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Multimodal Collective Sensemaking in Extreme Contexts: Evidence from Maritime Search and Rescue

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ABSTRACT In extreme contexts, actors must often engage in collective sensemaking to enable coordinated action. While prior research has established that cognitive disparities and emotive distractions disrupt collective sensemaking, we lack theory on how actors overcome these common challenges in extreme contexts. To address this shortcoming, we conducted a process study, collecting unique multi-perspective video and archival data during a maritime search and rescue mission in the Aegean Sea where actors (i.e., rescue crew members and refugees) faced cognitive disparities (e.g., different levels of maritime expertise) and distracting emotions (e.g., fear, anxiety, and tension) yet needed to coordinate their actions to ensure a safe evacuation. We draw on this data to develop a collective sensemaking model that details the auxiliary process steps and multimodal communication – verbal, para-verbal, and non-verbal cues – actors use to alternately frame emotional states and convey task-related information. Our model demonstrates how actors, through multimodal collective sensemaking, overcome the challenges posed by cognitive disparities and distracting emotions in extreme contexts. It thus adds a dynamic emotive and bodily perspective to the predominantly cognitive and verbal understanding in sensemaking theory, and also has implications for practitioners working in extreme contexts.

Keywords: collective sensemaking, extreme contexts, multimodal communication, embodiment, maritime search and rescue, video data

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INTRODUCTION

9 March 2016, 5:45 a.m.: The rescue cruiser *Unity*^[1] sights an unseaworthy rubber boat bobbing in the rough waters off the rocky shores of the island of Lesbos (Greece). Crammed with about 50 refugees from Syria, Afghanistan, and Iraq, the boat has men perched on the rim; women, children, and babies are huddled in the middle. These refugees – many of whom have endured weeks, if not months, of assaults, harassment, and attacks – appear afraid, tense, and anxious. The mission of the *Unity* is to evacuate these refugees from their boat to the cruiser. This evacuation requires a coordinated effort between the rescue crew and the refugees. The refugees must fix a towing line thrown by the crew to the sturdiest part of their boat. If a refugee is distracted when the crew member throws the line, the snap hook could hit and seriously injure one of the refugees. Furthermore, if a crew member fails to consider that the refugees may have varying levels of maritime expertise compared to the crew, a refugee might incorrectly attach the line, resulting in damage to the rubber boat and immediate sinking. This situation would likely kill the people trapped in the middle of the boat. In this extreme context, how can these actors – rescue crew members and refugees – enable coordinated action?

In extreme contexts – situations that are simultaneously evolving, uncertain, and risky (Hällgren et al., 2018) – actors often need to engage in interdependent actions (e.g., Heaphy, 2017; Steigenberger and Lübcke, 2022; Weick, 2010). Collective sensemaking, the collaborative transformation of complex realities into simplified cognitive representations for coordinated action, is common in such contexts (Weick, 1988, 1995). It becomes vital when other mechanisms for coordination, such as professional roles, hierarchical structures, and standard operating procedures, fall short (Faraj and Xiao, 2006; Weick and Roberts, 1993). However, collective sensemaking in such contexts is fragile. The evolving, uncertain, and risky nature of extreme contexts often forces together cognitively disparate actors – that is, actors with differing or conflicting cognitive elements (Audi, 2013). Extreme contexts also often trigger distracting emotions – that is, affective experiences that challenge the ability of individuals to focus on goal-relevant information (Dolcos and McCarthy, 2006). Cognitive disparities and emotive distractions disrupt the perception and processing of cues and thus complicate joint (inter-)action (e.g., Clark, 1996; Easterbrook, 1959; Gable and Harmon-Jones, 2010a), thereby impeding the formation of a shared and accurate cognitive representation of the situation (Maitlis and Christianson, 2014; Maitlis and Sonenshein, 2010). Without such a representation, collective sensemaking is bound to fail, potentially leading to catastrophic outcomes (e.g., Weick, 1993).

Previous research (e.g., Oliver et al., 2017) has extensively documented how fragile collective sensemaking is in extreme contexts. What remains puzzling and unclear, however, is how actors overcome this fragility so that catastrophic outcomes do not occur. This puzzle persists largely because existing research focuses on disastrous failures of collective sensemaking (e.g., Cornelissen et al., 2014; Dwyer et al., 2023; Weick, 1993). For example, Cornelissen et al. (2014) showed how fear-induced misperceptions and miscommunication among police officers led to fatally flawed cognitive representations, culminating in the shooting of a bystander. In addition, the focus

of existing research has been on expert-only collective sensemaking processes; for example, among medical experts (e.g., Christianson, 2019) or rescue experts during a maritime rescue exercise (e.g., Steigenberger and Lübcke, 2022), in which actors with elaborate cognitive representations of the extreme context must collectively make sense. Extant research thus offers limited insights into our puzzle: Experts' similar training makes them less subject to cognitive disparity, while explanations of disastrous failures provide little insight into how emotive distractions can be effectively handled. Consequently, the puzzle of how actors overcome the fragility of collective sensemaking in extreme contexts remains unsolved. Addressing this puzzle is not only theoretically significant for advancing our understanding of extreme contexts and collective sensemaking, addressing it also holds practical relevance. Therefore, this paper seeks to answer the following research question: How do actors overcome distracting emotions and cognitive disparities in collective sensemaking in extreme contexts?

To answer this research question, we conducted a process study analysing extensive video and archival data gathered during a maritime search and rescue (SAR) operation in the Aegean Sea. The goal of the SAR operation was to evacuate refugees from unseaworthy rubber boats and involved two distinct groups of actors: rescue crew members and refugees. Collective sensemaking was crucial in this scenario because it enabled the joint actions that were necessary for a safe evacuation and because it also prevented actions that would have endangered the evacuation. The behaviour of both groups of actors revealed disparate levels of maritime expertise. Furthermore, the refugees often exhibited intense emotions, such as fear, anxiety, and tension (see also United Nations Human Rights Office of the High Commissioner, 2021) – an expected response in such a life-threatening situation – which distracted from the collective sensemaking process necessary for successfully completing each evacuation. Consequently, this setting provided ideal data to address our research question.

Our findings uncover the auxiliary process steps of emotive framing and task framing that facilitate actors' overcoming cognitive disparity and distracting emotions and that thus ensure core collective sensemaking (cue perception, cue processing, and purposeful interaction) in extreme contexts. While both emotive and task framing steps rely on multimodal communication, the modalities used in each step are different. Specifically, emotive framing relies on para-verbal and non-verbal communication, which actors use to minimize distracting emotions so that attentiveness and calm can be established and then maintained. Once distracting emotions are minimized, experts – that is, those actors with more-elaborate cognitive representations of the extreme-context situation – engage in task framing. They use simple verbal cues, bridging the cognitive disparity and providing the guidance necessary for joint action. This multimodal communication pattern, grounded in the mundane – routinized, in some cases – communicative activities of actors, remained stable across different sensemaking episodes, enabling us to develop a process model of multimodal collective sensemaking in extreme contexts.

This study contributes to research on collective sensemaking in extreme contexts (e.g., Cornelissen et al., 2014; Faraj and Xiao, 2006; Schakel et al., 2016; Steigenberger and Lübcke, 2022). First, our process model theorizes the iterations of emotive and cognitive steps, resolving a persistent puzzle in this literature: how actors

can collectively make sense in extreme contexts despite the fragility of this process. It thus transcends the focus in current literature on cognitive cue processing (Faraj and Xiao, 2006; Landgren, 2005; Sherman and Roberto, 2020; Steigenberger and Lübcke, 2022). Second, our model unpacks the underlying communicative modalities by explaining how distinct combinations of verbal, non-verbal, and para-verbal communication (Dille and Plotnikof, 2020; Streeck et al., 2011) help actors overcome challenges that result from cognitive disparity and emotive distractions in extreme contexts. Our study, outlining the important role of non-verbal language, thereby adds a unique multimodal perspective to sensemaking research. It takes mundane communication seriously by offering theory on the role of the body in sensemaking processes (de Rond et al., 2019; Weick et al., 2005; Whittle et al., 2023). Finally, our study provides valuable practical insights for rescue workers, police officers, medical personnel, firefighters, and others who must coordinate with distracted, non-expert individuals on a daily basis.

THEORY

Collective Sensemaking

Collective sensemaking (Weick, 1988, 1995) ‘involves attending to and bracketing cues in the environment, creating intersubjective meaning through cycles of interpretation and action, and thereby enacting a more ordered environment from which further cues can be drawn’ (Maitlis and Christianson, 2014, p. 67). Once sense has been made, actors maintain a representation of the situation that is continually updated as new cues provide new information, modifying that representation only when a new cue substantially challenges the established meaning (Christianson, 2019). Collective sensemaking complements other, more-static precursors of coordinated action, such as professional roles, hierarchical structures, and standard operating procedures, and becomes crucial when these approaches are insufficient for coordinated action (Faraj and Xiao, 2006; Weick and Roberts, 1993).

Collective sensemaking consists of three phases: individual cue perception, individual cue processing, and collective purposeful (inter-)action (Maitlis and Christianson, 2014). In the cue perception phase, individuals become aware of environmental cues – any information that violates the expectations established in an existing sensemaking account. Actors pay selective attention, perceiving some cues while missing or ignoring others (Oliver et al., 2017; Steigenberger and Lübcke, 2022). This selective attention in the cue perception phase makes collective sensemaking fragile, since it is prone to disruptions caused by disparities and distractions. In cue processing, actors evaluate perceived cues based on their expertise, experience, and context, and they attempt to understand the meaning and relevance of cues for the situation. The last phase, purposeful (inter-)action, typically involves actors engaging in discourse to reach a shared cognitive representation of a situation based on their individual sensemaking accounts, as a precursor to coordinated action (Whittle et al., 2023). Examples of purposeful (inter-)action include doctors and nurses discussing patient

data (Faraj and Xiao, 2006), medical personnel deliberating whether a piece of technology is malfunctioning (Christianson, 2019), refugees in a camp elaborating on their situation (Kodeih et al., 2023), soldiers discussing tactical information during battle (Dixon and Weeks, 2017), and police officers communicating about a suspect's behaviour (Cornelissen et al., 2014).

In many situations, collective sensemaking based on verbal language alone is effective to facilitate coordinated action. For example, when roles and routines fail to enable coordination, medical personnel typically resort to verbal sensemaking by discussing available patient information and their respective interpretation of this data (Faraj and Xiao, 2006). Similarly, teams in control-room simulations use straightforward language to make sense of dynamic situations (Stachowski et al., 2009). In many extreme contexts, though, two conditions compromise the effectiveness of verbal collective sensemaking: distracting emotions and cognitive disparities (Dixon and Weeks, 2017; Weick, 1993).

Collective Sensemaking in Extreme Contexts

Extreme contexts and their impact on actors have been a research subject for decades, dating back at least to Sorokin's (1942) study, which analysed group reactions to catastrophic events. Sorokin concluded that in groups, extreme contexts lead to excessively heightened emotional states, which distort actors' information-processing and decision-making capabilities. More recently, research has demonstrated that extreme contexts can impair cognitive functioning (Taylor et al., 2016) and that high-activation, negative-valence emotional states such as fear, anxiety, and tension can distract individuals and hinder them from performing collaborative tasks (e.g., Casciaro et al., 2022; Catino and Patriotta, 2013; Cornelissen et al., 2014). Consistent with this evidence, research on collective sensemaking in extreme contexts is demonstrating that the distracting emotions that these contexts evoke can cause collective sensemaking to fail (Catino and Patriotta, 2013; Hällgren et al., 2018; O'Neill and Rothbard, 2017). For example, Weick's (1993) seminal study on the Mann Gulch disaster describes how firefighters' fear and panic led them to miss and misinterpret cues, which, in turn, resulted in their miscommunicating with other firefighters who, trapped in a forest fire, eventually died. Such findings from case studies are consistent with a broad stream of behavioural research demonstrating the distracting effects that emotions can have on cognitive tasks (e.g., Easterbrook, 1959; Gable and Harmon-Jones, 2010a; Traeger, 2013).

We know that emotions can distract actors in all phases of a collective sensemaking process: influencing which cues they perceive, how they interpret those cues, how they engage in communicative activities, and how they respond to the activities of others (de Rond et al., 2019; Evans, 2008; Frijda, 1986; Maitlis et al., 2013; Steigenberger, 2015). Emotions can distract because once actors perceive a 'relational theme' of a situation – such as threat, loss, or obstacle (Nabi, 1999) – they interpret their environment through the lens of this theme. This interpretation affects the working memory they dedicate to a task, triggering motivated attention and processing, which leads to orientations of avoidance or approach (Nabi, 1999). These

mechanisms affect which cues actors perceive or ignore, leading them to prioritize cues that seem relevant to the emotion they experience and pay minimal attention to less-relevant cues. The perceived cues are then processed in the context of how they align with the emotional goal, such as escaping a dangerous situation in the case of fear. This emotion-induced distraction can be highly problematic for collective sensemaking in extreme contexts, because it can direct an actor's attention and cognitive capacity to irrelevant cues and lead them to act on cues only if those cues align with the emotional goal. When actors perceive cues as not aligned with the emotional goal, these cues are rejected (for a more extensive discussion, see Lench et al., 2011), leading actors to not respond or to respond in dysfunctional ways to other actors' attempts at purposeful interaction (Steigenberger, 2015), thus rendering collective sensemaking fragile.

In addition to experiencing distracting emotions, actors also often encounter cognitive disparity in extreme contexts (Dixon and Weeks, 2017; Steigenberger, 2016), and this disparity can disrupt their ability to collectively make sense of a situation. Extreme contexts often bring together random, cognitively disparate actors with different expertise and backgrounds who need to interact and coordinate (Hällgren and Buchanan, 2020). Cognitive disparity – in particular, when some actors have substantially more-elaborate cognitive representations of a situation than other actors do – is therefore a common characteristic of extreme contexts. Previous research has demonstrated that cognitive disparity can disrupt cue perception, cue processing, and purposeful interaction in a collective sensemaking process (Hällgren et al., 2018; O'Neill and Rothbard, 2017) because actors' perception and interpretation of cues depend on their cognitive representations of the activities they are required to perform in a given situation. Actors with elaborate representations are more capable of identifying and processing task-relevant cues, while actors lacking elaborate representations often miss important cues or misinterpret the cues they perceive (Lois, 1980). Actors with elaborate representations are also able to understand when the cues they perceive are implausible or insufficient, and thus they can better prioritize accurate cues and ignore implausible ones (Lai, 2021). Finally, actors with elaborate representations might more-easily perceive when cues deviate from expectations, and thus they are in a better position to recognize when collective sensemaking and subsequent collective action is required in the first place (Weick and Sutcliffe, 2007). In a situation with cognitive disparity, actors with elaborate representations will therefore more-easily and more-efficiently perceive cues compared to actors with less-elaborate representations (Sherman and Roberto, 2020; Wolbers and Boersma, 2013), a state of affairs that adds to the fragility of collective sensemaking in extreme contexts.

Cognitive disparity and distracting emotions may even reinforce one another, as Hällgren and Buchanan (2020, p. 453) suggest in their paper on group dynamics in extreme contexts: '[m]embers of groups brought together at random bring different ethics, attitudes, skills, and experience, creating tensions that are exacerbated by fear and anxiety'. This reinforcement of cognitive disparity and distracting emotions has escalating effects, suppressing actors' ability to make collective sense in extreme contexts: Cognitive disparity among actors necessitates extensive discussions in the collective sensemaking process, yet in extreme contexts, these discussions are complicated by distracting

emotions, which can make actors less receptive to sensemaking cues. In addition, cognitive disparities result in actors both perceiving different cues and interpreting the same cues differently. Given these complicated interactions, we address our research question by conducting an exploratory process study, in which two groups of actors – rescue crew members and refugees – faced cognitive disparities and distracting emotions yet needed to coordinate their actions.

METHODS

We carried out a process study using unique multi-perspective video and rich archival data from a maritime search and rescue mission in the Aegean Sea. This method is particularly suited for studying under-researched phenomena (Strauss and Corbin, 2008; Wright et al., 2023). Our goal was to gradually build theoretical understanding by accumulating insights from the data and then developing theory on the process of interest (Cloutier and Langley, 2020; Cornelissen, 2017; Langley, 1999).

Research Setting

We collected data in 2016, when the eastern Aegean Sea was a humanitarian disaster zone, as wars in the Middle East and Afghanistan and humanitarian crises in African countries dramatically increased migration to Europe. Many refugees tried to reach the Greek islands of Lesbos, Chios, Samos, and Kos in unseaworthy rubber boats that often sank on or near the rocky shores of these islands, and many died trying. In addition to facing the dangers of the sea, refugees were often mistreated by officials of various countries where they arrived and were illegally threatened to be sent back to the countries from which they had departed (United Nations Human Rights Office of the High Commissioner, 2021). Our research examines the evacuation of such refugees from their rubber boats by the crew of the *Unity*. The *Unity* is a German rescue cruiser – operated by a non-profit organization (NPO) – that was transferred to Greek waters in 2016 as part of an international relief mission. Staffed with SAR experts from Greek and German maritime SAR organizations, the *Unity* patrolled the eastern waters of the island of Lesbos for three months, a mission carried out in cooperation with the European Border and Coast Guard Agency. Our study covers the first three weeks of this mission, during which the first author of this paper served as a crew member on the rescue cruiser.

Each day, the *Unity* left the port of Mytilene on Lesbos about an hour before sunrise and began patrolling for refugee boats in an area assigned to it by the Greek Coast Guard. If a boat was sighted, the *Unity* crew would prepare to deploy the daughter boat, and the helmsperson would inform the Greek Coast Guard's on-scene coordinator of the sighting and offer to evacuate the refugees from their rubber boat and take them aboard the *Unity*. The on-scene coordinator then issued an order allowing the *Unity* to proceed with the rescue. At this point, the evacuation we are studying began. It required coordinated action between the rescue crew and the refugees during three phases: (1) establishing a rope connection between the refugee boat and the *Unity*'s daughter boat, (2) mooring and securing the refugee boat to the aft of the *Unity*, and

(3) transferring the refugees and their luggage from their boat to the *Unity*. Within each of these three phases, the rescue crew and the refugees had to coordinate complex activities to ensure a safe evacuation. Once aboard the *Unity*, the refugees were taken to the port of Mytilene.

The rescue crew and refugees demonstrated considerable cognitive disparity in terms of maritime expertise, which led to divergent representations of the situation. Specifically, the behaviour of the rescue crew, despite their heterogeneous national backgrounds, demonstrated elaborate cognitive representations of the actions necessary for evacuating persons from distressed vessels, expertise that they had gained through their extensive maritime training and experience. However, our video data and firsthand observations reveal a very different scenario among the refugees. In contrast to the rescue crew, their behaviour consistently indicated that they had little maritime expertise, suggesting a different and less-elaborate cognitive representation of the situation. This disparity was complemented by refugees' displays of emotive distraction, which may have resulted from the refugees' intense emotional states. Displays of fear, anxiety, and tension were common in our video data. These observations mirror official reports based on interviews with refugees stating that 'those on board feared for their lives' and that 'the sea is not easy, either you're safe or you die' (United Nations Human Rights Office of the High Commissioner, 2021, pp. 12, 16). The refugees' experience of fear and anxiety is also understandable given that their previous encounters with state agencies may have resulted in water bombardments, push-backs, and/or assaults (United Nations Human Rights Office of the High Commissioner, 2021).

Cognitive disparity and emotive distraction presented fundamental challenges for collective sensemaking in this extreme context. For example, refugees commonly demonstrated their lack of maritime expertise by trying to attach the towline to unstable parts of their rubber boat in Phase 1 or by discarding their life jackets and attempting to board the *Unity* on their own in Phase 3 – all highly risky actions that can cause severe injury or drowning. In addition to cognitive disparity, emotions that distracted from the evacuation also clearly hampered the rescue crew's efforts to safely transfer the refugees. For example, during Phase 1, when the crew attempted to approach the refugee boat, the refugees commonly showed emotive displays of fear and anxiety. They took actions that were counterproductive to the evacuation, such as maintaining their course (rather than approaching the rescue cruiser), increasing their speed (rather than reducing it), or trying to escape from the rescue cruiser. Overall, collective sensemaking among crew members and refugees was necessary for purposeful interaction, yet both cognitive disparity and distracting emotions hindered the collective sensemaking effort.

The aim of the rescue crew was to guide the refugees' cue perception, cue processing, and the resulting interactions. The cognitive disparity between the actors along with the distracting emotions meant that verbal communication often failed to guide perception, processing, and interactions, as was evident early in our research project. Given these characteristics, the *Unity's* rescue mission is as an excellent setting to address our research question.

Table I below is based on our qualitative data (e.g., rescue-procedure manuals, video data, photographs, and the first author's documentation) and describes in detail the phases of the evacuation and the actions that each phase required.

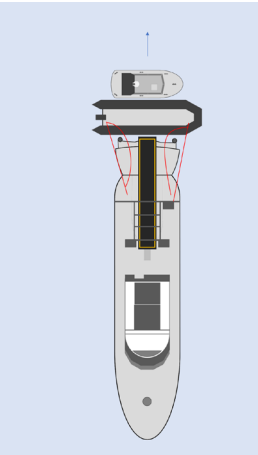
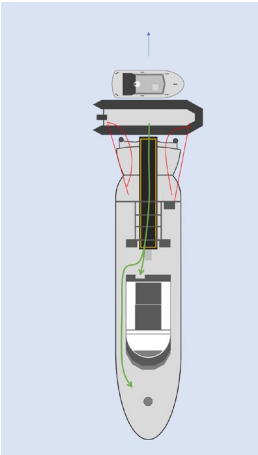
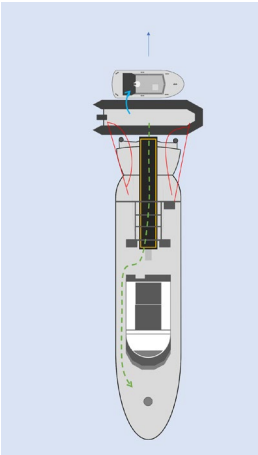
Table I. Description of the evacuation [Colour table can be viewed at wileyonlinelibrary.com]

Phase	Description of evacuation actions	Illustration
1a	<p>Approaching the refugee boat. The rescue crew members prepare to deploy the daughter boat, put on their personal protective equipment (immersion suits, two layers of latex gloves, working gloves), and load additional equipment (life jacket, handheld radio). Two crew members then board the daughter boat and launch it into the water, sailing it at some distance behind the rescue cruiser and in the direction of the refugee boat. The helmsperson on board the daughter boat steers toward the refugee boat, while the other crew member prepares a line for casting.</p>	
1b	<p>Greeting the refugees. The rescue crew members of the daughter boat welcome the refugees and inform them that they are now in Greece/the EU. They also gather information that is relevant to the operation, such as the approximate number of people on board and whether babies and small children are among the refugees. They ask the refugees to turn off the outboard engine if they have not already done so.</p>	
1c	<p>Establishing a rope connection. After the outboard engine has been shut off, a rescue crew member throws a line to the rubber boat. The refugees need to wrap the line around the engine (which is the sturdiest part of the rubber boat) and fasten it.</p>	

(Continues)

Table I. (Continued)

Phase	Description of evacuation actions	Illustration
2a	<p>Mooring the refugee boat to the aft of the rescue cruiser. After the rope from the daughter boat has been connected to the rubber boat, the helmsperson radios the rescue cruiser, which then slowly approaches the rubber boat laterally in reverse. By radio, the daughter boat's helmsperson informs the rescue-cruiser's helmsperson of its exact position and transmits relevant information about the refugee boat.</p>	
2b	<p>Preparing the rescue cruiser. Meanwhile, the rescue crew members on board the cruiser prepare for evacuation. A rubber rescue path is inflated and mooring lines are prepared. The crew members then take their positions on the aft deck as the cruiser slowly backs toward the rubber boat. During this phase, it is particularly important that the refugees remain seated.</p>	
2c	<p>Fixing the refugee boat to the aft of the rescue cruiser. As soon as the rubber boat is perpendicularly positioned exactly in the middle aft of the rescue cruiser, the rescue cruiser slows its backward movement, gently pushing the rubber boat to maintain its position relative to the cruiser. The rescue crew member in the daughter boat throws one end of the line connection to a colleague on board the rescue cruiser, who secures the rubber boat to the rescue cruiser. More lines are handed over or thrown to the refugee boat. Some refugees are involved in the task, while all others must remain seated.</p>	

Table I. (Continued)	
Phase	Description of evacuation actions
3a	<p>Preparing to transfer refugees and their luggage to the rescue cruiser. A rescue crew member standing at the ramp gate of the rescue cruiser, next to the inflatable rescue path, explains the next phases of the evacuation to the refugees. This crew member informs the refugees that babies and infants will disembark the rubber boat first, then women, and then the men, with everyone disembarking slowly, one-by-one.</p>
	
3b	<p>Transferring refugees to the rescue cruiser. The evacuation process begins with the refugees handing over the babies and then small children to the rescue crew. Crew members, standing one behind the other, pass the babies quickly toward the deckhouse. There, the babies and small children are placed in the lounge area to protect them from cold, wind, and accidents. Next, the mothers climb onto the cruiser and are led to their children. Youths, women without small children, and all men are then led past the deckhouse to the bow of the ship. The refugees leave their luggage in the rubber boat.</p>
	
3c	<p>Transferring refugees' luggage to the rescue cruiser. While the refugees are being transferred from the rubber boat to the rescue cruiser, the rescue crew members of the daughter boat begin to transfer the luggage. To do so, they ask individual refugees still in the rubber boat and waiting to transfer to the cruiser to hand over the luggage. Once the last refugee has boarded the rescue cruiser, the evacuation is complete. Evacuated refugees are given medical treatment as needed and brought to Mytilene harbour.</p>
	

Data Collection

Data collection took place in early 2016. The first author joined the rescue mission in the second half of 2015, when the NPO managing the mission began recruiting volunteer SAR experts for the mission. A trained sociologist with basic maritime SAR skills, this author went through the same selection process and professional training program as the rest of the crew, and was then assigned to the *Unity* as a crew member. During our data collection period, the rescue crew performed 12 evacuations. Because saving lives was the top priority, multichannel video recording – our main data source – was not always possible during these evacuations. We based our analysis primarily on the five evacuations for which we had high video-data quality. We cross-checked all evacuations to ensure that the evacuations with incomplete video data did not differ significantly from these five evacuations so that we were able to study the full range of evacuations that existed in our observation period. Whenever possible, we complemented the video data from the five evacuations with meaningful video passages from the other evacuations. The specific evacuations we studied were practically identical in their overall structure (the goal, the types of actors involved, the material environment, and the discrete phases necessary to successfully complete the evacuation), but varied in some contingencies, such as the time and day, the composition of the actor groups, or the weather conditions in which the evacuation took place.

We supplemented the video recordings with additional data sources, resulting in the following data:

Video recordings are central to our analysis because they enabled us to capture rich audio-visual information about the actions of actors (both the rescue crew and refugees) during each evacuation. The use of video data allows for detailed analysis of collective sensemaking as it unfolds, which is why it has become the gold standard for research on sensemaking in recent years (Christianson, 2018; de Rond et al., 2019; LeBaron et al., 2018). Multiple cameras were used to minimize biases introduced by specific camera angles and camera movements (Mengis et al., 2018). A wide-angle fixed camera was placed on the aft deck of the *Unity* to capture a panoramic view, and three people wore body cameras (intra-subjective view): one person aboard the daughter boat, the person managing the evacuation on the rescue cruiser, and another crew member (the first author of this paper). None of the refugees were equipped with cameras, so our setup privileges the perspective of the rescue crew. We discuss the implications of this privileging in the Future Research Directions and Limitations section below. In total, our analysis is based on 1415 minutes of video/audio recordings. Figure 1 shows sample screenshots from our video data.

Photographs complemented our video recordings. Like video recordings, they allow us to visually capture materially relevant aspects of the actors' behaviour (Meyer et al., 2013). We used 2339 photographs related to the mission, primarily to understand details not captured on video, such as the design of the life-saving equipment used by the crew and how this equipment functioned.

Participant observation was also critical to our analysis. The first author's status as a crew member allowed him to observe and participate in daily activities, including



Figure 1. Illustrative examples from our video data [Colour figure can be viewed at [wileyonlinelibrary.com](https://onlinelibrary.wiley.com)]

Note: Left: View from rescue crew member body camera; Middle: View from stationary camera on-board the rescue cruiser; Right: View from first-author body camera.

informal conversations with other crew members. This access gave him deep and direct insights into the evacuation and helped him understand the challenges experienced by crew members and refugees. The first author documented his observations in a research diary.

Written documents supplemented these field data. To triangulate the first author's records, we consulted instruction manuals to develop an abstract description of the evacuation. We also used the ship's logbook, crew lists, crew applications, and other documents to collect details such as weather conditions and time of day of each evacuation, crew composition, and the number and demographics of refugees.

Research Ethics and Data Protection

We collected live data in an extreme context, which required us to think critically about the ethics of our research and to apply rigorous data protection standards. Like most research on extreme contexts (e.g., de Rond and Lok, 2016; Kodeih et al., 2023; Shepherd et al., 2022), we collected data in an environment in which people were suffering. Accordingly, the first author always prioritized the rescue mission over data collection, a priority which affected the quality of the video recordings, as we explain above in the Data Collection section. During the mission, we placed the cameras so that they could not interfere with the evacuations, and crew members could stop recording if they felt that the camera was interfering with their work. In our study, none of the crew members did so. Because the first author worked for several weeks as a full member of the rescue crew, he was able to rescue people in distress, thus helping to alleviate suffering and counteracting the 'trafficking in pain' problems that studies such as ours are at risk of (de Rond, 2020).

We obtained the consent of all members of the rescue crew and the various organizations involved in the mission. We could not obtain consent from the refugees prior to their evacuation. After their evacuation, the refugees were typically physically and mentally exhausted and needed primary care on the *Unity*. Hence, it was not possible to ask for consent during the mission. Nor was it possible to obtain consent after the refugees were returned to the port of Mytilene, because the refugees were immediately taken to registration sites by the Greek authorities. In accordance with the data protection regulations applicable to this project, we therefore anonymized the refugees' identities by pixelating faces and blurring voices. Our data collection and subsequent anonymization was approved by the NPO's Ethics and Data Protection Board. To ensure appropriate storage of the data, we saved the data on an encrypted external hard drive. Finally, each

person who analysed the raw data (e.g., video recordings, photographs, written records) was required to sign a strict data protection agreement with the NPO.

Data Analysis

The core of our data analysis are episodes of collective sensemaking between the rescue crew and the refugees. Our analytic strategy was to first study collective sensemaking episodes within evacuations and then gradually expand our understanding by comparing both different sensemaking episodes within the same evacuation as well as the same sensemaking episodes across different evacuations (Strauss and Corbin, 2008). In order to prevent going-native bias (Langley and Klag, 2019), two other researchers – one author of this paper and a research assistant – analysed the video and other data with the first author. These two researchers joined the project after the data collection.

Specifically, our analysis proceeded as follows:

Understanding and visualizing the evacuation We first focused on each individual evacuation. Two of the authors and the research assistant watched and re-watched the video footage for each evacuation and wrote detailed descriptions of each, which we gradually enriched with additional insights from the other data sources (i.e., photographs, observations, and written documents). This procedure helped us to understand the evacuation and, from this understanding, to identify collective sensemaking episodes between rescue crew members and refugees. We developed thick descriptions of each evacuation and used visuals to map the temporal ordering of both visible and audible behaviour in each evacuation (Langley, 1999).

In each evacuation, we identified three episodes of collective sensemaking, relating to instances in which the refugees and the rescue crew members had to purposefully interact (see also Table I). The first sensemaking episode occurred when the refugees had to stop the rubber boat, catch a towing line, and loop the line around the engine (in ‘Phase 1’ in Table I); the second episode occurred as the rescue crew moored the rubber boat to the aft of the rescue cruiser with the help of the refugees (in ‘Phase 2’ in Table I); and the third episode relates to the evacuation, in which the refugees were asked to hand over babies, move to the cruiser one-by-one, and help transfer their luggage (in ‘Phase 3’ in Table I).

Coding sensemaking episodes within evacuations After identifying instances of collective sensemaking between rescue crew and refugees, we re-watched the videos and examined how actors collectively made sense in the three discrete sensemaking episodes in each evacuation, paying particular attention to how actors showed and handled cognitive disparity and emotive distraction. This analysis allowed us to gain initial insights into common temporal patterns within and across the sensemaking episodes found in each evacuation, which are exemplified in Figure 2.^[2] We labelled the steps that occurred in all collective sensemaking episodes ‘preparing for interaction’, ‘emotive framing (establishing a calm and attentive state)’, ‘task framing (instructing task performance)’, ‘emotive framing (closing interaction)’, and ‘distancing (protecting task performance)/emotive framing (re-establishing a calm and attentive state)’.

1. Approaching refugee boat and establishing rope connection	(1) Emotive framing (establishing a calm and attentive state) (00:17–01:10 (DB1))	(1) Task framing (instructing task performance) (01:10–02:03 (DB1))	(1) Emotive framing (closing interaction) (02:03–02:07 (DB1))	(1) Emotive framing (re-establishing a calm and attentive state) (02:07–04:09 (DB1))
	<ul style="list-style-type: none">- Do you speak English? English? ... Everything is okay. We bring you to our boat and then to the harbor.- (PV) English, loud and clear, friendly calming tone of voice, legato- Attention on board the refugee boat; therefore, all crew members focus on imminent first aid tasks- (NV) Body language: turning towards refugee boat, eye contact, waving (refugees wave back)- (V) "No English?" – "Yes." – "I am Peter. Hello!" – "Hello." – "We bring you to our boat. Okay."- (PV) Warm and friendly, calm and legato tone of voice- Refugees are smiling and nodding, calming down and starting to pay attention	<ul style="list-style-type: none">- (V) Instruction ("how to") "You wrap the rope around the engine."- (PV) Instructing tone of voice, emphasis on "around"- (NV) Body language: turning towards refugees, gestures of "offering line" (refugees signal readiness to catch line)- Refugees turn the rope around the engine. Crew members explain how to fix it with the hook. Refugees finally succeed.- (V) "Yes! – Okay."- (PV) Check sound, encouraging tone of voice- (NV) Eye contact, hand gestures	<ul style="list-style-type: none">- (PV) Friendly, applauding tone of voice- (NV) Hand signal ("thumbs-up"), eye contact- Refugee who fixed the rope is sitting down again, smiling contentedly, calm collective state on refugee boat.	<ul style="list-style-type: none">- Turning away and focusing on mooring procedure- (V) "So, hey ich hab die Verbindung – bits and bobs"- (NV) German, monotone, sailor-like tone of voice- (NV) Body language: turning away, focus on regular work- After the refugee boat is moored to the daughter boat, some refugees are still restless, seem tense, and are moving in the boat. The helmsman is seeking eye contact and calms refugees- (V) "...It's okay. We're here. Stay in the front."- (PV) Calming tone of voice- (NV) Eye contact
	(2) Preparing for interaction (00:00–01:32 (RC1))	(2) Task framing (instructing task performance) (01:35–02:19 (RC1))	(2) Emotive framing (closing interaction) (02:19–02:21 (RC1))	(2) Emotive framing (re-establishing a calm and attentive state) (05:13–06:01 (DB1) and 02:22–04:06 (RC1))
2. Mooring refugee boat to rescue cruiser	<ul style="list-style-type: none">- Preparing for deckman maneuver on board the <i>Unity</i>; crew members are talking about impending mooring procedure.- One crew member is rolling up sleeves while already wearing gloves and mask, preparing mooring line, preparing rescue platform- (V) "Auf jeder Seite [der Rettungsplattform] ... noch..." [On each side (of the rescue platform) ...]- conversation in Greek concerning towing unit- (PV) German/Greek, monotone, sailor-like tone of voice- (NV) Body language: turning towards refugee boat, observing, indicating to other crew members what is going on aboard the refugee boat	<ul style="list-style-type: none">- Instructing mooring and evacuation- (V) Instruction ("how to") "Listen! First, we fix the rope. Then, we start with 'Okay'."- "On the one side" "First babies, children, women. And one-by-one. Translate it!"- (PV) Instructing and commanding tone of voice- (NV) Eye contact- Refugees become attentive and listen to instructions- Throwing line towards refugee boat.- (V) Instruction ("how to") "Grab the rope."- (PV) Repetition, commanding tone of voice- (NV) Gesture (describing circles), eye contact, Refugees fix the rope	<ul style="list-style-type: none">- Collective state on refugee boat is calmer after boat has been moored. Young woman with baby is smiling contentedly.- (NV) Eye contact, hand gestures	<ul style="list-style-type: none">- Proceeding with regular work- (V) Body language: turning away from refugee boat- (NV) (To refugees) "I'll stay in the next commander's room."- (V) "Let the lines run side by side!"- (PV) German, monotone, sailor-like tone of voice- (V) "Rückwärts?" ...Ja." [Backwards? ...Yes]- (PV) German, monotone, sailor-like tone of voice- While the refugees are waiting for evacuation to start, one of the crew members on the rescue path, to one of the crew members on the rescue path.- (V) (To refugees) "Sit down. Keep the luggage in boat."- (V) Calming and clear tone of voice- (NV) Eye contact, hand gesture (pointing)
	(3) Preparing for interaction (06:01–07:01 (DB1) and 04:07–04:51 (RC1))	(3) Task framing (instructing task performance) (07:44–15:00 (DB1) and 05:06–12:24 (RC1))	(3) Emotive framing (closing interaction) (12:24–12:29 (RC1))	(3) Emotive framing (re-establishing a calm and attentive state) (15:06–15:30 (DB1) and 12:29–12:53 (RC1))
	<ul style="list-style-type: none">- (V) (Intra-crew conversation on evacuation procedure) "Children first, right?" – "Yes, children first, ladies first..."; thereafter:- (NV) Body language: turning towards refugees, eye contact- (V) (Intra-crew) "So, wie sieht's aus. Worauf warten wir noch?" [So, what does it look like? What are we waiting for?]- (PV) German- (NV) Body language (turning backwards to another crew member)- (V) (Intra-crew) "Joachim, eine Behinderte im Boot. Mit Krücken!" [Joachim, a disabled woman in the boat. With crutches]	<ul style="list-style-type: none">- Crew member boards at the edge of the rescue path, waiting for a sign to start with evacuation. His colleague is standing right behind him seeking eye contact with refugees- (V) (To refugees) "All of you will get over soon."- (PV) Calming tone of voice, loud and clear- (NV) Hand gesture ("calming")- Refugees are smiling and waiting	<ul style="list-style-type: none">- After having helped the crew members to transfer the luggage into the daughter boat, the remaining refugees are ready to leave the refugee boat, disassembling the engine- (V) "Come on!"- (NV) Nodding, eye contact- (PV) Friendly and encouraging tone of voice- (NV) Body language (raising arms)- Last refugee leaving refugee boat is smiling and raising his arms as a sign of relief and satisfaction.	<ul style="list-style-type: none">- Proceeding with regular work: clearing up refugee boat, disassembling the engine- (NV) Body language: turning away from refugees
3. Transferring refugees and luggage from refugee boat to rescue cruiser				

Figure 2. Example of mapping collective sensemaking episodes in Evacuation #1

Note: Time stamp indicates the length and position of the recording on the video; abbreviation after time stamp indicates the camera location (e.g., 'DB' for daughter boat, 'RC' for rescue cruiser) and specific evacuation (e.g., '1' for Evacuation #1); V, verbal communication; NV, non-verbal communication; PV, para-verbal communication.

Next, we examined the collective sensemaking episodes in detail. We found that actors extensively relied on multimodal communication by combining the three modes of communication (Bonaccio et al., 2016): verbal language, para-verbal elements (e.g., volume, intonation, or tone of voice), and non-verbal body language (e.g., gestures, signals, or eye contact) to engage in framing the emotional state and, based on this emotive framing, to enable the task-related framing.

Comparing evacuations to derive categories Finally, we compared pairs of evacuations, used new permutations, and gradually expanded our analysis (Miles et al., 2013). In this iterative process, we discovered commonalities in multimodal communication across evacuations despite differences such as time, day, weather conditions, crew composition, and the number and demographics of refugees. Table II makes this process transparent: it shows comparisons between evacuations (i.e., Evacuations #1 to #5).

Based on phrasal descriptions of verbal, para-verbal, and non-verbal communication we engaged in higher-order coding (Strauss and Corbin, 2008). We uncovered relationships between codes, probed the emergent concepts in the existing literature on multimodal communication and collective sensemaking, and built our categories. Table III illustrates the higher-order coding of the data, using examples of the task-framing and emotive-framing categories to show how these categories relate to our raw data (Pratt, 2009).

Developing a process model on multimodality in collective sensemaking in extreme contexts Finally, we examined our categories in more detail. In particular, and in line with the notion of multimodality, we explored the interplay of verbal, non-verbal, and para-verbal communication for emotion-related framing and task-related framing, respectively. Based on the emerging deeper understanding of our categories we developed a process model on multimodal collective sensemaking in extreme contexts.

FINDINGS

Collective sensemaking took place when rescue crew members and refugees needed to create a cognitive representation of how to collectively proceed with the evacuation. These sensemaking episodes occurred three times in each evacuation, as we showed above (see Table I). Below, we detail the sensemaking steps that characterize the first of these episodes. In the first episode, crew members and refugees had to establish a line connection between the refugee boat and the *Unity's* daughter boat (for a detailed description of the required activities, see Table I, Phase 1). For each of these sensemaking steps, we explain how verbal, non-verbal, and para-verbal bodily expressions combine to produce multimodal cues. This approach allows us to show the differences between the modalities actors use in emotive framing versus task framing and to establish these categories as the major building blocks for our process model on multimodal collective sensemaking in extreme contexts. Table A1 in the online Appendix presents empirical evidence from all inter-crew-refugee sensemaking episodes throughout the studied evacuations. It demonstrates that the multimodal use of

Table II. Summary of sensemaking episodes across evacuations

<i>Emotive framing (establishing a calm and attentive state)</i>	<i>Task framing (instructing task performance)</i>	<i>Emotive framing (closing interaction)</i>	<i>Emotive framing (re-establishing a calm and attentive state)</i>
Evacuation #1: 2016-03-12, 6:15 a.m.–6:40 a.m. Position: 39°04′55″ N, 026°35′80″ E. Weather: cloudy, water 16.5°C, air 19°C, wind light breeze. Rescue crew*: 9 German, 4 Greek. Rescued persons: 14 babies & toddlers on board, total headcount: 58 persons. Remarks: mainly refugees (families) from Syria, light-grey rubber boat (low quality)			
V: Using formulas of welcome (‘Good Morning’), safety (‘We bring you to our boat ...’) and common understanding (‘Do you speak English?’) NV: Using gestures of welcome (waving) while seeking eye contact PV: Using friendly and calm, tone of voice, using legato speech melody, speaking loudly and clearly	V: Giving instructions (‘You wrap the rope around the engine’) NV: Using illustrative gestures (finger-pointing, describing circles) while maintaining eye contact PV: Using instructing tone of voice, speaking loudly while emphasizing key words (‘aarouuuund’) and using onomatopoeia (‘clack’)	V: Using formulas of thanks (‘Thank you!’) and appraisal (‘Okay!’) NV: Using signals of appraisal (thumbs-up) PV: Using friendly, praising tone of voice and calming, legato speech melody	<i>No instances of emotive framing (re-establishing a calm and attentive state)</i>
Evacuation #2: 2016-03-12, 8:04 a.m.–8:14 a.m. Position: 39°07′15″ N, 026°38′38″ E. Weather: cloudy, occasional showers, water 16.5°C, air 19°C, wind light breeze. Rescue crew*: 9 German, 4 Greek. Rescued persons: 12 toddlers & kids on board, total headcount: 51 persons. Remarks: refugees from Syria and Iraq, black rubber boat (fair quality)			
V: Using formulas of welcome (‘Welcome to Europe ... Good Morning!’), safety (‘You are in a safe area.’) and common understanding (‘Is there anybody to translate?’) NV: Using gestures of welcome (waving) while seeking eye contact PV: Using friendly and calm tone of voice, using legato speech melody, speaking loudly and clearly	V: Describing procedure (‘We’ll give you a rope ... [you tie it] around the engine.’) and giving instructions (‘Turn ... turn [it around] the engine ...’) NV: Using illustrative gestures (indicating a circle, showing how to hook the snap hook in) while maintaining eye contact PV: Using instructing tone of voice, speaking loudly while emphasizing key words (‘aarouuuund’), and using onomatopoeia (‘clack’)	V: Using formulas of appraisal (‘Yeah!’, ‘Good Job!’) NV: Using signals of appraisal (thumbs-up) PV: Using friendly and applauding tone of voice and legato speech melody	V: Using formulas of calming (‘Sit down!’) NV: Using calming hand gesture PV: Using friendly tone of voice, using calming speech melody

(Continues)

Table II. (Continued)

<i>Emotive framing (establishing a calm and attentive state)</i>	<i>Task framing (instructing task performance)</i>	<i>Emotive framing (closing interaction)</i>	<i>Emotive framing (re-establishing a calm and attentive state)</i>
Evacuation #3: 2016-03-12, 8:35 a.m.–8:50 a.m. Position: 39°03′02″ N, 026°37′53″ E. Weather: cloudy, occasional showers, water 16.5°C, air 19°C, wind light breeze. Rescue crew*: 9 German, 4 Greek. Rescued persons: 2 babies, 12 toddlers, 9 kids, total headcount: 56 persons. Remarks: grey/green rubber boat (poor quality)			
V: Using formulas of welcome (‘Welcome in Europe’), safety (‘Everything is okay’) and common understanding (‘Is there anybody who understands English?’)	V: Giving instructions (‘Take the rope ... [wrap it] around the engine!’)	V: Using formulas of appraisal (‘Yeah!’, ‘Great!’, ‘Okay!’)	<i>No instances of emotive framing (re-establishing a calm and attentive state)</i>
NV: Using gestures of welcome (waving) while seeking eye contact	NV: Using illustrative gestures (finger-pointing, indicating a circle) while maintaining eye contact	NV: –	
PV: Using friendly tone of voice, using calming speech melody, speaking loudly	PV: Using instructing tone of voice, speaking loudly and commandingly while emphasizing key words (‘aarooouund’), and using onomatopoeia (‘clack’)	PV: Using friendly and applauding tone of voice and legato speech melody	
Evacuation #4: 2016-03-17, 6:47 a.m.–7:14 a.m. Position: 39°03′60″ N, 026°29′70″ E. Weather: sunny, air 10°C, wind gentle to fresh breeze, sea 0.5–1.0 m. Rescue crew ⁺ : 8 German, 2 Greek, Lifeguards: 4 German. Rescued persons: mainly young men from Afghanistan and India, total headcount: 61 persons. Remarks: many people are seasick, daughter boat with new crew (first joint rescue mission in this team constellation), additional fast rescue boat manned with two lifeguards, black rubber boat (fair quality)			
V: Using formulas of welcome (‘Welcome to Europe’), safety (‘You are safe!’) and common understanding (‘You speak English?’)	V: Giving instructions (‘Put our rope ... around the engine!’)	V: Using formulas of appraisal (‘Perfect!’)	V: Using formulas of safety (‘Everything is okay’)
NV: Using signals of safety (thumbs-up) while seeking eye contact	NV: Using illustrative gestures (offering a rope, finger-pointing, describing circles) while maintaining eye contact	NV: Using signals of appraisal (thumbs-up)	NV: Using gestures of calming (arm gesture) and signals of safety (thumbs-up)
PV: Using calm tone of voice, speaking loudly and clearly	PV: Using instructing and encouraging tone of voice, speaking loudly	PV: Using friendly and praising tone of voice	PV: Using friendly tone of voice, using calming speech melody
Evacuation #5: 2016-03-17, 7:30 a.m.–7:53 a.m. Position: 39°04′10″ N, 026°36′90″ E. Weather: sunny, air 10°C, wind gentle to fresh breeze, sea 0.5–1.0 m. Rescue crew ⁺ : 8 German, 2 Greek, Lifeguards: 4 German. Rescued persons: mainly men, 4 women, 1 child, total headcount: 64 persons. Remarks: same as Evacuation #4, persons from Evacuation #4 were still on board, black rubber boat (fair quality)			

Table II. (Continued)

<i>Emotive framing (establishing a calm and attentive state)</i>	<i>Task framing (instructing task performance)</i>	<i>Emotive framing (closing interaction)</i>	<i>Emotive framing (re-establishing a calm and attentive state)</i>
V: Using formulas of welcome ('Welcome to Europe'), safety ('You are safe!') and common understanding ('You speak English?') NV: Using signals of safety (thumbs-up) while seeking eye contact PV: Using calm tone of voice, speaking loudly and clearly	V: Giving instructions ('Around the engine!') NV: Using illustrative gestures (indicating a circle) while maintaining eye contact PV: Using instructing and encouraging tone of voice, speaking loudly	V: Using formulas of appraisal ('Yes, perfect!') NV: – PV: Using applauding tone of voice	V: Using formulas of safety ('It's okay'.) and calming ('Sit down'.) NV: Using signals of calming (hand gesture) PV: Using friendly tone of voice, using calming speech melody

Note: * and + indicate an identical composition of the rescue crew for the respective evacuation; Phase 1 of each evacuation, see online Appendix Table A1 for more evidence.
Abbreviations: NV, non-verbal communication; PV, para-verbal communication; V, verbal communication.

verbal, non-verbal, and para-verbal communication within these episodes was stable within and between evacuations.

Preparing for Interaction

At the beginning of the episode, the crew engaged in intra-crew sensemaking to prepare for the upcoming encounter with the refugees. As crew members observed the refugee boat, they typically shared their assessments of the situation and the collective state aboard the refugee boat by verbally communicating among themselves the cues they perceived. The following excerpt^[3] from Evacuation #3 illustrates how crew members aligned their individual representations while the daughter boat was approaching the refugees to prepare for the upcoming encounter.

00:00–01:12 (DB3): *The daughter boat, with two crew members on board, is pursuing the refugee boat. The first helmsperson (CM_1) is steering the daughter boat rapidly but steadily in the direction of the refugee boat; the second helmsperson (CM_2) is preparing the mooring line. While approaching and observing the refugee boat, they speak loudly in German in a small-talk-like tone of voice.*

CM_2: 'Die versuchen vor uns an Land zu kommen'. [*'They're trying to get ashore before us.'*]

CM_1 (*with a quick glance at his colleague, immediately turning back to the refugee boat in front of him*): 'Ja, die haben Angst'. [*'Yes, they are afraid.'*]

CM_2: 'Ja. Alles was geht fahren die'. [*'Yes. They're moving as fast as they can.'*]

Table III. Illustration of qualitative data coding

Category	Specification of multimodality	Phrasal description of data
Emotive framing (establishing a calm and attentive state)	Focus on non-verbal gestures or signals of welcome and safety	Rescue crew members wave to welcome refugees (refugees often wave back once intense emotions are minimized)
		Rescue crew members show thumbs-up to affirm that everything is okay (individual refugees often mirror hand signal until intense emotions are minimized)
		Rescue crew members use calming hand gestures (individual refugees often mirror gesture to calm down other refugees until intense emotions are minimized)
		Rescue crew members seek eye contact with refugees so that refugees become attentive
	Formulaic repetition of verbal expressions of welcome and safety (until distracting emotions are minimized and refugees become attentive)	Rescue crew members use formulas of welcome (e.g., ‘Welcome in Europe’, ‘You’re in Greece. Welcome’), which they repeat until intense emotions are minimized
		Rescue crew members use formulas to establish a common level of understanding (e.g., ‘Anyone speaks English?’), which they repeat until intense emotions are minimized and refugees become attentive
		Rescue crew members use formulas to signal safety (e.g., ‘Everything is okay’, ‘You are safe’, ‘We bring you to our boat’, ‘All of you will get over soon’), which they repeat until intense emotions are minimized
		Rescue crew members use friendly and calm tone of voice (refugees often mirror tone of voice once intense emotions are minimized)
	Focus on friendly, clear, and calming para-verbal communication	Rescue crew members speak loudly and clearly until refugees become attentive
		Rescue crew members use a legato and calming speech melody until intense emotions are minimized and refugees become attentive

Table III. (Continued)

Category	Specification of multimodality	Phrasal description of data
Task framing (instructing task performance)	Maintenance or repetition of non-verbal body signals and illustrative gestures to get attention (until required task is completed)	Rescue crew members maintain body language (e.g., turning to refugees, taking a visible position, kneeling to eye level) so that refugees stay attentive (refugees use body language to show attention, readiness)
		Rescue crew members maintain eye contact to ensure that refugees stay attentive (refugees maintain eye contact to indicate their attentiveness and readiness to accomplish required task)
		Rescue crew members use illustrative hand gestures (e.g., describing circles, a hand gesture showing how to ‘hook in’ the carabiner, a gesture of pointing to refugees ‘one-by-one’), which they repeat until required task is completed
	Focus on verbal transmittance of cues for performing required task	Rescue crew members give instructions on how to establish rope connection between refugee boat and (daughter boat of the) rescue cruiser without further explanation (e.g., ‘You take the rope and put it around the engine’)
		Rescue crew members describe basic procedure of evacuation without further explanation (e.g., ‘First we fix the boat. Boarding when we say start. First babies, children, women. And one-by-one’)
		Rescue crew members use instructing and encouraging tone of voice so that refugees stay attentive
	Maintenance or repetition of instructive, onomatopoeic para-verbal communication (until required task is completed)	Rescue crew members speak loudly, sometimes commandingly, so that refugees stay attentive
		Rescue crew members emphasize key words (e.g., ‘aarooound’) and use onomatopoeia (e.g., ‘clack’) to illustrate verbal instruction (i.e., hooking in the carabiner), which they repeat until required task is completed

(Continues)

Table III. (Continued)

Category	Specification of multimodality	Phrasal description of data
Emotive fram- ing (closing interaction)	Focus on non-verbal gestures or signals of thanks and appraisal	Rescue crew members show thumbs-up to affirm that joint work is completed to everyone’s satisfaction (individual refugees often mirror hand signals) Rescue crew members use gestures (e.g., high five) to affirm that joint work is completed to everyone’s satisfaction (refugees often mirror gestures or smile with relief and satisfaction)
	Formulaic repetition of verbal ex- pressions of thanks and appraisal (leaving overall positive collective emotive state)	Rescue crew members use formulas of thanks (e.g., ‘OK. Thank you!’) to affirm that joint work is completed to everyone’s satisfaction Rescue crew members use formulas of ap- praisal (e.g., ‘Yes, perfect. Perfect’, ‘Yeah great, okay’, ‘Good job’) to affirm that joint work is completed to everyone’s satisfaction
	Focus on friendly, praising, and calming para-verbal communication	Rescue crew members use friendly and prais- ing tone of voice Rescue crew members use a legato and calm- ing speech melody
Emotive framing (re-establishing a calm and at- tentive state)	Focus on non-verbal gestures or signals of calming and safety	Rescue crew members use calming hand gestures (individual refugees often mirror gesture to calm down other refugees until intense emotions are minimized) Rescue crew members use signals (e.g., thumbs-up, pointing to rescue cruiser) to affirm that everything is okay Rescue crew members seek eye contact with refugees so that refugees become attentive
	Formulaic repetition of verbal expressions of calming and safety (until distracting emotions mini- mize and refugees calm down)	Rescue crew members use formulas to signal safety (e.g., ‘Everything is okay’, ‘We are here’, ‘The big boat is coming’), which they repeat until intense emotions are minimized Rescue crew members use calming formulas (e.g., ‘Sit down’, ‘Wait’), which they repeat to stop restlessness among refugees
	Focus on friendly, clear, and calming para-verbal communication	Rescue crew members use friendly and calm tone of voice Rescue crew members speak loudly and clearly to ensure that refugees listen Rescue crew members use a legato and calm- ing speech melody until intense emotions are minimized

CM_1: 'Ich auch. Ich surfe gerade'. [*Me too. I'm surfing right now.*]

CM_2 (*waving to refugees*): 'Er soll Gas wegnehmen, sonst versenken wir das Ding'. [*He better slow down or we'll sink this thing.*]

CM_1 (*with a glance over his shoulder*): 'Wir nicht'. [*Not us.*]

CM_2 (*pointing to refugee boat*): 'Nein, **er** soll Gas wegnehmen, sonst versenken wir die'. [*No, he should slow down or we'll sink them.*]

The following excerpt from Evacuation #4 provides an additional example.

00:00–00:58 (DB4-1): *The refugee boat has already been spotted and the daughter boat is heading for it. While one helmsperson (CM_3) is steering the daughter boat, another one (CM_4) is preparing the mooring line.*

CM_3 (*turning around to his colleague, addressing him in a small-talk yet sailor-like tone of voice [in German]*): 'Hast Du die Leine klar?' [*Is the line clear?*"]

CM_4: 'Bin schon dabei'. [*I'm already on it.*]

CM_3: 'Jawohl'. [*Ay.*]

CM_4 (*continues preparing mooring line and snap hook; after a while he addresses his colleague again*): 'Schön langsam, ne. Fahr schön langsam'. [*Nice and slow, eh. Sail nice and slow.*]

CM_3: (*waving to refugees*)

CM_4: 'Das ist ein schwarzes Boot'. [*This is a black boat.*]

Verbal cues referred to a range of circumstances, such as the refugees' actions ('Er soll Gas wegnehmen, sonst versenken wir das Ding'. [*He better slow down or we'll sink this thing.*]), intense emotional displays ('Ja die haben Angst'. [*Yes, they are afraid.*]), or characteristics of the rubber boat ('Das ist ein schwarzes Boot'. [*This is a black boat.*]).^[4] Verbal communication was commonly accompanied by preparatory body movements (preparing the towing line, slowing down the daughter boat) (e.g., Evacuation #1, Evacuation #2, Evacuation #3, Evacuation #4), as were bodily signals when the refugees were in sight (pointing at and waving to the refugees) (e.g., Evacuation #3, Evacuation #4, Evacuation #5), and these signals primarily provided cues to rescue crew members (and apparently to the refugees as the daughter boat approached the refugee boat) that the encounter was imminent. Para-verbal communication was unagitated, with a rather small-talk-like or professional tone of voice, and the volume was quite loud depending on the background noise of the engine, wind, and waves.

In summary, 'preparing for interaction' focuses on the intra-crew verbal transmission of sensemaking cues, which was accompanied by non-verbal bodily cues. The

combination of verbal and non-verbal language helps create among the rescue crew a shared representation of the key parameters of the refugees' boat, including the composition, actions, and reactions of the refugees; and particularly, the collective emotive state among them.

Emotive Framing (Establishing a Calm and Attentive State)

Once the refugee boat was within earshot, collective sensemaking between the rescue crew and the refugees began. The rescue crew and the refugees sought to arrive at a shared representation of the situation, which, as the following examples illustrate, involved cues that signal welcome and safety. The following excerpt is again from Evacuation #3:

01:53–02:26 (DB3): *The daughter boat has almost reached the refugee boat. Both crew members wave to refugees, seeking eye contact with them and addressing all of them in English in a loud but friendly and calming tone of voice.*

CM_1: 'Welcome in Europe. You're in Greece. Everything is okay. Welcome!'.

Refugees (*waving back*): 'Thank you! Welcome!'.

CM_1: 'Is there anybody who understands English?'.

Refugee_3_1 (*giving a sign*): 'Yes, I speak English'.

CM_1 (*maintaining eye contact*): 'English?'.

Refugee_3_1: 'Yes'.

CM_1: 'Okay'.

Refugee_3_1: 'That's right'.

In this sensemaking step, both crew members and refugees used multimodal communication, combining verbal with non-verbal communication (e.g., gestures and hand signals) and para-verbal elements, such as a friendly, clear, and calm tone of voice. When the crew members produced cues that appeared to be ambiguous, the refugees in turn indicated that they were confused, anxious, or tense. In these instances, the crew members repeated specific embodied expressions until they and the refugees seemed to reach a shared representation of the situation. The following excerpt from Evacuation #1 shows how this shared representation was reached for both sets of actors:

00:17–01:10 (DB1): *One of the crew members greets the refugees in English. He talks loudly and clearly, addressing all refugees in a friendly, calming, legato tone of voice.*

CM_1: 'Good morning. Do you speak English? English?' (*waiting for a short moment, then commencing in the same mode*) 'Everything is okay. We bring you to our boat, and then to the harbour'.

Refugees: (*restless, seem to be anxious, gesturing eagerly and shaking their heads*)

Refugee_1_1: (*loud, agitated, gesturing*): 'No! No!'.

CM_1 (*seeking out eye contact with all refugees, starting over again in a friendly and calming tone of voice*): 'No English?'.

Refugees (*responding together like a choir, nodding their heads*): 'Yes. Yes'.

CM_1: 'You understand English?'.

Refugees (*giving signs by raising arms*): 'Yes, yes!'.

CM_1 (*waving with his hand, in a calm tone of voice, legato*): 'Aaah, okay. Good morning'.

Refugees: (*waving back*): 'Good morning'.

CM_1 (*warm and friendly*): 'I am Peter. Hello!'.

Refugees (*smiling, waving hands*): 'Hello!'.

CM_1: 'We bring you to our boat'.

Refugees (*nodding their heads*): 'Okay'.

The situation onboard the refugee boat and among the refugees calms down significantly. Refugees become attentive. Nodding, the refugees agree.

The crew members repeated and maintained specific verbal and embodied expressions until the refugees no longer displayed distracting emotions – such as fear or tension – and instead indicated that they agreed with being transferred to the rescue cruiser ('We bring you to our boat'). The crew members emphasized their intention by repeating formulaic expressions of welcome and safety such as 'Welcome to Europe. You are in a safe area here in Greece. Good Morning!' (Evacuation #2) or 'Welcome in Europe! You're in Greece. Everything is okay. Welcome' (Evacuation #3) or 'Welcome to Europe! You are now in Greece. You are safe' (Evacuation #4). The tone of the crew members' voices was typically friendly and calming, in stark contrast to the tone of their intra-crew conversations as they prepared for the evacuation, which was a combination of harsh small talk and sailor-like language. This para-verbal language reinforced their spoken message and helped calm the refugees on the rubber boat. In addition, crew members typically used gestures (waving hands) (e.g., Evacuation #1, Evacuation #3) or signals (thumbs-up) (e.g., Evacuation #4,

Evacuation #5) to reinforce their verbal language and they repeated these cues until refugees, in turn, indicated their agreement by mirroring these non-verbal expressions.

In summary, in this step of the collective sensemaking episode, the emotive framing of the situation helps to minimize distracting emotions and establishes a calm and attentive state. This step in the auxiliary collective sensemaking process provides an important foundation for subsequent interaction. To establish that foundation, crew members use multimodal communication: While the verbal cues are consistent, almost-monotonous repetitions of formulaic expressions of welcome and safety, the strong focus on non-verbal and para-verbal expressions reinforce the verbal content. The multimodal cueing is repeated until refugees' mirroring of both non-verbal (gestures and signals) and para-verbal (tone of voice) expressions indicate that a shared representation and a calm and attentive state have been achieved. This general pattern is not only evident in the first sensemaking episode of fixing a line, to which the above descriptions refer, but also in the later episodes (see online Appendix Table A1). Our model below depicts the multimodal interplay of verbal, non-verbal, and para-verbal cues in the general pattern of emotive framing (establishing a calm and attentive state). With this emotive framing, the refugees become receptive to the rescue crew's instructions about the activities the actors have to perform together in the next step.

Task Framing (Instructing Task Performance)

Once a calm and attentive collective state had been established, the next step in the collective sensemaking episode was to develop a shared representation of what actions would now be required of both groups of actors. In this sensemaking episode, the goal was to establish a safe towing connection. The rescue crew members provided the necessary cues by using verbal expressions about the actions required (or not required). In addition, they used non-verbal illustrative gestures and para-verbal onomatopoeia – words that sound like the action they refer to – to provide cues to the refugees. The following excerpt from Evacuation #2 is an example.

01:37–02:29 (DB2): *While the helmsperson of the daughter boat (CM_1) is asking to no one in particular whether anyone in the refugee boat can translate for the others, the crew member (CM_2) is ready to throw the towing line, arranging it properly with both hands.*

CM_1: 'Listen. Is there anybody to translate?'

Refugee_2_1 signals his readiness to translate by waving his hand.

While CM_1 is describing the procedure and gives instructions, his colleague (CM_2) offers the towing line and Refugee_2_1 signals he is ready to catch it by reaching out his hand and maintaining eye contact.

CM_1 (addressing Refugee 2_1): 'We'll give you a rope ... [you tie it] around the engine. And then we'll bring you to our boat. Translate it, please. Translate it for the others!'

(As the first attempt has failed, CM_2 is rearranging the rope in loops again).

CM_2 (*calmly*): ‘Okay, okay, okay ... (*legato*) okay’.

(*Refugee_2_1 gestures eagerly, signalling the rescuer to throw the line again. In a second try, Refugee_2_1 catches the line.*)

CM_2 (*using hand motions to indicate a circle*): ‘Turn ... turn (*using hand gestures to indicate circles again*) [it around] the engine ... (*repeating gesture and maintaining eye contact*) turn [it] around ... turn [it] around the engine’.

CM_1 (*legato, repeating over and over again the same circle gesture*): ‘Around the engine ... around ... around the engine ... around’.

(*Refugee_2_1 succeeds.*)

CM_2 (*applauding, legato*): ‘Yes!’.

CM_1: ‘And hook it in! (*Beating the side of his right hand in the palm of his left hand to show how to snap the hook in*) Clack!’.

CM_2 (*loudly*): ‘Hook! (*in a low voice, more to himself and, a bit on edge because he recognizes that Refugee_2_1 has wrapped the rope twice around the engine instead of snapping the hook, in German*) jetzt macht er’s doppelt [*now he’s done it twice*] ... (*louder, to refugees*) No, no ... no, no!’.

CM_1 (*slightly tense*): ‘No, no, no, [the hook] in the rope!’.

CM_2: (*gesturing with the rope*)

CM_1: ‘In the rope, (*beating the side of his right hand on his left forearm*) clack!’.

During this step, crew members made themselves visible and maintained eye contact with the refugees. Refugees on the boat regularly signalled their readiness by raising a hand, waving, or making eye contact, as illustrated in the following excerpt from Evacuation #3.

02:54–03:44 (DB3): *Holding the towing rope in loops in his right hand, the crew member in the daughter boat (CM_2) is searching for someone to establish eye contact while offering the rope – which is equipped with a snap hook at the end – to the refugees in the rubber boat. Meanwhile, his colleague (CM_1) starts addressing all the refugees and gives them the following instructions:*

CM_1: ‘Take the rope, take the rope and (*legato*) [wrap it] around the engine!’.

Refugee_3_3 signals his readiness to catch the line by reaching out his hands, taking the end of the rope, and passing it over to Refugee_3_2 and to Refugee_3_4, who is sitting next to the engine.

CM_2 (*instructing his colleague in German, while staying focused on refugees*): ‘Noch’n Stück zurück ... ja’. [*Back a bit more ... yes.*]

CM_2 is now concentrating on Refugee_3_4 who is holding the end of the rope in his hands. CM_2 maintains eye contact with Refugee_3_4 while holding the other end of the rope in one hand, pointing at Refugee_3_4 and making circle motions with the other hand.

CM_2 (*addressing Refugee_3_4 loudly, legato, in an instructive but calm tone of voice*): ‘Turn [it] around the engine!’.

Refugee_3_4 does not loop the rope, so CM_1 repeats the instructions and gestures.

CM_1 (*pointing at Refugee_3_4, making circle motions, and in a loud and commanding tone of voice*): ‘You man! Spoke with you! (*continuing in a calmer tone of voice*) And the line (*legato*) around the engine!’.

CM_1 and CM_2 (*both making circle motions simultaneously*): ‘Turn [it] around! Turn [it] around! (*now Refugee_3_5 succeeds; both applaud, speaking simultaneously*) Yes! Yes! (*now asking him to connect rope with the snap hook*) Hook it! Hook!’.

Refugee_3_5 seems to not understand.

CM_1: ‘No, no!’.

CM_2 (*lifting the rope a bit*): ‘No! With the line (*repeating onomatopoeia to illustrate the sound of the snapping hook, while reinforcing his instruction with a corresponding gesture*) Clack. Hook it with the line!’.

When communicating with the refugee(s) performing a required action, the crew members spoke loudly but calmly, in a tone that was instructive and at times commanding. They did not explain, but instead used para-verbal elements to emphasize the most-important part of the instruction. Para-verbal elements included crew members making a ‘clack’ sound to indicate the sound of the snapping hook (e.g., Evacuation #1, Evacuation #3), or they emphasized the word ‘around’ by articulating it clearly and slowly, legato, with smooth and connected pronunciation (e.g., Evacuation #1, Evacuation #2, Evacuation #3, Evacuation #5). They also used body language to illustrate and communicate their instructions. For example, when instructing the refugees how to loop the towing line around the engine, the crew members pantomimed an imaginary towing line, made circular gestures with their hands, and acted out hooking it into the carabiner (Evacuation #2, Evacuation #3, Evacuation #4, and Evacuation #5). The rescue crew members used a similar pattern not only to create a shared representation of the required actions, but also to prevent action when the refugees were not performing it as required or when their behaviour threatened the safety of the evacuation. To emphasize their verbal commands (‘No, no, no!’) (Evacuation #3, Evacuation #4), the rescue crew members spoke with a

loud and instructing tone of voice and used illustrative gestures (e.g., finger-pointing) (Evacuation #1, Evacuation #4).

To summarize, in the task-framing step, the crew members built on the previous emotive framing that made the refugees attentive to the rescue crew's instructive cues. The crew members focus on verbally transmitting cues to get refugees to perform a required task. Verbal expressions do not refer to explanations of why actions should be carried out, but rather to instructions on how actions should be performed. Non-verbal and para-verbal cues seem essential for illustrating complex executions and are repeated until the required task is completed. Our model below shows how the multimodal cues are combined in the task-framing step.

Emotive Framing (Closing Interaction)

The previous sensemaking step ends with the towing line in place, at which point no further action is required by the refugees. The following excerpt from Evacuation #5 shows the transition from task framing to emotive closing, illustrating how rescue crew members updated the shared representation for this new situation right after the towing line had been fixed:

02:58–03:07 (DB5): *The daughter boat is already very close to rubber boat. CM_4 is passing the towing line over to refugees.*

CM_4: 'Around the engine (*using hand motions to indicate circles*), around the engine!'

(*Refugee_5_1 takes the rope, and while maintaining eye contact, wraps it around the engine*).

CM_4 (*applauding*): 'Yes, perfect! Perfect!'

Refugee_5_1 is hooking in the rope with the snap hook.

CM_4 (*applauding*): 'Yes, perfect!'

The crew members used verbal expressions to make clear that the step was over. Sometimes they used friendly praise ('Yes, perfect!', 'Good job!'), thanked the refugees ('Thank you!'), and/or gave them a thumbs-up (e.g., Evacuation #1, Evacuation #2, Evacuation #4), all efforts aimed at instilling a positive emotive closure to the interactive sequence that preceded this step. The following excerpts from Evacuations #1 and #2, respectively, provide additional examples.

02:03–02:07 (DB1): *After Refugee_1_4 has succeeded in snapping the hook in, CM_1 gives him the thumbs-up.*

CM_1 and CM_2 (*simultaneously, applauding*): 'Okay!'

CM_2: 'Thank you!'. (*then turning away*)

Refugees: (*smiling contentedly*)

02:29–02:31 (DB2): *Refugee_2_1 has hooked the rope successfully.*

CM_1 (*legato, applauding*): ‘Yeah!’.

CM_2 (*also legato, also applauding*): ‘Yeah!’ (*then turning away*)

CM_1 (*giving the thumbs-up*): ‘Good job!’.

Refugee_2_1: (*smiling contentedly, waving, also giving the thumbs-up*)

The refugee(s), in turn, sometimes responded by mirroring the rescue crew members’ gestures (e.g., Evacuation #1, Evacuation #2, Evacuation #4), indicating that a shared representation had been reached.

This crew-refugee collective sensemaking is usually short, characterized by non-verbal and para-verbal communication that reinforces the verbal, formulaic, and oftentimes repeated expressions of thanks and praise. Multimodality and mirroring produce cues that express agreement on both sides that this joint work in the evacuation has been completed to everyone’s satisfaction. These cues leave an overall positive and relaxed emotional state immediately after the joint work has been completed, which is why we refer to this sensemaking step as ‘emotive framing (closing interaction)’. The general pattern of using multimodal cues in the closing step is similar to that of establishing a calm and attentive state at the beginning of the sensemaking episode, indicating that both refer to emotive (not task) framing.

Distancing (Protecting Task Performance)/Emotive Framing (Re-Establishing a Calm and Attentive State)

Immediately following emotive framing (closing interaction), crew members usually began to distance the refugees from further action, thereby protecting the task performance from interference. They turned away from the refugees, spoke to other crew members in their native language (e.g., Evacuation #3, Evacuation #4), used professional terminology (e.g., Evacuation #1), and continued with their regular work, thus – as in the first step of preparing for interaction – turning again to intra-crew sensemaking. Their use of non-verbal bodily expressions (e.g., breaking eye contact, turning away) provided cues that the refugees should not do anything until called on again.

When the refugees showed signs of becoming tense or afraid, however, the rescue crew members – in short sequences – engaged in emotive framing (re-establishing a calm and attentive state). This step encompassed communicative activities aimed at re-establishing and maintaining the calm and attentive emotive state that had been previously established. The following excerpt from Evacuation #2 provides a brief example of how the crew members initially focused on their intra-crew work, but then immediately began to calm the refugees when they displayed strong distracting emotions.

02:31–03:02 (DB2): *After the rope from the daughter boat has been connected to the refugee boat, both crew members proceed with towing the refugee boat to the aft of the rescue cruiser. CM_1 is focused on steering the daughter boat and CM_2 is keeping the rope in the right position while refugees have to wait and sit down in the boat. Refugee_2_3 in the back of the boat appears to get restless.*

CM_1 (to Refugee_2_3, with a calming hand gesture and a calming and friendly tone of voice): ‘Sit down!’.

The following excerpt from Evacuation #4 provides an example of the rescue crew members protecting the task performance from interference by the refugees while at the same time minimizing potentially distracting emotions. The crew members had turned away from the refugees (i.e., distancing), but responded immediately with emotive maintaining when the refugees showed non-verbal cues of unrest (e.g., hand signals). The crew members used non-verbal communication (e.g., gestures) and a calm and friendly tone of voice to reinforce their verbal expressions until refugees calmed down again.

02:28–03:05 (DB4-1): *After Refugee_4_1 and Refugee_4_5 have successfully fixed the mooring line to the engine of their boat, the crew members on the daughter boat concentrate on keeping the distance between the two boats. Due to rough water, and therefore difficulties in handling the mooring line, much intra-crew coordination is necessary.*

CM_4 (to his colleague): ‘Frank, setz zurück! Du setzt vorne auf’m Schlauch[boot] auf. Frank, Du warst auf’m Schlauch[boot] ... Also, wir sind fest, wir sind fest ... So ... Stop. Stop. Vorwärts, vorwärts. Ich hab nicht mehr viel [Leine]. Okay, langsam, langsam, langsam. Wir haben Zeit ... Okay, wir haben’s hinten dran’ [Frank, go backwards! You touched down at the front of the rubber (boat). Frank, you were on the rubber (boat). So, we are fixed ... So ... Stop. Stop. I don’t have much (rope) left. Okay, slowly, slowly, slowly. We have time. ... Okay, we’ve got it behind].

At the same time, some of the refugees are getting restless, giving hand signs signalling that they want to get over to the daughter boat.

CM_4 (calming tone of voice, using arm gestures that indicate that the ‘Unity’ is moving in the direction of the towing unit): ‘The big boat is coming’.

Refugees: (nodding as a sign of understanding)

CM_4 (calming, showing thumbs-up): ‘Everything is okay’.

While Refugee_4_1 is pointing in direction of the ‘Unity’, which is heading to the scene, all refugees calm down.

In this final sensemaking step, rescue crew members use verbal and non-verbal cues to distance refugees from further involvement. At the same time, the crew stays

vigilant for displays of intense emotions and produces cues – similar to those in the ‘emotive framing (establishing a calm and attentive state)’ and ‘emotive framing (closing interaction)’ sensemaking step – that build a shared representation of the situation with the refugees and, thus, allow the crew members to proceed with their work.

Table IV provides a summary of the insights emerging from our data. It also provides illustrations of the rescue crew engaging in embodied sensemaking with the refugees.

Our findings reveal the patterns of multimodal communication actors use to overcome challenges posed by cognitive disparities and distracting emotions in extreme contexts. They indicate different steps and interdependencies and suggest that the multimodal combination of verbal, non-verbal, and para-verbal communication differs depending on whether it is emotion-related (emotive framing) or task-related (task framing). Based on these findings, we develop a process model of multimodal collective sensemaking in extreme contexts.

A PROCESS MODEL OF MULTIMODAL COLLECTIVE SENSEMAKING IN EXTREME CONTEXTS

These findings allow us to develop a process model – depicted in Figure 3 – that addresses our research question. In contexts where actors with cognitive disparity and distracting emotions encounter one another, collective sensemaking cannot solely rely on verbal, task-focused information exchange, which is what most previous research studying sensemaking among experts has found (e.g., Christianson, 2019; Faraj and Xiao, 2006; Steigenberger and Lübcke, 2022). Instead, in these contexts collective sensemaking involves an auxiliary process, comprising the distinct yet interdependent steps of preparing for interaction, emotive framing (establishing a calm and attentive state), task framing (instructing task performance), emotive framing (closing interaction), and distancing (protecting task performance)/emotive framing (re-establishing a calm and attentive state), each of which is directed toward enabling the core collective sensemaking process (cue perception, cue interpretation, and purposeful interaction).

The auxiliary collective sensemaking steps necessitate multimodal communication, with the modalities contingent on whether the goal is either an emotive or a task-related one. Emotive framing helps actors to minimize distracting emotions and (re-)establish the necessary calm, attentive state so that task-related cues can be effectively transmitted. This transmission of task-related cues is crucial for bridging cognitive disparity between actors and creates the ground for coordinated action. By alternating between framing emotive states and providing task-related cues, multimodal communication assists actors in overcoming challenges posed by cognitive disparities and distracting emotions – both common in extreme contexts – thus facilitating collective sensemaking and subsequent action.

Core and Auxiliary Steps in the Collective Sensemaking Process

Extreme contexts often require that actors with disparate cognitive representations work together (Dixon and Weeks, 2017; Steigenberger, 2016), and these contexts often trigger distracting emotions (Catino and Patriotta, 2013; Hällgren et al., 2018; O’Neill and

Table IV. Multimodality in collective sensemaking [Colour table can be viewed at wileyonlinelibrary.com]

Auxiliary collective sensemaking:	Preparing for interaction	Emotive framing (establishing a calm and attentive state)	Task framing (instructing task performance)	Emotive framing (closing interaction)	Distancing (protecting task performance)/emotive framing (re-establishing a calm and attentive state)
Locus of Sensemaking: Focus of Communication:	Intra crew (+ inter crew-refugee) Focus on verbal transmittance of sensemaking cues, accompanied by non-verbal cues	Inter crew-refugee Focus on non-verbal and para-verbal cues to reinforce formulaic repetition of verbal message	Inter crew-refugee Focus on verbal transmittance of sensemaking cues, illustrated by non-verbal and para-verbal embodied expressions	Inter crew-refugee Focus on non-verbal and para-verbal cues to reinforce formulaic repetition of verbal message	Intra crew + (inter crew-refugee) Intra crew: focus on verbal transmittance of sensemaking cues, accompanied by non-verbal cues Inter crew-refugee: focus on non-verbal and para-verbal cues to reinforce formulaic repetition of verbal message
	Intra crew: combination of verbal and non-verbal communication helps to assess and adjust to emotions and situation among refugees Inter crew-refugee: non-verbal expressions also provide cues to both crew members and refugees that collective sensemaking with refugees was imminent	Reinforcing formulaic verbal message (i.e., welcome and safety) by non-verbal and para-verbal communication facilitates emotive framing of situation (i.e., minimizes distracting emotions, calms refugees, and makes them attentive)	Illustration of verbal message by non-verbal and para-verbal communication helps deliver messages for performing required task (i.e., instructions) properly and effectively	Reinforcing formulaic verbal message (i.e., thanks and praise) with non-verbal and para-verbal communication facilitates emotive closing (i.e., joint work completed to everyone's satisfaction, leaving overall positive emotive collective state)	Intra crew: combination of verbal and non-verbal communication helps crew proceed with regular (evacuation) work Inter crew-refugee: non-verbal and para-verbal expressions also provide cues to both crew members and refugees that collective sensemaking with refugees is over/reinforcing formulaic verbal message (i.e., of calming and safety) with non-verbal and para-verbal communication facilitates emotive maintaining (i.e., minimizes distracting emotions and calms refugees)
Communication – Verbal:	Verbal communication in native, professional language on perceived cues regarding situation, especially emotive state, on board the refugee boat	Verbal formulaic expressions of welcome and safety	Verbal communication to give instructions on how to perform required task	Verbal formulaic expressions of thanks and appraisal	Verbal communication in native, professional language on regular evacuation work/verbal formulaic expressions of calming and safety

(Continues)

Table IV. (Continued)

Communication – Non-Verbal:	Non-verbal communication accompanies verbal communication: preparing for evacuation, pointing at refugee boat, waving	Non-verbal communication reinforces verbal gestures (waving hands) or signals (thumbs-up)	Non-verbal communication helps maintain attention and illustrate verbal communication: taking a visible position, using eye contact, using illustrative gestures	Non-verbal communication reinforces verbal communication: gestures (high five) or signals (thumbs-up)	Non-verbal communication accompanies verbal communication: collectively turning away from refugees, proceeding with regular work/non-verbal communication reinforces verbal communication: gestures (calming hand gestures) or signals (thumbs-up)
Communication – Para-Verbal:	Para-verbal communication seems less relevant for sensemaking and is relevant only as a contrast to tone of voice in following episode: loud, small-talk-like, sailor-like tone of voice in native language	Para-verbal language reinforces verbal language: friendly and calm tone of voice (in stark contrast to tone of voice used during intra-crew member conversations)	Para-verbal language illustrates verbal language: instructive tone of voice, emphasizing key words, using onomatopoeia	Para-verbal language reinforces verbal language: friendly and calm tone of voice (in stark contrast to tone of voice used during intra-crew member conversations)	Para-verbal communication seems less relevant for sensemaking and only becomes relevant as a contrast to tone of voice in previous episode: loud, sailor-like tone of voice in native language/para-verbal language reinforces verbal language: friendly and calm tone of voice (in stark contrast to tone of voice used during intra-crew member conversations)
Illustration					

Note: Grey columns refer to auxiliary collective sensemaking processes that are predominantly intra-crew. We do not provide illustrations for these processes because they involve limited non-verbal and para-verbal communication.

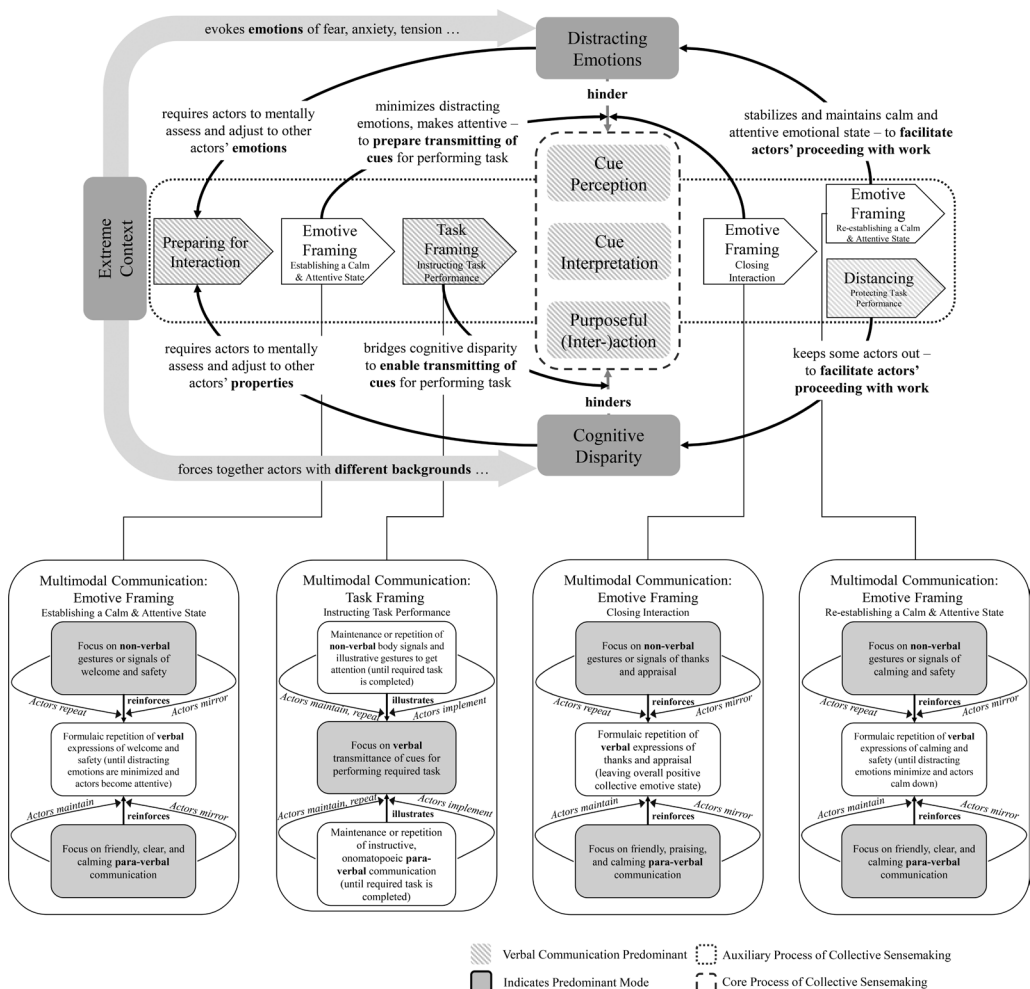


Figure 3. Multimodal collective sensemaking in extreme contexts

Rothbard, 2017) – such as fear, anxiety, and tension (e.g., Traeger, 2013). Cognitive disparity and distracting emotions render collective sensemaking fragile. To overcome this fragility, experts – such as the rescue crew we study, firefighters in a burning building, police officers during a terrorist attack, or physicians during a disaster – need to establish the conditions for effective collective sensemaking with the other actors involved – such as refugees in distress, residents in a burning building, civilians in a terrorist attack, or victims or volunteers after a disaster.

This auxiliary collective sensemaking process begins with a step in which actors prepare for the upcoming interaction. They mentally approach the extreme situation and agree on the key parameters; in particular, other actors' emotional state and task-relevant characteristics. Once the preparing is complete, experts involve the other actors, starting with attempts to minimize distracting emotions and establish a calm and attentive collective state. In this initial step of emotive framing, experts shift the 'relational theme'

(Nabi, 1999) of the situation and prevent emotionally distracted actors from missing or misinterpreting important cues. Thus, emotive framing establishes the preconditions for the task-framing step that follows.

In the next step, experts provide cues to other actors. These cues present the basis for task framing to facilitate subsequent joint action. Task framing differs from verbal exchange among experts in that in this step these expert actors do not discuss their interpretation of the situation, but instead provide clear, simple, and precise cues that allow actors with less-elaborate representations of the situation to perform the required actions immediately. Experts, by contrast, collectively make sense by engaging in a collective, verbal exploration of the situation (Christianson, 2019; Faraj and Xiao, 2006). Task framing is completed as soon as cue perception, cue interpretation, and purposeful (inter-)action – that is, core collective sensemaking – have led to the concerted completion of the required task.

A further emotive framing step follows, which aims at closing the joint task and leaving an overall positive, calm, attentive collective state. Closing the interaction – and the subsequent distancing – is important because actors with less-elaborate representations could potentially hinder necessary actions by preventing experts from completing their work. In this closing step, the experts indicate that no further joint actions beyond those that were initiated in the task-framing step are required or encouraged. This distancing is suspended only when distracting emotions seem to jeopardize their work, and in such a situation actors engage in emotive framing again to re-establish and maintain the calm and attentive emotive state. We suggest that this process allows actors in extreme contexts to overcome the sensemaking challenges posed by cognitive disparity and emotive distraction.

Multimodal Communication in the Collective Sensemaking Process

Our model (Figure 3; see also Table IV) reveals the distinct ways in which the different communicative modalities – verbal, para-verbal, and non-verbal – are used to facilitate collective sensemaking. The emotive-framing steps (i.e., establishing a calm and attentive state, closing interaction, and re-establishing a calm and attentive state) differ clearly and systematically from the task-framing step in terms of how actors use the different communication modalities they have available.

Emotive framing is characterized by a focus on non-verbal and para-verbal communication. Non-verbal communication includes emotional displays (Parkinson, 1996) that not only express personal emotions but also influence others' emotional experiences (Bonaccio et al., 2016; Vaughan-Johnston et al., 2021). Para-verbal elements (i.e., how something is said) also have great potential for shaping emotional experiences, intersecting with but also distinct from the verbal aspect (i.e., what is said) (Pell et al., 2009). These elements use prosodic cues to express and influence basic emotions. Both non-verbal (open or closed postures, gestures, and signals) and para-verbal (friendly and calm tone of voice) cues can shape the relational theme of the situation in a way that verbal communication alone would be unable to do. When actors mirror the gestures and tone of voice of other actors, they underscore the influence that non-verbal and para-verbal communication has on collective sensemaking.

Task framing, in contrast, is dominated by verbal communication, with non-verbal and para-verbal elements playing only a supporting role. Non-verbal and para-verbal

communication (e.g., descriptive gestures and expressive sounds) are used to illustrate the verbal transmission of task-related cues. This element of our model resonates with previous research on verbal communication in experts' sensemaking (Christianson, 2019; Faraj and Xiao, 2006; Steigenberger and Lübcke, 2022), yet, as explained above, because in our setting it involves actors with less-elaborate representations, the communication is largely unidirectional, simplified, and without explanations.

Taken together, our model (Figure 3) shows the different roles that the three communication modes play and how actors use them. It also highlights the critical role of the body and all of its expressions in collective sensemaking in extreme contexts – not only for perceiving and interpreting cues (de Rond et al., 2019; Sergeeva et al., 2020), but also for conveying cues and influencing and facilitating cue processing in these contexts.

DISCUSSION

On 14 June 2023, a fishing boat with an estimated 750 refugees on board sank about 47 nautical miles off the coast of Pylos, Greece. It sank during an evacuation attempt by the Greek Coast Guard, and over 600 people died. The cause of this disaster is unclear, as there is no video footage or other objective reports. The Greek Coast Guard argued that the refugee boat capsized because the refugees, collectively, moved to one side of the boat. This movement, seemingly at odds with maritime expertise, might be explained by the refugees' fear of dehydration, as it took place after bottles of fresh water had been tossed toward the refugee boat. According to media reports, survivors reported that the attempt to establish a towing line between the refugee boat and the coast guard cruiser failed, leading to the boat capsizing (CNN, 2023). Sensemaking research has extensively studied such catastrophic events, revealing the fragility of collective sensemaking in extreme contexts. Yet the puzzle of how actors overcome this fragility remains unexplained.

Our study helps solve this puzzle. The process model we introduce contextualizes collective sensemaking, significantly extending extant work in sensemaking research that has largely focused on sensemaking among experts (Christianson, 2019; Faraj and Xiao, 2006; Maitlis and Christianson, 2014). For the most part, experts make sense using verbal language, grounded in a deep understanding of the challenges at hand; they anchor their interpretation of a situation in the emerging collective sensemaking account; and engage in purposeful (inter-)action (Faraj and Xiao, 2006). However, in an extreme context, when actors with less-elaborate representations need to be involved to coordinate action, this verbal approach often falls short, as demonstrated by the vignette above and by extant work on sensemaking failures (Cornelissen et al., 2014; Oliver et al., 2017; Weick, 1993). The model we introduce theorizes how actors use an auxiliary sensemaking process to overcome distracting emotions and cognitive disparities in collective sensemaking in extreme contexts.

Outlining the importance of embodied communication, our model extends theory on the role of the body in sensemaking research. Sensemaking research has acknowledged – yet so far has undertheorized – the role of bodily and carnal processes (de

Rond et al., 2019; Kudesia, 2021; Weick et al., 2005; Whittle et al., 2023). Extant work has showed that the body is important both as a source of cues and as the physical and material instrument through which cues are perceived and processed, subject to physical and spatial circumstances (Cornelissen et al., 2014; de Rond et al., 2019; Steigenberger and Lübcke, 2022). Our research extends this perspective, outlining how the body also affects others' sensemaking. Specifically, we show how the body provides cues not only to the sensemaker (de Rond et al., 2019) but also to others, which helps bridge cognitive disparity and minimize distracting emotions.

We also further expand the literature on communication and emotions in extreme contexts (Cornelissen et al., 2014; Kudesia, 2021; Weick et al., 2005). Extant literature has demonstrated extensively that emotions influence actors' behaviour in extreme contexts, showing that emotions can both foster and hinder successful work. For example, Locke (1996) describes how some doctors use humour to alleviate negative emotions that their patients, suffering from life-threatening diseases, experienced. Rauch and Ansari (2022) explore how military drone pilots navigate the emotional ambivalence caused by their work to maintain focus and identification. Farny et al. (2019) discuss the relationship between collective emotions and institutional re-creation following a disaster. Our study expands this literature by introducing theory on how actors manage the emotions of others in extreme contexts. Our model shows how actors evoke a form of emotional contagion (e.g., Barsade, 2002; Barsade et al., 2018), displaying the emotions they want others to experience; in particular, low-activation positive affect. Both negative and positive affects high in activation tend to narrow attentional scope – increasing the likelihood that actors focus on irrelevant cues – while by contrast low-activation affects broaden the attentional scope (Gable and Harmon-Jones, 2010a; Gable and Harmon-Jones, 2010b; Harmon-Jones and Gable, 2009; Yang et al., 2022).

The behaviour exhibited by the actors in our study also resonates with extant research in communicational psychology showing that non-verbal and para-verbal cues play a more-significant role than verbal language in effectively transmitting emotive states between individuals. For example, Mehrabian (1972) found that non-verbal (facial expressions: 55 per cent) and para-verbal (tone: 38 per cent) cues have the strongest impact on an individual's emotional understanding of the other party. In contrast, verbal language contributes a mere 7 per cent to this understanding. The processes of emotional contagion largely operate subconsciously and automatically, and are expressed when others mimic facial expressions and body movements (Dimberg et al., 2000; Hatfield et al., 1994; Hess and Fischer, 2014). Integrating these communicational principles into the extreme-contexts literature helps us understand how actors can manage emotions and – if those emotions are distracting – how to minimize them, an issue so far not fully theorized. In doing so, our study also responds directly to calls to take mundane communication seriously (de Rond et al., 2019; Weick et al., 2005; Whittle et al., 2023). It also informs linguistic research in extreme contexts, which has underscored the importance of communication for handling emotive distractions (e.g., Dietrich, 2003; Dunn et al., 2002; Ungerer, 2004) but has not yet addressed collective sensemaking.

We also extend our current understanding of how actors overcome cognitive disparity in extreme contexts. Previous research (e.g., Cornelissen et al., 2014; Dwyer et al., 2023; Oliver et al., 2017; Schakel et al., 2016; Weick, 1993) has highlighted the issue of

sensemaking and coordination breakdowns as consequences of non-elaborate cognitive representations, yet extant work has emphasized how such cognitive discrepancies can be avoided rather than on how they can be compensated for during missions and assignments. Specifically, research has proposed methods including vicarious learning through storytelling (Myers, 2022), intra-organizational or inter-organizational training (Steigenberger, 2016), debriefings and ‘safety huddles’ (Franklin et al., 2020), and error-learning (Catino and Patriotta, 2013). However, those methods necessitate interactions before and after ‘hot’ situations. They are therefore unsuited to overcome the hindrances caused by cognitive disparities *during* such situations. Our study contributes theory to explain how actors in such situations combine verbal and onomatopoetic elements to provide perceptible and easy-to-process cues in collective sensemaking. With these insights, we expand our understanding of how to address problems rooted in cognitive disparity that cannot be resolved through learning.

In sum, our study contributes a dynamic emotive and bodily perspective on collective sensemaking in extreme contexts. This perspective expands the core model of collective sensemaking, consisting of cue perception, cue processing, and purposeful (inter-)action (Christianson, 2019; Maitlis and Christianson, 2014), by introducing auxiliary collective sensemaking processes. Much of the existing work assumes that actors needing to coordinate already have the cognitive representations of the situation necessary for effective cooperation, and does not problematize distracting emotions (Christianson, 2019; Faraj and Xiao, 2006; Steigenberger and Lübcke, 2022). Our model contextualizes collective sensemaking theory, moving beyond these implicit strict assumptions.

Finally, our study has important implications for extreme-context work in practice. Experts working in such environments often have to coordinate actions with actors who have less-developed cognitive representations of a situation and/or are affected by distracting emotions. The contrast between the two vignettes in our paper – the one in the Introduction in which the evacuation is successful, and the other that opens our Discussion section and that ends in tragedy – underscores the importance of the collective sensemaking model we introduce. We encourage extreme-context practitioners to incorporate an informed and targeted use of multimodal communication into their repertoire – both in training programs and in the field.

Future Research Directions and Limitations

We propose avenues for future research to address some of the limitations of our study. First, our study outlines the multimodal nature of collective sensemaking in extreme contexts. However, due to the exploratory nature of our inquiry, we do not provide an in-depth test of the effects of specific patterns of verbal, para-verbal, and bodily expressions in the moment-to-moment unfolding of a dialogue. We invite researchers with an interest in multimodal communication in sensemaking to use discourse analytical methods (e.g., Chia, 2000) to develop more-fine-grained theory. Such research could also provide a bridge into other relevant interpersonal phenomena, such as the development of trust between experts and other actors in extreme contexts. Trust – defined as the willingness to accept vulnerability (Rousseau et al., 1998) – is considered an important coordination mechanism when actors engage in concerted

action to perform a joint task (Okhuysen and Bechky, 2009). The actors involved often have to develop trust quite quickly – just as in the extreme situation we investigated. Examining the moment-to-moment unfolding of a dialogue could reveal the particular verbal, visual, or acoustic cues used to promote the development of such swift interpersonal trust (Schilke and Huang, 2018) or more-generalized institutional trust (Bachmann and Inkpen, 2011) when time is of the essence and actors cannot rely on a shared history of collaboration. The focus on trust development provides another potentially interesting angle: While the need for refugees to trust the rescue crew is apparent, the rescue crew also must place trust in those they are rescuing, meaning that they need to pay attention to additional cues, since the rescue crew also is vulnerable to refugees' actions – for example, their not following instructions, their having or acting on malicious intentions, or their failing to comply – that may lead to the rescue crew failing at their task, or even putting their own lives at risk.

Second, as discussed in the Methods section, our data inherently privileges one group of actors – the rescue crew – over the other group of actors – the refugees. We acknowledge that this privileging creates an imbalance, as we are unable to analyse the communication on board the refugee boat. We also recognize that the sharp and stable distinction between experts and actors with less-elaborate representations of the extreme context is not always a given. The expert role can be more fluid or can shift in the course of an extreme situation, resulting in the formation and changing of groups or subgroups whose collective sensemaking is suppressed by emotive distractions and cognitive disparity. To address both issues, we encourage future research to build on our work and have all actors involved in extreme contexts wear video recording equipment. For example, should ethical considerations permit, future research could explore the perspective of both local residents and firefighters who issue evacuation orders amid a looming natural disaster. This exploration would broaden the scope of perspectives covered, as exemplified by Dye et al.'s (2014) study on the decision-making processes surrounding evacuations in the wake of hurricane warnings. Such future research would deepen our understanding of how cognitive disparities and emotive distractions affect collective sensemaking in extreme contexts. This research could also investigate the dynamic use of multimodal communication.

Finally, we suggest that our knowledge on emotions in extreme contexts can be further advanced by more-systematically taking into account insights on emotion regulation obtained in non-extreme settings (e.g., Scott et al., 2020; Vuori and Huy, 2022). While our data was not suited to study intra-individual emotion regulation, future work might develop deeper insights into how actors make sense of their emotions – that is, control, suppress, or express them – in extreme contexts, which could lead to further relevant insights into the conditions, processes, and consequences of collective sensemaking in extreme contexts more generally.

CONCLUSION

In extreme contexts, actors often need to coordinate in situations characterized by considerable cognitive disparity and emotional distractions. When coordinated action is required, actors must engage in collective sensemaking to encourage necessary actions and prevent unnecessary ones, thus enabling concerted task performance. The model we develop in this

paper elucidates this process. It shows the dynamic interplay of auxiliary and core collective sensemaking processes. It further outlines the multimodal nature of auxiliary collective sensemaking steps and the different modalities used to frame emotional states and convey task-related information. This model can help mitigate causes of fatal errors in extreme contexts while at the same time addressing important shortcomings in sensemaking research.

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NOTES

- [1] We have changed names, distorted voices, and blurred faces in videos and photographs to preserve actors' anonymity. We describe our research ethics and data-protection considerations in more detail in the Methods section.
- [2] This visual description is for Evacuation #1. Visual descriptions for all other evacuations are available from the authors.
- [3] We wrote excerpts in the form of a script. Conversations were transcribed verbatim from the video recording. When names of actors were mentioned, we changed them to maintain anonymity. We added descriptions of actions to each transcript to more-fully represent the situation. The time sequence at the beginning indicates the length and the position of the recording on the video for each scene. The abbreviation at the beginning shows the camera location (e.g., 'DB' for daughter boat, 'RC' for rescue cruiser), the specific evacuation (e.g., 3 for Evacuation #3), and – if relevant – the file section (e.g., 1, for section #1). English translations are provided in italics in square brackets, and explanations and context are given in italics and brackets. To conserve space, and because we are not conducting conversation analysis – which would require more-detailed documentation of the actors' communication – we did not use a formal linguistic annotation system.
- [4] The colour of a rubber boat provides information about the boat, such as the strength of the material, its quality, and its weaknesses – aspects that rescue crew members need to be aware of during an evacuation, and that they therefore typically exchange information about.

REFERENCES

- Audi, R. (2013). 'Cognitive disparities: Dimensions of intellectual diversity and the resolution of disagreements'. In Christensen D. and Lackey J. (Eds), *The Epistemology of Disagreement: New Essays*. Oxford: Oxford University Press, 205–22.
- Bachmann, R. and Inkpen, A. C. (2011). 'Understanding institutional-based trust building processes in inter-organizational relationships'. *Organization Studies*, **32**, 281–301.
- Barsade, S. G. (2002). 'The ripple effect: Emotional contagion and its influence on group behavior'. *Administrative Science Quarterly*, **47**, 644–75.
- Barsade, S. G., Coutifaris, C. G. V. and Pillemer, J. (2018). 'Emotional contagion in organizational life'. *Research in Organizational Behavior*, **38**, 137–51.

- Bonaccio, S., O'Reilly, J., O'Sullivan, S. L. and Chiochio, F. (2016). 'Nonverbal behavior and communication in the workplace: A review and an agenda for research'. *Journal of Management*, **42**, 1044–74.
- Casciaro, T., Lobo, M. S., Wilhelm, H. and Wittland, M. (2022). 'The way we make each other feel: Relational affect and joint task performance'. *Academy of Management Discoveries*, **8**, 15–35.
- Catino, M. and Patriotta, G. (2013). 'Learning from errors: Cognition, emotions and safety culture in the Italian Air Force'. *Organization Studies*, **34**, 437–67.
- Chia, R. (2000). 'Discourse analysis as organizational analysis'. *Organization*, **7**, 513–8.
- Christianson, M. K. (2018). 'Mapping the terrain: The use of video-based research in top-tier organizational journals'. *Organizational Research Methods*, **21**, 261–87.
- Christianson, M. K. (2019). 'More and less effective updating: The role of trajectory management in making sense again'. *Administrative Science Quarterly*, **64**, 45–86.
- Clark, H. H. (1996). *Using Language*. Cambridge: Cambridge University Press.
- Cloutier, C. and Langley, A. (2020). 'What makes a process theoretical contribution?' *Organization Theory*, **1**, 1–32.
- CNN. (2023). "If they had left us be, we wouldn't have drowned": CNN investigation raises questions about Greek coast guard's account of shipwreck tragedy. Available at <https://edition.cnn.com/2023/06/23/europe/greece-migrant-boat-disaster-investigation-intl-cmd/index.html> (accessed 18 January 2024).
- Cornelissen, J. P. (2017). 'Preserving theoretical divergence in management research: Why the explanatory potential of qualitative research should be harnessed rather than suppressed'. *Journal of Management Studies*, **54**, 368–83.
- Cornelissen, J. P., Mantere, S. and Vaara, E. (2014). 'The contraction of meaning: The combined effect of communication, emotions, and materiality on sensemaking in the Stockwell shooting'. *Journal of Management Studies*, **51**, 699–736.
- de Rond, M. (2020). 'Ethnography and the traffic in pain'. In Mir, R. and Fayard, A.-L. (Eds), *The Routledge Companion to Anthropology and Business*. London: Routledge, 473–91.
- de Rond, M., Holeman, I. and Howard-Grenville, J. (2019). 'Sensemaking from the body: An enactive ethnography of rowing the Amazon'. *Academy of Management Journal*, **62**, 1961–88.
- de Rond, M. and Lok, J. (2016). 'Some things can never be unseen: The role of context in psychological injury at war'. *Academy of Management Journal*, **59**, 1965–93.
- Dietrich, R. (Ed) (2003). *Communication in High Risk Environments*. Buske Verlag: Linguistische Berichte. Hamburg.
- Dille, M. H. and Plotnikof, M. (2020). 'Retooling methods for approaching discourse–materiality relations: A new materialist framework of multimodal sensitivity'. *Qualitative Research in Organizations and Management: An International Journal*, **15**, 485–501.
- Dimberg, U., Thunberg, M. and Elmehed, K. (2000). 'Unconscious facial reactions to emotional facial expressions'. *Psychological Science*, **11**, 86–9.
- Dixon, D. P. and Weeks, M. R. (2017). 'Leading in extremis situations: How can leaders improve?'. In Holenweger, M., Jager, M. K. and Kernic, F. (Eds), *Leadership in Extreme Situations*. Basel: Springer, 251–75.
- Dolcos, F. and McCarthy, G. (2006). 'Brain systems mediating cognitive interference by emotional distraction'. *The Journal of Neuroscience*, **26**, 2072–9.
- Dunn, J. C., Lewandowsky, S. and Kirsner, K. (2002). 'Dynamics of communication in emergency management'. *Applied Cognitive Psychology*, **16**, 719–37.
- Dwyer, G., Hardy, C. and Tsoukas, H. (2023). 'Struggling to make sense of it all: The emotional process of sensemaking following an extreme incident'. *Human Relations*, **76**, 420–51.
- Dye, K. C., Eggers, J. P. and Shapira, Z. (2014). 'Trade-offs in a tempest: Stakeholder influence on hurricane evacuation decisions'. *Organization Science*, **25**, 1009–25.
- Easterbrook, J. A. (1959). 'The effect of emotion on cue utilization and the organization of behavior'. *Psychological Review*, **66**, 183–201.
- Evans, J. S. B. T. (2008). 'Dual-processing accounts of reasoning, judgment, and social cognition'. *Annual Review of Psychology*, **59**, 255–78.
- Faraj, S. and Xiao, Y. (2006). 'Coordination in fast-response organizations'. *Management Science*, **52**, 1155–69.
- Farny, S., Kibler, E. and Down, S. (2019). 'Collective emotions in institutional creation work'. *Academy of Management Journal*, **62**, 765–99.
- Franklin, B. J., Gandhi, T. K., Bates, D. W., Huancahuari, N., Morris, C. A., Pearson, M., Bass, M. B. and Goralnick, E. (2020). 'Impact of multidisciplinary team huddles on patient safety: A systematic review and proposed taxonomy'. *BMJ Quality and Safety*, **29**, 1–2.
- Frijda, N. H. (1986). *The Emotions*. Cambridge: Cambridge University Press.

- Gable, P. and Harmon-Jones, E. (2010a). 'The blues broaden, but the nasty narrows: Attentional consequences of negative affects low and high in motivational intensity'. *Psychological Science*, **21**, 211–5.
- Gable, P. and Harmon-Jones, E. (2010b). 'The motivational dimensional model of affect: Implications for breadth of attention, memory, and cognitive categorisation'. *Cognition and Emotion*, **24**, 322–37.
- Hällgren, M. and Buchanan, D. A. (2020). 'The dark side of group behavior: Zombie apocalypse lessons'. *Academy of Management Perspectives*, **34**, 434–57.
- Hällgren, M., Rouleau, L. and Rond, M. d. (2018). 'A matter of life or death: How extreme context research matters for management and organization studies'. *Academy of Management Annals*, **12**, 111–53.
- Harmon-Jones, E. and Gable, P. A. (2009). 'Neural activity underlying the effect of approach-motivated positive affect on narrowed attention'. *Psychological Science*, **20**, 406–9.
- Hatfield, E., Cacioppo, J. T. and Rapson, R. L. (1994). *Emotional Contagion*. New York: Cambridge University Press.
- Heaphy, E. D. (2017). "'Dancing on hot coals": How emotion work facilitates collective sensemaking'. *Academy of Management Journal*, **60**, 642–70.
- Hess, U. and Fischer, A. (2014). 'Emotional mimicry: Why and when we mimic emotions'. *Social and Personality Psychology Compass*, **8**, 45–57.
- Kodeih, F., Schildt, H. and Lawrence, T. B. (2023). 'Countering indeterminate temporariness: Sheltering work in refugee camps'. *Organization Studies*, **44**, 175–99.
- Kudesia, R. S. (2021). 'Emergent strategy from spontaneous anger: Crowd dynamics in the first 48 hours of the Ferguson shooting'. *Organization Science*, **32**, 1210–34.
- Lai, A. Y. (2021). 'The incomplete, outdated, incorrect, and unknown: Mitigating threats of knowledge errors in high-performance primary care'. *Academy of Management Discoveries*, **7**, 581–602.
- Landgren, J. (2005). 'Supporting fire crew sensemaking enroute to incidents'. *International Journal of Emergency Management*, **2**, 176–88.
- Langley, A. (1999). 'Strategies for theorizing from process data'. *Academy of Management Review*, **24**, 691–710.
- Langley, A. and Klag, M. (2019). 'Being where? Navigating the involvement paradox in qualitative research accounts'. *Organizational Research Methods*, **22**, 515–38.
- LeBaron, C., Jarzabkowski, P., Pratt, M. G. and Fetzter, G. (2018). 'An introduction to video methods in organizational research'. *Organizational Research Methods*, **21**, 239–60.
- Lench, H. C., Flores, S. A. and Bench, S. W. (2011). 'Discrete emotions predict changes in cognition, judgment, experience, behavior, and physiology: A meta-analysis of experimental emotion elicitations'. *Psychological Bulletin*, **137**, 834–55.
- Locke, K. (1996). 'A funny thing happened! The management of consumer emotions in service encounters'. *Organization Science*, **7**, 40–59.
- Lois, M. R. (1980). 'Surprise and sense making: What newcomers experience in entering unfamiliar organizational settings'. *Administrative Science Quarterly*, **25**, 226–51.
- Maitlis, S. and Christianson, M. (2014). 'Sensemaking in organizations: Taking stock and moving forward'. *Academy of Management Annals*, **8**, 57–125.
- Maitlis, S. and Sonenshein, S. (2010). 'Sensemaking in crisis and change: Inspiration and insights from Weick (1988)'. *Journal of Management Studies*, **47**, 551–80.
- Maitlis, S., Vogus, T. J. and Lawrence, T. B. (2013). 'Sensemaking and emotion in organizations'. *Organizational Psychology Review*, **3**, 222–47.
- Mehrabian, A. (1972). *Nonverbal Communication*. Chicago, IL: Aldine-Atherton.
- Mengis, J., Nicolini, D. and Gorli, M. (2018). 'The video production of space'. *Organizational Research Methods*, **21**, 288–315.
- Meyer, R. E., Höllerer, M. A., Jancsary, D. and Leeuwen, T. (2013). 'The visual dimension in organizing, organization, and organization research: Core ideas, current developments, and promising avenues'. *Academy of Management Annals*, **7**, 489–555.
- Miles, M. B., Huberman, A. M. and Saldaña, J. (2013). *Qualitative Data Analysis: A Methods Sourcebook*. Los Angeles, CA: Sage.
- Myers, C. G. (2022). 'Storytelling as a tool for vicarious learning among air medical transport crews'. *Administrative Science Quarterly*, **67**, 378–422.
- Nabi, R. L. (1999). 'A cognitive-functional model for the effects of discrete negative emotions on information processing, attitude change, and recall'. *Communication Theory*, **9**, 292–320.
- Okhuysen, G. A. and Bechky, B. A. (2009). 'Coordination in organizations: An integrative perspective'. *Academy of Management Annals*, **3**, 463–502.
- Oliver, N., Calvard, T. and Potočník, K. (2017). 'Cognition, technology, and organizational limits: Lessons from the Air France 447 disaster'. *Organization Science*, **28**, 729–43.

- O'Neill, O. A. and Rothbard, N. P. (2017). 'Is love all you need? The effects of emotional culture, suppression, and work-family conflict on firefighter risk-taking and health'. *Academy of Management Journal*, **60**, 78–108.
- Parkinson, B. (1996). 'Emotions are social'. *British Journal of Psychology*, **87**, 663–83.
- Pell, M. D., Paulmann, S., Dara, C., Alaseri, A. and Kotz, S. A. (2009). 'Factors in the recognition of vocally expressed emotions: A comparison of four languages'. *Journal of Phonetics*, **37**, 417–35.
- Pratt, M. G. (2009). 'From the editors – for the lack of a boilerplate: Tips on writing up (and reviewing) qualitative research'. *Academy of Management Journal*, **52**, 856–62.
- Rauch, M. and Ansari, S. (2022). 'Waging war from remote cubicles: How workers cope with technologies that disrupt the meaning and morality of their work'. *Organization Science*, **33**, 83–104.
- Rousseau, D. M., Sitkin, S. B., Burt, R. S. and Camerer, C. (1998). 'Not so different after all: A cross-discipline view of trust'. *Academy of Management Review*, **23**, 393–404.
- Schakel, J.-K., van Fenema, P. C. and Faraj, S. (2016). 'Shots fired! Switching between practices in police work'. *Organization Science*, **27**, 391–410.
- Schilke, O. and Huang, L. (2018). 'Worthy of swift trust? How brief interpersonal contact affects trust accuracy'. *Journal of Applied Psychology*, **103**, 1181–97.
- Scott, B. A., Awasty, N., Johnson, R. E., Matta, F. K. and Hollenbeck, J. R. (2020). 'Origins and destinations, distances and directions: Accounting for the journey in the emotion regulation process'. *Academy of Management Review*, **45**, 426–46.
- Sergeeva, A. V., Faraj, S. and Huysman, M. (2020). 'Losing touch: An embodiment perspective on coordination in robotic surgery'. *Organization Science*, **31**, 1248–71.
- Shepherd, D. A., Maitlis, S., Parida, V., Wincent, J. and Lawrence, T. B. (2022). 'Intersectionality in intractable dirty work: How Mumbai ragpickers make meaning of their work and lives'. *Academy of Management Journal*, **65**, 1680–708.
- Sherman, W. S. and Roberto, K. J. (2020). 'Are you talkin' to me?: The role of culture in crisis management sensemaking'. *Management Decision*, **58**, 2195–211.
- Sorokin, P. A. (1942). *Man and Society in Calamity*. New York: Dutton.
- Stachowski, A. A., Kaplan, S. A. and Waller, M. J. (2009). 'The benefits of flexible team interaction during crises'. *Journal of Applied Psychology*, **94**, 1536–43.
- Steigenberger, N. (2015). 'Emotions in sensemaking: A change management perspective'. *Journal of Organizational Change Management*, **28**, 432–51.
- Steigenberger, N. (2016). 'Organizing for the big one: A review of case studies and a research agenda for multi-agency disaster response'. *Journal of Contingencies & Crisis Management*, **24**, 60–72.
- Steigenberger, N. and Lübcke, T. (2022). 'Space and sensemaking in high-reliability task contexts: Insights from a maritime mass rescue exercise'. *Organization Studies*, **43**, 699–724.
- Strauss, A. and Corbin, J. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Thousand Oaks, CA: Sage.
- Streeck, J., Goodwin, C. and LeBaron, C. (2011). *Embodied Interaction: Language and Body in the Material World*. New York, USA: Cambridge University Press.
- Taylor, L., Watkins, S. L., Marshall, H., Dascombe, B. J. and Foster, J. (2016). 'The impact of different environmental conditions on cognitive function: A focused review'. *Frontiers in Physiology*, **6**, 1–12.
- Traeger, L. (2013). 'Distraction (coping strategy)'. In Gellman, M. D. and Turner, J. R. (Eds), *Encyclopedia of Behavioral Medicine*. New York: Springer, 610–1.
- Ungerer, D. (2004). 'Simple speech: Improving communication in disaster relief operations'. In Dietrich, R. and Jochum, K. (Eds), *Teaming Up: Components of Safety Under High Risk*. Aldershot: Ashgate, 81–92.
- United Nations Human Rights Office of the High Commissioner (2021). *'Lethal Disregard' – Search and Rescue and the Protection of Migrants in the Central Mediterranean Sea*. New York: United Nations.
- Vaughan-Johnston, T. I., Guyer, J. J., Fabrigar, L. R. and Shen, C. (2021). 'The role of vocal affect in persuasion: The CIVA model'. *Journal of Nonverbal Behavior*, **45**, 455–77.
- Vuori, T. O. and Huy, Q. N. (2022). 'Regulating top managers' emotions during strategy Making: Nokia's socially distributed approach enabling radical change from mobile phones to networks in 2007–2013'. *Academy of Management Journal*, **65**, 331–61.
- Weick, K. E. (1988). 'Enacted sensemaking in crisis situations'. *Journal of Management Studies*, **25**, 305–17.
- Weick, K. E. (1993). 'The collapse of sensemaking in organizations: The Mann Gulch disaster'. *Administrative Science Quarterly*, **38**, 628–52.
- Weick, K. E. (1995). *Sensemaking in Organizations*. Thousand Oaks, CA: Sage.
- Weick, K. E. (2010). 'Reflections on enacted sensemaking in the Bhopal disaster'. *Journal of Management Studies*, **47**, 537–50.

- Weick, K. E. and Roberts, K. H. (1993). 'Collective mind in organizations: Heedful interrelating on flight decks'. *Administrative Science Quarterly*, **38**, 357–81.
- Weick, K. E. and Sutcliffe, K. M. (2007). *Managing the Unexpected: Resilient Performance in an Age of Uncertainty*. San Francisco; CA: Jossey-Bass.
- Weick, K. E., Sutcliffe, K. M. and Obstfeld, D. (2005). 'Organizing and the process of sensemaking'. *Organization Science*, **16**, 409–21.
- Whittle, A., Vaara, E. and Maitlis, S. (2023). 'The role of language in organizational sensemaking: An integrative theoretical framework and an agenda for future research'. *Journal of Management*, **49**, 1807–40.
- Wolbers, J. and Boersma, K. (2013). 'The common operational picture as collective sensemaking'. *Journal of Contingencies & Crisis Management*, **21**, 186–99.
- Wright, A. L., Kent, D., Hällgren, M. and Rouleau, L. (2023). 'Theorizing as mode of engagement in and through extreme contexts research'. *Organization Theory*, **4**, 1–26.
- Yang, J., Yan, X., Chen, S., Liu, W., Zhang, X. and Yuan, J. (2022). 'Increased motivational intensity leads to preference for distraction over reappraisal during emotion regulation: Mediated by attentional breadth'. *Emotion*, **22**, 1595–603.

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