



DEPARTMENT OF APPLIED IT  
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# Clear skies, Clouded Communication.

- A content analyses on the effects of  
communication breakdowns in aviation disasters.

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# Abstract

This thesis investigates the pivotal role of communication dynamics in the management of crises, with a particular focus on how failures in communication can lead to catastrophic outcomes. Using aviation disasters as a detailed case study, this research explores the broader implications of communication breakdowns during crises. By analysing 20 aviation accident reports, the study identifies critical factors—such as emotional responses, power relations, and language specificity—that significantly influence crisis communication.

The research demonstrates that emotions like anger, panic, and stress can severely disrupt clear communication, while power dynamics, including leadership and organisational culture, often determine the effectiveness of crisis management efforts. The specificity and clarity of language also emerge as crucial elements, with ambiguous communication contributing to misunderstandings and delayed responses in high-pressure environments.

While aviation serves as the primary context for this analysis, the findings extend to a wide range of high-stakes industries where effective crisis communication is vital. The study underscores the need for improved training and protocols that address these communication challenges, advocating for strategies that enhance emotional regulation, assertive leadership, and clear, unambiguous language use. Ultimately, this thesis contributes to the broader field of crisis communication by revealing the complex ways in which communication dynamics can influence the outcomes of crises. It offers practical insights and recommendations for improving communication practices to better manage and mitigate the impact of crises in various sectors.

**Keywords:** Crisis Communication, Aviation Disasters, Aviation Communication, Emotions, Power Relations, Language Specificity.

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# Glossary

AAIB = Air Accident Investigation Branch

AAICMT = Aircraft Accident Investigation Commission Ministry of Transport

ASC = Aviation Safety Council.

ATC = Air Traffic Controller.

BCAA = Bangladesh Civil Aviation Authority.

BEA = Bureau d'Enquêtes et d'Analyses

BFU = Bundesstelle für Flugunfalluntersuchung

CAP = Captain.

CIAIAC = Comisión de Investigación de Accidentes e Incidentes de Aviación Civil.

CENIPA = Centro de Investigaçã e Prevençã de Acidentes Aeronáuticos.

CRM = Crew Resource Management.

CVR = Cockpit Voice Recorder.

F.A. = Flight Attendant.

FDETEC = Federal Department of the Environment, Transport, Energy and Communications.

F.E. = Flight Engineer

F.O. = First Officer.

KNKT = Komite Nasional Keselamatan Transportasi Republic of Indonesia KLM = Koninklijke Luchtvaart Maatschappij.

KAIB = Korean Ministry of Construction and Transportation

NTSB = National Transportation Safety Board.

PIC = Pilot in Command.

RVDL = Raad Voor De Luchtvaart (Dutch Transportation Safety Board).

Stall = The airflow over the wings becomes too disrupted for the wings to generate lift, causing the aircraft to lose altitude or even enter a descent if not corrected.

TAIC = Transport Accident Investigation Commission

Throttle = A control lever or mechanism used by pilots to regulate the power output of an aircraft's engines, thereby controlling its speed and thrust.

Wake Turbulence = A powerful, turbulent air currents created by the wingtips of an aircraft, which can pose a hazard to following aircraft, especially during take-off and landing.

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# 1. Introduction

"None of us yet knows why it happened." – Tony Hayward (BP, 2010).

Statements like these are not unusual in crisis communication. This example is from BP's Deepwater Horizon Oil Spill 2010, where they knew why it happened, the cementing was faulty, yet clear warning signs were ignored leading to the accident (National Research Council, 2012).

A crisis typically emerges from problems not adequately addressed over time. When these underlying issues are ignored or improperly managed, they can escalate into a full-blown crisis that requires an immediate and effective response to mitigate damage (Coombs, 2019). Effective communication is crucial in managing crises, as clear, concise, and timely information ensures that all stakeholders are informed, aligned, and able to coordinate their actions effectively. In contrast, poor communication can lead to confusion, misinformation, and delays, exacerbating the situation (Sellnow et al., 2008).

During a crisis, the speed and clarity of shared information significantly influence the outcome. Quickly disseminating accurate information helps mitigate panic, facilitates efficient resource allocation, and enables timely decision-making (Reynolds et al., 2002). Moreover, the tone and content of communication are vital; messages of transparency and empathy maintain trust and cooperation, while ambiguous or misleading information can erode trust and hinder collaboration (Heath & O'Hair, 2009). Although ineffective communication is not the sole cause of disasters, it can significantly amplify the impact of minor events.

However, most crisis communication research focuses on post-disaster responses and recovery strategies, often concerning stakeholders and public image, where the emphasis is typically on managing the aftermath of a crisis and maintaining or restoring the organisation's reputation (Ulmer et al., 2011). However, recent research, such as Eriksson (2018), highlights the need for effective communication during a crisis. That is today a gap in the research noticed by Coombs (2019), and Sellnow and Seeger (2013). This gap is particularly significant given crisis communication failures' potential socio-political and

economic ramifications. For instance, poor crisis communication in the aviation industry can lead to catastrophic accidents, loss of lives, and substantial economic damage. At the same time, in other sectors, such as finance or healthcare, similar failures can trigger widespread public distrust, regulatory consequences, and financial instability (Mumley, 2019). This gap is critical because effective in-the-moment communication can manage crises more efficiently and potentially prevent situations from worsening. Addressing this gap is essential for developing robust crisis communication strategies and ensuring better preparedness and response in real-time situations.

This thesis examines communication breakdowns during aviation crises to underscore the critical importance of effective communication. Aviation is chosen as a case study because detailed transcripts from aviation incidents offer clear insights into the consequences of communication failures. The goal is to use aviation as a clear example to highlight the role of communication in managing crises before they escalate into emergencies.

To explore this, the thesis analyses 20 aviation reports to demonstrate the crucial impact of communication in disaster scenarios. Investigating these cases, not only addresses specific issues within aviation but also provides broader insights into crisis communication strategies applicable across various high-stakes industries. This research fills a gap in the crisis communication literature by focusing on the communication between key stakeholders during crises, a factor often overlooked. By examining these dynamics within aviation incidents, the study highlights how stakeholder communication profoundly influences crisis outcomes. Additionally, it advocates for improved communication practices and strategies to enhance societal resilience and safety during crises (Hollnagel et al., 2006).

To research this, this thesis's central research question is:

"How do communication dynamics influence crisis communication in high-stakes environments?"

To answer this, the thesis will explore several key areas:

- How do emotions like anger, panic, and stress affect communication during aviation crises?

- In what ways do power dynamics impact decision-making and communication in aviation emergencies?
- What is the role of language clarity and proficiency in communication failures during aviation crises?

These focus areas are strategically chosen to delve into the critical elements—emotions, power dynamics, and language specificity—influencing crisis communication.

The thesis will be divided into six chapters: introduction, literature review and theory, methodology, data collection and ethical considerations, analysis and discussion, and summary.

## 2. Literature Review and Theory

The literature review is structured to elucidate key concepts relevant to examining miscommunication in aviation crises. It provides an overview of crisis communication, aviation communication, and the distinct yet related fields of risk, disaster, and emergency communication. This review explores the existing body of knowledge across these fields to contextualise this research and highlight the gap it aims to address.

### 2.1 Crisis communication

Crisis communication initially emerged in response to crises' growing frequency and complexity (Heath & O'Hair, 2009). It continues to evolve, consisting of various methods and theories on how to handle a crisis best. The field has developed significantly, incorporating insights from numerous crises to refine strategies and approaches (Coombs, 2019; Heath & O'Hair, 2009). Coombs (2019) posits that the effectiveness of crisis communication and response strategies depends on the attributions of crisis responsibility and the reputational threat posed to the organisation. Fearn-Banks (2011) emphasises the importance of mapping stakeholder relationships and communication channels during crises to know the

key stakeholders and how to communicate with them. Different methods are often used to reach stakeholders; for example, Ulmer et al. (2011) advocate for a message-centred approach that examines the content, timing, and format of crisis communication messages. Their work underscores the strategic importance of message design in shaping public perception and organisational response effectiveness.

Scholars such as Heath and O'Hair (2009) discuss the role of rhetoric in crisis communication, examining how persuasive communication strategies can influence stakeholder perceptions and organisational outcomes. Their analysis provides a rhetorical framework for understanding how crisis narratives are constructed and disseminated.

Moreover, Coombs and Holladay (2023) discuss the concept of post-crisis communication, emphasising the long-term reputational repair strategies organisations employ after a crisis. This perspective underscores the iterative nature of crisis communication and the ongoing efforts required to rebuild trust and credibility.

In addition to theory and practice, crisis communication scholars have explored the ethical dimensions of crisis response. Mumley, (2019) examine ethical decision-making in crises, emphasising the importance of transparency, honesty, and accountability in organisational communication strategies. Further enriching the literature, Seeger et al. (2003) propose a framework for analysing how organisations manage their reputations in the aftermath of a crisis. This theory identifies various strategies to repair organisational image and restore stakeholder trust, including denial, bolstering, and mortification.

However, most existing literature focuses on post-communication or strategies to prepare or mitigate crises, a form of risk management that will be discussed later. The existing gap, identified by, for example, Coombs (2019), and Zaremba, (2010), highlights the limited amount of research regarding the role of communication among a few stakeholders and its impact on a crisis outcome. While there is considerable research within other fields such as emergency communication, healthcare, military operations and disaster management, (Berggren et al., 2014) it is crucial to distinguish this from crisis communication, as they address different stages and aspects of adverse events. Coombs (2019) advocates for a deeper exploration of how communication between critical players influences the severity and outcome of a crisis. Effective communication is paramount as it can determine whether a situation is contained or spirals into a full-blown disaster. Zaremba (2010). emphasise the need for more comprehensive studies exploring various communication dynamics and their

impact on crisis communication across different crises. This includes examining factors such as hierarchy, team composition, and the flow of information, which are critical for understanding how to enhance communication strategies.

Research in crisis communication has increasingly focused on the impact of language, emotions, and power dynamics. Studies by Coombs (2019) and Seeger (2006) delve into how language use during a crisis can shape responses and outcomes, emphasising the importance of clear and precise communication. Emotional responses during crises are another critical area of study. Researchers like Lerner and Keltner (2000) have demonstrated how emotions such as fear, anger, and stress can influence decision-making and communication effectiveness. Similarly, Schraagen et al. (2010) examine the role of power dynamics in crisis communication, arguing that hierarchical structures can hinder or facilitate effective communication depending on how power is exercised and perceived within the team.

Despite these valuable insights, research on language, emotions, and power dynamics during crises is less prevalent than studies focusing on post-crisis communication or stakeholder communication during emergencies (Heath & O'Hair, 2009; Sellnow & Seeger, 2013). However, these topics are extensively researched in other fields dealing with dire situations, such as healthcare, military operations, and disaster management, where effective communication is critical for successful outcomes (Kapucu et al., 2010).

By employing established crisis communication strategies and drawing insights from related fields such as emergency communication, this research will analyse cockpit voice recorder (CVR) transcripts to uncover critical communication failures.

## 2.2 Aviation Communication

Communication within the aviation field has been extensively researched, with numerous studies focusing on various aspects, such as the aftermath of disasters, human factors, and emergency communication. Regarding crisis communication, most research delves into how companies handle stakeholder relations post-disaster (Ou & Wong, 2021; Tachkova, 2024). Ou & Wong (2021) concentrated on airline post-disaster communication strategies, concluding that effective strategies like timely and transparent updates are vital for upholding trust and confidence among stakeholders. Conversely, inadequate communication

can increase uncertainty and negative perceptions of the company's crisis management efforts. Similarly, Tachkova (2024) probed into stakeholder engagement methods adopted by flight companies following aviation accidents. Their studies underscored the importance of proactive risk management, clear communication protocols, and stakeholder collaborative efforts to enhance crisis response and recovery. The researchers stress the need for continuous improvements in these strategies to ensure adaptability and resilience in the face of crisis.

While much of the research focuses on post-disaster communication and recovery, significant attention is given to communication during an ongoing aviation crisis. For instance, Adamski and Westrum (2003) discuss the importance of anticipation and preparation in crises, including aviation disasters, and how effective communication can prevent and mitigate crises. Similarly, Dekker (2014) includes case studies on aviation disasters, examining how miscommunication and human error contribute to crises and suggesting methods to enhance communication reliability.

Research in related fields can explain the reasons behind faulty communication during a crisis, such as human factors. Studies in human factors research within aviation communication have shed light on how language barriers, emotional states, and power dynamics influence the occurrence and management of aviation disasters (Maurino & Salas, 2010). The impact of stress and decision-making under pressure are critical components, as highlighted in research by Helmreich and Merritt (2016), which explores the role of cockpit communication in preventing accidents.

Furthermore, emergency communication in aviation has been another significant area of research. Studies such as Garcia (2016) on the "Miracle on the Hudson" emphasise the crucial role of clear and effective communication during in-flight emergencies. Additionally, considerable research on risk management and disaster communication within the aviation sector also exists, with Maurino and Salas (2010) discussing the critical role of human factors and communication in aviation safety. These fields, while related, are distinct from the specific focus of this thesis on the communication dynamics between stakeholders during an active aviation crisis.

Despite the extensive literature, research remains scarce on the real-time communication processes between a few stakeholders during aviation crises. Addressing this gap is crucial,

as effective communication among critical individuals can significantly influence the outcome of a crisis and improve overall safety and response measures.

## 2.3 Emergency, Risk, and Disaster Communication

Emergency, risk, and disaster communication are closely related to crisis communication, but each has distinct differences. While all involve communication strategies to manage and mitigate adverse situations, each field's focus and application vary.

An emergency is a situation that poses an immediate risk to health, life, property, or the environment, necessitating urgent intervention to prevent further harm. These events, whether natural or human-made, demand coordinated, strategic communication (Kapucu & Van Wart, 2006). Effective communication is key in managing emergencies, involving precise, timely information sharing among stakeholders (Lindell & Perry, 1992). A key component of this communication is the establishment of clear and consistent messaging, which involves developing pre-established communication plans that clearly define the roles and responsibilities of each stakeholder. Such plans prepare all parties, preventing confusion and enhancing response (Kapucu & Özerdem, 2011). Such coordinated efforts are essential for reducing panic, preventing misinformation, and ultimately saving lives (Heath & O'Hair, 2009; Sellnow et al., 2008). Furthermore, poor communication breeds confusion, mistrust, and harm (Lindell & Perry, 1992; Mileti & Sorensen, 1990). Therefore, using various communication channels is crucial for reaching diverse audiences and ensuring accurate information dissemination (Sutton et al., 2008; Veil et al., 2011).

Risk communication is the information notifying people about potential hazards, the necessary preventive actions, and how to act when a risk materialises (Glik, 2007). A risk is the possibility of harm or adverse effects resulting from a specific event, activity, or situation. Risks can stem from various sources, including environmental hazards, technological failures, public health threats, and social or economic disruptions. This field is pivotal in managing perceptions and responses to risks ranging from environmental hazards to public health threats. Transparency and honesty are crucial, as being open about risks, uncertainties, and what is known and unknown builds trust and credibility (Covello, 2009;

Renn, 2009). Understanding the audience's knowledge, beliefs, and concerns allows for tailored messaging that is more likely to be effective (Fischhoff, 2012). Effective risk communication also emphasises a two-way dialogue, encouraging feedback and interaction to address concerns and build trust (Coombs, 2019). Clear messaging avoids jargon and uses accessible language (Morgan, 2002; Stern & Fineberg, 1996). Additionally, various communication channels ensure the message is widely disseminated (Lundgren & McMakin, 2013). The ability to communicate these risks effectively can significantly impact public response and safety (Covello, 2009; Fischhoff, 2012), underscoring the weight of responsibility on the shoulders of communication professionals in ensuring public safety.

Disaster communication focuses on disseminating information before, during, and after a disaster to reduce harm, guide response efforts, and facilitate recovery. A disaster is a sudden, catastrophic event causing widespread disruption and overwhelming local resources. Disasters include natural events like hurricanes and human-made incidents like industrial accidents (Haddow & Haddow, 2008; Sellnow & Seeger, 2013). Effective disaster communication, including preparedness messaging that provides information on emergency plans and supplies, can save lives, reduce damage, and speed up recovery (Haddow & Haddow, 2008; Sellnow & Seeger, 2013). Timely, accurate information ensures public, and stakeholders can act accordingly (Sellnow & Seeger, 2013). Coordination among various agencies and stakeholders is also essential for effective communication and response (Kapucu & Özerdem, 2011). Technology, such as social media, enhances communication efforts and broadens the reach of messages (Kapucu & Özerdem, 2011) Community engagement in disaster preparedness and response builds resilience and ensures culturally relevant messages (Lindell & Perry, 1992). When implemented with dedication and precision, effective disaster communication strategies can significantly impact the management and mitigation of these events (Haddow & Haddow, 2008; Sellnow & Seeger, 2013), offering hope and motivation to all involved in disaster communication.

Understanding the distinctions between emergencies, risks, disasters, and crises is crucial as they may overlap but often require distinct communication strategies. For example, a risk can escalate into a crisis, which might then trigger an emergency. This thesis specifically focuses on crisis communication in aviation accidents, particularly how communication breakdowns among key stakeholders contribute to these crises. The scope does not include pre-flight risk management or post-crash emergency response and disaster management.

### 3. Method, Data collection, Limitation and Ethical Consideration

This section presents the methodology, data collection, limitations, and ethical considerations of the thesis. The chapter outlines the research approach, ensuring transparency in data collection, potential constraints, and ethical adherence.

#### 3.1 Method

This study employs a content analysis approach, a widely used research method in various fields to analyse textual, visual, or audio content systematically. Content analysis involves systematically examining communication content to identify patterns, themes, and trends in its context (Bryman et al., 2022). Treadwell and Davis (2013) emphasise the importance of the method in uncovering implicit meanings and underlying themes within the data. This method can help researchers understand the attitudes, values, and ideologies of those involved or implicated in the communication. Content analysis is particularly suited for this research as it allows for a detailed examination of the communication dynamics within the cockpit and between the pilots and ATC, directly addressing the research questions about how communication influences crisis outcomes.

The analysis will be conducted using Braun and Clarke's (2006) six-step thematic coding, where themes will be identified and categorised. This qualitative research process is used to identify, analyse, and interpret patterns of meaning within textual data. The process involves six steps: 1) familiarise yourself with the data, 2) generate initial codes, 3) search for themes, 4) review the themes, 5) define and name the themes, and 6) produce the report. The process begins with familiarising oneself with the data and understanding its content entirely, which involves repeated readings and engagement with the material. In this case, it was done by re-reading the reports. Subsequently, initial codes are generated, where researchers systematically label and organise data segments to capture key concepts or ideas.

Researchers search for themes and identify overarching patterns or recurring topics across the dataset. This phase requires careful consideration as themes emerge from the interplay of multiple codes in the data. Once the themes are finalised, they are defined and named to accurately encapsulate their content and significance. Finally, the findings of the thematic analysis are synthesised into a comprehensive report wherein each theme is elaborated upon with supporting evidence from the data. This approach ensures a comprehensive understanding of the data, highlighting the key themes and patterns that influence communication dynamics during aviation crises.

A codebook has been developed to facilitate this analysis and will be included in Appendix 1. This codebook outlines the codes used, including definitions, examples, and instructions on how they were applied to the data. The codes were identified by meticulously examining the CVR transcripts, categorised into emotions, power dynamics, and language specificity themes. The codebook provides a structured framework for the analysis, ensuring consistency and transparency in how themes were derived and interpreted. These codes serve as the fundamental elements of analysis, laying the groundwork for identifying broader themes.

## 3.2 Data Collection

The data for this thesis were collected through a rigorous selection process meticulously designed to ensure the relevance of the selected reports. The following inclusion and exclusion criteria were applied with utmost care to identify suitable reports for analysis, ensuring the data's quality and applicability to the research:

- **Language:** The reports had to be written in English or have an official translation to ensure accessibility and comprehensibility for analysis.
- **Source:** The reports were sourced exclusively from official agencies responsible for investigating aviation accidents, such as the National Transportation Safety Board (NTSB). Reports from multiple agencies and countries were included to avoid limiting the data and capture a diverse range of communication dynamics.

- **Preventability:** The accidents selected for analysis were required to be deemed preventable if the stakeholders had acted and communicated correctly. None of the analysed accidents involved situations where the planes were beyond saving due to irreparable damage.
- **Aircraft Type:** Due to different regulations and equipment, only passenger or cargo plane accidents were included, excluding accidents with small private airplanes.
- **Availability of CVR Transcript:** The reports had to include a transcript documenting communication exchange between stakeholders during the critical phases of flight in some way.
- **Online Accessibility:** The reports had to be publicly available online to ensure transparency and accessibility for verification and further research.

All reports in this thesis were meticulously evaluated to ensure they met the specified criteria. Instances where reports did not align with the criteria resulted in their exclusion from the analysis. This rigorous evaluation process instils confidence in the reliability and relevance of the selected aviation disaster reports.

### 3.2.1 Dataset size

This thesis uses a comprehensive dataset comprising 20 accident reports and over 5000 pages to examine communication dynamics in aviation disasters. Of those 5000 pages, the analysis mainly focused on the transcript, the underlying problem determined by the investigators was briefly analysed. Sections involving, for example, engines and rescue performance were only glossed over. These accident reports were carefully selected based on the criteria mentioned above. The dataset includes various aviation incidents, as the reports had to fulfil the criteria. Including multiple accidents allows for a more comprehensive understanding of the factors influencing communication dynamics and their impact on the outcomes of aviation disasters rather than something peculiar to a specific accident.

### 3.3 Limitations

While content analysis offers valuable insights into communication dynamics in this thesis, it is crucial to acknowledge its limitations. Neuendorf (2017) cautions that content analysis may oversimplify complex phenomena by reducing them to quantifiable categories and overlooking contextual factors and nuances in the data, potentially leading to a superficial understanding of content. Additionally, there is a risk of subjectivity involved in coding textual data. It would have been preferable to have an intercoder process, but it was not possible due to limitations in this project's resources. Furthermore, the study's sample of 20 accidents, with some categories represented by only one example, reflects a limitation in resources, making it challenging to find additional cases for less common types of communication breakdowns. It is also essential to recognise that content analysis relies on the assumption that the textual data accurately reflects the communication dynamics within disaster scenarios, which may not always be accurate. In an aviation context, that may mean that the CVR is damaged and does not present a complete record, or it may be of an older model and just save the last 30 minutes of the flight. In addition, Weber (1990) and Krippendorff (2019) emphasise that content analysis may fail to capture the full complexity and richness of human communication due to its focus on observable content. To address these limitations, this study ensured rigorous coding protocols were followed to minimise bias, including multiple rounds of coding and review to enhance consistency and reliability in theme identification.

Despite these limitations, content analysis is deemed suitable for this thesis as it allows for analysing large amounts of data and identifying patterns in communication in aviation disasters. By acknowledging and addressing these limitations, the research can strive to reduce potential biases and ensure the validity and reliability of the findings.

### 3.4 Ethical considerations

The research conducted in this report adheres to the ethical guidelines outlined by Embry-Riddle Aeronautical University (ERAU). ERAU's guidelines ensure research integrity, validity,

and sensitivity involving human participants, personal data, and regulated material and procedures. Upholding the principles of respecting the dignity, rights, and welfare of all individuals involved in or impacted by the disaster, this study adheres to the commitment to conduct research to high ethical standards.

Following the university's standards guarantees that the research is designed and undertaken in a manner that demonstrates accountability and quality. This includes documenting data sources and analysis methods and ensuring that all procedures are transparent and reproducible. Additionally, the research aims to maximise the public's benefits by contributing positively to potentially enhancing aviation safety.

Special attention has been given to presenting findings accurately and objectively, avoiding sensationalism or distortion of information that could exploit the tragedy of aviation disasters. Furthermore, the study is committed to avoiding harm and stigmatisation of individuals or groups involved in disasters. The thesis focuses on improving aviation safety and understanding how miscommunication can contribute to a disaster rather than solely blaming involved individuals.

The research has been conducted with a vigilant approach to identifying and mitigating potential biases, including confirmation bias and researcher preconception. This involved conscientiously scrutinising data interpretation and analysis to ensure impartiality and accuracy. Furthermore, the study ensures the confidentiality and anonymity of participant information when necessary. Therefore, individuals will be referred to only by their titles rather than their names.

These ethical guidelines, as outlined by ERAU, serve as the foundation for conducting research in this study. They ensure that the research meets the highest ethical standards and contributes positively to advancing knowledge and the public good.

## 4. Analysis

The analysis section of this study is organized into three overarching categories: emotions, power relations, and language specificity. Each category is further divided into three subcategories, allowing for a detailed exploration of the findings within each area. Emotions

serve as a lens through which the psychological impact of communication becomes apparent, influencing power dynamics and shaping linguistic interactions. Power relations, in turn, dictate the distribution of authority and influence among stakeholders, profoundly affecting the expression and reception of language. Language specificity, encompassing the nuances of communication, reflects and reinforces both emotional states and power imbalances.

## 4.1 Emotions

This chapter explores the critical role emotions play in crisis communication, focusing on three key emotions: anger, panic, and stress. These emotions can significantly influence how information is conveyed and interpreted during high-pressure situations. By examining their impact on communication dynamics, this chapter aims to provide insights into how these emotions can hinder crisis management.

### 4.1.1 Anger

"Anger is never without a reason but seldom a good one." – Benjamin Franklin.

Research indicates that anger can increase tension and miscommunication among team members, causing individuals to become more defensive and less collaborative (Goleman, 1996). This phenomenon was starkly evident in the CVR transcripts from the US-Bangla incident, where the captain's anger significantly influenced the dynamics between him and the first officer (F.O.), ultimately contributing to the tragic outcome.

"PIC: ... That f—er, that son of a gun, bitch ...

FO: ... Sir, shouldn't I switch on the radar?" (BCAA, 2018, p. 4)

The captain's frequent and intense expressions of frustration significantly escalated the tension in the cockpit, leading to a critical breakdown in communication. The F.O. often

attempted to ignore these outbursts, —a reaction that highlights how anger can stifle necessary communication during crises (Kassinove, 2014; Soltain, et al., 2014).

Studies in crisis communication emphasise the importance of maintaining calm and composed communication during a crisis. Anger can severely impair decision-making effectiveness, reduce the ability to process information accurately, and ultimately lead to catastrophic outcomes (Lerner & Tiedens, 2006). This could be seen in the captain's decision to land, despite the unstable approach. Anger in communication has been extensively studied across various fields. In psychology, for instance, anger is known to impair information processing and appropriate responses (Anderson & Bushman, 2002). In organisational behaviour, leaders' anger has been linked to decreased team performance and morale (Schein & Schein, 2017). These insights are particularly relevant in high-stress environments like aviation, where the ability to communicate effectively can mean the difference between life and death.

The dynamics in the US-Bangla cockpit, demonstrate how subordinates often become passive when faced with an authority figure's anger, leading to decreased overall team performance (Miron-Spektor & Rafaeli, 2009). In the case of US-Bangla, the captain's anger not only stifled the F.O. responses but also created a culture of fear and compliance, which can undermine open communication and effective crisis management (Miron-Spektor & Rafaeli, 2009). This severely compromised their ability to manage the crisis effectively.

#### 4.1.2 Panic

"Panic causes tunnel vision." - Simon Sinek.

As an emotional response, panic significantly disrupts effective communication during crises, particularly in high-stakes environments where clear thinking and rapid decision-making are crucial. The onset of panic can severely impair cognitive function, distort perception, and lead to breakdowns in communication, escalating a manageable situation into a catastrophic one (Clementson & Xie, 2020). This phenomenon is particularly evident in the case of Pinnacle Airlines, where the pilots faced a crisis, they were unprepared to handle. As they

struggled to comprehend the nature of the problem, their panic impeded their ability to execute the necessary procedures to restart the engines:

"[Cap] I dunno. we're not getting any N two.

[F.O.] we're not?

[Cap] left engine oil pressure. For some reason it's shut down. ... I don't get it either." (NTSB, 2004, p. 134).

This exchange's confusion and lack of understanding exemplify how panic can paralyze cognitive processes, leading to ineffective crisis management.

The psychological roots of panic lie in the body's fight-or-flight response, an evolutionary mechanism designed for survival in immediate physical danger. While this response may be beneficial in specific contexts, it is maladaptive in complex crises that require precise, coordinated actions and clear communication (Anderson & Bushman, 2002). In such scenarios, the cognitive overload induced by panic diverts mental resources away from higher-order thinking, severely impairing decision-making and communication abilities (Vine et al., 2015).

The tragic events of Air France further illustrate the devastating impact of panic on crisis communication. As the aircraft entered a stall, the pilot, overwhelmed by panic, continued to climb instead of levelling off, exacerbating the situation. The lack of clear communication between the pilots, driven by the panic, prevented them from effectively addressing the issue:

F.O. 1: Climb climb climb climb

F.O. 2: But I've been at max nose-up for a while

CAP: no no no don't climb ...

F.O. 2: we're going to crash. This can't be true. But what's happening. (BEA, 2012, p. 26-31).

This dialogue highlights how panic-induced confusion can lead to a breakdown in communication, where critical information is neither conveyed nor processed effectively. The overwhelming panic directly influenced the pilot's inability to interpret the situation correctly and his failure to communicate effectively with his colleague.

The disruption of situational awareness caused by panic is another critical factor in communication breakdown during crises. Situational awareness, which involves understanding the current environment, anticipating future events, and recognizing the implications of actions, is crucial for effective crisis management (Endsley, 1999). However, panic fragments this awareness, leading to conflicting instructions, a lack of coordination, and the failure to resolve the crisis effectively. This was demonstrated in the case of TransAsia, where the captain, in a state of panic, mistakenly shut down the wrong engine:

"[CAP] I will pull back engine one throttle

[F.O.] wait a second cross check

...

"[CAP] Wow pulled back the wrong side throttle." (ASC, 2016, p.181-186).

The captain's hasty decision, driven by panic, compounded by the problem of miscommunication with the first officer, ultimately resulted in the loss of the aircraft. Panic's ripple effect extends beyond the immediate participants in a crisis, often affecting the entire crisis management process. Panic-induced miscommunication can cause initial errors to propagate throughout the response effort, exacerbating the crisis rather than mitigating it (Sandman, 2003). This is particularly concerning in fields like healthcare, where panic among providers can lead to procedural errors, adversely affecting patient outcomes.

Effective crisis communication also hinges on regulating emotions, particularly panic. Emotional regulation, the ability to manage and respond to emotional experiences to facilitate clear thinking and decision-making, is critical in maintaining composure during crises (Gross, 2014). The failure to regulate panic can lead to cognitive paralysis, where individuals become unable to think or communicate rationally, with dire consequences. The catastrophic outcome of China Airlines illustrates this point. The pilots, in a state of panic, were unable to manage the situation effectively:

"CAP: OK, I HAVE GOT IT, I HAVE GOT IT, I HAVE GOT IT ... WHAT'S THE MATTER WITH THIS?

F.O.: DISENGAGE, DISENGAGE THE AUTOPILOT

CAP: DAMN IT, HOW COME LIKE THIS?" (AAICMT, 1996, p. A136-137).

Despite recognising that they had an issue, the pilots' panic led to a failure in communication and coordination, preventing them from resolving the problem.

Panic also undermines established communication protocols designed to ensure clear and accurate information exchange during crises. The aviation industry relies heavily on checklists and standardized procedures to manage unexpected situations. However, in these cases, panic led to deviations from these protocols, contributing to catastrophic outcomes.

### 4.1.3 Stress

"Stress is caused by being 'here' but wanting to be 'there.'" – Eckhart Tolle.

Stress profoundly affects decision-making and communication, particularly in high-stakes environments. Different types of stress, such as acute and situational stress, uniquely impair communication outcomes, often leading to detrimental consequences (Anderson & Bushman, 2002). Stress is an inevitable part of crises, and its impact on communication processes is multifaceted and deeply rooted in the psychological responses it triggers. When individuals are stressed, their ability to process information, maintain situational awareness, and communicate effectively is significantly compromised (Endsley, 1999).

Acute stress can cause individuals to make hurried decisions, often based on incomplete or misinterpreted information. The narrowing of focus under acute stress leads to selective attention, where crucial details may be overlooked or misunderstood, ultimately impairing communication (Flin, 2016). This phenomenon was evident in the Tenerife accident, where the captain, under pressure to adhere to the schedule, rushed through procedures and neglected to verify critical information. The flight engineer's (F.E.) uncertainty about the Pan-Am aircraft's position on the runway was dismissed by the captain, who, under stress, misjudged the situation as the plane was not clear:

"[F.E.:] Is he not clear, then?"

[CAP]: What do you say?

...

[F.E.]: Is he not clear the Pan American?

[CAP]: Oh, yes.” (RVDL, 1977, p. 46).

This exchange highlights how acute stress can lead to a dangerous misinterpretation of crucial information, resulting in catastrophic consequences. The cognitive narrowing under acute stress not only hampers the flow of communication but also exacerbates the likelihood of errors in judgment, which can spiral into more severe consequences in crises (Lerner & Tiedens, 2006).

Situational stress, which occurs in response to immediate, high-pressure circumstances, similarly impairs communication. In crisis scenarios, individuals experiencing situational stress may exhibit tunnel vision, where their focus becomes disproportionately centred on specific aspects of the situation at the expense of others (Flin, 2016). This narrowed focus disrupts the situational awareness necessary for effective crisis management, leading to communication breakdowns and critical errors.

The Überlingen disaster is a stark example of how situational stress can severely impact decision-making and communication. The ATC, overwhelmed by the need to manage multiple aircraft, failed to coordinate two planes on a collision course effectively. His distraction with a third aircraft led to a critical delay in recognising the danger. When he finally issued instructions to one of the planes, the lack of communication and verification with the other aircraft resulted in the fatal collision (BFU, 2004, p. 4-65).

Furthermore, stress profoundly impacts situational awareness, a critical component of effective crisis management. Situational awareness involves perceiving, comprehending, and projecting the current environment and its potential future states (Endsley, 1999). However, when individuals are stressed, their situational awareness can become fragmented, leading to disjointed communication and poor decision-making (Heath & Palenchar, 2009). The fragmentation of situational awareness was evident in both accidents, where the stress-induced cognitive overload led to critical failures in communication and coordination.

## 4.2 Power Relations

This chapter examines the role of power relations in crisis communication, emphasizing leadership, experience, and work culture. These factors shape information flow, decision-

making, and overall crisis management. By exploring authority, experience, and organisational culture, this chapter provides insights into the dynamics underpinning effective crisis communication.

#### 4.2.1 Leadership

"The secret of crisis management is not good vs. bad, it's preventing the bad from getting worse." — Andy Gilman.

Effective leadership is crucial in ensuring clear communication during crises. Poor leadership, characterised by for example mocking, or indecisive behaviours, can severely impair the flow of critical information and jeopardise crisis management efforts (Johnson, 2017; Yukl et al., 2019). In high-stakes environments, a leader's style profoundly influences crisis communication, shaping team dynamics that can either ensure a coordinated response or result in disastrous miscommunications (DuBrin, 2016).

One of the most detrimental leadership styles is mocking, where leaders use sarcasm or ridicule to undermine their subordinates. This approach often results in a breakdown of open communication, as team members may feel belittled or humiliated, leading to a reluctance to voice concerns or provide crucial information (Brock, 2008). That is what happened on Northwest Airlines. The captain's attitude towards the F.O. was often sarcastic and mocking.

"No, you're going to have to room with me and it's only a single bed so there is a little carpet at the base of my bed and you can curl up at the base of my bed ..." (NTSB, 1994, p. 64)

Comments such as these made the F.O. reluctant to talk, making the conversation very short. This dynamic is particularly detrimental in crises, where collaboration and open communication are essential for effective decision-making and crisis resolution (Kolditz, 2010). The captain's mocking ways resulted in the F.O. not making the appropriate callouts about their descent rate and being silent (NTSB, 1994, p. 97-98). When leaders belittle their

team members' contributions, it sends a clear message that dissent, or alternative perspectives are unwelcome (Waugh & Streib, 2006).

Another critical issue is indecisive leadership, which poses significant risks during crises. Leaders who cannot make swift, clear decisions leave their teams directionless, which can be particularly damaging in situations where time is of the essence (Northouse, 2022), as was the case with United Airlines. The pilot was fixated on the landing gear problem despite the crew's warnings about the low fuel they had.

"CAP: ... another fifteen minutes.

F.E.: Fifteen minutes?

CAP: Yeah, give us three or four thousand pounds on top of zero fuel weight.

F.E.: Not enough. Fifteen minutes is gonna --- really run us low on fuel here.

CAP: Right" (NTSB, 1979, p. 46).

Despite that information, the captain did not decide to land the plane immediately and instead debated whether the landing gear problem needed to be handled first. Indecisive leaders often fail to provide explicit directives, leading to uncertainty and miscommunication among team members. This uncertainty can increase stress levels within the team, further impairing communication and decision-making processes (Kolditz, 2010).

In high-pressure environments, where clarity and decisiveness are crucial, the lack of solid leadership can hinder the team's ability to respond effectively, often resulting in a cascade of errors and missed opportunities (Kolditz, 2010), as was the case with the mid-air collision over Brazil. The radio in the airplane was not set to the correct frequency. Therefore, the pilots flew in radio silence, without the possibility of contacting or being contacted by ATC or other planes. However, neither of the pilots tried to find the reason for the lost radio contact. Instead, they sent messages into the dark, hoping the ATC would hear them (CENIPA, 2008, p. 229/266). As the pilots did not receive any commands from the ATC, they were unaware of the approaching plane they later collided with. However, both pilots knew that something was wrong with the radio discussing the matter, but neither took charge nor tried to solve the problem.

Leadership that promotes a participatory approach to decision-making can significantly enhance the effectiveness of crisis communication. In such environments, all team members

are encouraged to contribute their perspectives and expertise, leading to a more comprehensive understanding of the crisis and a more effective response (Mutangili, 2020), the opposite of what happened in Air China. The transcript shows how the captain failed to lead and delegate tasks among the crew effectively. Instead, he did most tasks himself, such as flying the plane and speaking with ATC (KAIB, 2005, p. 16). The captain did not communicate with the crew and encouraged them to contribute, solve, or understand the situation.

The literature on crisis communication consistently emphasises that effective leadership involves more than just giving orders; it requires fostering an environment where open, assertive communication is encouraged (Waugh & Streib, 2006). Leaders who foster collaborative environments are more likely to achieve successful crisis management outcomes by harnessing their teams' collective knowledge and skills (Tourish, 2013). This approach is vital in complex crises, where diverse team input is essential for navigating challenges that no single individual can address alone (DuBrin, 2016).

#### 4.2.2 Experience

"The only source of knowledge is experience." - Albert Einstein.

Experience plays a critical role in effective communication and decision-making during crises, especially in high-stakes environments. Experienced leaders and team members are better equipped to manage stress, interpret ambiguous information, and coordinate responses effectively, thus influencing the crisis's severity (Flin, 2016; Waugh & Streib, 2006). However, when individuals lack real-world experience, they may respond inadequately to crises, as was tragically demonstrated in the case of American Airlines. The flight encountered wake turbulence, an event the F.O. had only ever experienced in simulation (NTSB, 2004, p. 146, 149). This lack of real-world experience led the F.O. to make drastic rudder inputs, which exacerbated the aircraft's instability and ultimately resulted in the rudder's structural failure. The confusion and lack of coordination that ensued were evident in the CVR transcript:

"[F.O.] What the hell are we into? We're stuck in it.

[CAP] Get out of it, get out of it." (NTSB, 2004, p. 196)

In this instance, despite the captain's greater experience, he was not at the controls during the event and could not immediately correct the F.O.'s errors, highlighting the importance of hands-on experience in managing and communicating in unexpected crises. Moreover, the absence of experience can significantly hinder crisis communication. Less experienced individuals often struggle to process and react to the rapid influx of information during a crisis, leading to overreactions or inappropriate responses due to their lack of situational awareness and decision-making acumen compared to their more experienced counterparts (Endsley, 1999).

Additionally, inexperience can foster hesitation, as individuals may fear appearing less capable, leading to vital information being withheld. This hesitation hampers the flow of communication and exacerbates the crisis by delaying critical interventions (Flin, 2016). The CVR transcripts further reveal that the F.O. failed to communicate his actions clearly to the captain, which compounded the crisis (NTSB, 2004, p. 168-196). The suppression of dialogue can have dire consequences, as it prevents the timely exchange of critical information necessary for effective crisis management.

The positive impact of experience on crisis communication is well-documented across various fields. For example, in emergency medical scenarios, seasoned practitioners are often more adept at prioritizing tasks, managing resources, and maintaining calm, which leads to better patient outcomes (Nguyen et al., 2021; Weick & Sutcliffe, 2007).

### 4.2.3 Work Culture

"We can change culture if we change behavior." - Aubrey Daniels.

The impact of work culture on crisis communication is profound. The prevailing work culture within an organisation is pivotal in determining how effectively a crisis is managed. A culture that prioritises open communication, strict adherence to safety protocols, and mutual

support among employees enhances crisis management by ensuring the prompt and accurate sharing of critical information (Edmondson, 2018; Schein & Schein, 2017).

Analysing Air New Zealand demonstrates the consequences when safety protocols and critical information are not shared or accurate. The airline discovered an error in the charts being used, which was updated without informing the pilots (TAIC, 2006, p. 28). Nowhere in the transcript does the pilot discuss the changed course or the implications of the new route (TAIC, 2006, p. 39-78). This indicates that the crew was unaware of the changes, as the airline failed to communicate this critical information promptly and accurately. This lack of information made the crew unaware of the crisis they were in and how to handle it. Ensuring open communication and adherence to established protocols, as emphasized by Edmondson (2018), is crucial in crises, as it allows for the timely and accurate sharing of information, which can significantly mitigate the impact of a crisis.

Furthermore, national cultural dimensions influence organisational behaviour and communication practices. For instance, high power distance cultures, characterised by significant gaps between superiors and subordinates, often create communication barriers where subordinates are reluctant to challenge or question decisions made by those in authority (Hofstede, 1984; House, 2004). This reluctance can be particularly detrimental in crises. This was evident in the Korean Air case, where the F.E. recognised the issue and attempted to inform the captain about the problem. Despite these warnings, the captain did not acknowledge the information and continued trying to resolve the problem independently (AAIB, 2003, p. 4-5). The suppression of dialogue in such hierarchical cultures often results in crucial information not being acted upon, exacerbating the crisis (Gelfand et al., 2011).

In contrast, organizations that foster a culture of open communication, where questioning and feedback are encouraged, generally manage crises more effectively. Research highlights the importance of psychological safety—a critical element in high-stakes environments where employees feel secure speaking up without fear of retribution. This environment fosters the rapid exchange of accurate information and encourages collaborative problem-solving during crises (Carmeli et al., 2009; Kahn, 2005; Schein & Schein, 2017).

Moreover, work culture significantly impacts crisis communication across various industries. In healthcare, hierarchical cultures prioritizing obedience over dialogue have been linked to higher medical error rates, especially in high-pressure settings like operating

rooms (Edmondson, 2003). Similarly, military units with open communication and mutual respect outperform those with rigid hierarchies, particularly in high-pressure situations demanding adaptability and informed decision-making (Carmeli et al., 2009; House, 2004).

## 4.3 Language Specificity

This chapter delves into the critical role of language specificity in crisis communication, examining how ambiguous language, lack of proficiency in English, and the principles of crew/cockpit resource management (CRM) impact the clarity and effectiveness of communication in high-stakes environments.

### 4.3.1 Ambiguous language

“There is no greater impediment to the advancement of knowledge than the ambiguity of words.” – Thomas Reid.

Ambiguous language in crisis communication poses significant risks, leading to misunderstandings, misinterpretations, and ultimately, ineffective responses. In high-stakes environments, clear communication is crucial for safety and effective crisis management. The dangers of ambiguous language are well-documented, particularly in crises (Eisenberg, 2007). In such situations, vague or unclear language can have disastrous outcomes (Coombs, 2019), as seen in the aviation industry, where it has often escalated crises with life-and-death consequences. This was the case of Air Canada, which had a small fire onboard. Throughout the whole flight, the captain got mixed information from the crew, for example:

[F.A.] "okay, it's starting to clear now" (NTSB, 1984, p. 92).

[F.A.] "... it seems to be subsiding, all right!" (NTSB, 1984, p. 94).

These statements are ambiguous, especially as the fire was not put out, and the captain was not informed of this. Using ambiguous wordings meant that the captain did not land immediately, and the situation worsened until the accident was unavoidable.

Similarly, the impact of ambiguous language has significant implications in high-stakes environments where clarity is paramount. As Cushing (1994) notes, the use of ambiguous language in aviation has led to critical miscommunications that resulted in accidents. Ambiguous language can lead to hesitation, misinterpretation, or incorrect actions, which can be detrimental when swift and accurate responses are required.

This was particularly evident in the case of Crossair, where clear and direct communication would have been vital to ensuring that instructions were understood and executed correctly. The conversation between ATC and the pilots onboard was ambiguous as the airplane was instructed to turn left. Instead, it turned right, which the ATC noticed and responded to very ambiguously:

"Crossair four nine eight, confirm you are turning left ... OK, continue right" (FDETEC, 2002, p. 8/9, lines 6-8).

The word "right" has two meanings in English: direction and affirmation. The comment had the plane continue turning right despite the F.O.'s instruction to turn left and the captain may have thought the ATC meant that it was all right to continue turning to the right, despite the danger it provided due to the mountains around them.

In situations where instructions are ambiguous, there is a heightened risk that team members will misinterpret the intended actions, leading to dangerous delays or incorrect responses, as seen in the Crossair incident.

#### 4.3.2 Lack of Proficiency in English

"Learning another language is not only learning different words for the same things, but learning another way to think about things." – Flora Lewis

In aviation, English is the standardised language for international communication, ensuring that messages are conveyed clearly and reducing the risk of misunderstandings that could exacerbate an already critical situation. Communicating effectively in a shared language is essential for coordinating responses and making informed decisions under pressure (Heath & O'Hair, 2009).

The importance of language proficiency in crisis communication is underscored by its role in maintaining the precision and clarity of the language used. A lack of proficiency can introduce ambiguity, leading to misinterpretations with potentially severe consequences. This was tragically demonstrated in the case of Avianca, where the flight crew's limited English proficiency played a crucial role in the miscommunication with ATC. As the aircraft ran low on fuel after being in a holding pattern for an extended period, the F.O. responsible for communicating with the ATC failed to declare an emergency or convey the urgency of their situation. The transcript reveals that while the F.O. informed the captain that he had communicated their dire circumstances to the ATC, this was not the case (NTSB, 1991, p. 82-134). The ATC, not fully grasping the severity of the situation due to the F.O.'s vague language, did not prioritise the flight, leading to the tragic outcome. In this instance, the F.O.'s inability to use the term "emergency" or "mayday" clearly demonstrated the dangers of inadequate language proficiency. The standardised phraseology and emphasis on clear communication in aviation are designed to mitigate these risks, but such safeguards rely on a baseline level of language proficiency (Kanki, 2010).

Language proficiency impacts not only aviation but also other high-stakes fields like healthcare and the military. In healthcare, language barriers can cause severe miscommunications, leading to incorrect treatments or delayed care. John-Baptist et al. (2004) highlight how these barriers in emergency rooms can result in significant medical errors, underscoring the need for clear communication in crises. Similarly, in military operations, the lack of a shared language can hinder the coordination of complex manoeuvres and the dissemination of critical information, jeopardizing mission success (Kale et al., 2021). These challenges in aviation and other fields emphasize the universal importance of language proficiency in ensuring effective communication across high-risk domains.

### 4.3.3 Crew/Cockpit Resource Management

"Mistakes are inevitable in aviation, especially when one is still learning new things. The trick is to not make the mistake that will kill you." - Stephen Coonts.

CRM is crucial for enhancing communication, decision-making, and teamwork, especially in high-stakes environments like aviation. It fosters an environment where all team members contribute to decision-making, ensuring that critical information is shared effectively. However, inadequate CRM can lead to severe communication breakdowns and potentially catastrophic outcomes (Helmreich, 1997).

Situational awareness, central to CRM, involves continuously understanding all relevant factors in an environment. In crisis situations, maintaining this awareness is vital for informed decisions. Poor CRM practices can quickly degrade situational awareness, increasing the risk of miscommunication and error.

In the case of Spanair, the crew's decision to rush through their checklist without completing some critical items, such as setting the flaps, demonstrates a breakdown in both CRM and situational awareness (CIAIAC, 2008, pp. 229-230). The crew's actions highlight a fundamental principle of CRM: the necessity for thoroughness and communication, particularly during crucial pre-flight procedures. The failure to communicate the incomplete checklist during the second take-off attempt indicates a deeper systemic issue within the CRM framework the crew employs. The rushed behaviour, compounded by the lack of verification between the pilots, points to a critical loss of situational awareness—a foundational element that CRM aims to preserve. This loss is not merely a momentary lapse but an indication of how the pressures of operational tempo and possible overconfidence can degrade decision-making capabilities in the cockpit (Endsley, 1999; Helmreich, 1997).

Similarly, the tragic events of Lion Air further illustrate the devastating consequences of poor CRM and degraded situational awareness. The crew's preoccupation with their individual task, coupled with their failure to communicate effectively with each other, allowed the situation to spiral out of control as the aircraft's behaviour became increasingly erratic (KNKT, 2019, p. 213). In this scenario, the escalation of errors and the inability to effectively manage the crisis illustrate the domino effect that poor CRM can initiate, where

initial small mistakes, uncorrected due to communication failures, compound into a catastrophic outcome (Kanki, et al., 2019).

Another crucial aspect of CRM is its focus on managing multiple communication channels and tasks simultaneously. In crisis situations, individuals often need to handle information from various sources, make rapid decisions, and communicate effectively with different stakeholders. The importance of these skills was starkly illustrated in the mid-air collision between Aeromexico and a Piper, where the ATC struggled to manage the airspace and direct multiple airplanes simultaneously. The controller's overwhelmed state is evident in the way he asked other planes to be on the lookout for the Piper while simultaneously changing his plans:

"Okay, you can hold what you have sir, and we have a change in plans here, stand by ..."  
(NTSB, 1987, p. 69).

This failure to fully communicate the Piper's location and the reliance on other aircraft to locate it visually highlight a critical flaw in CRM implementation. The situation reveals how the inability to manage multiple communication channels effectively and the loss of situational awareness can lead to confusion and misalignment among different parties involved in crisis management, ultimately resulting in disastrous outcomes (Endsley, 1999; Helmreich, 1997).

Furthermore, the importance of CRM extends beyond aviation and has increasingly been recognised in other high-pressure domains, such as healthcare and emergency response teams. CRM principles have been adapted to enhance teamwork and communication in these fields, highlighting its critical role in improving outcomes by fostering a collaborative and communicative team environment (Helmreich, 1997; Shea-Lewis, 2009).

## 5. Discussion

This discussion is organised around three critical themes from the analysis: emotional responses, power relations, and language specificity in crisis communication. Each section will explore how these factors influenced the outcomes of the studied aviation accidents, supported by relevant literature.

### 5.1 Emotional Responses in Crisis Situations

Emotional responses, particularly anger, panic, and stress, play a significant role in crisis communication. The study's findings are consistent with the literature, which suggests that emotions like anger can severely impair communication and decision-making. This was demonstrated in the US-Bangla crash, where the captain's anger stifled necessary communication with the first officer, leading to a breakdown in the decision-making process (Goleman, 1996; Kassinove, 2014). This finding aligns with psychological research that indicates anger can increase tension and reduce collaboration among team members (Averill, 2012). However, the study shows that anger affects the individuals directly involved and sets a broader tone of dysfunction within the team, escalating the crisis. This challenges the prevailing notion that emotional management is solely an individual issue and suggests that team-wide emotional dynamics are crucial in crisis communication (Clementson & Xie, 2020).

Panic, another critical emotional response, impairs cognitive function and situational awareness, leading to fragmented and confused communication. This is consistent with the literature, which highlights the detrimental impact of panic on situational awareness and decision-making (Lerner & Tiedens, 2006). The Pinnacle Airlines incident exemplifies this, as panic led to a breakdown in communication, contributing to the escalation of the crisis. The study supports existing theories but suggests that current management training may not fully prepare individuals for the overwhelming panic in real-world scenarios (Lerner & Tiedens, 2006). This points to a need for more robust training programs that simulate high-panic situations more effectively (Heath & Palenchar, 2009).

The analysis of the Tenerife disaster, where the captain's stress-induced rush to take off led to a fatal misunderstanding, supports existing research on narrowing cognitive focus under stress (Endsley, 1999; Helmreich & Merritt, 2016). This finding highlights the importance of comprehensive stress management training to enhance situational awareness and communication efficacy in crises (Vine et al., 2015). Additionally, it raises questions about the effectiveness of current protocols in mitigating stress-related communication breakdowns, suggesting that further refinement of these protocols is necessary.

## 5.2 Power Relations in Crisis Communication

The study highlights how power dynamics within crisis management teams significantly influence communication outcomes. Leadership styles, particularly mocking, or indecisive, have been shown to hinder open communication and lead to poor decision-making. This is exemplified by the Northwest Airlines incident, where the captain's mocking behaviour stifled the first officer's attempts to communicate concerns. This finding aligns with existing research suggesting mocking leaders impede effective communication (Yukl et al., 2019). However, this study further illustrates how these power dynamics inhibit communication and directly contribute to the escalation of crises, emphasising the need for assertiveness training and leadership development that fosters more balanced power relations (Mutangili, 2020). This challenges the traditional view that leadership issues are primarily about command and control, instead highlighting the nuanced ways leadership can either facilitate or hinder effective crisis communication (Northouse, 2022).

Experience disparity is another critical factor that emerged from this study. The analysis of American Airlines, where the less experienced F.O. reaction to wake turbulence contrasted with the captain's more measured response, underscores the importance of balanced experience levels within crisis management teams (Nguyen et al., 2021). This finding is consistent with the literature, which emphasizes the role of experienced professionals in interpreting and responding to ambiguous situations effectively (Flin, 2016). However, the study challenges the assumption that the presence of an experienced leader is always sufficient, highlighting the need for balanced experience across the entire team to ensure effective communication (Endsley, 2017). This suggests a potential gap in the

literature regarding how team composition affects crisis communication, particularly in scenarios where experience levels vary widely.

Furthermore, the study's examination of work culture, as seen in the New Zealand Airline, supports the existing literature that stresses the impact of culture on safety and communication (Edmondson, 2018; Schein & Schein, 2017). In this case, the failure to communicate critical information effectively highlight the dangers of a work culture that does not prioritize open communication. This finding underscores the importance of cultivating a culture that supports transparent communication, essential for effective crisis management (Carsten & Uhl-Bien, 2012; Kahn, 2005).

### 5.3 Language Specificity in Crisis Communication

Language specificity emerged as a crucial factor in crisis communication. The use of ambiguous language led to misinterpretations and ineffective responses, as demonstrated in the Canadian air accident. This finding supports existing literature on the importance of clear and unambiguous communication in high-stakes environments (Doerfler, 2018). However, the study suggests that while current protocols are generally effective, there may be specific scenarios where they fall short, particularly in situations involving non-standard communication challenges (Kale et al., 2021).

The Avianca Flight incident further illustrates the detrimental impact of limited English proficiency on crisis communication. The F.O.'s failure to communicate the severity of the fuel emergency to ATC highlights the critical importance of language proficiency in ensuring effective communication during crises (Helmreich & Merritt, 2016). This finding aligns with the literature on the role of language proficiency in crisis management and underscores the need for stringent language standards in international aviation (Kale et al., 2021). This suggests that there is a need for research to explore the effectiveness of current language training programs in preparing aviation professionals for real-world crises, particularly in multilingual environments.

Finally, the study highlights the importance of CRM in enhancing communication and decision-making during crises, as shown in the collision between the Aeromexico and the Piper. This finding is consistent with existing research that emphasizes the role of CRM in

promoting teamwork and effective communication (Helmreich, 1997). The study demonstrates the need for continuous improvement and rigorous evaluation of CRM training programs are essential to address the challenges of evolving aviation technology and complex crisis scenarios.

## 6. Conclusion

This study aimed to investigate how ineffective communication among critical stakeholders influences crisis outcomes, using aviation as a case study. The primary research question guiding this study was: "How do communication dynamics influence crisis management in high-stakes environments?" By examining various aviation incidents, we identified critical factors such that significantly impacted communication during crises.

### 6.1 Empirical and Theoretical Contributions

Our findings reveal that emotional states, including anger, panic, and stress, play a pivotal role in communication breakdowns. These emotions significantly impair judgment and decision-making, leading to ineffective stakeholder communication. For instance, anger can lead to aggressive communication styles and reluctance to listen, while panic can result in fragmented and unclear messages. Acute stress often causes rushed decisions and selective attention, narrowing focus on critical information. These insights underscore the necessity of considering emotional regulation within crisis communication frameworks. While existing literature acknowledges the role of emotions in communication (Anderson & Bushman, 2002; Coombs, 2019), our study provides concrete evidence from aviation incidents, filling a critical gap in crisis communication literature regarding the tangible impacts of these emotional states on communication efficacy during crises. This research confirms previous theories and expands them by showing the severe consequences of these emotions in real-world crises.

Power dynamics within crisis communication settings emerged as another significant factor influencing outcomes. Hierarchical structures and authoritative leadership often

stifled essential communication, as subordinates felt intimidated or reluctant to voice concerns. This dynamic was evident in several cases where miscommunication and poor decision-making were linked to power imbalances. Studies in organizational behaviour have long highlighted the negative impact of rigid hierarchies on team communication and performance (Coombs, 2019; Schraagen et al., 2010). Our findings support these studies and extend the conversation by demonstrating the severe consequences of these dynamics in crises. These findings advocate for a more distributed leadership model that empowers all team members to communicate openly.

Another critical area identified was language specificity, including ambiguous language, lack of English proficiency, and CRM misuse. Effective crisis communication requires clear, unambiguous language to ensure all stakeholders understand the situation and necessary actions. Ambiguous language and limited proficiency can lead to fatal misunderstandings, as seen in multiple incidents. These findings emphasize the importance of standardized communication protocols and robust CRM practices, aligning with and extending existing literature on the role of explicit language in emergency management (Helmreich, 1997). However, the study highlights that despite existing protocols, there are still significant gaps in their implementation, especially under high-pressure conditions. This suggests that while current CRM practices are beneficial, they must be continuously updated and adapted to address the challenges of modern crisis scenarios.

## 6.2 Implications for Future Research

This study identifies three critical areas for future research. First, emotional regulation training programs designed explicitly for high-stakes environments like aviation could be further developed and empirically tested. Future research could explore different training methodologies, such as simulations and stress inoculation, to determine the most effective strategies for managing emotions in real-time crises. These studies could build on our findings, highlighting emotions' profound impact on communication efficacy during crises (Gross, 2014; Lerner et al., 2015).

Second, the role of power dynamics in crisis communication warrants further exploration across different industries. Comparative studies in sectors like healthcare, military

operations, and emergency response could provide valuable insights into how hierarchical structures influence communication and decision-making under pressure. Research could also investigate the effectiveness of team-based decision-making models or assertiveness training, in improving communication during crises. This directly links to our findings on the detrimental effects of rigid hierarchies in aviation crises.

Finally, as industries continue to globalize, future research should focus on overcoming language barriers in crisis communication, particularly in multilingual environments. Studies could examine the role of new technologies, such as real-time translation tools, in mitigating the risks associated with language differences and how these can be integrated into existing CRM practices to enhance their effectiveness during crises. These efforts could address the gaps identified in our study, where language barriers significantly hindered effective crisis communication.

### 6.3 Practical and Societal Implications

The practical implications of this research are significant, particularly for industries that operate in high-risk environments. The study suggests that crisis communication strategies must be reevaluated to incorporate a stronger focus on emotional regulation, balanced power dynamics, and language clarity. For instance, aviation training programs could further integrate more robust emotional management and assertiveness modules, ensuring that all team members feel empowered to communicate effectively, regardless of hierarchy. For example, implementing assertiveness training programs that encourage junior team members to speak up could prevent communication breakdowns like those seen in the analysed incidents. In broader societal terms, the research underscores the importance of effective communication in ensuring public safety. By improving communication protocols, industries like aviation, healthcare, and public safety can better manage crises, potentially saving lives and reducing the severity of incidents.

## 6.4 Transparent Discussion of Limitations

While this study provides valuable insights, it is not without limitations. The reliance on a selection of 20 aviation accident reports means that the findings may not capture all possible communication breakdown scenarios. Additionally, while providing a detailed account of verbal communication, the focus on CVR transcripts overlooks non-verbal cues and other contextual factors that might influence communication dynamics. This limitation is particularly relevant in understanding how non-verbal communication or lack thereof in radio communications might compound the issues identified. Future studies should incorporate a more diverse range of data sources, including interviews and observational studies, to provide a more comprehensive understanding of crisis communication. Furthermore, the study's focus on aviation may limit the generalisability of the findings to other industries, suggesting the need for further validation in different high-stakes environments. The study's limitations may have influenced the results, particularly regarding the generalisability of the findings across different industries.

## 6.5 Summary

In conclusion, this study highlights the critical role of effective communication in managing crises, using aviation as a case study. The research underscores the importance of emotional regulation, standardized communication protocols, and robust CRM practices by examining the impact of emotions, power dynamics, and language specificity on communication breakdowns. The findings offer valuable insights for improving crisis communication strategies across high-risk industries. Despite its limitations, this study contributes to a deeper understanding of how communication dynamics influence crisis outcomes and provides a foundation for further exploration in the vital field of crisis communication.

Moreover, John Powell aptly noted, "Communication works for those who work at it."

## 7. References

### 7.1 Accident reports

Korean Air:

Air Accident Investigation Branch. (2003). *Aircraft Accident Report No:3/2003*

(EW/C99/12/04). Retrieved from:

[https://www.icao.int/safety/fsix/Documents/sr/reports/99004720\\_final\\_report.pdf](https://www.icao.int/safety/fsix/Documents/sr/reports/99004720_final_report.pdf)

China Airlines:

Aircraft Accident Investigation Commission Ministry of Transport. (1996). *Aircraft*

*accident investigation report: China Airlines Airbus Industrie A300B4-622R, B1816*

*Nagoya Airport April 26, 1994*. Retrieved from: [https://www.mlit.go.jp/jtsb/eng-](https://www.mlit.go.jp/jtsb/eng-air_report/B1816.pdf)

[air\\_report/B1816.pdf](https://www.mlit.go.jp/jtsb/eng-air_report/B1816.pdf)

TransAsia:

Aviation Safety Council Taipei, Taiwan. (2016). *4 February, 2015 TransAsia Airways Flight*

*GE235 ATR72-212A Loss of Control and Crashed into Keelung River Three Nautical Miles*

*East of Songshan Airport*. Retrieved from: [https://reports.aviation-](https://reports.aviation-safety.net/2015/20150204-0_AT76_B-22816.pdf)

[safety.net/2015/20150204-0\\_AT76\\_B-22816.pdf](https://reports.aviation-safety.net/2015/20150204-0_AT76_B-22816.pdf)

US-Bangla:

Bangladesh Civil Aviation Authority. (2018). *The accident investigation of Us Bangla*

*Airlines, Bombardier (UBG-211), DHC-8-402, S2-AGU, At Tribhuvan International Airport,*

*Kathmandu, Nepal*. Retrieved from: [https://reports.aviation-](https://reports.aviation-safety.net/2018/20180312_DH8D_S2-AGU.pdf)

[safety.net/2018/20180312\\_DH8D\\_S2-AGU.pdf](https://reports.aviation-safety.net/2018/20180312_DH8D_S2-AGU.pdf)

Air France:

BEA. (2012). *Final report on the accident on 1<sup>st</sup> June 2009 to the Airbus A330-203*

registered F-GZCP, operated by Air France flight AF 447 Rio de Janeiro - Paris. Retrieved from <https://bea.aero/docspa/2009/f-cp090601.en/pdf/f-cp090601.en.pdf>

Überlingen collision:

Bundesstelle für Flugunfalluntersuchung. (2004). *Final Report on the Mid-air Collision Near Überlingen, Germany, on 1 July 2002 Involving a Boeing 757-23APF Operated by DHL and a Tupolev 154M Operated by Bashkirian Airlines*. Retrieved from [https://reports.aviation-safety.net/2002/20020701-1\\_B752\\_A9C-DHL\\_T154\\_RA-85816.pdf](https://reports.aviation-safety.net/2002/20020701-1_B752_A9C-DHL_T154_RA-85816.pdf)

Spanair:

CIAIAC. (2008). *Report A-032/2008 Accident Involving McDonnell Douglas DC-9-82 (MD-82) aircraft, Registration EC-HFP, operated by Spanair, at Madrid-Barajas Airport, on 20 August 2008*. Retrieved from [https://reports.aviation-safety.net/2008/20080820-0\\_MD82\\_EC-HFP.pdf](https://reports.aviation-safety.net/2008/20080820-0_MD82_EC-HFP.pdf)

Collision over Brazil:

CENIPA. (2008). *Final Report A00X/CENIPA/2008*. Retrieved from: <https://sistema.cenipa.fab.mil.br/cenipa/paginas/relatorios/rf/en/PU-AVD-ING..pdf>

Crossair:

Federal Department of the Environment, Transport, Energy and Communications. (2002). *Final Report of the Aircraft Accident Investigation Bureau on the accident to the Saab 340B aircraft, registration HB-AKK of Crossair flight CRX 498 on 10 January 2000 near Nassenwil/ZH*. Retrieved from: [https://www.sust.admin.ch/inhalte/AV-berichte/1781\\_e.pdf](https://www.sust.admin.ch/inhalte/AV-berichte/1781_e.pdf)

Air China:

KAIB. (2005). *Controlled flight into terrain Air China International Flight 129 B767-200ER, B2552 Mountain Dotdae, Gimhae April 15, 2002*. Retrieved from: [https://reports.aviation-safety.net/2002/20020415-0\\_B762\\_B-2552.pdf](https://reports.aviation-safety.net/2002/20020415-0_B762_B-2552.pdf)

Lion Air:

Komite Nasional Keselamatan Transportasi Republic of Indonesia. (2019). *Aircraft Accident Investigation Report, PT. Lion Mentari Airlines Boeing 737 (Max); PK-LQP, Tanjung Karawang, West Java, Republic of Indonesia, October 29, 2018*. Retrieved from <https://www.flightradar24.com/blog/wp-content/uploads/2019/10/JT610-PK-LQP-Final-Report.pdf>

United Airlines:

National Transportation Safety Board. (1979). *United Airlines, INC. McDonnell-Douglas, DC-8-61, N8082U, Portland, Oregon, December 28, 1978*. Retrieved from: <https://www.nts.gov/investigations/AccidentReports/Reports/AAR7907.pdf>

Air Canada:

National Transportation Safety Board. (1984). *Air Canada Flight 797 McDonnell Douglas DC-9-32, C-FTLU, Greater Cincinnati, International Airport, Covington, Kentucky, June 2, 1983*. Retrieved from: <https://libraryonline.erau.edu/online-full-text/nts.gov/aircraft-accident-reports/AAR84-09.pdf>

Aeromexico and Piper Collision:

National Transportation Safety Board. (1987). *Collision of Aeronaves De DC-9-32, XA-JED and Piper PA-28-181, N4891F August 31, 1986*. Retrieved from: <https://www.faa.gov/sites/aa.gov/files/2022-11/AAR87-07.pdf>

Avianca Airline:

National Transportation Safety Board. (1991). *Aircraft Accident Report: Avianca, the Airline of Columbia Boeing 707-321B, HK 2016 fuel exhaustion Cove Neck, New York January 25, 1990*. Retrieved from: <https://www.nts.gov/investigations/accidentreports/reports/aar9104.pdf>

Northwest:

National Transportation Safety Board. (1994). *Controlled collision with terrain express i! Airlines, INC./ Northwest Airlink Flight 5719 Jetstream BA-3100, N334PX, Hibbing, Minnesota December 1, 1993*. Retrieved from: <https://libraryonline.erau.edu/online-full-text/ntsb/aircraft-accident-reports/AAR94-05.pdf>

America Airlines:

National Transportation Safety Board. (2004). *In-Flight Separation of Vertical Stabilizer American Airlines Flight 587 Airbus Industrie A300-605R, N14053 Belle Harbor, New York November 12, 2001*. Retrieved from: <https://www.nts.gov/investigations/AccidentReports/Reports/AAR0404.pdf>

Pinnacle Airlines:

National Transportation Safety Board. (2005). *Crash of Pinnacle Airlines Flight 3701 Bombardier CL-600-2B19, N8396A Jefferson City, Missouri October 14, 2004*. Retrieved from: <https://www.nts.gov/investigations/accidentreports/reports/aar0701.pdf>

Tenerife Collision:

Raad Voor De Luchtvaart (Netherlands Aviation Safety Board). (1978). *Final Report and comments of the Netherlands Aviation Safety Board of the investigation into the accident with the collision of KLM flight 4805, Boeing 747-206B, PH-BUF and Pan American Flight 1736, Boeing 747-121, N736PAA at Tenerife Airport, Spain on 27 March 1977*. Retrieved from: <https://www.faasafety.gov/files/gslac/courses/content/232/1081/finaldutchreport.pdf>

New Zealand Air:

Transport Accident Investigation Commission. (2006). *Flight into terrain, Air New Zealand McDonnell-Douglas DC-10-30 ZK-NZP, Ross Island, Antarctica, November 28, 1979*. Retrieved from: <https://www.fss.aero/accident-reports/dvdfiles/NZ/1979-11-28-NZ.pdf>

## 7.2 Literature references

1. "BP chief Tony Hayward's statement in full". 2010-06-17.  
<https://www.theguardian.com/business/2010/jun/17/bp-tony-hayward-oil-spill-statement>.
2. Adamski, A. J., & Westrum, R. (2003). "Requisite imagination: The fine art of anticipating what might go wrong". In E. Hollnagel (Ed.). *Handbook of cognitive task design*. CRC Press.
3. Anderson, C. A., & Bushman, B. J. (2002). "Human aggression". *Annual Review of Psychology*, 53(1), 27–51.
4. Averill, J. R. (2012). *Anger and aggression: An essay on emotion*. Springer Science & Business Media.
5. Berggren, P., Nählinder, S., & Svensson, E. (Eds.). (2014). *Assessing command and control effectiveness: Dealing with a changing world*. Ashgate.
6. Braun, V., & Clarke, V. (2006). "Using thematic analysis in psychology". *Qualitative Research in Psychology*, 3(2), 77–101.
7. Brock, A. (2008). "Humor, jokes, and irony versus mocking, gossip and black humor". In G. Antos & E. Ventola (Ed.), *Handbook of interpersonal communication* (pp. 541-566). De Gruyter Mouton.
8. Bryman, A., Bell, E., Reck, J., & Fields, J. (2022). *Social research methods*. Oxford University Press.
9. Carmeli, A., Brueller, D., & Dutton, J. E. (2009). "Learning behaviours in the workplace: The role of high-quality interpersonal relationships and psychological

safety". *Systems Research and Behavioral Science*, 26(1), 81–98.

10. Carsten, M. K., & Uhl-Bien, M. (2012). "Follower Beliefs in the Co-Production of Leadership: Examining Upward Communication and the Moderating Role of Context". *Zeitschrift Für Psychologie*, 220(4), 210–220.
11. Clementson, D. E., & Xie, T. (2020). "Narrative storytelling and anger in crisis communication". *Communication Research Reports*, 37(4), 212-221.
12. Coombs, W. T. (2019). *Ongoing crisis communication: planning, managing, and responding* (Fifth Edition.). SAGE.
13. Coombs, W. T., & Holladay, S. J. (Eds.). (2023). *The Handbook of crisis communication* (Second edition.). Wiley Blackwell.
14. Covello, V. T. (2009). "Strategies for Overcoming Challenges to Effective Risk Communication". In *Handbook of Risk and Crisis Communication* (1st ed., pp. 143–167). Routledge.
15. Cushing, S. (1994). *Fatal words: Communication clashes and aircraft crashes*. University of Chicago Press.
16. Dekker, S. (2014). *The Field Guide to Understanding 'Human Error'* (Third edition.). CRC Press.
17. Doerfler, R. D. (2018). "HIGH-STAKES INTERPRETATION". *Michigan Law Review*, 116(4), 523–579.
18. DuBrin, A. J. (2016). *Leadership: research findings, practice, and skills* (Eighth Edition). Cengage Learning.

19. Edmondson, A. C. (2003). "Speaking up in the operating room: How team leaders promote learning in interdisciplinary action teams". *Journal of management studies*, 40(6), 1419-1452.
20. Edmondson, A. C. (2018). *The fearless organization: Creating psychological safety in the workplace for learning, innovation, and growth*. John Wiley & Sons.
21. Eisenberg, E. M. (2007). *Strategic ambiguities: essays on communication, organization, and identity* (1st ed.). Sage Publications.
22. Endsley, M. R. (1999). "Situation awareness in aviation systems". In D. J. Garland, J. A. Wise, & V. D. Hopkin (Eds.), *Handbook of aviation human factors* (pp. 257–276). Lawrence Erlbaum Associates Publishers.
23. Endsley, M. R. (2017). "From Here to Autonomy: Lessons Learned From Human–Automation Research". *Human Factors*, 59(1), 5-27.
24. Eriksson, M. (2018). "Lessons for Crisis Communication on Social Media: A Systematic Review of What Research Tells the Practice". *International Journal of Strategic Communication*, 12(5), 526–551.
25. Fearn-Banks, K. (2011). *Crisis communications: a casebook approach* (4. ed.). Routledge/Taylor and Francis Group.
26. Fischhoff, B. (2012). "Risk perception and communication". In *Risk Analysis and Human Behavior*, (pp. 17–46). Routledge.
27. Flin, R. H. (2016). *Decision making under stress: emerging themes and applications*. Routledge.
28. Garcia, A. C. (2016). "Air traffic communications in routine and emergency contexts: A case study of Flight 1549 'miracle on the Hudson'". *Journal of Pragmatics*, 106, 57–

- 71.
29. Gelfand, M. J., Frese, M., & Salmon, E. (2011). "Cultural influences on errors: Prevention, detection, and management". In D. A. Hofmann & M. Frese (Eds.), *Errors in organizations* (pp. 273–315). Routledge/Taylor & Francis Group.
30. GLIK, D. C. (2007). "Risk communication for public health emergencies". *Annual Review of Public Health, 28*(1), 33–54.
31. Goleman, D. (1996). *Emotional intelligence: why it can matter more than IQ*. Bloomsbury.
32. Gross, J. J. (2014). *Handbook of emotion regulation* (2 ed.). Guilford.
33. Haddow, G., & Haddow, K. S. (2008). *Disaster Communications in a Changing Media World* (1st ed.). Elsevier.
34. Heath, R. L., & O'Hair, H. D. (2009). *Handbook of Risk and Crisis Communication* (1st ed.). Routledge.
35. Heath, R. L., & Palenchar, M. J. (2009). *Strategic issues management: organizations and public policy challenges* (2nd ed.). Sage Publications.
36. Helmreich, R. L. (1997). "Managing Human Error in Aviation". In *Scientific American* (Vol. 276, Number 5, pp. 62–67). Scientific American, Incorporated.
37. Helmreich, R. L., & Foushee, H. C. (2010). "Why CRM? Empirical and theoretical bases of human factors training". In *Crew resource management* (pp. 3–57).
38. Helmreich, R. L., & Merritt, A. C. (2016). *Culture at work in aviation and medicine: national, organizational and professional influences* (Repr.). Routledge.

39. Hofstede, G. (1984). *Culture's consequences: International differences in work-related values* (Vol. 5). sage.
40. Hollnagel, E., Woods, D. D., & Leveson, N. (2006). *Resilience engineering: concepts and precepts* (1st edition). Ashgate.
41. House, R. J. (2004). *Culture, leadership and organizations: the GLOBE study of 62 societies*. Sage Publications.
42. Hromkovič, J., & Schnitger, G. (2011). "Ambiguity and Communication". *Theory of Computing Systems*, 48(3), 517–534.
43. ICAO. (2010). *Doc 9835 Manual on the implementation of ICAO language proficiency requirements*. International Civil Aviation Organization.
44. John-Baptiste, A., Naglie, G., Tomlinson, G., Alibhai, S. M. H., Etchells, E., Cheung, A., Kapral, M., Gold, W. L., Abrams, H., Bacchus, M., & Krahn, M. (2004). "The Effect of English Language Proficiency on Length of Stay and In-hospital Mortality". *Journal of General Internal Medicine: JGIM*, 19(3), 221–228.
45. Johnson, T. (2017). *Crisis leadership: How to lead in times of crisis, threat and uncertainty*. Bloomsbury Publishing.
46. Kahn, W. A. (2005). *Holding fast: the struggle to create resilient caregiving organizations* (1st ed.). Brunner-Routledge.
47. Kale, U., Herrera, M., & Nagy, A. (2021). "Examining pragmatic failure and other language-related risks in global aviation". *Aircraft Engineering and Aerospace Technology*, 93(8), 1313–1322.
48. Kanki, B. G. (2010). "Communication and Crew Resource Management". In B. G. Kanki, R. L. Helmreich, & J. Anca (Eds.), *Crew Resource Management* (2nd ed., pp.

- 111-146). Academic Press.
49. Kanki, B. G., Helmreich, R. L., & Anca, J. M. (2019). *Crew resource management* (3rd ed.). Academic Press.
  50. Kapucu, N., & Özerdem, A. (2011). *Managing emergencies and crises*. Jones & Bartlett Publishers.
  51. Kapucu, N., & Van Wart, M. (2006). "The Evolving Role of the Public Sector in Managing Catastrophic Disasters: Lessons Learned". *Administration & Society*, 38(3), 279–308.
  52. Kapucu, N., Arslan, T., & Collins, M. L. (2010). "Examining Intergovernmental and Interorganizational Response to Catastrophic Disasters: Toward a Network-Centered Approach". *Administration & Society*, 42(2), 222–247.
  53. Kassinove, H. (2014). *Anger disorders: Definition, diagnosis, and treatment*. Taylor & Francis.
  54. Klein, G. (1998). *Sources of power: how people make decisions*. MIT Press.
  55. Kolditz, T. A. (2010). *In extremis leadership: Leading as if your life depended on it*. John Wiley & Sons.
  56. Krippendorff, K. (2019). *Content analysis: an introduction to its methodology* (Fourth edition). SAGE.
  57. Lerner, J. S., & Keltner, D. (2000). "Beyond valence: Toward a model of emotion-specific influences on judgement and choice". *Cognition and Emotion*, 14(4), 473–493.

58. Lerner, J. S., & Tiedens, L. Z. (2006). "Portrait of the angry decision maker: how appraisal tendencies shape anger's influence on cognition". *Journal of Behavioral Decision Making*, 19(2), 115–137.
59. Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. S. (2015). "Emotion and Decision Making". *Annual Review of Psychology*, 66(1), 799–823.
60. Lindell, M. K., & Perry, R. W. (1992). *Behavioral foundations of community emergency planning*. Hemisphere Publishing Corp.
61. Lundgren, R. E., & McMakin, A. H. (2013). *Risk communication: a handbook for communicating environmental, safety, and health risks* (5th ed.). John Wiley & Sons.
62. Maurino, D. E., & Salas, E. (2010). *Human factors in aviation* (2nd ed.). Academic Press/Elsevier.
63. Mileti, D. S., & Sorensen, J. H. (1990). "Communication of emergency public warnings: A social perspective and state-of-the-art assessment". *Communication of emergency public warnings: A social perspective and State-of-the-art assessment* (pp. 200-200).
64. Miron-Spektor, E., & Rafaeli, A. (2009). "The effects of anger in the workplace: When, where, and why observing anger enhances or hinders performance". *Research in Personnel and Human Resources Management* (Vol. 28, pp. 153–178).
65. Molesworth, & Estival, D. (2015). "Miscommunication in general aviation: The influence of external factors on communication errors". *Safety Science*, 73, 73–79.
66. Morgan, M. G. (2002). *Risk communication: A mental models approach*. Cambridge University Press.

67. Mumley, W. E. (2019). "Organizational Culture and Ethical Decision-Making During Major Crises". *The Journal of Values Based Leadership*, 12(2), 81-.
68. Mutangili, S. K. (2020). "Influence of Assertive Leadership on Organizational Development: A Case of Kenya Power and Lighting Company (KPLC)". *Journal of Human Resource & Leadership*, 4(5), 21–34.
69. National Research Council. (2012). *Macondo well Deepwater Horizon blowout: lessons for improving offshore drilling safety* (1st ed.). The National Academies Press.
70. Neuendorf, K. A. (2017). *The Content Analysis Guidebook* (Second edition.). SAGE Publications, Inc.
71. Nguyen, D., Arnaert, A., Pringle, J., Ponzoni, N., Kouyaté, S., Fansia, N., & Nouvet, E. (2021). "Nurses' experiences of their decision-making process when participating in clinical trials during the 2014–2016 West African Ebola crisis". *Public Health Nursing*, 38(1), 40–46.
72. Northouse, P. G. (2022). *Leadership: theory and practice* (Ninth edition). SAGE.
73. Ou, J., & Wong, I. A. (2021). "Strategic crisis response through changing message frames: a case of airline corporations". *Current Issues in Tourism*, 24(20), 2890–2904.
74. Reason, J. T. (1997). *Managing the risks of organizational accidents*. Ashgate.
75. Renn, O. (2009). "Risk Communication: Insights and Requirements for Designing Successful Communication Programs on Health and Environmental Hazards". In *Handbook of Risk and Crisis Communication* (1st ed., pp. 80–98). Routledge.
76. Reynolds, B., Galdo, J. H., Sokler, L., & Freimuth, V. S. (2002). *Crisis and emergency risk communication*.

77. Sandman, P. (2003). *Beyond panic prevention: addressing emotion in emergency communication. Emergency risk communication CDCynergy [CD-ROM]*. Atlanta: Centers for Disease Control and Prevention.
78. Schein, E. H. (2016). *Organizational culture and leadership*. Wiley.
79. Schein, E. H., & Schein, P. (2017). *Organizational culture and leadership* (Fifth edition.). John Wiley & Sons, Inc.
80. Schraagen, J. M., Veld, M. H. in 't, & De Koning, L. (2010). "Information Sharing During Crisis Management in Hierarchical vs. Network Teams". *Journal of Contingencies and Crisis Management*, 18(2), 117–127.
81. Seeger, M. W. (2006). "Best Practices in Crisis Communication: An Expert Panel Process". *Journal of Applied Communication Research*, 34(3), 232–244.
82. Seeger, M. W., Sellnow, T. L., & Ulmer, R. R. (2003). *Communication and organizational crisis*. Bloomsbury Academic.
83. Sellnow, T. L., & Seeger, M. W. (2013). *Theorizing crisis communication*. Wiley-Blackwell.
84. Sellnow, T.L., Ulmer, R.R., Seeger, M.W., & Littlefield, R. (2008). *Effective Risk Communication: A Message-Centered Approach*. Springer Science & Business Media.
85. Shea-Lewis, A. (2009). "Teamwork: Crew resource management in a community hospital". *Journal for Healthcare Quality*, 31(5), 14-18.
86. Soltani, I., Shahsavari, M., & Moradi, M. (2014). "The impact of emotional intelligence on crisis management capabilities case study: Small and medium enterprises in the province of Isfahan". *International Journal of Academic Research in*

*Business and Social Sciences*, 4(1), 415-423.

87. Stern, P. C., & Fineberg, H. V. (1996). *Understanding risk: informing decisions in a democratic society* (1st ed.). National Academy Press.
88. Sutton, J. N., Palen, L., & Shklovski, I. (2008). *Backchannels on the front lines: Emergency uses of social media in the 2007 Southern California Wildfires*.
89. Tachkova, E. R. (2024). "Expanding victim-centred postcrisis communication through memorials: A case study of Lufthansa's communication efforts following the 2015 Germanwings plane crash". *Journal of Contingencies and Crisis Management*, 32(2).
90. Tourish, D. (2013). *The dark side of transformational leadership: a critical perspective* (1st ed.). Routledge.
91. Treadwell, D. F., & Davis, A. (2020). *Introducing communication research : paths of inquiry* (Fourth edition. International student edition.). SAGE Publications, Inc.
92. Ulmer, R. R., Sellnow, T. L., & Seeger, M. W. (2011). *Effective crisis communication: moving from crisis to opportunity* (2nd ed.). SAGE.
93. Veil, S. R., Buehner, T., & Palenchar, M. J. (2011). "A Work-In-Process Literature Review: Incorporating Social Media in Risk and Crisis Communication". *Journal of Contingencies and Crisis Management*, 19(2), 110–122.
94. Vine, S. J., Uiga, L., Lavric, A., Moore, L. J., Tsaneva-Atanasova, K., & Wilson, M. R. (2015). "Individual reactions to stress predict performance during a critical aviation incident". *Anxiety, Stress, and Coping*, 28(4), 467–477.
95. Waugh Jr, W. L., & Streib, G. (2006). "Collaboration and Leadership for Effective Emergency Management". *Public Administration Review*, 66(s1), 131–140.

96. Weber, R. P. (1990). *Basic content analysis* (2nd ed.). SAGE.
97. Weick, K. E., & Sutcliffe, K. M. (2007). *Managing the Unexpected: Resilient Performance in an Age of Uncertainty, Second Edition* (2nd ed.). Jossey-Bass.
98. Yukl, G., Mahsud, R., Prussia, G., & Hassan, S. (2019). "Effectiveness of broad and specific leadership behaviors". *Personnel Review*, 48(3), 774–783
99. Zaremba, A. J. (2010). *Crisis communication: theory and practice* (1st ed.). Routledge.

# Appendix 1: Codebook

## Introduction

This codebook is designed to guide the systematic coding of communication data from aviation crisis reports. It ensures consistency and reliability in identifying patterns and themes related to communication dynamics during crises. The primary research question is: "How do communication dynamics influence crisis communication in high-stakes environments?" The objective is to analyse how faulty communication can affect the outcome of a crisis, using aviation as an example.

## Code Development Process

The codes were developed based on a thorough review of relevant literature in crisis communication, aviation communication, human factors, and emergency response. The initial set of codes was developed from the literature review and pilot coding of a subset of the data using Braun and Clarke's (2006) six-step thematic analysis method. The codes were refined through an iterative process involving repeated readings and coding of the data to ensure they accurately capture the communication dynamics.

## Coding Instructions

### **Braun and Clarke's six steps:**

1. Familiarisation: Read through the data multiple times to get an overall sense of the content.
2. Initial Coding: Apply initial codes to segments of the text that correspond to the definitions provided in the codebook.
3. Theme Identification: Group similar codes together to identify overarching themes.

4. Review and Refinement: Review the themes and codes to ensure they accurately represent the data. Refine as necessary.
5. Final Coding: Apply the refined codes to the entire dataset, ensuring consistency.
6. Produce the report.

### **Visual Representation**

To further clarify this process, a visual representation (like a flowchart) could be included to guide the reader through the decision-making process:

1. **Start:** Accident occurs.
2. **Identify All Relevant Codes:** List all potential factors (e.g., emotions, power relations, language).
3. **Assess Each Factor's Impact on Outcome:** Evaluate the influence of each code on the crisis outcome.
4. **Prioritize the Most Impactful Factor:** Determine the primary factor that influenced the crisis outcome.
5. **Categorize the Accident:** Assign the accident to the category of the most impactful factor.
6. **Document the Rationale:** Record the reasoning for the prioritization and categorization.

## **Explanation of Sorting by Contributing Factor**

The aviation accidents have been sorted under specific sections—emotions, power relations, and language—based on the primary contributing factor to the accident. For instance, the Northwest Airlines accident is categorised under leadership because poor leadership was identified as the main cause of the accident. However, it is important to note that these accidents may also exhibit other factors such as anger, panic, or ambiguity in communication. The primary categorisation helps in understanding the most significant factor that led to the crisis, while the detailed analysis allows for the identification of contributing themes within each accident.

## List of Codes

### 1. Emotions

- Definition: Instances where emotional responses such as anger, panic, or stress are evident and impact communication.
- Associated Aviation Disasters:
  - Anger: US-Bangla Airlines Flight 211
  - Panic: Pinnacle Airlines Flight 3710, TransAsia Airways Flight GE235, China Airlines Flight 140, Air France Flight 447
  - Stress: Tenerife Disaster, Überlingen Mid-Air Collision
- Examples:
  - Anger (US-Bangla Airlines Flight 211):  
"PIC: ... That f—er, that son of a gun, bitch ..."
  - Panic (TransAsia):  
"[CAP] I will pull back engine one throttle  
[F.O.] wait a second cross check  
"[CAP] Wow pulled back the wrong side throttle."
  - Stress (Tenerife Disaster):  
"[F.E.]: Is he not clear, then?  
[CAP]: What do you say?  
[F.E.]: Is he not clear the Pan American?  
[CAP]: Oh, yes."

## 2. Power Relations

- Definition: The influence of power dynamics on communication and decision-making during the crisis.
- Associated Aviation Disasters:
  - Leadership: Northwest Airlines Flight 5719, Mid-Air Collision over Brazil Air China Flight 129, United Airlines Flight 173
  - Experience: American Airlines Flight 587
  - Work Culture: Air New Zealand Flight TE901, Korean Air Flight 8509
- Examples:
  - Leadership (Northwest Airlines Flight 5719):

"No, you're going to have to room with me, and it's only a single bed so there is a little carpet at the base of my bed, and you can curl up at the base of my bed ..."
  - Experience (American Airlines Flight 587):

"[F.O.] What the hell are we into? We're stuck in it.  
[CAP] Get out of it, get out of it."
  - Work Culture (Air New Zealand Flight TE901):

"[F.E.] Bank is not working  
[F.E.] Bank Bank  
[CAP] Request radar vector. YA  
[F.E.] Oy Bank"

### 3. Language Specificity

- Definition: Instances where language clarity or ambiguity affects communication.
- Associated Aviation Disasters:
  - Ambiguous Language: Air Canada Flight 797, Crossair Flight 498
  - Lack of Proficiency: Avianca Flight 052
  - CRM: Spanair Flight 5022, Lion Air Flight 610, Aeromexico Flight 498
- Examples:
  - Ambiguous Language (Air Canada Flight 797):  
"[F.A.] 'okay, it's starting to clear now'"  
"[F.A.] '... it seems to be subsiding, all right!'" (
  - Lack of Proficiency in English (Avianca Flight 052):  
"[ATC]: Avianca zero five two heavy, descend and maintain, ahh, descend and maintain three thousand..."  
"[F.E] They already know that we are in bad condition."
  - Crew Resource Management (Aeromexico Flight 498):  
"[ATC]: 'Okay, you can hold what you have sir, and we have a change in plans here, stand by ...'"

### Handling Multiple Codes and Sorting by Impact

In aviation crises, multiple communication factors often interplay, making it crucial to determine which factor had the most significant impact on the accident's outcome. This codebook employs a systematic approach to prioritize and sort accidents based on the primary contributing factor. Below is a detailed explanation of this process, followed by

examples to illustrate how coding is applied and sorted.

### **1. Identifying Relevant Codes**

For each accident, all relevant codes are initially identified. These codes represent various aspects of communication, such as emotions, power relations, and language specificity.

### **2. Assessing Impact on the Outcome**

Once the relevant codes are identified, the next step is to assess the impact of each code on the accident's outcome. This involves determining which factor was most critical in influencing the crisis's progression and resolution.

- **Example:** If both "Stress" and "Leadership" are identified in an accident, but the decision-making flaws due to poor leadership were the primary cause of the crisis, the accident is categorized under "Leadership."

### **3. Prioritizing the Dominant Factor**

The accident is then sorted under the code that had the most profound impact. The rationale behind this sorting is documented to maintain transparency and ensure consistency in the coding process.

### **4. Documentation of Rationale**

For each accident, a brief rationale is provided, explaining why a particular code was prioritized. This documentation helps to clarify the decision-making process and reinforces the validity of the sorting.

### **Example of Sorting Process**

#### **Transcript Excerpt: United Airlines**

- **Identified Codes:**
  - **Indecisive Leadership** (multiple instances)
  - **Stress**
- **Impact Assessment:**

Although stress was a significant factor, the indecisive leadership had a more direct

and substantial impact on the outcome of the accident. The captain's hesitation and poor decision-making under pressure were pivotal in the crisis's escalation.

- **Primary Code:**

**Leadership** - The accident is categorized under "Leadership" due to its overriding influence on the outcome.

- **Rationale:**

The Captain's indecisiveness directly contributed to the failure to avert the crisis, making leadership the dominant factor in this scenario.

### Detailed Examples and Coding Process

To further illustrate how these principles are applied, below are examples of the coding process using actual transcript excerpts from aviation accidents.

#### Transcript Excerpt 1: US-Bangla Airlines Flight 211

- **Captain:**

*"That f--er, that son of a gun, bitch ..."*

**Coding:**

- **Anger:** The captain's language indicates a strong emotional reaction, which is categorized under **Emotions: Anger**.

- **First Officer (F.O.):**

*"Sir, shouldn't I switch on the radar?"*

**Coding:**

- **Experience:** The First Officer's question reflects uncertainty or lack of confidence, pointing to **Power Relations: Experience**.

#### Transcript Excerpt 2: TransAsia

- **Captain:**

*"I will pull back engine one throttle."*

**Coding:**

- **Panic:** The captain's action shows a response to panic, fitting under **Emotions: Panic**.

- **First Officer:**

*“Wait a second, cross-check.”*

**Coding:**

- **Stress:** The First Officer’s insistence on cross-checking under stress fits under  
**Emotions: Stress.**

- **Captain:**

*“Wow, pulled back the wrong side throttle.”*

**Coding:**

- **Panic:** The realization of the error further illustrates panic, coded under  
**Emotions: Panic.**

**Transcript Excerpt 3: United Airlines**

- **Captain:**

*“Another fifteen minutes.”*

**Coding:**

- **Indecisive Leadership:** The captain’s uncertainty is coded under **Power**  
**Relations: Leadership.**

- **First Engineer (F.E.):**

*“Fifteen minutes?”*

**Coding:**

- **Stress:** The First Engineer’s reaction is coded under **Emotions: Stress.**

- **Captain:**

*“Yeah, give us three or four thousand pounds on top of zero fuel weight.”*

**Coding:**

- **Indecisive Leadership:** Further hesitation is again coded under **Power**  
**Relations: Leadership.**

- **First Engineer (F.E.):**

*“Not enough. Fifteen minutes is gonna --- really run us low on fuel here.”*

**Coding:**

- **Stress:** This response is coded under **Emotions: Stress.**

- **Captain:**

*“Right.”*

**Coding:**

- **Indecisive Leadership:** The final confirmation by the captain is coded under **Power Relations: Leadership.**