely to hit us. We probably did not think it would hit us so fast and so hard. We thought we had more time available. (Informant 4)
(3) Information	Lack of knowledge	This category is related to the fact that, at the beginning of the pandemic, informants felt an uncertainty related to the properties of the virus. There was generally little information in society about how the virus spread and how quickly, and little was known about how serious the course of the disease would be for those who became infected.	The authorities had never encountered this virus. They did not know how to deal with it, how sick you could get. There had been indications that this was very serious from seeing reports to seeing how they handled it in Italy and how it was in China. (Informant 7)
	Quick changes	Because COVID-19 was a new and unknown virus, there were constant changes in the information that was communicated by the authorities, media, and professionals. Knowledge about the virus increased as the virus spread, but as a result, the information changed rapidly and there were	We followed the Oslo municipality or NIPH's advice, but there were also some challenges with changes that happened quickly, restrictions, and things like that. (Informant 5)



TABLE 1 (Continued)

Main category	Subcategory	Explanation	Quotes from participants
	Information basis	<p>constantly new guidelines to which emergency management needed to adhere and implement.</p> <p>This category refers to the extent to which the emergency management had sufficient information in the initial phase to implement necessary measures to deal with the pandemic.</p>	<p>We made decisions based on the knowledge we had at the time. And that is what we must do in such a situation. There is no point in looking back all the time. You have to relate to the information you have, and then you have to make decisions. Then you have to dare to make a wrong decision before you get new knowledge again. That's how it is in a crisis situation. You have to act on what you know, and you cannot wait to make decisions. (Informant 4)</p>
(4) Cooperation and trust	Professional trust	<p>This category concerns the degree of professional trust within the management team. Most members had worked together for several years. Trust had been established during the time they had worked together and known each other as colleagues. This professional trust proved to be highly necessary and useful when they came together as an emergency management team. They showed confidence in each other's assessments and expressed openness to the possibility that anyone could speak out and provide input across areas of responsibility. Their expertise was complementary and important in the overall crisis management. Clear areas of responsibility and the confidence that the person who was responsible for a given area was also the one who had the right competence gave informants the space to focus on their own tasks.</p>	<p>Even if we disagree, there is good professional respect between us, and it makes me feel that, for my area, I get a hearing for my views, I certainly do. I experience that my role is greatly understood and that I get a hearing and I get an impact for my things. (Informant 6)</p>
	Cooperation	<p>All informants described a well-functioning team that stood together during the handling of the pandemic. They described how the dynamics of the management team changed as they came together for emergency management, how their collaboration improved, and how they became sharper and more focused on the tasks that they had to solve.</p>	<p>I think that the emergency response team worked very well [...] From the moment we went into standby mode, then you put everything else aside and go into that track [...] everyone has gone all in and focused on what was the mission now. We have been much more disciplined in communications. (Informant 1)</p>

informants expressed that time seemed to accelerate, and the feeling of being in a hurry hit them abruptly. The informants commonly experienced the same shift, but the differences between informants lie in when this shift occurred—something we again see has clear parallels to the time of risk recognition.

So I think we increased resources gradually when we saw how serious this was going to be, but I think you can

never say you were well enough prepared. So when these so-called milestones passed—the first infected employee, the first infected resident, the first death, at least the one that generates a little extra attention—I felt we were prepared for it mentally, but it still goes so fast from us getting the first infected employee, which is a Tuesday night or Wednesday night, until we get both the first infected resident and the [first] dead resident on

Saturday, 3 days later. Then I experienced that it was very quick. (Informant 6)

It was because the infection came from Italy, and we saw that this is very likely to hit us. We probably did not think it would hit us so fast and so hard. We thought we had more time available. (Informant 4)

#### 4.2.3 | Main Category 3: Information

The findings in this category show how the informants experienced the development and access to information—in particular, how they initially had little knowledge of the virus's properties and how the flow of information changed when Norway in general and Oslo specifically became affected. Over the course of events, the informants went from experiencing that there was little available knowledge and information about the virus or what measures were to be implemented in an 'information overload' when the national and local crisis management started in earnest. In sum, these findings show that the informants were aware that their information base might be deficient but still chose to make decisions with the aim of reducing the potential consequences of the pandemic, given that the alternative of being passive and delaying action could entail a greater risk of deaths and serious illness due to the virus.

The authorities had never encountered this virus. They did not know how to deal with it, how sick you could get. There had been indications that this was very serious from seeing reports to seeing how they handled it in Italy and how it was in China. (Informant 7)

We followed the Oslo municipality or NIPH's advice, but there [were] also some challenges with changes that happened quickly, restrictions, and things like that. (Informant 5)

#### 4.2.4 | Main Category 4: Cooperation and trust

This category describes how the informants experienced internal collaboration within the emergency management team and how they clearly expressed professional trust in their colleagues on the management team. We further show how the informants experienced clear differences in how they came together as a management team through the handling of a crisis in comparison with how they cooperated in a normal situation.

I think that the emergency response team worked very well [...] From the moment we went into standby mode, then you put everything else aside and go into that track [...] everyone has gone all in and focused on what was the mission now. We

have been much more disciplined in communications. (Informant 1)

## 5 | DISCUSSION

In 2020, the COVID-19 pandemic represented a new situation for the whole world. During the initial phases of the pandemic, few understood the potential of the crisis and what measures needed to be taken to prevent the virus from spreading. For the Nursing Home Agency in the municipality of Oslo, comprehending the seriousness of the situation at the correct time was of utmost importance in saving patients' lives. This study explored the factors that were involved in establishing SA of the crisis for the management team of the Nursing Home Agency in Oslo, one of the hardest-hit organizations in Norway during the early phases of the pandemic. In this section, we discuss our findings in the context of the research question: *How can the context of a creeping crisis affect SA for decision-makers?*

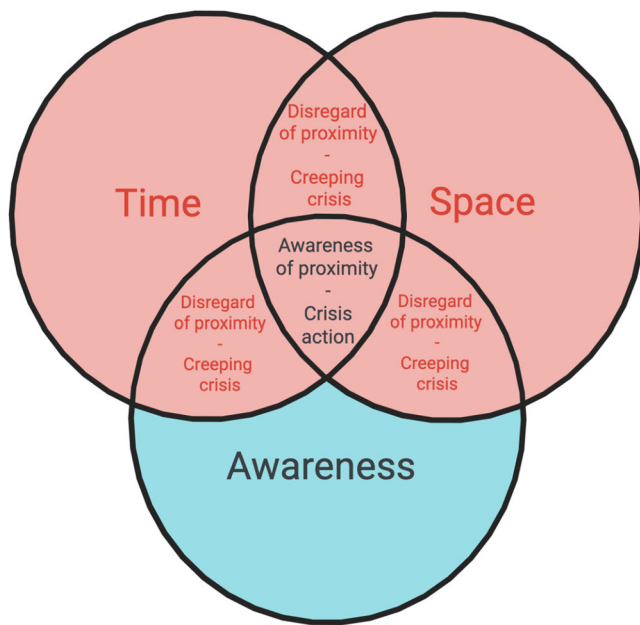
Our findings showed that several factors influenced the management team's SA. Four main categories were identified as important elements of when the informants came to share the SA necessary for implementing measures sufficient for the actual crisis they were facing: (1) perception of event development, (2) perception of available time, (3) information, and (4) cooperation and trust. The overall common factor for these categories was subjective perception, coinciding with the objectiveness of time and space.

### 5.1 | SA in a creeping crisis

Even though SA has been broadly used in the accident literature involving human responsibilities and human errors (Endsley, 2015), SA has been very sparsely used in literature concerning creeping crises. However, we argue that this theory is relevant for this type of crisis.

Time and space are relevant factors for both Endsley (1995) and Boin et al. (2020). Endsley (1995) defined these as situation-based factors. Figure 2 presents time and space segments in conjunction with creeping crisis and SA to show how factors must coincide in order for an event to be perceived as a crisis. It shows the overlap of the time and space segments of factors in a creeping crisis, as well as the time and space segments of subjective perception that must exist to have SA of a crisis. Time and space are critical factors that must be sufficiently present in order for SA to be formed and for a person to experience an event's development as a crisis. If one of these factors is removed, the perception of the situation will not develop into SA, and the crisis will remain a creeping crisis.

The model is a representation that bridges the gaps of the theoretical aspects offered by Boin et al. (2020) and Endsley (1995). It visualizes the factors that must be present for a person to achieve SA in a creeping crisis to avoid a disastrous outcome. The model



**FIGURE 2** PROSA—The PROximity model of Situational Awareness (factors defining the breaking point from creeping crisis to urgent crisis and crisis action based on objective time and space and subjective situational awareness).

shows that the crisis is located at the turning point between time, space, and the subjective perspective. Without the understanding of available time, the crisis will not be perceived as acute; without the understanding of space, the crisis will not be perceived as serious enough for proper decisions and actions to be taken.

The objective factors of time and space took place in the course of events, regardless of the informants' involvement in the incident. Our findings show that the informants started following the development of the COVID-19 pandemic in December 2019, when the virus was still concentrated in Wuhan, China. From this time until 11 March 2020, when the first COVID-19 infection was registered at a Nursing Home Agency institution, there was a geographical spread (i.e., a physical transfer of the threat). This transfer had been ongoing since December, when the media first started reporting on infections in China and our informants first became aware of the situation. Furthermore, our findings show that the experience of a threat based on geographical proximity was individual. For some, it was the media's reports of infections in Italy, while for others it was confirmed infections at OUS. For still others, COVID-19 was perceived as a real threat only when the virus hit an institution.

All informants experienced a shift in the experience of available time when the geographical proximity triggered a recognition that they were facing a real and near threat. They experienced moving from a perception of having sufficient time to handle the situation to suddenly not having sufficient time. This change seemed to trigger a higher level of SA. This experience of suddenly perceiving a lack of time is recognized in the theory of creeping crises, which describes a turning point that marks a crisis's transformation from a gradual development to a sudden acceleration (Boin et al., 2020).

Even though the informants did not have in-depth knowledge of the virus's properties, they had information that indicated that the pandemic would affect them. The CIM log noted that both the WHO and government agencies warned of an impending pandemic and asked the health service to prepare accordingly. Between situational perception and the formation of SA, it seems that informants needed to feel that there was an imminent threat that would strike within a relatively short amount of time. To put it another way, the informants seemed to move from situation perception to SA by experiencing an incident as being acute. The experience of the acceleration of time triggered the cognition and action needed to deal with the situation they were facing. Endsley (1995) noted that a person can use time to achieve a perception of a situation because the elements in the environment must unfold so that the person has sufficient information to form the basis for the cognitive process.

There were individual differences with regard to the specific incident that led each informant to experience COVID-19 as a real threat. Our findings further show that the discovery of the first COVID-19 infection at one of the Nursing Home Agency's institutions constituted the single incident that the informants perceived as being serious enough to create a shared SA that they were in a crisis. Until this point, the processes for acquiring, achieving, and maintaining SA had taken place on an individual level. After this turning point, however, the informants acted as a coordinated group in dealing with the pandemic. There was a turning point between the individual processes for achieving SA to what can be interpreted as the achievement of a shared SA (Endsley, 1995). In particular, those informants who had professional backgrounds in health care were the first to understand the seriousness of the situation. The reason for the emergency management team's achievement of shared SA as a group only when the first infection appeared in a Nursing Home Agency institution can also be explained according to the theory of creeping crises (Boin et al., 2020)—namely, this was an incident that was serious enough to form a common experience of danger. We believe, however, that this can be better explained by Endsley's (1995) theory, in that all informants had gained an understanding of the situation by this time. This takes into account that some informants had already achieved a situational understanding but that it was not possible for the emergency management to handle the crisis as a unit before everyone involved had achieved the same level of SA. It is not sufficient for one person to possess all the knowledge; rather everyone must have SA (Endsley, 1995). From this point on, the informants stood together as a more coordinated emergency management team, and they perceived this phase as being a more optimal cooperation process.

The objective perspective in a creeping crisis is linked to the accumulation of the potential of the crisis; the crisis is understood as a process containing a root cause, an incubation phase, an acute phase, and an aftermath (Boin et al., 2020). Time and space are also independent factors belonging to the objective perspective. In the model, they are presented as factors with which a person must have a subjective relationship. In other words, time and space are understood as part of an objective reality, but a person cannot achieve an

understanding that the event is acute or serious without a subjective understanding of these factors. In this model (Figure 2), subjective understanding is linked to the social and political attention directed toward the crisis (Boin et al., 2020) and constitutes an element of the environment that in turn contributes to a person's achievement of SA (Endsley, 1995).

Boin et al. (2020) linked subjective perspective to the social and political attention needed to achieve a collective experience that something one cares about is in danger. Endsley (1995) described SA as primarily an individual cognitive process, although shared situation awareness is also theorized. In both theories, however, there is a turning point between the individual processes of achieving SA and the achievement of a shared SA. This turning point occurs when all individuals have achieved the same level of SA.

The current study shows that a group of people facing a creeping crisis achieved the understanding of an imminent threat at different times (subjective perception), even when faced with the same threat (objective context). Some of the informants perceived it as a threat in February, while others did not perceive this as something that would hit Norway before one of the residents was infected in March. The 1-month delay in acquiring this perspective could mean a great difference in the resources available for preventive actions, such as preparing the staff or receiving necessary equipment. This difference in when an occurrence is perceived as a threat is best explained by Endsley's (1995) description of individual factors, according to which sensory memory, perception, working memory, and long-term memory are shaped by an individual's acquired knowledge, competence and experience.

The model shown in Figure 2 visualizes the factors that must be present in order for a person to achieve SA. By this, we mean that a person must have a subjective understanding that the development of the event has a given geographical proximity, and the development of the event must be experienced as having a given speed, which together causes the event to be perceived as an imminent threat. As time goes on and the threat becomes geographically closer, the crisis will receive greater social and political attention, resulting in increased SA. The model shows that SA occurs at the crossroads of time, space, and the subjective understanding that a crisis exists. Without the understanding of time, the crisis will not be perceived as acute, and without the understanding of space, the crisis will not be perceived as serious. Time and space are objective factors, but they are experienced subjectively. If one of these factors is removed, an individual's perception of the situation will not develop into a situational understanding, and the crisis will remain a creeping crisis.

## 5.2 | Theoretical and practical implications

The theoretical presentation of SA should address, to a greater extent, how creeping crises affect the development and achievement of SA, as it seems that the situational factors of time and space can lead to a greater lack of SA or to incorrect situation awareness in creeping crises compared with in rapid-fire crises.

Our study has practical significance for actors responsible for crisis management in that we have focused on the importance of the subjective experience of time and space and the fact that one can easily underestimate a threat that is perceived to be far away.

Our findings show that the Nursing Home Agency should continue its focus on and practice its proactive work methods. This has likely contributed to faster decisions based on limited information, and it has led to the coordination of crisis management such that the agency attempts to stay ahead of the curve and thus limit the potential for damage.

## 5.3 | Further research and implications

This research was a single-case study with one analysis unit. Further research based on our problem could be carried out as a case study with several analysis units and/or several cases, which would offer the opportunity to collect a larger amount of data from several organizations and/or compare the results of several creeping crises.

Further research could also explore the phenomenon of SA in creeping crises with a deductive approach, based on our theoretical model, combining creeping crises and SA with a primary focus on the situational factors of time and space. Additionally, research on how to compensate for the lack of perceived presence of critical factors necessary to identify a creeping crisis could be beneficial.

We uncovered findings in our data analysis that we did not include in the discussion because we considered them to be less relevant to answering our research question. One of these findings is the importance of planning in a crisis, which could be interesting to research further with a special focus on creeping crises.

In terms of theoretical contribution, this paper has developed an understanding of how SA and creeping crises can be seen in comparison to each other. This theoretical development is important for the threats seen today, including climate change and an increasingly global world with fewer boundaries, where creeping crises are easily overlooked. Practically, this research could provide insight in management education, perhaps, especially in safety management education. With insight on situation awareness in creeping crises, management teams can be a step further in the process of staying ahead of unwanted incidents if they also train for such scenarios.

## 5.4 | Limitations

In this paper, we have narrowed down the theoretical perspectives to addressing two main theories. This could be viewed as too narrow, and more perspectives could be included for a broader scope of the topic. For instance, theories concerning the perception of time or perception of control are common in the field of human factors, and they could have been useful additions. Furthermore, more socio-legal perspectives on a societal perception of time and the handling of the crisis offer another perspective that could have been beneficial for

the analysis of this theme. With a broader theoretical perspective, other conclusions could have been drawn, such as how the central government's handling of the pandemic could have affected the decisions of the management team.

The methodological limitations in this study could first be related to the number of informants. Even though there are few informants, they represent the majority of the crisis management team for the municipal agency studied. Furthermore, a transferability of the findings seems relevant, even though there are no generalizable numbers in the study, as the methodological and theoretical foundations are thoroughly described and can thus be compared with other contexts. Second, methodological limitations could be related to the analysis and interviews. The analysis was thorough, but it was contextually conducted based on the authors' field of expertise. This could narrow the interviews and analysis, as they were conducted through the lens of the researchers. To provide insight for the reader in this respect, the authors were introduced, and a discussion of validity was part of the method section for a reflexive approach.

## 6 | CONCLUSION

SA in creeping crises is greatly affected by the situational factors of time and space. A creeping crisis does not develop in the same manner as a 'traditional' fast-burning crisis, and people's perceptions of the situation are greatly affected by this. Our research shows that the triggering of an experience of imminent threat depends on a person's subjective understanding of their geographical proximity to the event. In addition, the development of the event must be experienced at a pace that leads it to be perceived as acute. Without this subjective understanding, a person or group will not recognize that they are facing a crisis, and the creeping crisis will have the opportunity to develop—without those who are at risk of being affected taking measures to counteract the potential consequences of the developing situation. Time and space—together with the individual and task- and system-based factors that Endsley (1995) describes in his theoretical presentation—are necessary to achieve the different levels of SA. However, Endsley (1995) does not clearly address how the characteristics of a creeping crisis differ from those of a traditional, fast-burning crisis and how this affects an individual's ability to develop SA. It is the slow development of a creeping crisis that presents the greatest challenge in achieving SA. The characteristics of a creeping crisis stand in the way of an early development of SA due to the lack of subjective experience of time and space.

Our model is a further development of the theoretical representations of Boin et al. (2020) and Endsley (1995). Our model seeks to visualize the factors that must be present in order for a person to achieve SA. The model shows that SA occurs at the intersection of time, space, and the subjective perception that a crisis exists.

The theory of creeping crisis has a time and a space dimension, but it does not address the psychological development of awareness for those who are in the middle of it, apart from addressing the attention of the crisis from a societal level such as by the media, politicians and the public.

Therefore, a relevant aspect is how an understanding of the situation develops for those involved on an individual and group level. Creeping crisis explains the development of a crisis, and situation awareness explains the psychology behind how those involved increase their awareness in a given situation. Together, these two theories can provide important pointers on how humans create SA, even in creeping crises, as we know from cognitive psychology that slow changes are difficult for humans to perceive. This study has illustrated a combination of the two theories through its case study.

It is only when a group of people perceives something as an urgent threat, something that must be addressed now, that we can talk about a crisis (Boin et al., 2020). To understand the process for individuals and groups from perceiving, understanding, and projecting the effects, situation awareness is a useful theoretical perspective (Endsley, 1995; Stanton et al., 2017).

For a safety and crisis management team, the understanding of the development of crisis and the development of individual and team awareness are important for a coordinated management team process. Without the awareness of time, the crisis will not be understood as acute, and without the awareness of space, the crisis will not be understood as serious.

## AUTHOR CONTRIBUTIONS

Gunhild B. Sætren, Jonas R. Vaag, Iselin F. Hansen, and Gro A. Bjørnfeldt have contributed to the reflection and development on the conceptualization of the theme and models, and contributed to the writing and reflections of discussion. Gunhild B. Sætren was responsible for writing and the publication process of the article and had an oversight and project responsibility for the research activity. Gunhild B. Sætren, Iselin F. Hansen, and Gro A. Bjørnfeldt contributed to the methodological integrity and ethics, and Iselin F. Hansen and Gro A. Bjørnfeldt contributed by collecting data, formal analyzing, developing conceptualization, and had responsibility in the planning and execution of the project.

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## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

No data available.

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