Turning Crisis into Opportunity:

the Influence of Government and Social Environment

Marije Bakker

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TURNING CRISIS INTO OPPORTUNITY:

THE INFLUENCE OF GOVERNMENT AND SOCIAL ENVIRONMENT

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by

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This thesis has been approved by my supervisors prof. dr. J.H. Kerstholt, prof. dr. E. Giebels, and dr. M. van Bommel.

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Table of contents

Chapter 1:	General introduction	9
Chapter 2:	Effects of risk- and crisis communication	23
Chapter 3:	The influence of accountability and the type of crisis communication	41
Chapter 4:	The interplay of narratives and statistical information	59
Chapter 5:	The interplay between official crisis communication and peer reactions	79
Chapter 6:	General discussion	101
References		113
Summary		127
Samenvatting		133
Dankwoord		139
KLI Dissertation Series		143

CHAPTER 1

General Introduction

Despite highly sophisticated emergency management systems, citizens are usually the first responders during a crisis (Prati, Catufi, & Pietrantoni, 2012). Citizens play important roles in three ways: (1) helping those who are affected by the crisis, (2) providing assistance to official institutions, and (3) taking actions to protect themselves against the negative consequences of the crisis (Whittaker, McLennan, & Handmer, 2015). However, in most countries, emergency and disaster management is not focused on ordinary citizens; crisis management plans are mostly focused on professionals and, to varying degrees, on volunteers who are affiliated with official organizations (Alexander, 2010). Given the fact that the world has to deal with an increasing risk of crisis situations, due to population growth, climate change and urban development (Field, 2012), it is likely that ordinary citizens become even more important in response to more frequent emergencies and disasters in the future.

Citizen participation during a crisis represents a vital resource for emergency and disaster management. Therefore, more knowledge is needed about the role of citizens during crises and how, for instance, government may guide citizens' decisions and self-reliant behavior with the help of risk- and crisis communication (e.g., Seeger, 2006; Vihalemm, Kiisel, & Harro-Loit, 2012). However, the extent to which crisis information influences citizens' behavior depends also on whether government is held accountable for the crisis (Coombs, 2004; B. K. Lee, 2004). As a crisis is a dynamic situation, citizens' decisions and behavior in response to a crisis are not only influenced by government, but also by other citizens in the social environment, for example, via narratives of citizens nearby and information on social media. The information received from the (online) social environment may also influence the effectiveness of official crisis communication from government (Cho, Jung, & Park, 2013; Eisenman, Cordasco, Asch, Golden, & Glik, 2007; Vieweg, Hughes, Starbird, & Palen, 2010). The content of the information from peers in the social environment often conflict with that from government, and often even conflict with the content from other peers. Conflicting information can make citizens feel uncertain and behave in a less self-reliant way (Gutteling & De Vries, 2016).

The primary goal of this thesis is to advance the field of crisis management by examining the influence of different types of risk- and crisis communication, accountability for the crisis, and information from the social environment (narratives and peer reactions on social media) on how citizens deal with a crisis. First, we investigate the effect of risk- and crisis communication on helping behavior during a crisis. Second, we investigate to what extent citizens' behavior and their relationship with government is influenced by whether the government is held accountable for the crisis. In addition, we are interested in the influence of empathic crisis information on citizens' behavior and their relationship with government. Third, we examined the interplay of narratives and statistical information on helping behavior during a crisis. Fourth, we focus on the interplay between official crisis communication and

peer reactions via social media and their influence on self-reliant behavior and perceptions towards peers and government. To gain insight in the influence of government and social environment on citizens' behavior during a crisis, we first discuss how citizens generally behave in response to a crisis.

Citizens' Behavior During a Crisis

Crisis situations of the past (e.g., earthquake in Christchurch and hurricane Katrina in the United States) show that citizens often take action in response to a crisis (Sauer, Catlett, Tosatto, & Kirsch, 2014; Whittaker et al., 2015). Evaluations of citizen behavior during actual crisis generally show that citizens behave adaptively: as far as possible, they start with the search of victims, take care of victims and start with reconstruction (Perry & Lindell, 2003). Grimm, Hulse, Preiss, and Schmidt (2014) found similar results when they interviewed survivors of a range of disasters: collapse of a building, earthquakes, fires, floods and terror attacks. The most frequently mentioned behaviors were supporting each other through the crisis, saving people's lives, preparing for evacuation and seeking information. Clearly, citizens do not passively wait for the emergency services to arrive, but tend to act in what they believe is the best way given their understanding of the situation (Perry & Lindell, 2003).

Despite citizens' good intentions to provide help during crisis, several risks are involved when citizens act upon a crisis. Not every individual may be able to provide help in an adequate way due to limited knowledge and skills, and actions may not always be optimal given the situation at hand (Fernandez, Barbera, & Van Dorp, 2006). For example, after the 2007 Hebei Spirit oil spill in South Korea, many helpers were not aware of the toxicity and harmful effects of petroleum, and so they were not properly clothed and later suffered from skin diseases (Hur, 2012). Another example, after the 2001 terrorist attacks of the World Trade Center, is that many volunteers who were at the scene to assist search and rescue operations, were later overwhelmed by the emotional impact of their actions (Whittaker et al., 2015).

Taken together, citizens who spontaneous help by spending their time, knowledge, skills and resources during a crisis represent a vital resource for emergency and disaster management. However, this helping behavior may be ineffective and can actually hinder emergency activities by creating health and safety problems for themselves or others if they engage in activities without the right knowledge, equipment, training and skills. Therefore, research suggests that organizations that have to deal with crises have to collaborate with citizens, for example, by providing information that is required to help adequately (Whittaker et al., 2015).

Information from Government

Citizen participation during a crisis is valuable, so governments and crisis management organizations have to integrate the help of ordinary citizens in mitigation, adaptation, or emergency management and recovery plans (Hoss, Klima, & Fischbeck, 2014). This is necessary to reduce the risk that citizens act upon a crisis in a manner that is not adequate for the specific situation. By providing citizens information before and during a crisis, through risk- and crisis communication, behavior can be guided (Vihalemm et al., 2012). In this thesis, we refer to risk communication as the information that is distributed before an actual crisis occurs to prepare to eliminate risk or mitigate negative consequences. Crisis communication contains the information that is distributed during a crisis to lessen the negative outcomes of a crisis by providing information about the best course of action (Seeger, 2006).

Risk- and crisis communication can empower citizens in a way that they have the ability and opportunity to make informed decisions regarding a crisis, and that they are able to take appropriate actions to mitigate or eliminate the consequences of a crisis (Jardine & Driedger, 2013). Without such information, citizens may not be able to make sense of the situation and they may engage in actions that actually increase the level of harm (Reynolds & Seeger, 2005). Although there is a lot of literature on risk- and crisis communication as separate research lines, little is known about the interaction between the two types of communication (Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013). In the first study of my thesis I will argue and demonstrate that both risk- and crisis communication influences self-reliant behavior during a crisis situation.

Risk Communication

Risk communication focuses on the communication of the probability and negative consequences of activities, events or processes. These consequences include all threats to individual or societal safety, health, and wellbeing. Meijnders, Midden, and Wilke (2001) state that risk communication goals vary from increasing knowledge on risks and consequences to influencing behavior towards self-protective behaviors. It may include building trust in the sender, raising awareness, reaching agreement, educating, and encouraging protective behavior (Rowan, 1991).The main focus is usually on increasing risk awareness and to change behavior in ways that it protects health and safety (Reynolds & Seeger, 2005). The domain of risk communication has existed now for approximately 35 years and a distinction can be made between the traditional approach and the receiver-oriented approach. In the traditional approach, the assumption is that the public has a poor recognition of risks and that information would resolve this problem, i.e. a top down approach (Fischhoff, 1995; Kasperson & Stallen, 1991). The receiver-oriented approach states that a continuous flow of information on risks is needed between experts and the public, i.e. a bottom-up approach (Gutteling, 2000; Slovic, 1986).

Traditional approach. The interest of communication about risks has been induced by large-scale public conflicts about the impact of new technologies as well as the limited success of health protection programs and safety campaigns (Rohrmann, 1992). During this period, risk communication was mainly driven by expert conceptualizations of public information needs (R. J. Griffin, Dunwoody, & Neuwirth, 1999). The main strategy was to provide the public with rational and objective information to increase the level of knowledge, as to make the public capable of judging risks and benefits. From this perspective, the ideal risk communication is one-way, expert driven, to convince the public to manage risks (J. T. Liu & Smith, 1990). The information provided to the public typically contains quantitative, technical, or statistical information (Gutteling, 2000).

In the late 1980's, this traditional 'technical' approach was challenged, because it was found that the top-down approach to increase public's awareness of risks did not always lead to action (Fischhoff, 1995). The traditional approach was regarded as too much focused on educating the public, lacking the capacity for interacting or actually communicating with the public, and generally neglecting the role of the receiver of the information (Steelman & McCaffrey, 2013). As a consequence, the provided risk information was not considered sufficient for the public to fulfill their needs and wishes.

Bottom-up approach. A more bottom-up, receiver-oriented approach was gaining more support in the '90s. The bottom-up approach acknowledges that risk communication might fail when it only provides information of what experts think the public should know, without taking into account the perceptions, feelings and information needs of the public (R. J. Griffin et al., 1999). Therefore, for risk communication practitioners it would be useful to understand how the public evaluates risks and risk information, and how they use that information to make decisions regarding risks (Rowan, 1994). Risk communication as an interactive process may make risk messages more effective and satisfying to the public (Palenchar & Heath, 2002). It is an ongoing process of active listening, expressing empathy, and the cultural and social context in which communication takes place have to be assessed (Beck, 1992; Hampel, 2006; J. N. Sutton, Palen, & Shklovski, 2008). This receiver-oriented approach has proven to be effective in stimulating self-reliant behavior (D. D. Sellnow et al., 2015). Therefore, for risk communication it is advised to not only focus on explaining the actual situation (sender-focused), but to also incorporate information about the relevance of the potential crisis, information about specific and meaningful actions, and the information has to be brief, understandable and clear (D. D. Sellnow et al., 2015; Turner, Rimal, Morrison, & Kim, 2006).

Crisis Communication

While risk communication mainly focuses on increasing risk awareness before a crisis occurs, crisis communication focuses on communication during a crisis and involves the sending and receiving of messages to prevent or reduce the negative consequences of a crisis (Seeger, 2006; Steelman & McCaffrey, 2013). Traditionally, crisis communication has its roots in crisis management and public relations (Coombs, 1995), but since the '80s crisis communication also has become more important during public emergencies, earthquakes, floods and other hazards (T. L. Sellnow, Seeger, & Ulmer, 2002). An important goal of crisis communication is to reduce and contain harm for those who are affected by the crisis (Reynolds & Seeger, 2005). Crisis information allows the public to create a basic understanding of what is happening, and by telling them what they can do, they may act appropriately upon the crisis (Reynolds & Seeger, 2005). Specific harm-reducing information can help restore a sense of control over a crisis and may help lessen the harm created by a crisis (Seeger, 2006).

In recent years, the content of crisis communication has gained more attention. The crisis communication literature suggests that the government has to distribute information fast, even when this means that they have to release uncertain crisis information (Steelman & McCaffrey, 2013). Waiting until all facts are confirmed usually means that the information is simply too late. Potentially less credible sources, for instance posts on Twitter, will tell the story of the crisis and become main sources of information and guidance for citizens, which may lead to misinformation. On the other hand, the literature on decision making in general showed that communication with a certain level of uncertainty may lead to avoidance and less adequate behavior (e.g., Fox & Weber, 2002; Rabinovich & Morton, 2012). For example, when faced with uncertainty, citizens may think why they should take action if they do not know what exactly is going to happen (Morton, Rabinovich, Marshall, & Bretschneider, 2011).

In addition to the content of crisis communication, more attention has been paid on the framing of crisis communication. Generally, crisis information contains facts about the situation and advices how to deal with a crisis. However, it has been suggested that crises also create a need for empathy (J. N. Sutton et al., 2008). Expressing empathy during crisis is important as it demonstrates recognition of and concern for the citizens that are suffering (Fehr & Gelfand, 2010). Up to now, little is known about how an empathic frame of crisis information may influence the effectiveness of crisis communication. There is sporadic evidence for the persuasive impact of empathy-based information. Most studies that are done are focused on messages that advocate pro-social behaviors that concern others' well-being (e.g., organ donation) (Bae, 2008). However, less is known about the persuasive effect of empathy when the message is relevant to one's own well-being (Shen, 2010). Some researchers suggested that expressing empathy leads to more similarity and

a better relationship between the sender and receiver of information. A good relationship increases persuasion of the information (Faraji-Rad, Samuelsen, & Warlop, 2015; Silvia, 2005; Steelman, McCaffrey, Velez, & Briefel, 2015). However, the effect of empathic crisis information on self-reliant behavior and the relationship between government and citizens has never been studied.

Accountability for the Crisis

In addition to the influence of empathic crisis information on self-reliant behavior and citizens' relationship with government, accountability for the crisis may also influence the way how citizens respond to crisis information. Attributions about who or what is held accountable for the crisis are important, because they may influence citizens' behavior and how they view the actors involved in the situation (Coombs, 2004; Jin, Liu, & Austin, 2014). The rationale for this notion lies in attribution theory, which holds that people make judgments about the causes of a situation, especially when the situation is unexpected and has negative outcomes, such as crisis situations. The more people attribute a negative event to the organization involved, the more negative they are toward that organization, and the less motivated people are to take action (Coombs, 2004). Moreover, in times of crisis, government is also responsible for communicating proper and trustworthy crisis communication. Once the trust is lowered due to accountability (B. K. Lee, 2004), it is possible that citizens will also have less trust in this information, what consequently may negatively influence citizens' behavior.

Insights from the effect of different types of crisis information and the influence of accountability for a crisis are useful to examine how this information may influence citizens' behavior and perceptions. However, citizens' behavior and perceptions are not only influenced by information received from government. Information from social environment also appears important for the decisions citizens make in response to a crisis.

Information from Social Environment

A crisis is a dynamic situation where citizens have to deal with a wide variety of information, which they receive from both government and social environment. Information from social environment can be obtained, for example, via narratives and peer reactions on social media.

Narratives of citizens nearby, such as family and friends, can enable citizens to empathize with the experiences of others, which help them to envisage the consequences of a (potential) crisis (Eisenman et al., 2007). This visualization of what may happen may therefore influence individuals' decision making during a crisis (Wachinger, Renn, Begg, & Kuhlicke, 2013). Evaluation studies of crisis situations showed that citizens' decisions during a crisis are influenced by narratives of relatives and other members of citizens' social

networks (Messias, Barrington, & Lacy, 2012). The influence of narratives on decision making can be problematic when risks are involved. When narratives overrule the statistical, factual information from the government, probabilities may be ignored, resulting in suboptimal decisions (Fagerlin, Wang, & Ubel, 2005; Ubel, Jepson, & Baron, 2001).

In today's digital society, information from the social environment is not only distributed via narratives that are personally shared with each other. Immediately after a crisis, a lot of crisis-related information spreads rapidly through citizens' online social networks (Austin, Fisher Liu, & Jin, 2012; Lachlan, Spence, Lin, Najarian, & Greco, 2014). Information is shared about the crisis itself, own experiences are distributed and advices are given about how to deal with the crisis (Palen, Vieweg, Liu, & Hughes, 2009; Veil, Buehner, & Palenchar, 2011). The impact of peer reactions via social media is large, as the information is often seen as usable and reliable (Vieweg et al., 2010). Consequently, information from others on social media may be very important for the decisions citizens make in response to a crisis. Peer reactions may lead to self-reliant behavior when helpful and adequate information is distributed (Verroen, Gutteling, & De Vries, 2013). However, peer reactions may also lead to less self-reliant behavior, when incorrect information is given about the actual situation or when inadequate advices are given about how to deal with the situation (Kavanaugh et al., 2012).

Taken together, citizens' self-reliant behavior in response to a crisis is likely to be influenced by information received from the social environment. It is unclear, however, how information from the social environment influences the effectiveness of official information from government. Citizens may be confronted with information from the social environment that opposes the advice given by government. The availability of an abundance of and (partly) opposing information may overwhelm citizens. Therefore, opposing information can make citizens feel uncertain about the situation, what consequently may lead to less self-reliant behavior in response to a crisis (Betsch, 2011; Gutteling & De Vries, 2016).

This Thesis

In this thesis I argue that several factors influence how citizens deal with a crisis. On the one hand, government can stimulate self-reliant behavior with the help of risk- and crisis communication. However, how citizens' respond to this information depends also on who is held accountable for the crisis, and the quality of the relationship between citizens and government. On the other hand, information from fellow citizens in the (online) social environment also affects how citizens respond to a crisis. Please see Table 1.1 for an overview of the research goals, methodological approach, and dependent variables per chapter.

Table 1.1 Overview of the empirical chapters

Chapter	Research goals	Experimental design	Method	Crisis type	Participants	Dependent variables
2.	Gain more insight into the (combined) effects of risk- and crisis communication on adequate behavior during a crisis situation.	3 (risk communication: risk information vs risk information with course of action vs control) x 2 (crisis communication: with recommended behaviors vs without recommended behaviors) between subjects design.	- Participants had to follow a route through the virtual environment, when unexpectedly an accident happened with two victims. - Risk communication was manipulated before participants entered the virtual environment. - Crisis communication was manipulated one minute after the accident.	Car accident with two victims	Students *N*= 120	- Move victims - Contact victims - Contact bystanders - Call emergencies - Check info app - Send a tweet - Seriousness of risk - Severity of consequences - Affective response - Self-efficacy - Info satisfaction
3.	- To what extent is the willingness of people to take advice from government, and the way citizens perceive government, dependent on whether government was held accountable for the crisis? - To what extent influence empathic crisis information citizens' behavior, feelings and their relationship with government?	2 (accountability: government accountable or government not accountable) x 2 (type of crisis information: empathic or neutral) between subjects design.	- An online experiment where participants first had to read the scenario about the fire. Subsequently, participants watched a short video clip of the fire. - After the scenario, participants received the accountability manipulation. Subsequently, they received the manipulation regarding type of crisis information.	A large-scale fire at a warehouse that stored hazardous substances.	Citizens *N*= 164	- Willingness to follow the advice of the government - Affective response - Collective efficacy - Empowerment - Trust - Closeness to the government
4.	Gain more insight into how narrative information and statistical information influence helping behavior after an accident and how these types of information interact with a governmental message.	One-factorial (type of prior information) between subjects design: statistical information, narrative, statistical information plus narrative, control.	- Participants had to follow a route through the virtual environment, when unexpectedly an accident happened with two victims. - Prior information was manipulated before participant entered the virtual environment.	Car accident with two victims	Students *N*= 156	- Move victims - Contact victims - Contact bystanders - Call emergencies - Check info app - Send a tweet - Affective response - Risk awareness

5.	- To uncover the interplay between peer feedback against official crisis communication and their influence on intentions of self-reliant behavior. - To examine the influence of a certain versus uncertain crisis message from government in the interplay with peer feedback, and consequently their effect on intentions of self-reliant behavior.	Study 1: One-factorial (peer feedback) between subjects design: adequate peer feedback, inadequate peer feedback, mixed peer feedback, control. Study 2: 2 (type crisis communication: clear, uncertain) x 4 (peer feedback: adequate, inadequate, mixed, control) between subjects design.	Both studies: An online experiment where participants first had to read a scenario about the fire that rages in an industrial area close to their homes. Study 1: After the scenario peer feedback was manipulated. Subsequently, participants received a message from government; the official crisis communication. Study 2: After the scenario, type crisis communication was manipulated. Subsequently, the peer feedback was manipulated.	Both studies: A large-scale fire at a warehouse that stored hazardous substances.	Study 1: Students *N*= 156 Study 2: Students *N*= 232	Both studies: - Intentions of self-reliant behavior - Self-efficacy - Response efficacy - Risk awareness - Affective response - Trust in peers - Trust in government - Perceived similarity peers - Perceived similarity government - Certainty own judgment

The study reported in chapter 2 provides insight into the (combined) effects of risk- and crisis communication from government on adequate, self-reliant behavior during a crisis situation. This research extends the scope of current risk- and crisis communication research, as there is already a lot of literature on both risk- and crisis communication as separate research lines, but little is known about the interaction between the two types of communication (Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013). In addition, this study adds to the existing literature by examining the effects of risk- and crisis communication on psychological factors that are involved in decision making during a crisis situation. Measuring these psychological factors may provide insight into underlying causes of potential behavioral changes. To study these effects, we used a virtual environment, which allows for both experimental control and the measurement of actual behavior. In the virtual environment, participants witnessed a car accident with two victims. We were interested in the question whether participants showed adequate behavior as a function of two factors: risk communication that provided information before the accident happened and crisis communication that was given after the accident.

The study in chapter 3 aims to investigate to what extent the willingness of citizens to take advice from government, and the way citizens perceive government, depends on whether government was held accountable for the crisis. Research shows that who or what is held accountable for a crisis shape feelings and behaviors. Moreover, it may change the relationship between citizens and the organization that is held accountable for the crisis (Becker, Paton, & Johnston, 2015; Coombs, 2004; Jin et al., 2014). In addition, we were interested in the influence of empathic crisis information on citizens' behavior and their relationship with government. Generally, crisis information contains facts about the crisis and advices how to deal with the crisis (Seeger, 2006). More recently, however, researchers suggest that crises not only create a need for information, but also for empathy (J. N. Sutton et al., 2008). Empathic crisis information may lead to a better relationship between the sender and receiver of the information, may reduce negative affective responses, and may lead to higher levels of credibility of the sender of information (e.g., Decety & Jackson, 2004; Shen, 2010; Sweetser & Metzgar, 2007). An online experiment with a scenario was run to investigate to what extent accountability for a crisis (government accountable versus government not accountable) and the content of crisis communication (empathic versus neutral) influences citizens' reactions to the crisis, their feelings and relationship with government.

The study in chapter 4 examines how narratives from relatives and friends and official information from government influence helping behavior after an accident occurred. In addition, we were interested how these two types of information interact with a crisis communication message, which usually is provided shortly after the incident occurred. We used the same virtual environment as the one used in the first study. Before participants

entered the virtual environment, they received information about the consequences of moving victims during an accident (our main dependent variable), either in statistical terms, as a narrative, or as a combination of both. Then, participants entered the virtual environment and unexpectedly encountered the accident. One minute after the accident occurred, participants received a formal crisis message with information about the actual situation. This way we could analyze the effect of the interaction between type of information and crisis communication on further actions taken such as moving the victim.

Two studies in chapter 5 explore the dynamic situation of a crisis where people have to deal with a variety of information, which they receive from both peers and government. In this chapter we will focus on two problems. First, information from peers can be conflicting with that from government, and even with other peers (Betsch, 2011; Verroen et al., 2013). Second, government mostly waits with communicating until all facts about the crisis are confirmed and are consequently later than people on social media (Kavanaugh et al., 2012; Steelman & McCaffrey, 2013). Recent studies, however, underscore the importance of distributing governmental crisis information fast, even when not all information is certain (Seeger, 2006). To gain insight in the interplay between peer reactions on social media and official crisis communication and their effects on self-reliant behavior and perceptions, two scenario studies were conducted. In Study 1, participants first received peer reactions followed by the official crisis communication. Participants either received supporting, opposing, mixed or no peer reactions. In Study 2, participants first received the official crisis communication with certain or uncertain crisis information, followed by the peer reactions manipulation.

In chapter 6 the general conclusion and discussion of this dissertation is presented. Furthermore, in this chapter, I reflect on the limitations of this dissertation and suggest avenues for future research. I conclude this dissertation with a general discussion of the implications for theory and practice.

CHAPTER 2

Deciding to Help: Effects of Risk- and Crisis Communication

This chapter is based on:
Bakker, M.H., Kerstholt, J.H., & Giebels, E. (2017). Deciding to Help: Effects of Risk- and crisis communication. *Journal of Contingencies and Crisis Management.*

Even though a lot is invested in highly sophisticated emergency and disaster management systems, ordinary citizens are usually the first responders when an emergency occurs. These citizens are already present at the scene and it takes some time before emergency services arrive (Prati et al., 2012; Whittaker et al., 2015). As they are at the scene, citizens can directly help victims and mitigate negative consequences of the situation at hand (Whittaker et al., 2015). However, not every individual may be able to provide help in an adequate way due to limited knowledge and skills, and actions may not always be optimal given the situation at hand (Fernandez et al., 2006; Hur, 2012).

Citizen participation on emergency and disaster sites is inevitable, so governments and crisis management organizations should integrate the help of ordinary citizens in mitigation, adaptation, or emergency management and recovery plans (Hoss et al., 2014). This is necessary to reduce the risk that untrained and uncoordinated citizens provide help that is not adequate for the specific emergency (Whittaker et al., 2015). A way to guide adequate behavior during crises is by risk- and crisis communication (Vihalemm et al., 2012). While risk communication is mainly focused on increasing risk awareness before a crisis occurs, crisis communication is focused on communication during a crisis in order to prevent or reduce the negative consequences of a crisis (Coombs, 2014; Seeger, 2006). As noted by D. D. Sellnow et al. (2015) effective communication to elicit appropriate actions both before and during a crisis, should not be sender-focused, but receiver-focused. In order to adjust information to receiver needs, it is important to understand how citizens interpret and respond to these messages and how it relates to citizen behavior during a crisis.

Although there is a lot of literature on risk- and crisis communication as separate research lines, little is known about the interaction between the two types of communication (Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013). Recently, scholars have argued that effective communication needs to be an integrated process (Seeger, 2006), as communication during each phase of crisis management can affect behavior and outcomes in another phase (Olsen & Shindler, 2010). So our overall research goal is to gain more insight into the (combined) effects of risk- and crisis communication on adequate behavior during a crisis situation. In addition, this study also adds to the existing literature by examining the effects of risk- and crisis communication on psychological factors that are involved in decision making during a crisis situation. Measuring these mediating psychological factors may provide insight into underlying causes of potential behavioral changes.

Crisis Communication

During a crisis, potential helpers make several considerations before providing assistance to a person. First an assessment of the situation is made: if a situation is perceived as serious and dangerous, people are more willing to help (P. Fischer, Greitemeyer, Pollozek, & Frey, 2006; P. Fischer et al., 2011). Second, people have to decide on how to help: first trade-

offs need to be made of the costs and rewards of courses of action, followed by the best personal outcome for themselves (Penner, Dovidio, Piliavin, & Schroeder, 2005)

Both processes (assessing the situation and selecting a course of action) can be supported by crisis communication, which generally aims to prevent or reduce the negative consequences of a crisis (Coombs, 2014; Seeger, 2006). However, citizens are generally not passive followers of crisis communication. Many citizens search for additional information and need to be convinced that the provided information is actually correct (Kievik & Gutteling, 2011; Lindell & Perry, 2012). In times of crisis, individuals seek out different media for additional crisis information. Austin et al. (2012) found in their study that the most reported forms of searching for crisis communication was face-to-face communication, TV news, text messaging, phone calls and Facebook. Which media was used depended on the crisis and the way they had heard about this crisis.

The probability that an advice is followed is generally related to two psychological factors: self-efficacy and response efficacy (e.g., Bandura, 1997; Lindell & Perry, 2012; Seeger, 2006). Self-efficacy has been defined in several ways, but we follow Bandura's (1997) definition that refers to citizens' beliefs that they are able to conduct a specific task successfully. Response efficacy is defined as the extent to which citizens think that different suggested behaviors are effective in protecting oneself and others from negative consequences of a risk (Kievik & Gutteling, 2011). Both processes together determine whether citizens will be motivated to control the danger and consequences of a risk. When citizens believe they are able to conduct an effective course of action against the risk, they are motivated to control the risk and consciously consider ways to reduce negative outcomes (Witte & Allen, 2000). Several studies show that perceived response efficacy and self-efficacy increase the likelihood of citizens to engage in self-reliant behavior (Kievik & Gutteling, 2011; Rimal, 2001; Steelman & McCaffrey, 2013). Lindell and Perry (2012) also found that citizens are more likely to consider action when they are aware of appropriate protective actions. Therefore, we expect that crisis communication with useful, easy to execute courses of action will lead to higher levels of self-efficacy, response efficacy and more adequate behavior in times of crisis, compared with crisis communication without these courses of action.

Moreover, crisis communication research highlighted the importance of honest, clear and accessible information during a crisis (Seeger, 2006). When citizens perceived crisis communication as up-to-date, valuable, reliable, and understandable, they were more inclined to follow the courses of action (Reynolds & Seeger, 2005). In line with this finding we expect that participants will be more satisfied with crisis communication, when the messages contains easy to follow, up-to-date and complete information about the situation at hand.

Risk Communication

As noted above many citizens do not passively follow suggested courses of actions. Messages they receive are related to cues in the actual environment (for example, whether there are people in need) and also to prior knowledge and experiences (Kusev, van Schaik, & Aldrovandi, 2012; E. Peters & Slovic, 2000). This implies that information that is provided before an actual crisis occurs, through risk communication, may also affect helping behavior in an actual crisis situation (Stubbé, Emmerik, & Kerstholt, 2017). Covello (1992) defines risk communication as "the exchange of information among interested parties about the nature, magnitude, significance, or control of a risk" (p. 359). Risk communication is typically used to inform citizens about the severity and consequences of a hazardous situation as to increase risk awareness. Several studies show that when citizens read risk related information, the risk is appraised more as serious and relevant. In addition, citizens are more aware of possible negative consequences (Kievik & Gutteling, 2011; Terpstra, 2011; Witte & Allen, 2000). This implies that risk communication about the severity and consequences of a risk increases risk awareness. In addition to the effects of risk communication on risk awareness, risk communication may also influence affective reactions. Messages that provide knowledge on how to handle the risk presumably restore one's sense of control over a threatening situation (Seeger, 2006). With this information citizens know better what to do during a crisis, which may lead to less worries about the crisis situation. Therefore, we expect that risk communication that provides a clear course of action leads to less affective reactions.

Present Study

Our overall research goal is to gain more insight into the (combined) effects of risk- and crisis communication on adequate behavior during a crisis situation. We defined adequate behavior as behavior that is in line with the given advise in risk- and crisis communication. Most conclusions on the effect of crisis communication on human behavior are based on interviews with affected citizens (T. L. Sellnow et al., 2002; Steelman & McCaffrey, 2013) and on studies that measured intentional behavior (e.g., Verroen et al., 2013). Different research methods have their own advantages and disadvantages. Data collected from actual crises provides insight into actual behavior (albeit retrospectively) but it lacks the possibilities to systematically measure the effects of relevant factors such as the content of crisis messages. Laboratory studies, on the other hand, allow for controlled manipulations, but it mostly measures intentions to behave in a certain way instead of actual behavior. In the present study we used a virtual environment, which allows for both experimental control and the measurement of actual behavior.

The main advantage of using a virtual environment is that it is quite 'immersive'. As has amply been shown in decision making research, affective responses are a significant driver for behavior (Loewenstein & Lerner, 2003; Slovic & Peters, 2006; Visschers et al., 2012) and

experiencing an accident in such a virtual environment is likely to increase more arousal than just imagining it. Another important advantage of using a virtual environment is that the scenario is completely scripted, allowing for measurement and comparison of several behaviors of citizens in a more controlled way. Even though it is still not completely realistic, several studies showed that when citizens are faced with events and situations in a virtual environment, they tend to respond and behave in a similar way as in the real world (Gillath, McCall, Shaver, & Blascovich, 2008; Yee, Bailenson, Urbanek, Chang, & Merget, 2007). As such, a virtual environment provides a good platform to study human behavior during crises.

The virtual environment in this study is the same as was used by Stubbé et al. (2017). Participants were required to follow a specific route, but halfway through they witnessed a car accident. Our main research question was whether participants showed adequate behavior as a function of two factors. The first factor concerned risk communication (before the accident), providing information on risks of traffic accidents either with or without information on the (negative) consequences of moving victims. The second factor concerned crisis communication (after the accident), providing a specific course of action (do not move the victims and talk to them) or not. In addition, we were interested in the influence of risk- and crisis communication on the psychological factors risk awareness, affective response, self-efficacy, and information satisfaction. We additionally measured these psychological factors as they may provide insight into underlying causes of potential changes at the behavioral level.

Method

Participants

A total of 120 students from the University of Twente participated in the experiment in exchange for course credit and some participated voluntarily. Data of eight participants were removed, as they failed to answer the questions of the manipulation check correctly[1]. The study sample therefore comprised 112 students (mean age = 21.7, *SD* = 3.70, 67 females). A post-hoc power analysis for variance analyses was conducted with power (1-β) set at 0.80, α = .05, two tailed and *N* = 112. An effect size of *f* = .267 was found which corresponds with a medium effect size, so the sample size is large enough to detect expected effects (Faul, Erdfelder, Lang, & Buchner, 2007).

[1] As a manipulation check, participants had to answer two questions about the risk communication to make sure that they were able to reproduce what they had read. Given the importance of this information for the manipulation, data from participants that failed to answer the questions correctly were removed from the final sample. For crisis communication, participants had to read a text message. The time participants spent on reading the message varied between four and fifteen seconds, which gave a fair indication that all participants had read the text.

Participants indicated via self-report (7-point Likert scale, 1 (not at all) – 7 (very much)) that they were in general able to empathize with the situation, (M = 4.72, SD = 1.40) and that they had good computer skills (M = 5.76, SD = 1.21). There were no differences between the six conditions for either gender, X^2 (5) = 3.04, ns., age, F (5, 106) = 1.07, ns., or nationality X^2 (5) = 4.38, ns. Please see Table 2.1 for the distribution of participants per condition, gender, age, and nationality.

Design

The study was a 3 (risk communication) x 2 (crisis communication) between subjects design. Risk communication consisted of three conditions: risk information, risk information with course of action and control condition. Crisis communication consisted of two conditions: no recommended behavior and recommended behavior.

Table 2.1 Number of participants by experimental condition, gender, age and nationality.

Risk com.	Control condition		Risk information		Risk information with course of action		Total
Crisis com.	Without recom. behaviors	With recom. behaviors	Without recom. behaviors	With recom. behaviors	Without recom. behaviors	With recom. behaviors	
Participants (N)	21	15	21	17	16	22	112
Male (N)	8	5	6	7	8	11	45
Female (N)	13	10	15	10	8	11	67
Age (M)	21.48	20.27	21.81	21.71	21.06	22.95	21.64
Dutch (N)	17	11	13	15	13	16	85
German (N)	4	4	8	2	3	6	27

Procedure

Participants entered the experimental room, were welcomed by the experimental leader and were seated behind a computer. They were told that all further instructions would be provided via the computer screen. As an overarching cover story, participants were asked to emphasize with the following situation: participants had found a vacancy of the job of their dreams and they had decided to apply for it. They had written an application letter and were subsequently invited for a first selection round.

Risk Communication Manipulation

The first task in the selection round was a memory task (actually the risk communication manipulation) and participants were asked to read a half page newspaper article carefully. The content of the article depended on the experimental condition of the risk communication, followed by a short manipulation check. In the risk information condition, participants

read an article about traffic accidents with *no* course of action. In the risk information with course of action condition they read the same article about traffic accidents, but now with information that victims should not be moved. In the control condition, participants read an article about Dutch people on holidays (see Appendix 2A).

Practice Scenario

After reading the article with the risk communication manipulation, participants were introduced to the second task in which participants were entered into a virtual environment. In this virtual environment they were asked to help a virtual person finding lost parcels. In fact, this was a practice scenario, to let participants familiarize themselves with the virtual environment of the third task, the experimental scenario. In the practice scenario, they received instructions on how to control the virtual environment, a map of the virtual environment and a picture that showed the control actions on the keyboard. The practice scenario lasted for about 10 minutes. After participants finished the practice scenario they started with the experimental scenario.

Experimental Scenario

The scenario. The overall task for participants was to follow a route in order to go to a job interview. On this route participants had to cross a bridge and when they approached the bridge, a truck drove past them, and shortly thereafter the sound of a claxon and the sound of colliding cars could be heard. During the collision the screen moved and turned to white for a short period of time. The moment the screen returned to normal a car was on its side and the truck blocked the bridge. Both drivers were thrown out of their cars and moaned with pain. One victim was visible and was lying in front of the car. The other victim was not visible and was lying behind the tilted car. There were three (virtual) bystanders, they did not take any actions themselves but could respond to specific behaviors of the participants. The participants all had (virtual) mobile phones for communication and they had the possibility to check their phone for information about what actions to take. In the first minute after the accident there was time for "spontaneous" behavior, then the crisis communication manipulation was given via a text message on participants' mobile phone. In the condition without recommended behavior, participants received only a text message on the virtual mobile phone that there was an accident on the bridge and that emergency services were on their way. In the recommended behavior condition participants received the same message, but this message included two recommended behaviors: participants were told that they had to talk to the victims and that they should not move them.

Initial reactions participants. Directly after the incident, participants could react in several ways. Participants had the possibility to communicate with bystanders and victims, were able to move a victim, and they had a (virtual) mobile phone. Depending on the

reaction of the participants, there would be a pre-programmed reaction from the virtual environment.

Bystanders. Bystanders could not take any action by themselves, but they were able to react on the behavior and remarks of the participants. For instance, when participants asked bystanders to call the emergency services, the bystanders told them that they could not call, because they did not have a phone.

Victims. Participants could also talk with the victims; only the first victim was able to say that he was in pain. Besides, both victims moaned of pain.

Mobile phone. The participants all had a (virtual) mobile phone with the possibility to send tweets and to check a risk information app. When participants clicked on the application, risk information about traffic accidents (e.g. about the severity and consequences) was opened. The risk information was exactly the same, as in the risk communication condition with course of action (see Appendix 2A).

Ending. The scenario ended when the ambulance arrived, three minutes after the accident.

Questionnaire

Finally, when participants completed the main scenario they were told to fill out a questionnaire that consisted of a measurement of their risk awareness, affective response, self-efficacy, response efficacy, information satisfaction, perceived computer skills, ability to empathize with the situation and their sex, age and nationality. The experiment ended with a debriefing.

Measures

Actual behavior. All actions participants took were logged during the experimental scenario. We registered whether people called the emergency service, talked to victims, talked to bystanders, sent a tweet, checked the information app, moved a victim or walked away. For talking to victims and bystanders we noted also how often participants spoke with them. In addition, we were interested in participants' first action after the accident had occurred.

Psychological factors. Psychological factors were all measured after the experimental scenario and all responses to the questions were measured on seven-point Likert type scales.

Risk awareness. Risk assessment measures were based on Slovic (1987) and Wiegman and Gutteling (1995). Participants reported how they in general judged the risk of a traffic accident. Exploratory factor analysis (see Table 2.2) resulted in two distinct factors of the risk awareness scale. One item that was intended to measure the seriousness of traffic accidents showed low inter-item correlations with the other measures in the scale, and was

consequently deleted. A new factor analysis resulted in two factors, together explaining 73% of the variance: seriousness of traffic accidents (2 items; r = .51, p < 0.01) and the severity of potential consequences (3 items; Cronbach's alpha = 0.79).

Table 2.2 Factor loadings risk awareness

	Factor loadings	
	1	**2**
Seriousness of traffic accidents (*r* = .51)**		
I am aware that traffic accidents occur frequently.[1]	.29	**.82**
The probability of a traffic accident in my district is…[2]	.18	**.85**
Severity of potential consequences (α = .79)		
A traffic accident has serious consequences.[1]	**.78**	-.07
I am aware that a traffic accident might lead to a lot of damage.[1]	**.85**	-.18
I am aware that a traffic accident might lead to personal injuries.[1]	**.85**	-.21
Variance explained	*44%*	*30%*

All items were measured on a seven-point scale ([1]scale: strongly disagree – strongly agree, [2]scale: very small – very high).** significant at p < .01.

Affective response. Participants reported their affective reaction with respect to the experimental scenario in terms of feeling tense, anxious, nervous and concerned (scale: not at all – very much; α = 0.90). Participants who scored high on affective response, were more worried about the crisis situation.

Self-efficacy. The self-efficacy scale was based on previous studies conducted by Lindell and Perry (1992) and Terpstra (2009). Participants reported whether they felt able to deal with the traffic accident. A three-item scale was used: 'I felt able to respond adequately to the accident', 'When the accident occurred, I was able to help' and 'I knew what I had to do, when the accident occurred (scale: strongly disagree – strongly agree; α = 0.74).

Response efficacy. Cronbach's alpha of this scale was low (α = .51). Therefore, in the analysis we present we decided to leave out this scale.

Information satisfaction. After the experiment participants reported their satisfaction with all the given information they received during the entire experiment (i.e. the newspaper article and the text message on their virtual mobile phone). They could indicate their satisfaction by rating at on four items: understandable, complete, reliable and clear. This scale was newly developed (scale: not at all – very much; α= 0.78).

General questions and demographics. Participants reported how well they were able to empathize with the situation (scale: not at all – very much) and their perceived computer skills (scale: not at all – very much). Both questions were measured on seven-point Likert type scales. In addition, participants reported their gender (male = 0, female = 1), age (in years), and nationality (Dutch = 0, German = 1).

Analysis

Separate logistic regression analyses were conducted for moving victims, calling emergency services, sending tweets and checking the information app to evaluate the extent to which behavior was influenced by risk- and crisis communication. Risk communication was coded as a dummy variable, the control group was chosen as the reference variable. To test whether number of contacts with victims and bystanders, a counting variable, was influenced by risk- and crisis communication, analysis of variance was used. To address the effect of risk- and crisis communication on seriousness of risk, severity of the consequences, self-efficacy and information satisfaction we performed separate variance analyses.

Results

Descriptive Statistics

First action. Of all 112 participants, 80 participants (71%) first contacted the victim that was visible after the accident had occurred. A total of 26 participants (24%) immediately called the emergency services, 5 participants (4%) contacted a bystander, 1 participant (1%) directly moved a victim.

Actual behavior. Throughout the whole experimental scenario, 111 participants (99%) talked at least once with one of the victims. With respect to moving victims, 40 participants (36%) moved one of the victims. Of all participants, 91 participants (81%) talked at least once with the bystanders. 95 participants (85%) called the emergency services. Only 6 participants (5%) sent a tweet during the experiment and 27 participants (24%) checked the information app.

Correlations

Table 2.3 presents the Pearson correlation coefficients for the dependent variables in this study. For actual behavior it can be seen that participants who moved victims, called the emergency services less often (r = -.31) and checked the information app less often (r = -.33). Participants who talked with bystanders, checked the information app more often (r = .20). Also, participants that called the emergency services checked the information app more often (r = .23), Finally, participants who checked the information app sent tweets more often (r = .18).

Table 2.3 Pearson Correlations

	1	2	3	4	5	6	7	8	9	10
1.Move victims[a]										
2. # contacts victims[b]	-.10									
3. # contacts bystanders[b]	-.11	-.07								
4. Call emergencies[a]	-.31**	.06	.06							
5. Check info app[a]	-.33**	.00	.20*	.23*						
6. Send tweet[a]	-.01	.03	-.07	.10	.18*					
7. Serious-ness risk[c]	-.01	.06	.02	-.04	.01	.04				
8. Severity [c]	.21*	-.13	.06	-.21*	-.22*	.07	.10			
9. Affective response[c]	.22*	.04	.03	-.23*	-.10	-.12	.22*	.31**		
10. Self-efficacy[c]	-.28**	.16	-.04	.28**	.06	.07	-.20*	-.08	-.29**	
11. Info satisfaction[c]	-.31**	.14	.00	.21*	.03	.05	-.23*	-.14	-.37**	.44**

Significance levels: *$p < .05$, **$p < .01$, $N = 112$. [a] = binary variable, [b] = counting variable, [c]= scale 1-7.

Actual Behavior

After the accident happened, participants could do several things: move a victim, contact one of the victims, contact a bystander, call the emergency services, send a tweet and check the information app. Table 2.4 displayed the mean scores or percentages on these various types of behavior for the three risk communication conditions and the two crisis communication conditions.

Move victims. For crisis communication we found a significant main effect on moving victims, $\chi^2(1) = 8.51$, $p < .01$. Moving victims occurred less often when participants received the text message with the suggested course of action ($e^b = .27$, 95% CI: .12 - .65). For risk communication we found a difference between the condition where people read risk information and a course of action compared with the control condition, $\chi^2(1) = 6.55$, $p < .05$. Participants moved victims less often when they had read the newspaper article with the information that injuries can occur or become more severe when victims are moved ($e^b = .23$, 95% CI: .07 -.71) (See Table 2.5).

Table 2.4 Means, standard deviations and percentages of actual behavior

	Risk communication			Crisis communication		Across conditions
	Control condition	Risk info	Risk info with course of action	Without recom. behaviors	With recom. behaviors	
Move victims[a] N (%)	17 (47.2)	17 (44.7)	6 (15.8)	29 (50)	11 (20.4)	40 (36)
# contacts victims[b] M (SD)	9.33 (10.89)	6.13 (4.28)	6.95 (6.96)	6.22 (7.04)	8.74 (8.49)	7.44 (7.84)
# contacts bystand.[b] M (SD)	3.89 (3.08)	4.53 (3.94)	5.18 (4.01)	4.93 (3.88)	4.13 (3.51)	4.54 (3.72)
Call emergency services[a] N (%)	29 (80.6)	34 (89.5)	32 (84.2)	49 (84.5)	46 (85.2)	95 (85)
Check info app[a] N (%)	8 (22.2)	9 (23.7)	10 (35.7)	14 (24.1)	13 (24.1)	27 (24)
Send tweet[a] N (%)	0 (0)	3 (7.9)	3 (7.9)	2 (3.4)	4 (7.4)	6 (5)
N*	36	38	38	58	54	112

[a] = binary variable; no= 0, yes = 1, [b]= counting variable. *= total number of participants in the condition.

Contact victims. There was a marginal significant main effect of crisis communication, F (1, 106) = 3.37, p = .07, partial η^2 = .03. Victims were contacted more often in the condition where participants received a crisis communication message (M = 8.74, SD = 8.49) than in the condition were they did not receive a message (M = 6.22, SD = 7.04).

We did not find any effects of risk- and crisis communication on contacting bystanders, calling the emergency services and checking the information app. In addition, we found no effect of sending a tweet, probably due the low number of participants in the cells (N = 6).

Table 2.5 Logistic regression moving victims

Predictor	β	*SE* β	Wald's χ^2	*df*	*p*	e^{β}
Constant	1.71	.49	5.83	1	.016	5.51
Risk information	-0.07	.58	0.02	1	.889	.93
Risk information with course of action	-1.47	.44	6.55	1	.011	.23
Crisis communication	-1.30	.71	8.51	1	.004	.27
Test			χ^2	*df*	*p*	
Omnibus test of model coefficients			19.89	3	.000	
Hosmer & Lemeshow goodness-of-fit test			1.80	4	.773	

Model summary: -2 Log likelihood = 126.11, Cox & Snell R^2 = .16, Nagelkerke R^2 = .22. N = 112.

Psychological Factors

Table 2.6 presents the mean scores on the psychological factors for the three risk communication conditions and the two crisis communication conditions.

Affective response. A marginal significant main effect was found of risk communication, F (2, 106) = 2.91, p = .06, partial η^2 = .05 on affective responses. Planned contrasts revealed that participants in the control condition were more worried by the situation than participants in the two other conditions, t (112) = -2.29, p = .02. Participants in the control condition scored higher on affective response (M = 4.85, SD = 1.43) compared with participants in the two other conditions (risk awareness: M = 4.20, SD = 1.22, risk awareness with course of action: M = 4.28, SD = 1.29).

Information satisfaction. A significant main effect was found of crisis communication, F (1,106) = 9.35, p < .01, partial η^2 = .08. Participants who received the message with the recommended behaviors to talk to victims and not to move them were more satisfied with the information (M = 4.93, SD = 1.00) than when they were just told some general information about the accident (M = 4.34, SD = .99).

No effects were found of risk- and crisis communication on seriousness of risk, severity of consequences and self-efficacy, all p = ns.

Table 2.6 Means and standard deviations psychological factors

	Risk communication			**Crisis communication**		**Across conditions**
	Control condition	Risk info	Risk info with course of action	Without recom. behaviors	With recom. behaviors	
Seriousness risk M (SD)	4.44 (1.14)	4.37 (1.12)	4.58 (1.37)	4.47 (1.05)	4.45 (1.36)	4.46 (1.21)
Severity consequences M (SD)	5.76 (.81)	5.54 (.69)	5.54 (.91)	5.65 (.80)	5.57 (.82)	5.61 (.81)
Affective response M (SD)	4.85 (1.43)	4.20 (1.22)	4.28 (1.29)	4.61 (1.30)	4.26 (1.37)	4.44 (1.34)
Self-efficacy M (SD)	4.3 (1.41)	4.23 (1.17)	4.45 (1.32)	4.25 (1.24)	4.46 (1.35)	4.35 (1.29)
Information satisfaction M (SD)	4.73 (.98)	4.35 (1.00)	4.79 (1.09)	4.34 (.99)	4.93 (1.00)	4.62 (1.04)
N*	36	38	38	58	54	112

All variables were measured on a 7 point Likert scale. *= total number of participants in the condition.

Discussion

In this study we examined the effects of risk- and crisis communication on adequate behavior in a virtual crisis situation. Overall, the results clearly indicate that all participants were willing to help when they were confronted with a traffic accident. The most frequent reaction was to contact one of the victims or to call the emergency services. This finding confirms previous research, which indicates that people behave pro-socially during crises: they are willing to help others in need (P. Fischer et al., 2011). However, we also found that actual behavior was affected by risk- and crisis communication.

Crisis communication affected both whether victims were moved and how often participants talked to the victims. Participants who received the crisis communication message with recommended behaviors moved victims less often than participants who had not received this message. This is an important result, as it may guide bystanders towards the most appropriate action for the situation at hand. Moving victims is generally not the best option, as injuries may become more severe, and telling people not to do so actually reduces these risks. By communicating courses of action during crises, people may therefore be empowered to adequately deal with the situation at hand (Reynolds & Seeger, 2005; Rimal, 2001; Steelman & McCaffrey, 2013).

Similar results were found for talking to victims. Participants who received directions to talk to the victims did this more often, than participants who had not received this recommended behavior. So it can be concluded we found clear effects of advice on actual behavior.

However, adequate behavior was not only affected by the advice given after the accident had happened, but also by the information that participants received beforehand. Participants who had read that moving victims might cause extra damage, moved the victims less often than participants who had not received this information. As predicted, actual behavior during crisis is therefore also affected by prior knowledge (Kusev et al., 2012). However, in our experiment the information provided before and after the accident is consistent and applicable in the situation at hand, which may not always be the case. Particularly in ambiguous situations, individuals may search for additional information through social media, the Internet or face to face with people at the same location.

Risk communication also influenced affective responses. Participants who received relevant risk information about traffic accidents were less worried about the accident, as compared with the control condition. A possible interpretation of this result is that information about risks gives a person some sense of control over a threatening situation (Seeger, 2006). This finding is the more interesting as level of emotional response also correlated with less adaptive behavior: the more worried participants were, the more often they moved victims and the less often they contacted the emergency services. As argued by

for example E. Peters and Slovic (2000) affective reactions have a major impact on human judgment and decision making. However, even though affect may increase a tendency towards pro-social behavior, these reactions may not always be optimal.

Opposite to our expectations, we did not find an effect of crisis communication on self-efficacy. The behavior that was addressed was not to move victims, as this could lead to more severe injuries. So even though direct effects on behavior were found (less moves) this behavior cannot be explained by means of this mechanism. Still, the results did show that self-efficacy correlated with more adaptive behavior, that is, less moves of victims and more contacts with emergency services, which is in line with previous findings (Kievik & Gutteling, 2011; Verroen et al., 2013). A possible explanation is that the recommended behaviors were not that difficult to conduct. We would predict that crisis communication would have clearer effects on self-efficacy in more ambiguous situations, with less straightforward advice. Another reason for not finding a clear effect of crisis communication on self-efficacy could be due to the instruction to refrain from doing something ("do not move victims"). Actually, receiving specific instructions on how to act may lead to a stronger increase in self-efficacy than instructions on how not to act. Indeed, participants who were instructed not to do something may have had no clue what else they actually could do to help. Doing nothing might not feel like "helping", leading to lower levels of self-efficacy.

As for the psychological factors we only found an effect of crisis communication on information satisfaction. When participants received the text message with courses of action, they were more content with the given information than the participants who did not receive the recommended behaviors. This result is in line with the idea that providing accurate and understandable harm-reducing information leads to more satisfaction and acceptance of the message (Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013).

While several interesting results were found on the effects of risk- and crisis communication on helping behavior, this experimental study also has limitations. First of all, this study used a convenience sample. All participants were students, which limits the generalizability of the results. In addition, students who were willing to participate in this study were maybe more pro-social by nature than those who did not participate, what might lead to an overestimating of pro-social behavior during the virtual crisis situation. Furthermore, all students were in their twenties. Older citizens could have more experience with traffic accidents and assess risks differently, which could lead to other results of helping behavior. For example, citizens who have experienced traffic accidents may know better how to act, which would result in a reduced effect of additional information. Another limitation of this experiment is that it is possible that the knowledge of being observed influences one's behavior – the Hawthorne effect (Adair, 1984). For example, participants in this experiment might show more pro-social behavior because they know their outcomes will be measured. However, in our study we included control conditions in order to ensure that the effects of

risk- and crisis communication could not be explained by the Hawthorne effect. Finally, the crisis situation in this study was rather obvious and unambiguous; a pedestrian witnessed a traffic accident and received messages about the situation. Most crisis situations are far more complex, such as when the situation is ambiguous, with a broad range of response options, and helping others is risky for the helper. Possibly, different effects are found when the situation is more ambiguous and/or severe with less obvious courses of action. Future research needs to reveal whether the effects as found in the present study also hold for more ambiguous and complex situations.

Taken together, our results provide valuable implications for risk- and crisis communication. From a theoretical perspective, this is the first empirical study that looked at the interaction between risk- and crisis communication. We found that communication before and during a crisis situation both affected behavior during crisis. Furthermore, our results support the claim by D. D. Sellnow et al. (2015) that messages should not only focus on explaining the current situation (sender-focused). To stimulate adequate behavior, a receiver-oriented approach could be used by incorporating the following information: relevance of the potential crisis, information about specific and meaningful actions, and the information should be brief, understandable and clear. Subsequently, our results have implications for governmental institutions and crisis management organizations. First, a comprehensive strategy should be developed integrating risk- and crisis communication efforts. In addition, as ordinary citizens are willing to help during crisis, this capacity needs to be incorporated in mitigation, adaption, or emergency management and recovery plans. Furthermore, the results of this study suggest that risk- and crisis messages aimed at promoting adequate helping behavior are effective when recommendations are given about courses of action. In risk communication this information also reduces affective reactions. Knowledge can restore a sense of control, what might lead to fewer worries about a crisis situation and more adequate behavior.

Appendix 2A Manipulations Risk Communication

Risk information

Road accidents

It is hard to say how many traffic accidents occur in the Netherlands annually. The police register traffic accidents in the Netherlands, but when the police aren't warned the accident is not registered. In general it appears that accident registration mostly depends on the severity of the accident. The severity of the accident is determined by the number of people with injuries and the types of injuries. Accidents lead to an estimation of 840.000 injuries every year. Medical treatment by a doctor was needed in 20% of these cases. In addition, 15% was treated in the emergency room and nearly 5% was admitted to the hospital. Finally, 650 people were deceased in traffic accidents.

Risk information with course of action

Road accidents

It is hard to say how many traffic accidents occur in the Netherlands annually. The police register traffic accidents in the Netherlands, but when the police aren't warned the accident is not registered. In general it appears that accident registration mostly depends on the severity of the accident. The severity of the accident is determined by the number of people with injuries and the types of injuries. Injuries can occur or become more severe, when victims are moved.

Accidents lead to an estimation of 840.000 injuries every year. Medical treatment by a doctor was needed in 20% of these cases. In addition, 15% was treated in the emergency room and nearly 5% was admitted to the hospital. Finally, 650 people were deceased in traffic accidents.

Control

The Dutch on holiday

It is difficult for the Dutch to abandon their holiday. Holiday is considered to be very important. TNS-NIPO registers the holiday plans of Dutch citizens, but they do this only during summer and for vacations of a week or longer. In general it appears that despite the economic conditions, Dutch citizens massively keep going on holiday. However, they save on holidays by going short or less far on holiday.

About 12.5 million go on holidays every year. 52% of these people used their car as transport. In addition, 36% travelled by plane and nearly 10% travelled by bus. Finally, Germany is the number one on the list of most visited countries for foreign holiday destinations.

CHAPTER 3

The Influence of Accountability for the Crisis and the Type of Crisis Communication on Citizens' Behavior, Feelings and Relationship with the Government

This chapter is based on:
Bakker, M.H., van Bommel, M., Kerstholt, J.H., & Giebels, E. (Accepted). The Influence of Accountability for the Crisis and the Type of Crisis Communication on People's Behavior, Feelings and Relationship with the Government. *Public Relations Review.*

Citizens live in a society that is affected by a broad range of crisis situations, such as floods, industrial fires and terrorist attacks. Regardless of where one lives, many different types of crisis have the potential to disrupt citizens' daily life (Ulmer, Sellnow, & Seeger, 2013). There are two prominent factors that influence citizens' reactions during a crisis, namely who or what is held accountable for the crisis, and the type of information citizens receive about the crisis (e.g., Coombs, 2004; Steelman et al., 2015).

Accountability can broadly be attributed to internal or external factors. When the cause of the crisis is attributed to internal factors, a person or organization is held accountable for the cause of the crisis. Attributions to external factors include situations with a low accountability attribution to a person or organization, such as a crisis caused by technical errors (e.g., Coombs, 2007). These categories are important as research shows that attributions about who or what is accountable for a crisis shape feelings and behaviors (Coombs, 2004; Jin et al., 2014; B. K. Lee, 2004). Moreover, it may change the relationship between people and the organization that is held accountable for the crisis. The organization, for instance, may seem as less trustworthy or less competent (e.g., Becker et al., 2015; Cuddy, Glick, & Beninger, 2011).

However, how citizens respond to a crisis depends not only on who is held accountable for the crisis, but it is also influenced by the information citizens receive. Typically, crisis information contains facts about the situation and advises on how to deal it (Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013). However, J. N. Sutton et al. (2008) reasoned that crises also create a need for empathy. Expressing empathy during crisis is important as it demonstrates recognition of and concern for the citizens that are suffering (Fehr & Gelfand, 2010), which may lead to a better relationship between citizens, and the organization and a stronger influence of crisis information on citizens' behavior (Seeger, 2006).

The current research aims to investigate to what extent citizens' behavior, feelings of collective efficacy and empowerment, and their relationship with the organization is influenced by accountability for the crisis and the type of crisis communication. We focus on the local government as organization, as the local government usually sends crisis information, and they are primary accountable for public security in the Netherlands. Up to now, research mostly investigated the effect of accountability for a crisis when the organization was a commercial company (the private sector) (Coombs, 2004, 2007). However, it is worthwhile to also examine what the effect of accountability for a crisis is when the organization is the local government (the public sector), because in times of crisis the (local) government is usually accountable for communicating proper and trustworthy crisis communication. Once trust is lowered due to accountability, it is possible that citizens will also have less trust in this information. Empathic crisis communication may restore the relationship between citizens and the local government. In an experimental study involving a fictitious large-scale fire with hazardous substances, we manipulated whether the local

government was accountable for the crisis or not and whether the crisis communication was framed as neutral or empathic.

Crisis Accountability

Who or what is held accountable for a crisis may influence how citizens' respond to the crisis and how they view the actors involved in the situation. The rationale for this notion lies in attribution theory, which holds that citizens make judgments about the causes of a situation, especially when the situation is unexpected and has negative outcomes, such as crisis situations. Citizens will attribute the cause of an event either to an individual or organization involved in the event or to external circumstances. Attributions indicate whether someone believes that the cause of the crisis is within the control of people or an organization involved (Coombs, 2004, 2007). If citizens believe, for instance, that an organization could control a crisis, they will also hold the organization responsible for the crisis (B. K. Lee, 2004).

Causal attributions are important because they affect emotions generated by the event and future interactions with the person or organization involved (Coombs, 2004, 2007). B. K. Lee (2004), for example, found that when an organization is responsible for a crisis, citizens are more likely to form negative impressions of the organization, tend to be less sympathetic toward the organization and have less trust in the organization. In addition, McDonald, Sparks, and Glendon (2010) describe an association between crisis responsibility and negative feelings, and behavioral intentions.

Framing Crisis Communication

Citizens' behavior and attitude in response to a crisis is not only influenced by crisis accountability, but also by the information they receive during a crisis. During a crisis, the local government provides crisis information to enable citizens to adequately deal with the crisis (e.g., Lindell & Perry, 2012; Stubbé et al., 2017). Telling citizens about the crisis situation and what they can do to reduce their harm can help restore some sense of control over an uncertain and threatening situation (Seeger, 2006). More recently, however, researchers suggested that crises not only create a need for information, but also for human conversation (J. N. Sutton et al., 2008).

A way to introduce "a human voice" in crisis communication is by expressing empathy. Although the definition of empathy has been much discussed, most researchers view empathy as having both cognitive and affective elements (e.g., Davis et al., 2004; Eisenberg & Miller, 1987). Cognitive empathy refers to perspective taking, the cognitive capacity to consider the world from another individual's viewpoint. Affective empathy refers to empathic concern, the ability to understand and share emotions with someone else. It is also often labeled as expressing sympathy or compassion (Shen, 2010).

There has been sporadic evidence for the persuasive impact of empathy-based information. Most studies on this topic are focused on messages that advocate pro-social behaviors that concern others' well-being, as reflected in the topics they considered (e.g., organ donation, Bae (2008)). Less is known about the persuasive effect of empathy when the message is relevant to one's own well-being (Shen, 2010). There is, however, some evidence that indicates that including empathy in a message has several positive consequences. Firstly, Shen (2010) suggested that when information induces empathy, this leads to more similarity and a better relationship between the sender and receiver of the information. Additionally, a good relationship increases the persuasiveness of the information for behavior (Faraji-Rad et al., 2015; Silvia, 2005; Steelman et al., 2015). Secondly, when a person receives empathy expressing information this may reduce negative affective responses, such as anger (Decety & Jackson, 2004; Shen, 2010). Thirdly, expressing empathy may also lead to higher levels of trust in the sender and citizens may respond more positively (i.e., citizens have more faith that the recommended actions are appropriate and legitimate) to spokespersons who acknowledge their concerns and show compassion for any harm that may have occurred (De Waal, 2008; Seeger, 2006; Sweetser & Metzgar, 2007).

Stimulating Resilient Communities

The relationship between citizens and professionals in crisis management is becoming more and more important, as a result of societal changes like citizen empowerment and attention for strengthening community resilience (Duijnhoven, Neef, Davis, Dinesen, & Kerstholt, 2016). Responsibility for the safety of citizens is not a matter exclusively for the local government anymore and local governments expect that citizens themselves contribute to their own safety during and after a crisis. The benefits of empowering citizens and strengthening community resilience are, for example, more self-reliant behavior during and after a crisis, decreased recovery time, better community responses to warnings, less victims and less damages (Becker et al., 2011; Becker et al., 2015).

One of the most important factors identified as stimulating resilient communities is collective efficacy. Collective efficacy is the belief that collectively a community can effectively deal with a crisis (Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008; Paton, 2013). During a crisis, communities with high levels of collective efficacy are able to coordinate efforts toward recovery, can effectively manage resources, are able to generate strategic plans and are more resilient during crisis (Benight, 2004).

Collective efficacy is highly related to empowerment (Perkins, Hughey, & Speer, 2002). Empowerment describes citizens' feelings of personal competence and confidence to deal with issues that arise (Norris et al., 2008). The local government can empower citizens by providing information about how to deal with a crisis. Citizens who feel more empowered by the local government feel themselves more capable to prepare for and to respond to a crisis, which makes them more likely to follow the local government's advice (Becker et al., 2015).

Relationship between Citizens and the Local Government

Research shows that besides crisis information, the quality of the relationship between citizens and the local government also influences decisions to act (Coombs, 2004; Lindell & Whitney, 2000; Paton, Smith, Daly, & Johnston, 2008; Reynolds & Seeger, 2005; Seeger, 2006). In the following section we will reason that trust and closeness are important influences on the relationship between citizens and the local government.

Trust has been conceptualized in many ways, but in line with a number of authors (Frewer, Howard, Hedderley, & Shepherd, 1996; R. G. Peters, Covello, & McCallum, 1997; Renn & Levine, 1991), we conceptualize trust as a multidimensional construct that consists of 'competence', 'openness, honesty and expertise', and 'concern and care'. When the local government is not trusted, the value of the information will strongly reduce (Pieniak, Verbeke, Scholderer, Brunsø, & Olsen, 2007; Seeger, 2006; Steelman & McCaffrey, 2013). Consequently, having trust in the local government is important for motivating citizens to act upon a crisis (Becker et al., 2015; Cuddy, Fiske, & Glick, 2008; Fiske, Cuddy, & Glick, 2007; Siegrist, 2000).

Closeness is another factor that determines whether citizens are willing to follow the advice of the government. Closeness describes the interdependence between two people in terms of support, shared interests, and self-disclosure (Parks & Floyd, 1996). Close relationships are important for human experience and behavior as it, for example, provides safety and emotional support (Aron, Aron, & Smollan, 1992; Baumeister & Leary, 1995). Typically closeness measures have been used to assess closeness in romantic relationships (Aron et al., 1992), but more recent work also used the scale to determine the level of closeness across various interpersonal relationships which are not romantic in nature (Li, Zhang, Bhatt, & Yum, 2006; Woosnam, 2010).

Present Study

Crisis situations differ in several ways, but an important factor is who or what is held accountable for the crisis. Who or what is held accountable may influence how citizens respond to the crisis. However, the reaction of citizens is not only dependent on this issue about accountability, as previously mentioned, it also depends on the way the crisis communication is conveyed. Therefore, in this study we examined the influence of accountability for a crisis (government accountable versus government not accountable) and type of crisis communication (neutral versus empathic) on citizens' willingness to take advice from the local government, citizens' feelings of collective efficacy and empowerment, and the relationship between citizens' and the local government.

In line with research of Coombs (2004) and Jin et al. (2014), it was predicted that:

> *When the local government is held accountable for the crisis, citizens have a stronger negative affect (H1a), experience lower levels of collective*

efficacy (H1b) and empowerment (H1c), and the relationship with the local government is more negatively affected (in terms trust (H1d) and closeness (H1e)), compared to a local government that is not held accountable for the crisis.

Based on research of Coombs (2004, 2007), B. K. Lee (2004), and McDonald et al. (2010) we hypothesized that:

When the local government is held accountable for the crisis, citizen have less trust in the message of the local government, and consequently this lead to less willingness to follow the advice of the local government, compared with a crisis for which the local government is not held accountable (H2).

Based on previous research (e.g., Faraji-Rad et al., 2015; Seeger, 2006; Shen, 2010), we expect the following regarding type of crisis communication:

H3: *Empathically framed crisis information will result in higher willingness to follow the advice of the local government (H3a), less negative affect (H3b), higher scores on collective efficacy (H3c) and empowerment (H3d), and a better relationship between citizens' and the local government (i.e., higher scores on trust (H3e) and closeness (H3f)), compared with the neutrally framed crisis communication.*

Finally, we were interested in the interaction between who is held accountable for the crisis and type of crisis communication. In times of crisis, the local government is responsible for communicating clear and trustworthy crisis information. How citizens respond to this crisis information may be influenced when the local government is held accountable for the crisis and may be influenced by the type of crisis communication. Therefore, we predict that:

H4: The effect of the type of crisis communication (neutral or empathic) is dependent upon whether the local government is held accountable for the crisis for willingness to follow the advice of the local government, negative affect, collective efficacy, empowerment, trust and closeness (H4).

Method

Design and Participants

An online experiment was run to investigate to what extent accountability for the crisis and the type of crisis communication influences citizens' reaction to the crisis. The study was a 2 (accountability: government accountable or government not accountable) x 2 (crisis communication: empathic or neutral) between subjects design. Data were collected from 164 participants using a convenience sample from Dutch-speaking men and women who lived in the Netherlands. We excluded 11 participants who did not complete the whole questionnaire, leaving 153 participants for statistical analyses (M_{age} = 41.75, SD_{age} = 14.14;

95 females, 58 males). No differences were found between the four conditions for gender, $\chi^2(3) = 2.29$, ns., age, $F(3,149) = .69$, ns., education $\chi^2(18) = 21.16$, ns., or prior experience with a fire involving hazardous substances, $F(3,149) = .84$, ns. Participants indicated via self-report (seven-point Likert scale, 1 (not at all) – 7 (very much)) that they were in general able to imagine the crisis situation, $M = 5.50$, $SD = .87$ and they rated the crisis as realistic, $M = 5.72$, $SD = .97$.

Procedure

Participants were randomly divided across the four experimental conditions. First, participants had to read a short vignette about a fire at a company that worked with hazardous substances. They read that the fire raged in an industrial area close to their homes (see Appendix 3A). Subsequently, to increase immersion and vividness of the vignette, participants watched a short video clip of the fire.

After the scenario, participants received information about who or what was held accountable for the crisis. Half of the participants received information that the local government was negligent regarding the storage of large amounts of chemicals in the building. The local government illegitimately provided the company permit and the cause of the fire was due to the local government's negligence to perform proper safety checks. The other half received information that the local government regularly checked the storage of large amounts of chemicals in the building. The local government provided the company legitimately a permit and performed proper safety checks, however the cause of the fire was due to a technical error in a machine, which could not possibly have been foreseen.

After reading information about who was held accountable for the fire, participants received crisis information from the local government about the actual situation and advices were given about self-protective actions. Half of the participants received neutral crisis communication, whereas the other half received empathic crisis communication (see Appendix 3A). The neutral crisis information was based on the crisis communication that was released during a large-scale fire at Chemie-pack in Moerdijk (Joustra, Brouwer-Korf, Mertens, Muller, & Visser, 2012). The empathic crisis information was based on the best crisis communication practices of Seeger (2006). Three sentences to induce empathy were used, e.g., 'Our thoughts are with everyone affected by this fire'. Finally, participants had to fill out a questionnaire.

Measures

All questions in the questionnaire were measured on seven-point Likert type scales, with the exception of the measurement of closeness, which was a multiple-choice question.

Manipulation Checks

Accountability. The accountability scale was based on a previous study conducted by M. Griffin, Babin, and Darden (1992). Participants reported to what extent the local government was held accountable for the crisis. Questions were asked like: 'The local government is accountable for the fire' and 'The local government is to blame for the cause of the fire' (scale: 1= totally disagree – 7= totally agree; α = .95).

Empathy. The empathy scale was newly developed. Participants were asked to what extent they agreed that the local government expressed sympathy, empathy and showed compassion in their crisis information (scale: 1= totally disagree – 7= totally agree; α = .91).

Dependent Variables

Follow the advice. Three items measured willingness to follow the advice of the local government. The items were based on a study of Gutteling and De Vries (2016). An example item is 'How likely is it that you follow the advice of the local government' (scale: 1= not at all – 7= very; α = .79).

Negative affect. Participants reported their negative affect with respect to the fire in terms of feeling tense, anxious, nervous, concerned, angry and sad (scale: 1= not at all – 7= very much; α = .85). Participants who scored high on negative affect were more worried about the crisis situation. Negative affect measures were adapted from Wiegman and Gutteling (1995).

Collective efficacy. Collective efficacy was based on a study of Paton (2013). Participants were asked to what extent they had the feeling that they collectively were able to do something to control the outcome of a crisis. A three-item scale was used, e.g., 'I have the feeling that we collectively can deal effectively with this crisis' (scale: 1= totally disagree – 7= totally agree; α = .89).

Empowerment. Three items measured empowerment (Paton, 2013). Based on the information during the fire, participants were asked to what extent they felt they were able to influence what was happening. One item showed low inter-item correlations with the other measures in the scale and was consequently deleted (scale: 1= not at all – 7= very much; r = .52, p < .001).

Trust in the local government. Based on studies of Rosenberg, Nelson, and Vivekananthan (1968) and Regan et al. (2014) trust was measured using three dimensions of trust: 'competence', 'openness, honesty and expertise', and 'concern and care'. Participants were asked to what extent they characterize the local government as, for example, helpful, sincere, intelligent, skillful, accurate and credible. Pairwise correlations among these dimensions were high (Range $r(153)$ = .82 -.85, p < .001), and a Principle Components factor

analysis on the three dimensions revealing one underlying factor (based on Eigenvalues greater than 1) that explained 65.37% of the variance. Consequently, we decided to create a trust scale by averaging the scores on these three dimensions, which showed high internal consistency (scale: 1= not at all – 7= very much, Cronbach's α = .96). A higher score on this scale means that the participant had more trust in the local government.

Closeness to the local government. Based on the Inclusion of Others in Self scale (Aron et al., 1992), participants were asked to choose the pair of circles that best portrays their relationship with the local government. This measurement consisted of seven pairs of circles whereby each pair overlapped each other slightly more than the preceding pair (scale: 1= far apart – 7= highly overlapping).

Finally, questions were asked about the ability to imagine the situation and prior experiences with a fire involving hazardous substances. Demographics were collected about their age (in years), gender (male = 0, female = 1), and education level.

Results

Manipulation Checks

A pre-test with university students and personnel was conducted to check the manipulation of the accountability frame and type of crisis communication (N = 20). The results of an independent-samples t-test show that when the local government was held accountable for the crisis, participants considered the local government as more accountable (M = 4.60, SD = .70), than when the local government was not held accountable for the crisis (M = 1.90, SD = 1.32), t (18) = -5.70, p < .001. In addition, consistent with the manipulation of type of crisis communication, when the information was framed in an empathic manner, participants considered the communication to be significantly more empathic (M = 4.37, SD = 1.38), than when the message was framed as neutral (M = 2.50, SD = 1.33), t (18) = -3.08, p = .006.

For the experiment, a manipulation check of the accountability frame and type of crisis communication was also conducted and yielded similar results. The findings indicate a significant main effect of accountable frame on accountability, F(3,149) = 698.51, p <.001. Accountability was perceived as considerably higher in the accountable condition (M = 5.44, SD = .09), compared to the no-accountable condition (M = 2.02, SD = .09). In addition, a main affect was found for type of crisis communication on empathy, F(3,149) = 698.51, p <.001. Participants perceived the empathic framed crisis communication as more empathic (M = 4.62, SD = .17), than when the message was framed as neutral (M = 3.14, SD = .17). There were no interaction effects.

Means and Correlations

Participants scored quite high on willingness to follow the advice of the local government (*M* = 5.80). Willingness to follow the advice correlates positively with collective efficacy (*r* = .35), trust (*r* = .32), and closeness (*r* = .35). See Table 3.1 for the means, standard deviations, and the correlations among all dependent variables.

Table 3.1 Means and Pearson correlations

		M	SD					
				1.	2.	3.	4.	5.
1.	Willingness to follow advice	5.80	1.19					
2.	Negative affect	3.95	1.23	.03				
3.	Collective efficacy	4.79	1.37	.35**	-.10			
4.	Empowerment	2.52	1.44	.08	-.01	.28**		
5.	Trust	4.00	1.27	.32**	-.22**	.47**	.28**	
6.	Closeness	3.98	1.16	.35**	-.17*	.47**	.27**	.46**

Significance levels: *$p < .05$, **$p < .001$, $N = 153$.

Hypothesis Testing

To learn more about the influence of accountability frame and the type of crisis communication on the dependent variables; willingness to follow the advice of the local government, negative affect, collective efficacy, empowerment, trust, and closeness, analysis of variance was applied. See Table 3.2 for the means and standard deviations across the conditions.

Effects of crisis accountability. There was no significant main effect for the accountability frame on negative affect, $p = .238$, implying that negative affect was not influenced by whether the government was held accountable for the crisis. This means that H1a, stating that when the government is held accountable for the crisis, citizens have a stronger negative affect, was not supported.

There was a marginal main effect for the accountability frame on collective efficacy, $F(3, 149) = 3.09$, $p = .081$, partial $\eta^2 = .02$. Participants in the accountable condition had less the feeling that they collectively were able to do something to control the outcome of the crisis ($M = 4.60$), than those in the no-accountable condition ($M = 4.98$). H1b was thus confirmed.

There was no main effect for the accountability frame on empowerment, $p = .187$. Hypothesis H1c was therefore not supported.

A significant main effect was found for the accountability frame on trust, $F(3, 149) = 18.14$, $p < .001$, partial $\eta^2 = .11$. Participants in the accountable condition scored lower on trust in the local government ($M = 3.62$), compared with participants in the no-accountable condition ($M = 4.37$). H1d was thus confirmed.

Table 3.2 Means and standard deviations per accountability frame and type of crisis communication frame

	Accountability				Type of crisis communication			
	Government accountable		Government not accountable		Neutral		Empathic	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Willingness to follow advice	5.84	1.15	5.76	1.23	5.71	1.30	5.89	1.06
Negative affect	4.07	1.24	3.84	1.21	4.04	1.22	3.87	1.25
Collective efficacy	4.59	1.39	4.98	1.33	4.57	1.33	5.01	1.38
Empowerment	2.36	1.27	2.67	1.59	2.45	1.27	2.58	1.61
Trust	3.62	1.16	4.37	.98	3.92	1.18	4.08	1.08
Closeness	2.77	1.23	3.17	1.26	2.83	1.28	3.12	1.22

N = 153

A marginal main effect was found of the accountability frame on closeness to the local government, $F(3, 149) = 3.78$, $p = .054$, partial $\eta^2 = .03$. Participants in the no-accountable condition felt more closeness to the local government ($M = 3.17$), than participants in the accountable condition ($M = 2.78$). This result confirms H1e.

To investigate whether trust mediates the relationship between accountability frame and willingness to follow the advice of the local government, we performed a mediation analysis. The first regression analysis with willingness to follow the advice of the local government as dependent variable and accountability frame as the predictor yielded an insignificant relation ($b = .37$, $SE = .19$, $p > .05$, 95% CI [-.01; .75]. Therefore, H2 was not supported.

Effects of the type of crisis communication. There were no significant main effects of the type of crisis communication on willingness to follow the advice of the local government, $p = .348$, and negative affect, $p = .399$. Therefore, H3a and H3b were rejected.

A significant main effect was found of the type of crisis communication on collective efficacy, $F(3, 149) = 4.19$, $p = .042$, partial $\eta^2 = .03$. Participants who received the empathic crisis information scored higher on collective efficacy ($M = 5.01$), compared with participants who received neutral crisis information ($M = 4.56$). There results confirmed H3c.

There were no significant main effects of the type of crisis communication on empowerment, $p = .620$, trust, $p = .365$, and closeness, $p = .158$. Therefore, H3d, H3e and H3f were rejected.

Interaction effects. The interaction between crisis accountability and the type of crisis communication was found to be insignificant for all dependent variables, all *p*'s > .139. Hypothesis 4 was therefore rejected.

Discussion

In this study we examined the influence of accountability for the crisis and type of crisis communication on citizens' willingness to follow the advice of the local government, feelings of collective efficacy and empowerment, and citizens' relationship with the local government (i.e., trust and closeness to the local government). Overall, we found effects of both accountability for the crisis and the type of crisis communication. When the local government is held accountable for the crisis, then the relationship between citizens and the local government is undermined in terms of trust and closeness, and it leads to reduced feelings of collective efficacy. Furthermore, the type of crisis communication has less influence on citizens' behavior, feelings and their relationship with the local government; empathic crisis information only leads to stronger feelings of collective efficacy.

More specifically, we did not find a difference on willingness to follow the advice of the local government, between a crisis where the local government was held accountable for the crisis, and a crisis where the government was not held accountable for the crisis. This finding is in contrast with research of McDonald et al. (2010), who argued that crisis accountability and behavioral intentions are associated with each other. A possible explanation for this difference in result is the difference in crisis scenarios. We used a scenario where citizens themselves were involved in the crisis: citizens were asked to imagine that a large-scale fire with hazardous substances rages close to their homes. McDonald et al. (2010) used a scenario where citizens not directly were involved in the crisis: citizens were asked to imagine that an airplane had crashed which they or their loved ones recently used. We expect that the need to do something against the crisis was much larger in our scenario (due to the direct involvement), than in the scenario of McDonald et al. (2010). Therefore, who or what is accountable for the crisis did not make any difference on willingness to follow the advice of the local government.

Accountability frame did have an influence on collective efficacy. Participants scored lower on collective efficacy when the local government was accountable for the crisis. A consequence of lower levels of collective efficacy is that citizens have less trust that they collectively can do something to control the outcome of a crisis (Benight, 2004; Norris et al., 2008).

With respect to the relationship variables, our results showed effects of accountability frame on trust, and closeness to the local government. When the local government was held accountable for the crisis, participants scored lower on trust in the local government, and they felt less close to the local government, compared with the scenario where the local government was not held accountable for the crisis. This was in line with our expectations. The more citizens attribute a negative event to the organization involved, the more negative they are towards that organization (e.g., Coombs, 2014). In addition, trust and closeness

to the local government correlated positively with the willingness to follow the advice of the local government. The correlation between trust and willingness to follow the advice of the local government is consistent with the literature (e.g., Becker et al., 2015; Pieniak et al., 2007; Seeger, 2006). Having trust in the local government is important for motivating citizens to act upon a crisis (Becker et al., 2015; Siegrist, 2000). Finally, the correlation between closeness and willingness to follow the advice of the local government is in line with research of Baumeister and Leary (1995), who described that close relationships are important for behavior, as it provides safety and emotional support.

Regarding the crisis communication frame, it was expected that participants were more willing to follow the advice of the local government when they received empathic crisis information, than participants who received neutral crisis information (e.g., Seeger, 2006; Shen, 2010). This is not in line with our results, as we found no effect of the crisis communication frame on willingness to follow the advice of the local government. We suggest that in 'the heat of the moment' citizens only need information that helps them to deal adequately with the crisis. Expressing empathy in crisis information does not provide that first need. Therefore, we suggest that expressing empathy is more important in the aftermath of a crisis, as it is a way to apologize for any harm that may have occurred (Claeys, Cauberghe, & Leysen, 2013). This implies that it is the content of the information that determines whether citizens decide to act upon a crisis, and not the way the crisis information is framed.

However, crisis communication frame did have an influence on collective efficacy. Our results showed that the participants who received empathic crisis information felt more able to deal collectively with the crisis, compared with participants who only received neutral crisis information. Probably, empathic information leads to a better understanding between citizens and the local government, which also influence citizens' belief that a community together can do something to mitigate the effects of a crisis (Norris et al., 2008; Shen, 2010; Silvia, 2005). This is an important result as collective efficacy is identified as one of the most important factors in stimulating resilient communication (Becker et al., 2015; Benight, 2004).

No effects were found for the crisis communication frame on the relationship variables. Expressing empathy in crisis information did not lead to more trust in the local government, and more closeness to the local government. This contrasts with findings of Shen (2010), who found that when information express empathy a better relationship with the sender of the information is obtained. We suggest that it takes more effort to influence levels of trust and closeness; just one message is not enough.

While this study uncovered novel insights into the influence of accountability for a crisis and type of crisis communication, we wish to acknowledge some limitations of this experimental study. First of all, this study used a convenience sample of the general population

that could limit the scope of our findings. However, we considered it important not to do a study with the often-used student sample as students differ from the general population: students have a weaker self-definition, and consequently they have weaker attitudes that are more easily influenced and less predictive of behavior than those of the general population (Petty & Cacioppo, 1996). Another limitation concerning the generalizability of our results is that we used one specific crisis situation, a fire with hazardous substances. In real life, most crisis situations are far more complex, with a broad range of response options, more confusion about what exactly is going on and people interacting with each other. Although participants experienced the fire as realistic, it is not the same as experiencing an actual crisis situation. A last limitation of our results concerns the measurement of willingness to follow the advice of the local government, as we asked for behavioral intentions. Research often indicates that behavioral tendencies do not always correlate strongly with actual behavior (Baumeister, Vohs, & Funder, 2007; Warshaw & Davis, 1985). However, other work specifically in the safety domain, for instance Paton et al. (2010) demonstrated that intention actually is a good predictor for behavior. As the literature does not provide an unequivocal answer, follow-up research is needed to reveal whether the effects as found in the present study also hold for a study where actual behavior is measured. To measure actual behavior, a field experiment can be conducted or virtual reality can be used in which a crisis situation is simulated.

Taken together, our findings indicate that in general citizens' intention to follow the advice of the local government is high, even when the local government is held accountable for the crisis. However, accountability negatively influenced citizens' relationship with the local government and lowered citizens' collective efficacy, i.e., their believe that they collectively can do something to mitigate the consequences of the crisis. Our research shows that this negative outcome for citizens' relationship with the local government cannot be countered by empathic crisis information. However, conveying empathic concern in the crisis information enhances levels of collective efficacy in general.

Appendix 3A Manipulations

Scenario

Imagine that you are at home and black clouds of smoke are moving for a while over your home and you wonder what is going on. On a news app on your phone you read that a large-scale fire is raging at a company close to your home. The company was set on fire after an explosion, and in the meanwhile the fire has been spread to two adjacent warehouses. The strong wind causes high flames. You hear explosions, possibly caused by chemicals that are stored in the warehouse. The fire brigade fights the fire, but it isn't under control yet. Due to the strong wind enormous clouds of smoke are moving over the region. At this moment it isn't clear what the consequences are of the fire and the smoke.

Manipulation accountability

Local government accountable

The fire started in a warehouse that worked with chemicals and is located in an industrial area near a densely populated area. The local government was careless in the control of the storage of large amounts of chemicals in the warehouse. The company did not fulfill all safety requirements and the obtained license from the local government was unjustified. The cause of the fire was due to failing safety checks.

Local government not accountable

The fire started in a warehouse that worked with chemicals and is located in an industrial area near a densely populated area. The local government has checked regularly the storage of large amounts of chemicals in the warehouse. The company fulfilled all safety requirements and the obtained license from the local government was justified. The cause of the fire was due to a technical problem in one of the machines.

Manipulation type of crisis communication

Neutral

Today, our region is startled by the large-scale fire with toxic chemicals, such as ammonia and methanol. Enormous clouds of smoke are moving over our region.

To ensure the safety of all residents, we will inform you at an early stage about the situation. At this moment we don't know whether the smoke contains hazardous substances, but nevertheless we recommend the following: 1) don't go outside to watch the fire, 2) go inside and close windows, doors and ventilation shafts, 3) switch off the mechanical ventilation, 4) stay inside a room that can be sealed off, preferably in the middle of the house.

The present state of affairs concerning the fire is that the fire brigade fights the fire, but it isn't under control yet. Air samples are taken to collect information concerning the presence and the risk of hazardous materials. Stay informed about the latest developments; follow the news or visit www.crisis.nl

Empathic

Today, our region is startled by the large-scale fire with toxic chemicals, such as ammonia and methanol. Enormous clouds of smoke are moving over our region. We understand that you, as a resident, are concerned about the situation and the possible consequences of this fire.

To ensure the safety of all residents, we will inform you at an early stage about the situation. At this moment we don't know whether the smoke contains hazardous substances, but nevertheless we recommend the following: 1) don't go outside to watch the fire, 2) go inside and close windows, doors and ventilation shafts, 3) switch off the mechanical ventilation, 4) stay inside a room that can be sealed off, preferably in the middle of the house. We understand that these measures may cause inconvenience.

The present state of affairs concerning the fire is that the fire brigade fights the fire, but it isn't under control yet. Air samples are taken to collect information concerning the presence and the risk of hazardous materials. Stay informed about the latest developments; follow the news or visit www.crisis.nl. Our thoughts are with everyone affected by this fire.

CHAPTER 4

Decision Making During a Crisis: the Interplay of Narratives and Statistical Information Before and After Crisis Communication

This chapter is based on:
Bakker, M.H., Kerstholt, J.H., van Bommel, M., & Giebels, E. (Submitted). Decision Making During a Crisis: the Interplay of Narratives and Statistical Information Before and After Crisis Communication.

Hurricane Katrina made landfall on the Gulf Coast on August 29, 2005. It was by far the most expensive natural disaster with damages of over $100 billion, as well as one of the five deadliest hurricanes in US history with over 1200 deaths (Galea, Tracy, Norris, & Coffey, 2008). Two days before Hurricane Katrina made landfall, local governments spread information about the actual situation and evacuation orders via news broadcasts. As evaluation studies of the incident showed, however, citizens' decision to evacuate was not only affected by information provided by the government, but also by narratives of relatives and other members of citizens' social networks (Messias et al., 2012). There is even note of an individual's evacuation decision initiating a chain reaction in the entire family: "My mother-in-law would not leave the house. My husband would not leave her and I am not going to leave him" (Eisenman et al., 2007, p. 112).

The information that individuals use to make their decision during a crisis is not only from different sources (e.g., government, family and friends), but also of different types. On the one hand, official information distributed by the government is usually focused on presenting facts and statistics about the crisis itself, the (potential) consequences and courses of action (Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013). On the other hand, information obtained from others who experienced similar crisis situations is mostly in the form of narratives (Brenkert-Smith, Dickinson, Champ, & Flores, 2013; Lindell & Perry, 2012). Both types of information may influence decision making during a crisis in a different way.

Although some studies have shown how different types of information can influence behavior, less is known about how these two types of information interact with each other during a crisis situation (Olsen & Shindler, 2010; Reynolds & Seeger, 2005; Steelman & McCaffrey, 2013). In the current study we therefore aim to give a better insight into how narrative information and statistical information influence helping behavior after the occurrence of an accident and how these types of information interact with a governmental message, that is usually provided shortly after the incident occurred.

Situation Assessment

When confronted with a crisis, citizens make several considerations before they act upon the situation. First an assessment of the situation is made, to learn what is going on. This may be quite difficult when citizens lack the knowledge and skills required (Fernandez et al., 2006; Hur, 2012). They may, for example, not know the consequences of toxic substances or what would be a safe location to go to. For instance, after the 2007 Hebei Spirit oil spill in South Korea, many citizens were not aware of the toxicity and harmful effects of petroleum. As a result they took no precautionary actions, and as they were not properly clothed, they later suffered from skin diseases (Hur, 2012). Second, citizens have to decide, under some level of uncertainty, between options with different outcomes and consequences (Seeger,

2006). For example: do I need to evacuate or can I stay to help others? Evacuation would increase an individual's chance of survival but possibly at the cost of those unable to leave the area by themselves.

In uncertain situations citizens may need information from professionals, enabling them to make an informed choice as to what to do (Reynolds & Seeger, 2005; Seeger, 2006). Several studies show that such crisis communication can enable citizens to deal adequately with a crisis. J. Sutton et al. (2014), for example, studied the tweets sent by official government accounts during a 48-hour period after the Waldo Canyon wildfire in Colorado. The fire ravaged the mountainous area close to Colorado Springs, resulting in the evacuation of over 32.000 residents, and the loss of 2 lives, 346 buildings, and 18.247 acres of national forest and residential area. The researchers found that warning messages that included protective action guidance together with hazard impact, location and message source were more influential on taking protective actions, compared with messages that only provided ongoing situational updates without any protective action guidance. Incomplete messages, such as tweets that lacked specific information about where evacuees should go, for how long, and what to expect after being evacuated, led also to less protective actions, because citizens spent more time to understand and confirm the message content and its implications (J. Sutton et al., 2014). Gutteling, Kerstholt, Terpstra, and Van As (2014) evaluated NL-alert, a new broadcast system in The Netherlands to inform citizens in the direct environment of a disaster or emergency via their mobile phone. The study was based on survey data that was collected as soon as possible after the delivery of a NL-Alert warning (usually within 2 days) in three different actual crisis situations (e.g., two large industrial fires with release of potentially hazardous substances and one large fire in a historic city center). Results of this study showed that receivers of a NL-alert message were quite willing to follow the given advice.

However, as noted above, what citizens actually do is not only influenced by crisis communication, but also by one's own experiences and considerations, as well as by narratives of other citizens, such as friends, family, neighbors, or fellow church members (Eisenman et al., 2007). It is well known that an individual's own experiences with a crisis exert a strong effect on risk perception and behavior (e.g., Miceli, Sotgiu, & Settanni, 2008; Plapp & Werner, 2006). Ruin, Gaillard, and Lutoff (2007), for example, showed that citizens with flood experience tend to overestimate the potential danger of floods. In addition to a direct effect of personal experience on decision making, there can also be an indirect effect through narratives of others. As noted by Wachinger et al. (2013), by hearing a narrative, citizens are able to empathize with the experiences of others, which helps them to envisage the negative consequences of a risk. This visualization of what may happen, leads to stronger intentions to act upon a crisis. Narratives of others may therefore influence individuals' decision making during a crisis.

Narrative versus Non-narrative Persuasion

Narratives may lead to adequate decisions during a crisis, but when risks are involved their influence can be problematic. When narratives overrule statistical information, probabilities might be ignored, resulting in suboptimal decisions. A number of studies have compared narrative to non-narrative messages, but there is no consensus to date about their effect on human behavior. In medical decision making research the overall conclusion is that narratives often have a more persuasive effect on individual's decisions than statistical information (Fagerlin et al., 2005; Ubel et al., 2001). When participants had read narratives describing choices of other citizens regarding a treatment, they were more inclined to choose the option in line with the narratives (Fagerlin et al., 2005, Study 1; Ubel et al., 2001, Study 1). A study of De Wit, Das, and Vet (2008), for example, showed a stronger influence of a narrative message compared with a statistical message on perceived risk and severity of contracting hepatitis B. Betsch, Renkewitz, and Haase (2013) compared the effect of narratives, statistical information, and a combination of both on the decision to vaccinate. Although each participant received the same initial information about the base rate of adverse events regarding vaccinating, narratives had a stronger impact on perceived risk and intention to vaccinate than statistical information. However, research of Shaffer, Tomek, and Hulsey (2014) showed no effect of narratives on treatment decisions regarding breast cancer.

Studies in other domains, such as advertising, have found an equal influence or less influence of narrative messages compared with non-narrative messages. Dunlop, Wakefield, and Kashima (2010) found no advantage of a narrative over a non-narrative format in storyboards for advertisements about quitting smoking or the importance of protecting oneself from sunburn. Greene and Brinn (2003) found statistical information to be more effective than a narrative in reducing tanning bed usage.

Several meta-analyses that are conducted also showed mixed results. A meta-analysis of Allen and Preiss (1997) suggested that statistical information is more persuasive than narrative information, while a more recent meta-analysis of Reinhart (2006) did not find any differences between statistical and narrative information when all outcome measures were pooled together. However, when attitude as an outcome measure was singled out, narratives had a stronger effect than statistical information. Zebregs, van den Putte, Neijens, and de Graaf (2015) differentiated the impact of statistical and narrative information on beliefs, attitude, and intention. Statistical information was found to have a stronger influence on beliefs and attitudes, whereas narrative information had a stronger influence on intentions.

To date, results about the persuasiveness of narratives versus non-narrative information are somewhat mixed. Shaffer and Zikmund-Fisher (2013) reasoned that this might be caused by the fact that narratives are generally seen as homogeneous. However, narratives may differ in format and content potentially leading to different results. Studies that compare narrative with non-narrative messages suggest that progress lies in investigating when and under what conditions narratives may have a stronger influence on people (Bilandzic & Busselle, 2013).

Underlying Mechanisms of Narrative Persuasion

Several models have been developed to explain the persuasive effect of narratives, such as narrative transportation and the exemplification theory. Narrative transportation means that citizens mentally enter a world that a story evokes. When citizens lose themselves in a story, their affective and cognitive responses, beliefs, attitudes and intentions changes (Green et al., 2008; Van Laer, De Ruyter, Visconti, & Wetzels, 2013). Transportation may lead to persuasion through two mechanisms. First, transportation may inhibit cognitive responding. Transported citizens may lose access to some real-world facts in favor of accepting the world of the narrative that has been created by the author (Green & Brock, 2000). Second, through transportation the narrative may feel like a real experience. Transported citizens are able to take the perspective of a character and see the narrative through this character's eyes. A consequence of such mental imagery is that citizens are able to deeply understand the emotions and the motivations of a character to behave in a certain way. Therefore, narrative transportation may influence the generation of affective responses, such that larger levels of transportation cause people to perceive the narrative as more realistic and, thus, to elicit stronger affective responses (Green, 2004; Van Laer et al., 2013).

Related to narrative transportation is the exemplification theory. The exemplification theory addresses the formation and changes in beliefs on the basis of specific cases as examples (Dahlstrom, 2014; Zillmann, 2006). Gibson and Zillmann (1994) found that when narrative and statistical information are both present within a message, such as a news message that describes a general phenomenon, but also provides specific narratives, citizens' perceptions were more influenced by the specific narratives. The exemplification theory posits several heuristics that evoke the persuasive effect of narratives, such as the representativeness heuristic and the availability heuristic. According the representativeness heuristic, citizens estimate a frequency or probability of a situation based on similarity with a schema, stereotype, or other pre-existing knowledge. As a consequence citizens may under- or overestimate actual frequencies and probabilities of a situation (E. Peters, McCaul, Stefanek, & Nelson, 2006; Zillmann, 2006). According to the availability heuristic, citizens estimate the frequency of a situation, or the likelihood of its occurrence, "by the ease with which instances or associations come to mind" (Tversky & Kahneman, 1973, p.

208). A consequence of this heuristic is that citizens believe that things that come to mind more easily, often the more emotional situations, are far more common and more accurate reflections of the real world. Consequently, citizens misjudge the frequency and magnitude of events (Zillmann, 2006).

Expectations

Translating the insights of previous research on narrative versus non-narratives to a crisis situation, we predict that someone's behavior during a crisis is more strongly affected by narrative information, than by official risk information. Although meta-analyses of Allen and Preiss (1997) and Reinhart (2006) showed no persuasive effect of narratives, when the outcome variables attitude and intentions were singled out, narratives had a stronger influence compared with statistical information (Zebregs et al., 2015).

Based on the underlying mechanisms of narrative persuasion, we expect that affective responses are an important motivator for citizens' behavior. Based on the transportation theory, a narrative can seem quite realistic through mental imagery. As narratives are detailed, vivid and concrete descriptions of a situation, citizens are able to understand the emotions and the motivation of someone to behave in a certain way. Therefore, narrative transportation may trigger affective reactions, which generally have strong effects on decision making (Slovic, Finucane, Peters, & MacGregor, 2007; Winterbottom, Bekker, Conner, & Mooney, 2008). In addition, based on the exemplification theory, narratives come more easily to mind, compared with the more abstract statistical risk information. Narrative information is easier to retrieve and/or coded in memory than statistical information, because of the affective responses related to the narrative information (Winterbottom et al., 2008). This also advocates the important role of affective responses in decision making.

Present Study

The aim of the current study is to give a better insight into how narrative information and statistical information influence helping behavior after the occurrence of an accident and how these types of information interact with a governmental message, that is usually provided shortly after the incident occurred. We used a completely scripted scenario in a virtual environment, which makes it possible to have controlled manipulations yet still measure actual behavior. Another advantage is that experiencing a crisis in such a virtual environment is likely to increase more arousal than just imagining it, what makes the situation more realistic. Even though such a virtual environment is an abstraction of a real crisis situation, several studies showed that when people are faced with situations in a virtual environment, they tend to behave and respond in a similar way as in the real world (Gillath et al., 2008; Yee et al., 2007). As such, a virtual environment provides a good platform to study citizens' behavior during a crisis.

The virtual environment used in this study is similar to the one that was used by Stubbé et al. (2017) and Bakker et al. (2017). Participants were required to follow a specific route, but halfway through they witnessed a car accident. Our main research question was how the previously obtained statistical and narrative information would affect participants' reactions to this accident. The main dependent variable was whether participants would move the victim or not, as we manipulated the consequences of moving the victim in either statistical terms, as a narrative or as a combination of both types. Similar to what would occur in reality, participants received a formal crisis message shortly after the accident had occurred (Gutteling, Terpstra, & Kerstholt, 2017). This way we could analyze the interaction between prior information (narratives and/or statistical information) and such crisis communication. Finally, in addition to the behavior in the virtual environment we were also interested in the question why narratives may have a stronger influence on the decisions citizens made. Based on previous research it is expected that narratives lead to higher affective response and higher risk awareness, compared with statistical information (e.g., Betsch et al., 2013; Ruin et al., 2007; Wachinger et al., 2013; Winterbottom et al., 2008). Narratives provide a more vivid image of a situation and potential consequences, and the more precise the image, the more influence on affective response and risk awareness (Fagerlin et al., 2005; Kerstholt, van der Zwaard, Bart, & Cremers, 2009; Wachinger et al., 2013).

Method

Participants

An experiment was conducted with 177 graduate students. Some students participated in exchange for course credits and some participated in exchange for 5 Euro. The data of 21 participants who failed to correctly answer the three questions about the content of prior information and crisis communication were removed[2], leaving 156 participants for statistical analyses (mean age =20.76, *SD* = 2.56; 71 females, 85 males; 141 Dutch nationality, 15 German nationality). Participants provided written informed consent, and the institutional review board approved the experimental protocol.

No differences were found between the four conditions for all measured demographic variables: age, $F(3, 152) = .85$, ns., gender, $\chi^2(3, N = 156) = 5.30$, ns., and nationality, $\chi^2(3, N = 156) = 1.31$, ns. In addition, no differences were found between the four conditions for experience with accidents as a victim, $F(3, 152) = 1.41$, ns., experience with accidents as a witness, $F(3, 152) = 1.35$, ns., imagining the situation, $F(3, 152) = .41$, ns., or computer skills, $F(3, 152) = 1.42$, ns.

[2] The 21 of 177 participants who had to be excluded were equally distributed across conditions.

Design

The experiment consisted of a one-factorial between-subject design. Participants were randomly assigned to one of three types of prior information (plus one control condition): statistical, narrative, or statistical plus narrative information. In the statistical condition, participants read a newspaper article about the risk of traffic accidents, the potential consequences, and the fact that in 80% of the situations victims should not be moved, because injuries can occur or can become more severe, and thus in 20% that victims should be moved (in case of a fire or explosion risk), because otherwise not moving may lead to a fatal outcome (See Appendix 4A). Participants assigned to the narrative condition read a testimonial of an individual who recently witnessed a traffic accident. In this testimonial the person made the decision to not move the victim and this decision resulted in fatal consequences for the victim. Participants assigned to the statistical and narrative combination, received the same information as in the statistical condition and the same narrative as in the narrative condition. To counterbalance for order of information, half of the participants in this condition, first received the statistical information and then the narrative, and the other half received it in reversed order[3]. In the control condition, participants read a newspaper article about Dutch people and their holidays, and consequently read no relevant prior information.

Participants assigned to the three prior information conditions all received the same crisis communication information in the virtual environment. One minute after the accident, participants received a text message on a virtual mobile phone, which stated that there was an accident on the bridge with explosion risk. Participants were told to take some distance and to wait for the emergency services. In the control condition, they received a text message on their mobile phone only stating that there was an accident on the bridge.

Procedure

Participants entered the experimental room and were seated behind a computer. They could immediately start reading the instructions on the computer screen. As an overarching cover story, participants were asked to imagine the following situation: participants had found a vacancy of the job of their dreams and they had decided to apply for it. They had written an application letter and were subsequently invited for a selection round.

Participants were told that as part of the selection they were required to do a memory task, which was actually the prior information manipulation. Participants were asked to read a half page article carefully. The content of this article depended on the experimental condition. After reading the article, a short check of the manipulated information followed and a questionnaire to measure their affective response and risk awareness.

[3] Analyses showed no order effects.

After reading the article with the prior information manipulation, participants were introduced to the second task in which participants were entered into a virtual environment. In this virtual environment, participants were asked to help a person finding lost parcels. In fact, this was a practice scenario to learn how to control the virtual environment as a preparation on dealing with the experimental scenario. In the practice scenario, participants received instructions with a map of the virtual environment, an explanation of how to control the virtual environment, and a picture that showed control actions on the keyboard. This practice scenario lasted for about 10 minutes. When participants were done with the practice scenario, they started with the experimental scenario by walking to their job interview. For a detailed description of this scenario, see below.

Finally, when participants finished the experimental scenario, participants were asked to fill out a questionnaire on their computer skills, ability to imagine the situation, experiences with traffic accidents, and their sex, age, and nationality. The experiment ended with a debriefing.

Experimental Scenario

Scenario. The overall task for participants was to follow a route in order to go to a job interview. On their route, participants had to cross a river using a bridge. When they approached the bridge, a truck drove past them, and shortly thereafter the sound of a claxon and colliding cars could be heard. During the collision the screen moved and turned to white for a brief period of time. The moment the screen returned to normal a truck blocked the bridge and a car was on its side. Both drivers were thrown out of their cars and moaned with pain. One victim was visible and was lying in front of the car. The other victim was not visible and was lying behind the tilted car. There were three (virtual) bystanders, who did not take any action by themselves but they could respond to specific behaviors of participants. In all cases, participants had to take the initiative. There was one exception; immediately after the accident a bystander provided the following statement: “Hi! I know this type of truck. Last week, such a truck was tilted and that one contained dangerous substances. At that time there was an explosion risk, maybe it is better to take some distance”? Besides talking with bystanders, each participant had a (virtual) mobile phone for communicating and searching for information. Participants were also able to move victims. One minute after the accident, participant received a text message on their mobile phone with information about the accident (see design). The scenario ended three minutes after the accident, when the ambulance arrived. In total, the experimental scenario lasted about six minutes.

Reactions participants. Directly after the accident, participants were able to react in several ways. First of all participants were able to move victims, by selecting the option “moving victim” in a drop down menu. In addition, participants had the possibility to communicate with victims and bystanders. They could communicate by means of a drop

down menu with preselected questions and sentences. Besides, participants had a (virtual) mobile phone, which they could use by pressing a specific button. Dependent on the reaction of the participants, there would be a pre-programmed reaction from the virtual environment.

Bystanders. Bystanders were not able to take any action themselves, but they were able to react to the behavior and statements of the participants. For instance, when participants asked bystanders to call the emergency services, bystanders told them that they could not call, because they did not have a phone.

Victims. Participants could talk with victims, but only the first victim was able to say that he was in pain. Both victims moaned with pain.

Mobile phone. Participants had a (virtual) mobile phone for communication. They had the possibility to call the emergency services and to send tweets. To measure information seeking, participants had the possibility to choose between one of four Web site links with an informative name. Two of these links were relevant for the topic of traffic accidents and two Web site links were irrelevant to the topic. When participants clicked on one of the four links, they received the text that there was no internet connection, so they received no additional information about the topic (see Kievik & Gutteling, 2011).

Measures

Behavior. All actions performed by participants were registered during the experimental scenario. Participants could react in six different ways when they witnessed the accident: move a victims, contact one of the victims, contact a bystander, call the emergency service, send a tweet and search for information. For talking to victims and bystanders we noted how often participants spoke with them. For the other four reactions (move a victim, call the emergency service, send a tweet and search for information) we registered whether participants showed these behaviors. In the data a distinction was made between behavior before the crisis communication, after the crisis communication, and during the entire experiment. The part of the data before the crisis communication was given, was used to test the effect of the types of prior information. The part of the data after the crisis communication was used to test the interaction between prior information and crisis communication.

Affective response. Directly after the prior information manipulation, participants indicated their affective reaction in response to the risk of a traffic accident in terms of feeling tense, anxious, nervous and concerned (7 point Likert type scale: not at all – very much; $\alpha = 0.90$). Affective response measures were adapted from Wiegman and Gutteling (1995).

Risk awareness. Straight after the affective response, we measured risk awareness (Wiegman & Gutteling, 1995). Participants indicated how they judged in general the risk of

a traffic accident, based on seriousness and perceptions of consequences. A six-item scale was used to assess the risk and this was measured after the prior information manipulation: 'There is a high risk of traffic accidents', 'I am aware that traffic accidents occur frequently', 'A traffic accident has serious consequences', 'I am aware that a traffic accident might lead to personal injuries' (scale: strongly disagree – strongly agree) and 'The probability of a traffic accident in my district is…' (7 point Likert type scale: very small – very high; $\alpha = 0.73$).

General questions and demographics. Participants reported how well they were able to imagine the situation (7 point Likert type scale: not at all – very much) and their perceived computer skills (7 point Likert type scale: not at all – very much). Participants also indicated how often they were involved in a traffic accident as a witness and as a victim. In addition, participants indicated their gender (male = 0, female = 1), age (in years), and nationality (Dutch = 0, German = 1).

Results

Correlations

Table 4.1 presents the Pearson correlation coefficients for the dependent variables in this study. For moving victims several significant correlations were found. Participants who moved one of the victims, talked less often to bystanders (r = -.20), called less often the emergency services (r = -.21), and searched less often for information (r = -.24). In addition, participants who moved victims scored higher on affective response (r = .20), and risk awareness (r = .16).

Table 4.1 Pearson Correlations

Constructs	1.	2.	3.	4.	5.	6.	7.
1. Move victims [a]							
2. # contacts victims [b]	.04						
3. # contacts bystanders [b]	-.20*	-.03					
4. Call emergencies [a]	-.21**	-.06	-.01				
5. Send a tweet [a]	-.15	.00	-.01	-.01			
6. Search for information [a]	-.24**	-.04	.12	.14	.21*		
7. Affective response [c]	.20*	.05	-.05	-.04	-.20*	-.08	
8. Risk awareness [c]	.16*	-.05	-.12	-.00	.08	-.08	.31**

[a] = binary variables: no = 0, yes = 1, [b]= counting variables, [c]= scale variables: 1-7. Significance levels: *p < .05, **p < .01, N = 156

Moving Victims

A logistic regression analysis was conducted for moving victims to test if there was a difference between participants who received different prior information. Type of prior information was coded as a dummy variable, the control group was chosen as the reference variable. To be able to better understand the interplay of the types of information, and crisis communication, we made a distinction between the period before participants received the crisis communication message and afterwards.

When only looking at the time period from before the crisis communication message was sent out, we only found a significant effect for the participants in the narrative condition on moving victims, compared to the control condition χ^2 (1, N =156) = 5.58, p = .018, e^b = 12.76, 95% CI: 1.54 – 105.48, see Figure 4.1. In short, before the crisis communication message was sent, only in the narrative condition we found that the victims were more often moved compared to the control condition.

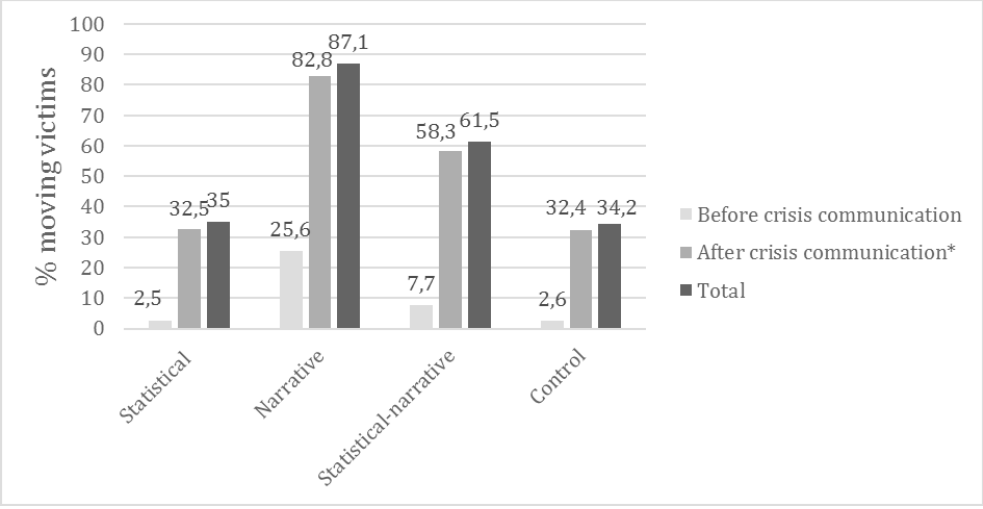

Figure 4.1 Percentages of Moving Victims Between Conditions.
* Participants were excluded who moved one of the victims before they received the crisis communication message.

However, when looking at the time period after the crisis communication[4], a significant effect was found for the narrative condition, χ^2 (1, N =141) = 14.53, p < .001, e^b = 10.00, 95% CI: 3.06 – 32.68, and for the statistical plus narrative information condition, χ^2 (1, N =141) = 1.07, p = .028, e^b = 2.92, 95% CI: 1.12 – 7.58, when a comparison was made with the control condition. This indicates that, in the period after the crisis communication was sent, victims were moved more often in the narrative condition and the statistical plus narrative

[4] Note that this analysis only included participants who had not already moved one of the participants.

information condition compared with the control condition. In addition, participants who read both types of information (statistical plus narrative information) moved victims less often compared with participants who only read the narrative, χ^2 (1, *N* =141) = 4.27, *p* = .039, e^b = 3.43, 95% CI: 1.07 – 11.04, indicating an attenuating effect of statistical information on the effect of narratives.

Table 4.2 Logistic Regression Moving Victims During Entire Experiment

Predictor	β	*SE* β	Wald's χ^2	*df*	*p*	e^{β}
Constant	-.65	.34	3.66	1	.056	.52
Statistical vs control	.04	.48	0.01	1	.942	1.04
Narrative vs control	2.57	.59	19.08	1	.000	13.08
Statistical/Narrative vs control	1.12	.48	5.61	1	.018	3.08
Test			χ^2	*df*	*p*	
Omnibus test of model coefficients			32.54	3	.000	

Model summary: -2 Log likelihood = 182.46, Cox & Snell R^2 = .19, Nagelkerke R^2 = .25. *N* = 156.

When looking at the entire experiment, the period before and after the crisis communication together, there is no difference between the statistical condition and the control condition with regard to moving victims, χ^2 (1, *N* =156) = .01, ns., e^b = 1.04, 95% CI: .41 – 2.63, see Table 4.2. Therefore, participants who had read statistical information about moving victims moved victims as often as participants who did not receive any relevant information. However, participants who read a narrative about moving a victim after an accident, moved victims more often, as compared with the control condition, χ^2 (1, *N* =156) = 19.08, *p* < .001, e^b = 13.08, 95% CI: 4.13 – 41.44, and with the statistical information condition, χ^2 (1, *N* =156) = 18.95, *p* < .001, e^b = 12.63, 95% CI: 4.03 – 39.55. Participants who read both statistical information and the narrative moved victims more often, compared with the control condition, χ^2 (1, *N* =156) = 5.61, *p* = .018, e^b = 3.08, 95% CI: 1.21 – 7.80, and the statistical information condition, χ^2 (1, *N* =156) = 5.44, *p* = .020, e^b = 2.97, 95% CI: 1.19 – 7.42. However, participants who read both types of information (statistical plus narrative information) moved victims less often compared with participants who only read the narrative, χ^2 (1, *N* =156) = 6.20, *p* = .013, e^b = .24, 95% CI: .08 – .74.

Other Behavior

Besides moving victims, participants had several other options in the virtual environment: talking to victims, talking to bystanders, calling the emergency services, sending a tweet, and searching for information. Table 4.3 displayed the mean scores or percentages on these various types of behavior for the four types of prior information.

Table 4.3 Means, Standard Deviations and Percentages Per Condition

	Statistical	Narrative	Statistical – narrative	Control
Move victims [a] N (%)	14 (35.0)	34 (87.2)	24 (61.5)	13 (34.2)
# contact victims [b] M (SD)	5.48 (5.32)	6.00 (3.33)	5.64 (4.15)	4.16 (2.85)
# contact bystanders [b] M (SD)	3.43 (3.34)	2.54 (2.30)	4.23 (3.64)	3.92 (3.66)
Call emergencies [a] N (%)	30 (75.0)	24 (61.5)	28 (71.8)	26 (68.4)
Search for information [a] N (%)	4 (10.0)	3 (7.7)	6 (15.4)	10 (26.3)
Send a tweet [a] N (%)	1 (2.5)	0 (0.0)	0 (0.0)	2 (5.3)
Affective response [c] M (SD)	3.81 (1.28)	4.69 (1.02)	4.50 (1.24)	3.83 (1.39)
Risk awareness [c] M (SD)	4.96 (.78)	5.16 (.86)	5.06 (.84)	4.79 (.84)

[a] = binary variables: no/yes, [b]= counting variables, [c]= scale variables: 1-7. *N* = 156.

Analyses showed no significant effects between the four conditions on talking to victims, talking to bystanders, calling the emergency services and checking the information app, all *p* = ns. In addition, we found no effect on sending a tweet, probably due to the low number of participants who sent a tweet (*N* = 3).

Affective Response and Risk Awareness

To learn more why certain information has more influence on people's decisions, we were also interested in whether type of prior information (statistical, narrative or both) has an influence on affective response and risk awareness. Analysis of variance was applied. Table 4.3 presents the means on these measures for the four types of prior information.

Affective response. Consistent with the manipulation of type of prior information, significant differences were found between the conditions on affective response, $F(3, 152) = 5.31$, $p = .002$, partial $\eta^2 = .10$. Pairwise post hoc comparisons, using a Bonferroni adjustment, showed that affective response was rated significantly higher in the narrative condition ($M = 4.69$), compared to the statistical condition ($M = 3.81$, $p = .011$) and control condition ($M = 3.83$, $p = .016$). The difference between the narrative condition and the statistical plus narrative information condition ($M = 4.50$), however, was not significant. In addition, the statistical plus narrative information condition scored also marginal higher on affective response, compared to the statistical condition ($p = .083$).

Risk awareness, No effects were found for type of prior information on risk awareness, all p = ns.

Mediation Analysis

To investigate whether affective responses mediate the relationship between type of prior information and moving victims, we used a multiple mediator process model that allows for a multicategorical independent variable (Hayes & Preacher, 2013). With this model we estimated the confidence intervals (based on 10.000 bootstraps) of the indirect effect of type of prior information on moving victims, through affective response. Consistent with our previous analyses, we found direct effects of narratives, b = .86, SE = .28, p = .003, 95% CI [.31; .1.42], and affective response on moving victims, b = 2.46, SE =. 60, p < .001, 95% CI [1.29; 3.63]. However, the indirect effect of narratives on moving victims through affective response did not differ significantly from zero, b = .12, 95% CI [-.10; .45]. Therefore, affective response did not mediate the relationship between narratives and moving victims.

Discussion

Decision making during a crisis is affected by several sources of information and prior knowledge, such as factual (statistical) information, narratives of others and real-time governmental messages. Our main research question was how these two types of information, provided separately or simultaneously, influence behavior during two distinct phases of an incident: before and after an official crisis message was provided. In line with our expectations, the results show that in times of relative uncertainty about the situation (i.e. before the crisis communication), victims were most often moved by participants who had only received the narrative information. This result was to be expected as the narrative vividly highlighted a potential negative effect of not moving the victim, whereas in the statistical information this potential consequence was only mentioned. The persuasive effect of the narrative is consistent with prior research in medical decision making, which shows mostly that narratives have a stronger influence on individual's decisions regarding a treatment than statistical information (Fagerlin et al., 2005; Ubel et al., 2001; Winterbottom et al., 2008). This result is also in line with the meta-analysis of Zebregs et al. (2015), which made a differentiation on the outcome measures. Narrative information was found to have a stronger influence on behavioral intentions. However, when participants had also received statistical information besides the narrative, this persuasive effect was reduced. So despite the persuasive strength of narratives, participants' decisions were mostly informed by the statistical information. This result corresponds with the findings of Fagerlin et al. (2005), which were obtained in the medical domain.

However, after the crisis message was received, victims were not only moved more often by participants who had received the narrative information, but also by those who had received both statistical and narrative information. In the statistical information condition the same percentage was found as in the control condition. The crisis communication message informed participants that the situation could be dangerous, and that they should take some distance and wait for the emergency services to arrive. In all conditions the number of victim movements increased after this message, but most so in the narrative condition and the statistical plus narrative information condition. So unlike the first phase, we did not see a mitigating effect of the statistical information on the narrative information.

One explanation for the persuasive effect of narratives on decision making may be that affective responses (e.g., stress and anxiety) are triggered, which generally have strong effects on decision behavior (Betsch et al., 2013; Slovic et al., 2007; Winterbottom et al., 2008). In line with this explanation, we found that participants had stronger affective responses in the narrative condition and in the statistical plus narrative condition, than in the control and statistical conditions. However, in contrast to what we expected, we did not find that affective responses mediate the relationship between type of prior information and moving victims. This suggests that the persuasive effect of narratives is caused by other mechanisms than affect. Based on the theory of narrative transportation, narratives could inhibit negative cognitive responding. As a consequence people are less open to counter arguments, and less aware of real-world facts that contradict the assertions made in the narrative (Green & Brock, 2000). The exemplification theory, on the other hand, exerts that narratives evoke specific heuristics, such as the representativeness heuristic and the availability heuristic (Gibson & Zillmann, 1994; Zillmann, 2006). Common in both heuristics is that people's perceptions are strongly influenced by examples that come to mind easily, under or overestimating the actual frequencies of situations. Fur future research it would be interesting to systematically investigate why narratives have this persuasive effect on decision making and behavior.

We found no evidence to support our expectation that prior information influences risk awareness. This contrasts with previous research, where it was found that narratives led to a higher level of risk awareness, compared with statistical information (Fagerlin et al., 2005; Wachinger et al., 2013). A possible explanation is that the crisis situation in this study was quite clear and relatively common. Most citizens already have some awareness of risks involving traffic accidents. This familiarity could have moderated the effect of additional information on risk awareness, even when it is a narrative. Another explanation may be that the content of our messages was not well-suited to influence risk awareness, as none of the messages involved any personal risk for the participants (Kievik & Gutteling, 2011).

While this study revealed several interesting effects of different types of information on decision making during a crisis, we wish to acknowledge some limitations and strengths of

this experimental study. One important limitation of this study is that our results are only based on one very specific form of a narrative (a vivid portrayal of possible consequences when someone decide not to not move a victim after a car accident) and one specific form of statistical information (probability information about moving a victim and potential consequences). Results may be different when the information contains a different purpose, content or valence and for that reason our results cannot be generalized to narrative and statistical information in general (Shaffer & Zikmund-Fisher, 2013; Steiner, 2005). Another concern regarding the generalizability of our results is that we used one specific (virtual) crisis situation that was relatively clear. In real life, most crisis situations are far more complex, with more victims and helpers, a broad range of response options, more confusion about what exactly is going on, and where something is actually at stake. Although the virtual environment allowed us to measure actual behavior instead of intentions, and helped reach high levels of immersion and realism, it is still not completely similar to actual crisis situations. More research is needed to investigate the effects of these additional variables on human behavior in crisis situations.

Another limitation of the current study is that the type of information manipulation was given just before participants were confronted with the traffic accident. In real life, there is often time between receiving information about a crisis (e.g., narratives and risk information), and an actual crisis situation. This may lead to an overestimation of the effect of narratives in our research. As noted by Baumeister, Vohs, Nathan DeWall, and Zhang (2007) the affective response related to a narrative is likely to diminish over a period of time, or is likely to be overruled by affective reactions triggered by other situations. This suggests that the effect of statistical information lasts longer, compared with the narrative. However, as our research showed, a trigger such as an official governmental message can enable citizens to recall previously stored information, and this can again increase the influence of the narrative on citizens' behavior. To gain more insight into the persistence of the effect of narratives, future research should focus on research designs where the crisis follows the prior information after a longer period of time, or one with some cognitive- or affective load between the information and the crisis.

In conclusion, our results indicate that more victims were moved in the narrative condition before an official message was received. Participants who had received statistical information or both types of information performed similar to the control condition. After the official message, informing participants to keep distance, more victims were moved in the narrative condition and in the combined narrative and statistical condition. A narrative therefore has stronger effects when (information about) the actual situation matches the narrative's content. In contrast with our expectations, affective response did not mediate the relationship between narrative information and moving victims. An alternative explanation would be that narratives trigger a more heuristic way of information processing.

Appendix 4A Manipulation Type of Information [5]

Statistical information

Never had so much traffic accidents

The number of traffic accidents whereby cars were involved has increased in the past year to a record of 500.000 reports. That shows the Risk-monitor Traffic 2015 written by the Association of Insurers. The exact number is unknown, because a traffic accident is not registered when the police is not warned.

Further, the study shows that traffic accidents lead to an estimation of 840.000 injuries every year. Medical treatment by a doctor was needed in 40% of these cases. In addition, 20% was treated in the emergency room and nearly 10% was admitted to the hospital. Finally, 950 people were deceased in traffic accidents.

The first minutes after a traffic accident are crucial to a successful outcome and full recovery of victims. Research shows that in 80% of the situations, victims should not be moved after an accident, because injuries can occur or can become more severe. However, in 20% of the situations victims should be moved because of immediate environmental hazards, such as a fire or explosion risk. Otherwise, not moving may lead to a fatal outcome.

Narrative

A narrative about an own experience

Anne: “It was a big nightmare. On that particular evening I was on my way home, when I witnessed a terrible accident. A truck collided with the car that drove in front of me. After I stopped my car I ran straight to the location of the accident. In the car that was hit, I saw a man with a lot of scratches, he looked deathly pale and seemed in shock. There was a lot of blood on his leg, but I was not able to clearly see the wound. I decided to not move the victim and to wait for the emergency services. Until I realized that there was a lot of smoke that came from the hood of the car, and before I realized what was going on the entire car was ablaze. I tried to get the victim out of the car, but I was not able to do that because of all the flames. At this moment I still feel very guilty about this. If I had moved the victim immediately to a safe place, then the whole situation was ended differently.

Control

Many Dutch go on holiday

The number of Dutch citizens going on holiday this summer has risen to a record of 12.5 million people this year. This is reflected in the ANWB vacation plans-monitor 2015. The exact number is unknown, because a holiday is only registered when the holiday is booked through an authorized travel agency. The survey further shows that people spend approximately 1500 euros annually on their vacation.

[5] Participants in the statistical-narrative condition received both the statistical information and the narrative. All manipulations are translated from Dutch.

By 40% of the people, the holiday money is used to pay their holiday. In addition, 20% spent their year-end benefits and 10% of the holidaymakers use their savings to pay their holiday. Finally, a small percentage takes a loan.

For couples and families, the woman is decisive in booking a holiday. The survey shows that in 80% of the situations, the woman searches the holiday, because she is the major regulator and is the most active one in seeking and booking holidays. However, in 20% of the situations, the whole family helps in figuring out the holiday, even if the woman is finally the big regulator.

CHAPTER 5

The Interplay Between Official Crisis Communication and Peer Reactions via Social Media During a Crisis

This chapter is based on:

Bakker, M.H., van Bommel, M., Kerstholt, J.H., & Giebels, E. (Submitted). The Interplay Between Official Crisis Communication and Peer Reactions via Social Media During a Crisis.

In times of crisis, the government informs citizens in the affected areas about the crisis (Seeger, 2006). However, past crises show that citizens also obtain information from other sources, such as social media (Cho et al., 2013). Immediately after a crisis, a lot of crisis-related information is quickly shared with other citizens who are involved in the crisis through online networks, such as Twitter. Information is shared about the crisis itself, own experiences are ventilated and advice is given about how to best deal with the situation (Palen et al., 2009; Veil et al., 2011). With this paramount role of social media during a crisis, the question arises how the effectiveness of crisis communication from the government is influenced by peer reactions of involved citizens on social media.

In this paper we will focus on two potential problems. First, the content of information from peers often conflicts with that from the government and often even conflicts with the content from other peers (Verroen et al., 2013). Conflicting information can make citizens feel uncertain and behave in a less self-reliant way (Gutteling & De Vries, 2016). Up to now, research only investigated the effect of either supporting (reactions that correspond with the crisis communication) or opposing peer reactions (reactions that contrast the crisis communication) on self-reliant behavior (Verroen et al., 2013), but in the real world it is more likely that citizens are exposed to both supporting and opposing information from peers at the same time (J. Lee, Park, & Han, 2008). Moreover, peer reactions may also change the perception of citizens towards their peers and the government, which can influence how someone responds to the information (Betsch, 2011; Pieniak et al., 2007). Second, the government often waits with distributing crisis information until all facts are confirmed in order to avoid providing uncertain crisis information (e.g., Kavanaugh et al., 2012; Steelman & McCaffrey, 2013). As a result, the government typically provides information much later than peers on social media. A recent study, however, underscores the importance of distributing crisis information fast, even when not all information is certain (Seeger, 2006). Otherwise, potentiality less credible sources may distribute information about the crisis, which may lead to misinformation (Steelman & McCaffrey, 2013). Although we know that crisis communication can stimulate self-reliant behavior (e.g., Kievik & Gutteling, 2011; Lindell & Perry, 2012), less is known about the influence of fast, but uncertain crisis information on self-reliant behavior. Moreover, it is likely that uncertain crisis information also influences citizens' perceptions towards the government, which may influence adoption of the governmental advices (Paek, Hove, Ju Jeong, & Kim, 2011).

Beside the effects of peer reactions and type of crisis information on self-reliant behavior and perceptions, we will investigate the interplay between peer reactions from social media and crisis communication, because peer reactions may influence the effectiveness of the crisis information (Austin et al., 2012; Veil et al., 2011). In this paper we focus on peer reactions of involved citizens on Twitter. Research shows that Twitter is often used first to report about a crisis (Cho et al., 2013). Participants were exposed to a scenario of a large-

scale fire with hazardous substances; afterwards, they received peer reactions on Twitter and crisis information from the government.

Peer Reactions via Social Media

Given the fact that peer reactions on social media often act as a source of information during a crisis (Jin et al., 2014), a question that arises is what impact these peer reactions may have on citizens' self-reliant behavior. Self-reliant behavior is the capacity to draw upon personal and social sources, in order to minimize the consequences of a crisis (Paton, McClure, & Bürgelt, 2006). In crisis communication research, self-reliant behavior is often studied in relation to four psychological factors: risk awareness, affective response, self-efficacy and response efficacy. Research shows that crisis information about the actual situation and information on how to handle the crisis may influence these psychological factors and subsequently these factors can increase self-reliant behavior (Kievik & Gutteling, 2011; Lindell & Perry, 2012; Witte & Allen, 2000).

The impact of peer reactions via social media seems large. Research shows that citizens perceive crisis information on social media as usable and reliable (Vieweg et al., 2010). Consequently, information on social media may be very important for the decisions citizens make in response to a crisis (Cho et al., 2013). Peer reactions may therefore lead to self-reliant behavior when the information is perceived as helpful and adequate. However, peer reactions may also lead to less self-reliant behavior, when, for example, people feel that incorrect or inadequate information is distributed (Kavanaugh et al., 2012; Regan, Raats, Shan, Wall, & McConnon, 2016). In addition to inadequate peer reactions, citizens may also be confronted with peer reactions that explicitly oppose the advice given by the government. The availability of an abundance of and (partly) opposing information may overwhelm an information seeker. Therefore, opposing information can make people feel uncertain about the situation and they may behave in a less self-reliant way (Betsch, 2011; Gutteling & De Vries, 2016).

Verroen et al. (2013) studied whether opposing and supporting peer reactions had an influence on the effect of crisis communication. They found that peer reactions through social media influence citizens' self-protective behavior when the crisis communication contains low efficacy information. The likelihood to take protective actions was reduced when participants were exposed to peer reactions opposing the crisis communication. In real world settings, however, citizens are not only confronted with peer reactions that all oppose the crisis communication. It is more likely that citizens are exposed to both supporting and opposing information from peers at the same time (J. Lee et al., 2008). During a fire in the Netherlands, for instance, citizens on Twitter warned others for the smoke and stated that they went inside and closed their windows. However, other citizens went outside and made photos of the fire which they posted on social media (Helsloot & Groenendaal, 2013). Up to

now, research only investigated the effect of either opposing or supporting peer reactions (Verroen et al., 2013), however, it would be worthwhile to also examine the effect of mixed peer reactions on self-reliant behavior and perceptions, as it is closer to reality.

Communicating Uncertain Information

During a crisis, peer reactions on social media spread fast, but these reactions are not always reliable. The government generally provides reliable crisis information, but it often takes a while before the first information is distributed (Steelman & McCaffrey, 2013). For instance, during the Chemie-Pack fire in The Netherlands, the government waited to communicate with the public until all information about the fire was confirmed (Joustra et al., 2012). As a result, citizens already received information about the fire from other (less reliant) sources. For that reason, the crisis communication literature advises governments to be the first to communicate about a crisis, as a crisis creates an immediate need for information (T. L. Sellnow & Seeger, 2001; Steelman & McCaffrey, 2013). Waiting until all information is known usually means that the information is simply too late. Potentially less credible sources will tell the story of the crisis, which may lead to misinformation. A downside of providing crisis information fast is that incorrect information may be distributed, potentially undermining the credibility and trustworthiness of the government (Seeger, 2006). Therefore, it is advised to accept uncertainty in crisis communication and to avoid overly confident statements, because that allows the spokesperson to adjust messages when more information about the crisis becomes available (Freberg, 2012; Veil et al., 2011). Acknowledging uncertainty can be done by using statements such as, 'The situation is fluid' and 'We do not yet have all the facts' (Seeger, 2006).

Although the government is honest about the situation when they use this kind of "uncertain" statements, the government cannot provide complete certainty about the situation. One typical reaction that has been well-documented in the decision making literature is that people tend to avoid uncertain situations (Fox & Weber, 2002; Morton et al., 2011) and tend to be less inclined to act in line with information that conveys uncertainty rather than certainty (Rabinovich & Morton, 2012; Van Dijk & Zeelenberg, 2003). In such an uncertain situation, people don't know what to do and so they may adopt the attitude 'If we don't know what is going to happen, why should we take action right now?' (Morton et al., 2011).

Taken together, the literature does not provide an unequivocal answer to how crisis communicators should cope with uncertainty while being in direct competition with information on social media. Two bodies of literature provide different types of answers. On the one hand, the crisis communication literature suggests that in order to remain seen as trustworthy, communicators have to accept uncertainty and that they have to communicate about a crisis even when not all information is available (Seeger, 2006; Veil et al., 2011). On

the other hand, the literature on decision making shows that communication with a certain level of uncertainty may lead to avoidance and passivity (Fox & Weber, 2002; Morton et al., 2011; Rabinovich & Morton, 2012). Therefore, it would be worthwhile to empirically examine the effect of certain versus uncertain crisis communication on self-reliant behavior.

Perceptions Towards Peers and the Government

Peer reactions and type of crisis communication may not only influence someone's self-reliant behavior, but also someone's perception towards peers and the government. This may be specifically the case during a crisis with high levels of uncertainty. In such a situation, someone may feel dependent on others who are more knowledgeable about the crisis (Coombs, 2014; Reynolds & Seeger, 2005). Furthermore, perceptions towards peers and the government can influence how someone responds to the information (Paek et al., 2011; Pieniak et al., 2007). In this study, perceived similarity and trust are used as indicators of citizens' perception towards peers and the government.

Perceived similarity. Perceived similarity appears particularly influential for decision making (Hilverda, Kuttschreuter, & Giebels, 2017; Paek et al., 2011). When someone perceives others as similar to themselves, this person is likely to experience greater levels of personal identification, which in turn makes this person more susceptible to others' influences (Rimal, Lapinski, Cook, & Real, 2005). The more similar the other person is perceived to be, the more likely behavior is influenced by this person (Faraji-Rad et al., 2015).

In the context of a crisis, individuals receive information from the government, but they also receive information on social media from peers. Based on the mechanisms of perceived similarity, it is expected that individuals perceive themselves more similar to peers compared with the government. However, we suggest that it is not only the person that influences perceived similarity, but also what this person is saying or doing. This makes it likely that perceived similarity with peers is influenced by type of peer reactions.

Trust. Trust in the sender is another influential factor for decision making during a crisis (Becker et al., 2015). As most people do not have detailed knowledge of every crisis, people have to rely on others who have more information about a specific situation (Siegrist, 2000). When the sender is trusted, people are more likely to use that information to make their decision. However, when the sender is not trusted, the value of the information will be of no value to the receiver (Pieniak et al., 2007).

During a crisis, people will receive crisis information from both the government and peers. Which information is used to make a decision depends among others on how trustworthy that source is seen to be (Reynolds & Seeger, 2005; Steelman et al., 2015). Some research shows that people perceive official sources, such as the government, as more credible and trustworthy sources for crisis information than unofficial sources such as peers (B. F. Liu, Fraustino, & Jin, 2016; Steelman et al., 2015; Wogalter, 2006). Other research, however,

revealed that people sometimes view unofficial sources as more trustworthy, because the information was faster and more locally relevant than crisis information (J. N. Sutton et al., 2008).

Which source is seen as more trustful depends on the situation, but also on the content of information. Some studies in the field of risk communication have investigated what impact supporting or opposing information may have on trust in the information source (Dijk, Fischer, & Frewer, 2011; Regan et al., 2014). In general, receiving opposing information about a risk leads to less credibility of messages and less trust in those communicating them (Breakwell & Barnett, 2002; Smithson, 1999). Research of Smithson (1999) showed that people view opposing sources as less knowledgeable and less reliable, than sources that are in line with each other. However, other research found that communicating opposing risk information did not decrease the trust in the government (Dean & Shepherd, 2007). An explanation for this difference in result is that in Smithson's study the experts were not identified, i.e. the sources were unknown. In the study of Dean and Shepherd (2007), however, it was known who the sender was (and thus the expert) of the information. In real life people may draw upon this information when making a decision. As it is not completely clear how opposing or supporting peer reactions affect trust in both the government and peers, we tested these effects.

Another question that remains unanswered is how uncertain crisis communication through crisis communication influences trust in the government. Seeger (2006) suggests that uncertain crisis communication does not lead to lower trust in the government. As uncertainty is inherent in a crisis situation, it is better to distribute information fast even when some level of uncertainty exists about the crisis. Waiting to share information until all information is confirmed take too long and that may reduce trust in the government (Joustra et al., 2012). However, as far as we know, this has not been studied in an empirical research.

Present Study

Based on the previous discussion we examined the research question to what extent peer reactions on social media influence the effectiveness of crisis communication. In Study 5.1, we studied the interplay between peer reactions and crisis communication and its influence on behavior and perceptions. Peer reactions were supporting or opposing the crisis communication. In addition, as it is likely that in the real world individuals are exposed to opposing information on social media, we also examined the effect of mixed peer reactions. In Study 5.1, participants first receive the peer reactions followed by the crisis communication, as this is close to reality. However, as we mentioned before, the crisis communication literature advises the government to be the first to communicate about a crisis even when not all facts are known (Seeger, 2006). Therefore, in Study 5.2, we tested the influence of an uncertain crisis message from the government in the interplay with peer

reactions, and their effect on self-reliant behavior and perceptions. Participants first received crisis information from the government, which is either certain or uncertain, followed by the same peer reactions manipulation as in Study 5.1.

Study 5.1

In this study an experimental design was used to uncover the interplay between official crisis communication and peer reactions via social media. In this study we manipulated opposing, supporting and mixed reactions from involved citizens (a control condition was included in which participants received no peer reactions). Participants first received the peer reactions and then the official crisis communication.

Method

Participants

A total of 176 students from the University of Twente participated in the experiment in exchange for course credits. We excluded eight participants who completed the experiment in less than 1/3 of the median duration. In addition, data of 15 participants were removed, as they failed to answer the question about the content of the information correctly, leaving 156 participants for statistical analyses (M_{age} = 20.00, SD_{age} = 1.80; 120 females, 36 males). No differences were found between the four conditions for gender, χ^2 (3) = 2.59, ns., nationality, χ^2 (6) = 4.51, ns., or prior experience with a fire involving hazardous substances, F (3,152) = .46, ns. A significant difference between the four conditions was found for age, F (3,152) = 3.26, p = .019. As age was not correlated with the dependent variables, we did not control for it.

Design and Procedure

Participants were presented with several messages about a large-scale fire at a warehouse that stored hazardous substances. These messages were based on information that was released during a large-scale fire at Chemie-pack in the Dutch city Moerdijk. Participants were told that we were interested in the decisions they make during that crisis. First, participants had to read a scenario about the fire that raged close to their homes.

After reading the scenario, the participants were randomly confronted with one of the four types of peer reactions. See Appendix 5A for examples of each type of peer reactions. Participants in the condition with supporting peer reactions received Twitter messages from peers who showed adequate behaviors (i.e. self-reliant behavior) in response to the crisis that was in line with the official crisis communication that would follow later on. In line with research of Verroen et al. (2013) ten Twitter-like messages were simultaneously shown on the screen in random order, of which eight messages gave adequate reactions about how

peers handle the situation, and two were left neutral to obscure the purpose of the study. Participants in the opposing peer reactions condition received Twitter messages from peers who showed behavior in response to the crisis that was not in line with the official crisis communication. Participants received ten messages in random order, eight messages gave opposing reactions and also two messages were included that were neutral. In the condition with mixed peer reactions, participants received from peers four messages with supporting peer reactions, four messages with opposing peer reactions and two neutral messages. In the control condition, participants did not receive any peer reactions, but they directly received the official crisis communication.

After the peer reactions manipulation, participants received a message from the government; the official crisis communication. In this message more information was given about what was known about the crisis and advice was given about how to act.

Measures

After participants read the official crisis communication, participants had to fill out a questionnaire, to be answered on seven-point Likert type scales, mostly in the form of: 1 (totally disagree) to 7 (totally agree).

Self-reliant behavior. The intention to perform self-reliant behavior was based on research of Verroen et al. (2013). A six-item scale was used to indicate how likely they were to adopt self-reliant behaviors ($\alpha = .76$). Questions were asked about following up the advice from the government: closing windows, doors and ventilation shafts, going inside and keeping informed about the latest developments of the fire.

Trust. Based on a study of Regan et al. (2014) trust in peers who tweeted and trust in the official communicator was measured using a five-item scale. Participants were asked to what extent they agreed that the people who had sent tweets demonstrated expertise, honesty, trustworthiness, accurateness and credibility ($\alpha = .73$). Similar items were used to assess trust in the government ($\alpha = .89$).

Perceived similarity. Perceived similarity was based on a study of Hilverda et al. (2017). Participants were asked to what extent the persons who sent tweets about the fire were comparable to them and whether these persons were in the same situation as the participant ($r = .38$, $p < .001$). Similar items were used to assess the perceived similarity with the person who sent the official crisis communication ($r = .59$, $p < .001$).

Certainty own judgment. Certainty of own judgment was newly developed. Participants were asked 'how certain do you feel that you chose the correct behavior' and 'how certain are you that you have correctly assessed the situation' ($r = .70$, $p < .001$).

Self-efficacy. The self-efficacy scale was based on previous studies conducted by Lindell and Perry (1992) and Terpstra (2010). Participants reported whether they felt able to deal adequately with the crisis. Three questions were asked like: 'I am able to deal adequately

with the fire' and 'I have the knowledge to respond in an appropriate way regarding the fire' (α = .74).

Response efficacy. Response efficacy was based on research of Verroen et al. (2013) and measured the perceived effectiveness of the advised self-reliant behaviors. A six-item scale was used (α = .83): e.g. 'Following the official advice from the government is effective in preventing negative consequences of the crisis' and 'Staying informed about the latest news concerning the fire is useful'.

Risk perception. Four items measured risk perception. Participants were asked how they judged the large-scale fire with hazardous substances based on the probability and consequences. These items were based on research of Gutteling and De Vries (2016). An example item is: 'The probability that I have to face the consequences of this fire is large'. One item that was intended to measure the seriousness of the fire showed low inter-item correlations with the other measures in the scale, and was consequently deleted (α = .64).

Affective response. Participants reported their affective response with respect to the fire in terms of feeling tense, anxious, nervous and concerned (scale: not at all – very much; α = .85). These items were adapted from Wiegman and Gutteling (1995).

Finally, a question was asked about their prior experiences with a fire involving hazardous substances. Demographics were collected about age (in years), gender (male = 0, female = 1), and nationality (Dutch = 0, German = 1, Other = 2).

Table 5.1 Means and Pearson correlations

Constructs		*M*	*SD*	Correlations								
				1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Self-reliant behavior	6.29	.98									
2.	Self-efficacy	5.14	1.06	.09								
3.	Response efficacy	5.70	.95	.21*	.45**							
4.	Risk perception	5.12	.87	.18*	.09	.23**						
5.	Affective response	4.99	1.07	.09	-.22**	.12	.39**					
6.	Trust peers	3.22	1.07	-.09	.01	.01	.02	.03				
7.	Trust government	5.27	1.09	.20*	.24**	.54**	.17*	.14	.27			
8.	Similarity peers	3.90	1.46	.13*	.14	.13	.14	.15	.43**	.04		
9.	Similarity government	3.11	1.38	.01	.21**	.27**	.04	.04	-.26**	.38**	-.20*	
10.	Certainty own judgment	4.99	1.16	.20*	.44**	.59**	.21*	.02	.02	.45**	.07	.27**

Significance levels: *p < .05, **p < .01, N = 114-156

Results

Means and Correlations

Participants scored quite high on self-reliant behavior (M = 6.29). As can be seen in Table 5.1, self-reliant behavior correlated positively with response efficacy (r = .21), risk

perception (r = .18), trust in the government (r = .20), perceived similarity with peers (r = .13) and certainty about their own judgment (r = .20). In addition, paired sample t-test showed that participants perceived themselves more similar with peers (M = 3.90) than with the government (M = 3.11), t (113) = 3.80, p < .001. Also, participants have more trust in the government (M = 5.40), compared to trust in peers (M = 3.19), t (114) = 16.37, p < .001.

Analysis

To learn more about the effect of peer reactions on citizen' self-reliant behavior and other dependent variables, analysis of variance was applied. See Table 5.2 for the means and standard deviations across the conditions.

Table 5.2 Means and standard deviations per peer reactions condition

	Supporting		Opposing		Mixed		Control	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Self-reliant behavior	6.62	.44	6.17	.73	6.53	.49	6.27	.95
Self-efficacy	4.95	1.06	5.13	1.08	5.36	1.04	4.99	1.06
Response efficacy	5.50	.95	5.82	.87	5.92	.74	5.47	1.15
Risk perception	5.26	.80	4.98	.88	5.33	.71	4.92	1.04
Affective response	5.32	.93	4.82	1.07	5.00	1.11	4.83	1.16
Trust peers	3.84	.99	2.59	.96	3.25	.82	*	*
Trust government	5.15	1.09	5.55	.90	5.47	1.22	4.85	1.02
Similarity peers	4.91	1.22	3.30	1.24	3.56	1.42	*	*
Similarity government	2.29	1.01	3.49	1.28	3.39	1.33	3.07	1.55
Certainty own judgment	4.76	1.21	5.11	.98	5.45	1.04	4.57	1.17

***** Participants in the control group did not receive any peer reactions. Therefore we did not ask for trust in peers and perceived similarity with peers.

Self-reliant behavior. There was a significant main effect for self-reliant behavior, F (3, 153) = 3.16, p = .014, partial η^2 = .07. Pairwise post hoc comparisons, using Bonferroni adjustment, showed that participants who received supporting peer reactions scored higher on intentions of self-reliant behavior (M = 6.62), compared with participants who received opposing peer reactions (M = 6.17, p = .033).

Trust in peers. There was a significant main effect for trust in peers, F (2, 114) = 17.03, p < .001, partial η^2 = .24. Pairwise post hoc comparisons, using Bonferroni adjustment, showed that participants who received supporting peer reactions, scored higher on trust in peers (M = *3*.84), compared with participants who received opposing peer reactions (M = 2.59, p < .001), or mixed peer reactions (M = 3.25, p = .020). This indicates that participants had more trust in their peers when information from peers is supporting the official crisis information,

compared with participants who received peer reactions that were opposing the official crisis information or those who received mixed peer reactions. In addition, participants who received opposing peer reactions, scored lower on trust in peers compared with participants who received mixed peer reactions (p = .006).

Trust in the government. There was a significant main effect for trust in the government, F (3, 153) = 3.55, p = .016, partial η^2 = .07. Participants who were in the control group and received no peer reactions, scored lower on trust in the government (M = 4.85), compared with the participants who received opposing peer reactions (M = 5.55, p = .024) or mixed peer reactions (M = 5.47, p = .064).

Perceived similarity with peers. There was a significant main effect for perceived similarity with peers, F (2, 114) = 15.95, p < .001, partial η^2 = .22. Participants who received supporting peer reactions scored higher on the perceived similarity with peers (M = 4.91), compared with the participants who received opposing peer reactions (M = 3.30, p < .001, or those who received the mixed peer reactions (M = 3.56, p < .001). In addition, participants in the mixed peer reactions scored significantly higher on perceived similarity with peers, compared with the participant who received opposing peer reactions (p < .001).

Perceived similarity with the government. There was a significant main effect for perceived similarity with the government, F (3, 153) = 6.05, p = .001, partial η^2 = .11. Pairwise post hoc comparisons, using Bonferroni adjustment, showed that participants who received peer reactions that were supportive of the official crisis information, scored lower on perceived similarity with the government (M = 2.29), compared with participants who received opposing peer reactions (M = 3.49, p = .001), or those who received mixed peer reactions (M = 3.39, p = .003).

Certainty of own judgment. There was a significant main effect on certainty of own judgment, F (3, 153) = 4.58, p = .004 partial η^2 = .08. Pairwise post hoc comparisons, using Bonferroni adjustment, showed that participants in the mixed peer reactions condition scored higher on certainty in own judgment (M = 5.45), compared with participants who received supporting peer reactions (M = 4.76, p = .006) or participants who received no peer reactions (M = 4.57, p = .004).

We did not find any effects of peer reactions on self-efficacy, response efficacy, risk perception and affective response, all *p's* >.195.

Discussion

Study 5.1 shows that the type of peer reactions preceding official crisis information influences both self-reliant behavior and perceptions towards peers and the local government, i.e., trust and perceived similarity. In line with our expectations, participants who received supporting peer reactions that were in line with the official crisis information

showed more self-reliant behavior compared with participants who received opposing peer reactions. With respect to trust in peers and the government, we found that participants who received opposing or mixed peer reactions exhibited less trust in their peers but -interestingly- more trust in the government, compared with participants who received supporting peer reactions. Finally, participants perceived themselves less similar to peers in the mixed or opposing peer reactions condition compared to peers in the supporting peer reactions condition.

Study 5.2

In this study we focused on the interplay between the same peer reaction categories from study 5.1 and a new variable: a certain versus uncertain crisis message from the government. Participants first receive crisis information from the government, followed by peer reactions. Again, our dependent variables are self-reliant behavior and perceptions towards peers and the government.

Method

Participants

An experiment was conducted with 263 graduate students. Some participated in exchange for course credits and some participated voluntarily. The data of 21 participants who had not filled out the entire questionnaire were removed. In addition, data of 10 participants were removed, as they failed to answer the question about the content of the information correctly, [6], leaving 232 participants for statistical analyses (M_{age} =20.56, SD_{age} = 2.27; 150 females, 82 males). Participants indicated via self-report (7-point Likert type scale: not at all – very much) that they in general judged the scenario as realistic (M = 4.97, SD = 1.14), and that they were able to picture themselves in the situation (M = 5.11, SD = 1.27). No differences were found between the eight conditions for age, F (7, 232) = .35, ns., gender, χ^2 (7, N =232) = 3.63, ns., nationality, χ^2 (14, N =232) = 14.08, ns., or prior experience with a fire involving hazardous substances, F (7,232) = 1.85, ns.

Design and Procedure

The study was a 2 (type of crisis communication: clear, uncertain) x 4 (peer reactions: supporting, opposing, mixed, control) between subjects design. The same scenario, about a large-scale fire, was used as in study 5.1 (see Appendix 5A). After reading the scenario, participants received information from the local government about the crisis and advice was given about self-protective actions. However, half of the participants received clear information about the crisis. The other half received information that included some level

[6] The 31 of 263 participants who had to be excluded were equally divided across conditions.

of uncertainty, explicitly stating that not all facts about the crisis were already known. For example, 'At this moment it is still unknown which hazardous substances have been released' (See Appendix 5B).

After reading the official crisis communication, participants were randomly assigned to one of the four types of peer reactions. This manipulation was similar to the manipulation used in study 5.1.

Measures

Instruments were similar to those in study 5.1, except for a few modifications. To prevent possible ceiling effects, we adjusted our self-reliant behavior measurement by introducing three items that were opposite to self-reliant behavior. An example would be 'How likely is it that you ventilate your home?'. Consequently three items were added to the response efficacy scale. Consistent with study 5.1, all scales proved to be reliable: self-reliant behavior (α = .76), self-efficacy (α = .74), response efficacy (α = .73), risk perception (α = .64), affective response (α = .87), trust in peers (α = .84), trust in the government (α = .87), perceived similarity with peers (r = .30, p < .01), perceived similarity with the government (r = .43, p < .01), and certainty own judgment (r = .67, p < .01).

Results

Means and Correlations

Participants again scored quite high on self-reliant behavior (M = 5.98). In addition, participants had in general more trust in the government (M = 5.33) than in their peers (M = 3.15). As can be seen in Table 5.3, self-reliant behavior correlated positively with self-efficacy (r = .39), response efficacy (r = .64), risk perception (r = .23), affective response (r = .14), trust in the government (r = .33), and certainty of their own judgment (r = .34). In addition, paired sample t-test shows that participants perceived themselves more similar with peers (M = 3.78) than with the government (M = 3.39), t (173) = 2.79, p = .006. Also, participants have more trust in the government (M = 5.37) than in peers (M = 3.15), t (173) = 20.51, p < .001.

Table 5.3 Means and Pearson correlations

Constructs		*M*	*SD*	Correlations								
				1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Self-reliant behavior	5.98	.74									
2.	Self-efficacy	5.00	1.14	.39**								
3.	Response efficacy	5.79	.70	.64**	.40**							
4.	Risk perception	4.98	.97	.23*	.11	.28**						
5.	Affective response	4.91	1.13	.14*	-.20**	.06	.36**					
6.	Trust peers	3.15	1.16	-.03	.10	.01	-.04	.18*				
7.	Trust government	5.37	.95	.33**	.20**	.45**	.34**	.01	.06			
8.	Similarity peers	3.77	1.38	.06	.07	.06	.02	.28**	.50**	..13		
9.	Similarity government	3.44	1.28	-.04	.04	-.05	.06	.10	.13	.13*	.09	
10.	Certainty judgment	5.03	1.07	.34**	.35**	.48**	.27**	-.01	.05	.36**	.12	.16*

Significance levels *$p < .05$, **$p < .01$, $N = 171$-232

Analysis

To learn more about the influence of type of crisis communication and peer reactions on the dependent variables, analysis of variance was applied to test for main and interaction effects. See Table 5.4 for the means and standard deviations.

Table 5.4 Means and standard deviations per peer reactions condition and type of crisis communication

	Peer reactions								Crisis communication			
	Supporting		Opposing		Mixed		Control		Certain		Uncertain	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Self-reliant behavior	6.17	.61	5.75	.72	6.11	.60	5.91	.91	6.01	.72	5.95	.74
Self-efficacy	5.20	1.14	4.85	1.05	5.16	1.14	4.81	1.19	5.08	1.14	4.93	1.14
Response efficacy	5.89	.68	5.71	.78	5.82	.60	5.76	.73	5.87	.67	5.72	.72
Risk perception	5.06	.92	4.95	1.02	5.02	.92	4.87	1.01	5.09	.97	4.86	.95
Affective response	4.88	1.03	4.79	1.05	4.87	1.11	5.10	1.31	4.99	1.04	4.83	1.21
Trust peers	3.93	1.06	2.68	1.04	2.86	.96	*	*	3.16	1.26	3.15	1.06
Trust government	5.48	.94	5.27	1.04	5.36	.73	5.23	1.04	5.49	.82	5.18	1.04
Similarity peers	4.62	1.11	3.23	1.18	3.50	1.42	*	*	3.75	1.45	3.82	1.30
Similarity government	3.31	1.37	3.72	1.26	3.19	1.35	3.57	1.08	3.66	1.30	3.23	1.22
Certainty own judgment	5.16	.99	4.99	1.13	5.04	.95	4.92	1.20	5.19	1.04	4.87	1.08

***** Participants in the control group did not receive any peer reactions. Therefore we did not ask for trust in peers and perceived similarity with peers.

Self-reliant behavior. For peer reactions we found a significant main effect on self-reliant behavior, F (3, 232) = 4.00, p = .008, partial η^2 = .05. Pairwise post hoc comparisons, using Bonferroni adjustment, showed that participants who received supporting peer reactions scored higher on intentions of self-reliant behavior (M = 6.17), compared with participants

who received opposing peer reactions (M = 5.75, p = .015). Thus, participants who received supporting peer reactions indicated more self-reliant behavior, compared with those who received opposing peer reactions. In addition, participants who received opposing peer reactions scored lower on intentions of self-reliant behavior, compared with participants who received mixed peer reactions (M = 6.11, p = .047). There was no main effect of type of crisis communication, F (1, 232) = .38, p = .541, nor any interaction effects, F (3, 232) = .38, p = .768.

Trust in peers. There was a significant main effect of peer reactions on trust in peers, F (2, 174) = 24.53, p < .001, partial η^2 = .23. Pairwise post hoc comparisons, using Bonferroni adjustment, showed that participants who received supporting peer reactions, scored higher on trust in peers (M = 3.93), compared with participants who received opposing peer reactions (M = 2.68, p < .001), or mixed peer reactions (M = 2.86, p < .001). In short, participants who received supporting peer reactions had more trust in their peers than participants who received opposing or mixed peer reactions. There was no main effect of type of crisis communication, F (1, 174) = .01, p = .906, nor any interaction effects, F (2, 174) = .36, p = .698.

Trust in the government. There was a significant main effect of type of crisis communication on trust in the government, F (1, 232) = 6.47, p = .012, partial η^2 = .03. Participants who received certain crisis communication (M = 5.49) scored higher on trust in the government, compared with the participants who received uncertain crisis communication (M = 5.18). This indicates that participants who receive certain crisis communication have more trust in the government than participants who receive uncertain crisis communication. There were no main effects of peer reactions, F (3, 232) = .84, p = .474, nor any interaction effects, F (3, 232) = .49, p = .688.

Perceived similarity with peers. There was a significant main effect of peer reactions on perceived similarity with peers, F (2, 174) = 19.36, p < .001, partial η^2 = .19. Participants who received supporting peer reactions scored higher on perceived similarity with peers (M = 4.62), compared with the participants who received opposing peer reactions (M = 3.23), p < .001, or with those who received mixed peer reactions (M = 3.50, p < .001). There was no main effect of type of crisis communication, F (1, 174) = .16, p = .689, nor any interaction effects, F (2, 174) = 1.05, p = .352.

Perceived similarity with the government. For type of crisis communication we found a significant main effect on perceived similarity with the government, F (1, 232) = 6.91, p = .009, partial η^2 = .03. Participants who received certain crisis communication (M = 3.66) scored higher on perceived similarity with the government, than participants who received uncertain crisis communication (M = 3.23). In short, participants who received certain crisis communication perceived themselves as more similar with the government, compared with participants who received uncertain crisis communication. There were no main effects of

peer reactions, F (3, 232) = 2.16, p = .094, nor any interaction effects, F (3, 232) = 1.80, p = .148.

Certainty own judgment. There was a significant main effect of type of crisis communication on certainty in own judgment, F (1, 232) = 5.23, p = .023 partial η^2 = .02. Participants who received certain crisis communication (M = 5.19) scored higher on certainty in own judgment, compared with participants who received uncertain crisis communication (M = 4.87). This indicates that participants are more certain about their own judgment, when they received certain crisis communication compared with uncertain crisis communication. There were no main effects of peer reactions, F (3, 232) = .50, p = .685, nor any interaction effects, F (3, 232) = 1.21, p = .307.

We did not find any effects of peer reactions and type of crisis communication on self-efficacy, response efficacy, risk perception and affective response, all *p's* > .123.

General Discussion

To gain insight in the influence of peer reactions and official crisis communication (when both information sources are available) on self-reliant behavior and perceptions towards peers and the government, two experimental studies were conducted. In Study 5.1, participants first received peer reactions followed by the official crisis communication. In Study 5.2, participants received the information in reversed order. First the official crisis communication with certain or uncertain crisis information was given followed by peer reactions. For both studies we found effects on self-reliant behavior and perceptions towards peers and the government.

The results of both studies show that peer reactions influence the intention to perform self-reliant behavior. In line with research of Verroen et al. (2013), participants who received peer reactions consistent with official crisis communication, showed higher intentions of self-reliant behavior. In addition, in Study 5.2 we found that participants in the mixed peer reactions condition had higher intentions of self-reliant behavior compared with participants in the opposing peer reactions condition. No difference was found between mixed peer reactions and the control group. As in real world settings it is more likely that peer reactions on social media are mixed (Helsloot & Groenendaal, 2013; J. Lee et al., 2008), it is important to know that peer reactions that are simultaneously opposing and supporting the official crisis communication do not negatively influence reports of self-reliant behavior. Apparently, people take no risk and, therefore, choose to respond to the crisis consistent with the official information.

Peer reactions influenced the perceptions towards peers and the government. In both studies, trust in peers was lower when participants received opposing or mixed peer reactions, compared with those who received supporting peer reactions. In Study 5.1,

participants who received opposing or mixed peer reactions even had more trust in the government compared with participants in the control condition who received no peer reactions. More importantly, these peer reactions changed not only the perception of the government; it also changed perception of the peers themselves. When participants received opposing or mixed peer reactions, participants had less trust in their peers. Taken together, opposing and mixed peer reactions leads to less trust in peers but more trust in the government. The result that mixed peer reactions lead to less trust in peers is in line with findings of Breakwell and Barnett (2002), who describe that receiving conflicting information about a risk within a source leads to less trust in the information source. As we asked participants how much trust they had in the people who sent the tweets, we treated peers as one information source. At the same time, this lowered trust in one source appears to contrast with an elevated trust in the other source, i.e., the government. This indicates that the trust in one source is based on the quality of the other.

Official crisis communication also has an influence on trust in the government. Our results show that crisis communication with certain information about the situation leads to more trust in the government compared with uncertain crisis communication. This result suggests that people expect clear information from the government that corresponds with their needs. When the government is not able to provide that kind of information, then this has a negative influence on citizens' trust in the government.

Taken together, it seems that type of crisis communication influences trust perceptions. This finding becomes particularly important, as we found that trust perceptions of the government are related to reports of self-reliant behavior. Participants who have less trust in the government had lower intentions to perform self-reliant behavior. Therefore, we advise governmental institutions to be careful with distributing uncertain crisis information.

With respect to perceived similarity, it was expected that participants would identify themselves more with peers than with the government (e.g., Faraji-Rad et al., 2015; Rimal et al., 2005). This is in line with our results from both studies. More interestingly, our research indicates that perceived similarity is not only influenced by the source of the information, but also by the content of the information that is received from that source. In both studies, we found that participants perceived themselves less similar with peers in the mixed or opposing peer reactions condition compared with peers whose reaction was in line with the official governmental information. We suggest that it is the reaction given by the source that influences perceived similarity, and not the homogeneity within the peer group. Apparently, receiving (limited) opposing reactions during a crisis is enough for people to identify themselves less with the people who sent the reactions.

Certainty of one's own judgment was assessed to see to what extent participants felt certain that they choose the correct behavior in response to the crisis and how certain participants were that they assessed the crisis situation correctly. In Study 5.2, we

found an effect for type of crisis communication: participants who received certain crisis communication were more certain about their own judgment, compared with participants who received uncertain crisis communication. However, uncertain crisis communication influences not only feelings of certainty of one's own judgment, but also their behavior. For instance, Morton et al. (2011) showed that if people feel uncertain about a situation, they are less inclined to act in line with information. Correlations in both studies confirm this finding; certainty in own judgment is associated with self-reliant behavior. Although we did not find a direct effect of uncertain crisis communication on self-reliant behavior, we suggest that when people receive more often uncertain information during a crisis this may lead to more uncertainty about how the situation should be interpreted and this may on the long-term lead to less self-reliant behavior in response to a crisis.

While this study uncovered novel insights on the interplay of peer reactions and type of crisis communication, we wish to acknowledge some limitations of this experimental study. One limitation of our results concerns the measurement of self-reliant behavior, as we asked for intentions to perform self-reliant behavior. Research often indicates that behavioral tendencies do not always correlate strongly with actual behavior (Baumeister, Vohs, & Funder, 2007; Warshaw & Davis, 1985). However, for instance, Paton et al. (2010) demonstrated that intention is a good predictor for actual behavior. As the literature does not provide an unequivocal answer, follow-up research is needed to reveal whether the effects as found in the present study also hold for a study where actual behavior is measured.

In this paper we used vignettes to examine the influence of peer reactions on official crisis communication. A limitation from vignettes is that people may find it difficult to imagine themselves in the described hypothetical situation (Collett & Childs, 2011), or that the vignette is not able to measure decision making accurately as they are limited in the extent to which they can elicit relevant emotions (Exum & Bouffard, 2010). We did our best to mitigate these limitations and it seems to be successful, as participants stated that they were able to picture themselves in the crisis situation and they score quite high on affective responses related to the crisis situation. Nevertheless, it would be interesting for future research to use methods that can increase realism and immersion, such as video clips and virtual reality.

Taken together, our results provide valuable implications for communication during a crisis. From a theoretical perspective, this is the first empirical study that investigated the effect of peer reactions and type of crisis communication on perceptions towards peers and the government, beside the influence of these two information sources on self-reliant behavior. We found that peer reactions and crisis communication from the government both affected perceptions towards peers and the government. Self-reliant behavior was only affected by peer reactions. Subsequently, our results have implications for governmental institutions and crisis management organizations. First, peer reactions via social media are

not necessarily detrimental to the effectiveness of official crisis communication. Only when peer reactions are unanimously opposing the official crisis communication people are less likely to follow up the recommended actions of the government. However, this will often not be the case as in real world it is more likely that peer reactions are mixed. Furthermore, with respect to trust in the government, we suggest that, in general, peer reactions are positively influencing people's trust in the government. However, trust in the government is reduced, when the government provides uncertain crisis communication. Uncertain crisis information also leads to less certainty in one's own judgment. As both trust in the government and certainty in own judgment are associated with self-reliant behavior, our findings suggest to be careful with providing uncertain crisis information during a crisis.

Appendix 5A Peer reactions Manipulation

Supporting peer reactions

Opposing peer reactions

Neutral peer reaction

Appendix 5B Crisis Communication Manipulation

Certain

Today, our region is startled by the large-scale fire, at a warehouse that stores toxic chemicals like ammonia and chlorine. Enormous clouds of smoke are moving over our region, so our main concern is the safety for all residents. We can't and don't want to take any health risks. Therefore, we want to inform you at an early stage about the situation, because the smoke contains hazardous substances. It is important for the residents of this area to follow the following advice: go inside your house and close your doors, windows and ventilation shafts, switch off the mechanical ventilation and if you are outside cover your mouth and nose and go as fast as possible inside. Be wise and think about your health. The present state of affairs concerning the fire is that the fire brigade fights the fire, but it isn't under control yet. Air samples show the presence of hazardous materials in the smoke. For more information, watch de local news or visit www.crisis.nl

Uncertain

Today, our region is startled by the large-scale fire at a warehouse that stores toxic chemicals. At this moment it is still unknown which hazardous substances have been released. Enormous clouds of smoke are moving over our region, so our main concern is the safety for all residents. We can't and don't want to take any health risks. Therefore, we want to inform you at an early stage about the situation, because at this moment we don't know whether the smoke contains hazardous substances. Unfortunately we do not yet have all the facts. Therefore, at this point in time, it is important for the residents of this area to follow the following advice: go inside your house and close your doors, windows and ventilation shafts, switch off the mechanical ventilation and if you are outside cover your mouth and nose and go as fast as possible inside. Be wise and think about your health. The present state of affairs concerning the fire is that the fire brigade fights the fire, but it isn't under control yet. Air samples are taken to collect information concerning the presence and the risk of hazardous materials, but unfortunately results are still not available. Therefore, it is unclear what the consequences are of the fire and smoke. We continue to keep you informed of the latest developments. For more information, watch de local news or visit www.crisis.nl.

CHAPTER 6

General Discussion

Citizen participation during a crisis provides a vital resource for emergency and disaster management; usually ordinary citizens are the first responders, as they are already present at the scene whereas the first emergency services arrive only after a while (Prati et al., 2012; Whittaker et al., 2015). Citizens can do various things such as helping victims, support official institutions and take actions to protect themselves against the consequences of the crisis (Grimm et al., 2014; Perry & Lindell, 2003; Whittaker et al., 2015). Given the fact that citizens have to deal with an increased risk of crisis situations, due to population growth, climate change and urban developments (Field, 2012), it is likely that participation of ordinary citizens will be even more important in the future.

In this thesis I reason that several factors influence how citizens react to a crisis. For these factors, I make a distinction based on whether they are related to government, or to social environment (e.g., Seeger, 2006; Steelman & McCaffrey, 2013; Vihalemm et al., 2012). First, government can include courses of action in their risk- and crisis communication in order to stimulate self-reliant behavior. Whether citizens actually follow up these courses of action depends also on the quality of the relationship between citizens and government. When citizens, for example, have less trust in government, then they will be less inclined to follow up her advice (Lindell & Whitney, 2000; Paton et al., 2008; Reynolds & Seeger, 2005; Seeger, 2006). Government can also be held accountable for the crisis, which can affect citizens' behavior and perceptions. When the government is held accountable for a crisis, this may negatively affect the relationship between citizens and the government, which may lead to citizens who are less inclined to follow up the advices of the government (Becker et al., 2015; Coombs, 2007; Cuddy et al., 2011; Jin et al., 2014; B. K. Lee, 2004). Second, narratives and (online) reactions of peers may also influence how citizens respond to a crisis (e.g., Austin et al., 2012; Eisenman et al., 2007). This information from the social environment may not only affect self-reliant behavior, it may also change the perceptions of citizens towards their peers, which can influence how citizens respond to the information received from the social environment (Betsch, 2011; Paek et al., 2011; Pieniak et al., 2007).

The main research goal of this thesis was to investigate to what extent different types of risk- and crisis communication, accountability for the crisis, and information from the social environment (narratives and peer reactions on social media) influence how citizens deal with a crisis. In the final chapter, Chapter 6, I will provide the main findings of this dissertation, reflect on the limitations of this dissertation, and suggest avenues for future research. I conclude this chapter with a general discussion of the theoretical and practical implications.

Summary of the Main Findings

Influence of Risk- and Crisis Communication from Government on Helping Behavior

A way to guide adequate behavior during crises is to provide risk- and crisis communication. While risk communication is mainly focused on increasing risk awareness before a crisis occurs, crisis communication is focused on communication during a crisis in order to prevent or reduce the negative consequences of a crisis (Seeger, 2006; Steelman & McCaffrey, 2013). In chapter 2, my co-authors and I were interested in the effect of risk- and crisis communication from government on adequate helping behavior during a crisis situation. In addition, we examined the effects of risk- and crisis communication on psychological factors that are involved in decision making during a crisis situation. To study these effects, we used a virtual environment in which participants witnessed a car accident with two victims.

Our results show that helping behavior was affected by both risk- and crisis communication. Participants who received risk and/or crisis communication with courses of action (i.e., specific information on how to handle the situation) showed more adequate helping behavior compared with participants who did not receive these courses of action. In addition, for risk communication these courses of action also reduced affective responses. Participants who received relevant risk communication about traffic accidents were less worried about the accident, compared with participants who received no risk communication. A possible interpretation of this result is that information about risks gives citizens a sense of control over a threatening situation, as they were already prepared (Seeger, 2006).

The Influence of Accountability for the Crisis and the Type of Crisis Communication

When a crisis occurs, two prominent factors that influence how citizens respond to a crisis are who or what is held accountable for the crisis, and the type of information citizens receive about the crisis (e.g., Coombs, 2004; Steelman et al., 2015). In chapter 3, we were interested in the question to what extent accountability for the crisis and the type of crisis information (framed as neutral or empathic) influences citizens' behavior, feelings of collective efficacy and empowerment, and their relationship with the government. To study these effects, an experimental study involving a fictitious large-scale fire with hazardous substances was run.

Our results show both effects of accountability for the crisis and type of crisis communication. When the government is held accountable for the crisis, the relationship between citizens and the government is undermined in terms of trust and closeness, and it leads to diminished feelings of collective efficacy. We did not find a difference on willingness to follow the advice of the government across accountability conditions. Regarding the type of crisis information, we found no effect of empathic messages on citizens' willingness to follow the advice of the government and their relationship with the government. However,

conveying empathic concern in the crisis information enhanced levels of collective efficacy, such that participants felt more able to deal with the crisis in a concerted effort (Becker et al., 2015; Benight, 2004).

The interplay of Narratives and Statistical Information Before and After Crisis Communication

Citizens' decisions and self-reliant behavior in response to a crisis are not only influenced by official information from the government, but also by information received from other citizens in their social environment. Information from the social environment can be obtained, for example, via narratives of citizens nearby (Eisenman et al., 2007; Wachinger et al., 2013). In chapter 4, my co-authors and I aimed to give a better insight into how narrative information and official (statistical) information influence helping behavior after a crisis situation, and how these types of information interact with a governmental crisis message, that is usually provided shortly after an incident occurs. To study these effects, we measured several types of behavior in a virtual environment in which a car accident occurred. The main dependent variable was whether participants moved the victim or not (which in general involved a risk of worsening injuries).

Our results show that in times of relative uncertainty about the situation (i.e. before the crisis communication), victims were more often moved in the narrative condition. Participants who had received statistical information or both types of information performed similar to the control condition. However after the official crisis message was received, in which participants were informed to keep distance, victims were not only moved more often in the narrative condition, but also in the combined narrative and statistical condition. A narrative therefore has stronger effects when (information about) the actual situation matches the narrative's content. One explanation for the persuasive effect of narratives on decision making is that affective responses are triggered, which generally have strong effects on decision behavior (Betsch et al., 2013; Winterbottom et al., 2008). In line with this explanation, we found that participants had stronger affective responses in the narrative condition and in the statistical plus narrative condition, than in the control and statistical conditions. However, in contrast to what we expected, we did not find that affective responses mediate the relationship between type of prior information and moving victims. An alternative explanation could be that heuristic reasoning, such as representativeness or narrative transportation, underlies the persuasive effect of narratives (e.g., Green & Brock, 2000; Zillmann, 2006).

The Interplay between Official Crisis Communication and Peer Reactions via Social Media

During crisis, peer reactions via social media may influence the effectiveness of official crisis communication. In chapter 5, my co-authors and I focused on two problems. First, information from peers can be conflicting with that from the local government, and even

with other peers (J. Lee et al., 2008; Verroen et al., 2013). Second, the government often communicates only what has been confirmed, and are consequently later than citizens on social media (e.g., Kavanaugh et al., 2012; Steelman & McCaffrey, 2013). Recent studies, however, underscore the importance of distributing governmental crisis information fast, even when not all information is certain (Seeger, 2006). To gain insight into the interplay between peer reactions on social media and official crisis communication and their effects on self-reliant behavior and perceptions, two experimental studies were conducted. In both studies, participants were presented with a scenario of a large-scale fire with hazardous substances. After the scenario, participants in study 5.1 first received peer reactions followed by the official crisis communication. Participants either received supporting, opposing, mixed or no peer reactions. In study 5.2 participants first received the official crisis communication with certain or uncertain crisis information, followed by the peer reactions manipulation.

For both studies we found effects on self-reliant behavior and perceptions towards peers and the government. Both studies show that peer reactions influence the intention to adhere to the recommended behavior. Participants who received peer reactions consistent with official crisis communication, showed higher intentions to follow up the recommended behaviors. No difference was found between mixed peer reactions and the control group. In real world settings mixed peer reactions are more likely (Helsloot & Groenendaal, 2013; J. Lee et al., 2008), which would, according to our results, not negatively influence self-reliant behavior. No effects were found for type of crisis communication, that is certain or uncertain, on self-reliant behavior.

Perceptions towards peers and the government in terms of perceived similarity and trust were influenced by both peer reactions and type of crisis communication. Concerning perceived similarity, we found that participants perceived themselves less similar with peers in the opposing and mixed peer reactions condition, compared with peers whose reactions were in line with the official government information. With regard to trust, opposing and mixed peer reactions are negatively influencing citizens' trust in peers, but they are positively influencing trust in the government. However, trust in the government is reduced when the government provides uncertain crisis information. Uncertain crisis information also leads to less certainty in one's own judgment. Participants who received uncertain information were less certain that they chose the correct behavior in response to the crisis, and they were less certain that they assessed the crisis correctly. As both trust in the government and certainty in own judgment are associated with self-reliant behavior, my co-authors and I suggest being careful with providing uncertain crisis information during a crisis.

Strengths, Limitations, and Future Research

While this thesis revealed several interesting effects of different types of risk- and crisis communication, accountability for the crisis, and information from the social environment on self-reliant behavior during a crisis, and the relationship with government and peers, we wish to acknowledge some strengths, limitations, and directions for future research. One limitation of this thesis concerns the type of crisis situations we used. In the five studies of this thesis, two different crisis situations were used: a traffic accident with two victims and a large-scale fire at a company that stored hazardous substances. We chose for these crisis situations to obtain high levels of realism for our mostly Dutch participant sample. In the Netherlands these two crisis situations are among the most common, frequently reported on, and as such easier to imagine. As a large part of the world is dealing with more devastating crises types, such as hurricanes, tsunamis and nuclear meltdowns (Ulmer et al., 2013), one should be cautious in generalizing our results to all crisis types. Future research needs to reveal whether the effects found in this dissertation also hold for more complex crisis situations.

Another limitation of this thesis is that most participants have the Dutch or German nationality. The Netherlands and Germany are typical individualistic cultures (Hofstede, 2003), which can be characterized as a society with loose bonds between citizens. Citizens are considered to be independent and autonomous, with protection coming largely from self-development and self-interest. In a collectivistic culture (most non-western societies located in Asia, Africa, the Middle East and South America), citizens are integrated into close-knit groups. These groups are important in citizens' daily life and offer also protection in exchange for loyalty (Cialdini, Wosinska, Barrett, Butner, & Gornik-Durose, 1999). Culture has an important influence on citizens' attitudes and behavior (e.g., Giebels & Taylor, 2012). Therefore, based on these cultural differences, it is expected that citizens with a collectivistic culture may respond in a different way to a crisis, compared to citizens with an individualistic culture. As a characteristic of the collectivistic culture is that they offer protection to each other, we expect even more helping behavior in response to a crisis. In addition, the social environment may have a larger influence on self-reliant behavior, compared with the social environment in an individualistic culture. Therefore, it would be interesting for future studies to include collectivistic cultures and to see what differences can be found on how citizens deal with a crisis.

In all five studies, participants received risk and/or crisis messages from the government. A strength of this thesis is that my co-authors and I constructed realistic risk and crisis messages. For example, the crisis communication message, which participants received on their mobile phone in the two studies with the virtual environment, was based on how in the Netherlands the so-called NL-Alert messages are constructed. These crisis messages comprise four elements to stimulate self-reliant behavior: the threat, the location, the

advice and the sender of the message (Gutteling et al., 2017). The crisis messages in the three vignette studies, where participants were confronted with a large-scale fire with hazardous substances, were based on the crisis communication that was released during a large-scale fire at Chemie-pack in Moerdijk, which is a company that processed and stored chemicals (Joustra et al., 2012).

In this thesis my co-authors and I used vignettes and a virtual environment to examine the influence of information on people's behavior during a crisis. The vignettes method is an efficient, low-cost and effective method of data collection addressing how people would act in situations that are difficult to research with other methods, for example because of the high costs, sensitive nature or infrequent occurrence of the situation (Collett & Childs, 2011). A limitation of vignettes is that people may find it hard to imagine themselves in the hypothetical situation, or that the vignette is not able to measure decision making accurately as they are limited in the extent to which they can elicit relevant emotions (Exum & Bouffard, 2010). My co-auteurs and I did our best to mitigate these limitations and it seems to be (at least partly) successful, as participants stated that they were able to picture themselves in the crisis situation and they score high on affective responses related to the crisis situation. Nevertheless, we want to emphasize that the emotions and reactions elicited by vignettes are not necessarily comparable with the responses elicited by an actual crisis.

Virtual scenarios can have a number of important advantages in comparison with the written vignettes. Compared to written scenarios, virtual scenarios can convey a much larger amount of contextual information, which can increase their psychological and physical realism. As has amply been shown in decision making research, affective responses are a significant driver for behavior (Loewenstein & Lerner, 2003; Slovic & Peters, 2006; Visschers et al., 2012), and experiencing a crisis in a virtual environment is likely to increase more arousal than just imagining it. Another advantage of a virtual environment compared with vignettes is that it allows for measuring actual behavior instead of behavioral intentions. Even though it is still not completely realistic, several studies showed that when people are faced with situations in a virtual environment, they tend to respond and behave in a similar way as in the real world (Gillath et al., 2008; Yee et al., 2007). A limitation of a virtual environment is that it is time consuming and expensive, compared to its written counterpart.

To conclude, vignettes are a useful and commonly used research method. Given the well-known drawbacks of this methodology, in combination with the need to validate and expand our knowledge, future research should focus on ways to improve this methodology. In this dissertation we attempted to do so by using a virtual environment in two studies. However, it would be interesting to empirically compare virtual scenarios (e.g., a virtual environment) with the more traditional written scenarios (i.e., vignettes), to test whether these different methods lead to different findings. As we used two different crisis situations for the vignette studies and the studies in the virtual environment and we measured other

dependent variables in both study types, we are not able to make a proper comparison between the two different methods based on our studies.

Another issue that is important to address in future research is the dynamic process of receiving, searching and sharing of information during a crisis. In this dissertation, I have only addressed the influence of information on citizens' self-reliant behavior. It may be, however, that during a crisis citizens themselves are going to search actively for crisis information. A study of Kuttschreuter et al. (2014), for example, showed that most citizens use social media to find additional information about risks. Future research could focus on whether citizens search for information during a crisis, the extent to which citizens seek crisis information from social and traditional media, what kind of information they are looking for during different types of crises, and the influence of this "self-searched" information on the assessment of the crisis situation, as well as citizens' behavior. Even though in two studies of this dissertation, participants received peer reactions of involved citizens via social media, they were not able to actually interact with these peers on social media. The potential for interaction on social media is one of the key features, which distinguishes it from regular media (E. Fischer & Reuber, 2011). Therefore, future research could explore the effects of interactions on social media on citizens' perceptions and behavior during a crisis.

Theoretical and Practical Implications

The findings of the studies discussed in this dissertation provide valuable theoretical and practical implications for crisis management.

Theoretical Implications

From a theoretical perspective, the study described in Chapter 2 was, as far as we know, the first empirical study that looked at the interaction between risk- and crisis communication. Our results showed that both risk- and crisis communication influence citizens' behavior during a crisis. By providing courses of action in risk- and crisis communication messages, citizens showed more adequate, self-reliant behavior during a crisis. In addition, the study in Chapter 2 also adds to the existing literature by examining the effects of risk- and crisis communication on psychological factors that are involved in decision making during a crisis situation. We found that when citizens received clear courses of action (i.e., specific knowledge on how to handle the situation) in risk communication, this reduces negative affect. Presumably, knowledge can restore a sense of control over a threatening situation, resulting in fewer worries about an actual crisis situation and consequently more adequate behavior.

The studies described in Chapter 3 and Chapter 5 empirically tested the effect of empathic versus neutral crisis information, and certain versus uncertain crisis information. Knowledge about these types of crisis information was, up to now, mostly based on

anecdotal observations, experiences with crisis response, and case study analyses. It was shown that there was no difference between empathic and neutral crisis information on willingness to perform self-reliant behavior. Therefore, empathic crisis information is not necessary to stimulate self-reliant behavior. However, conveying empathic concern in the crisis information enhanced levels of collective efficacy. Participants felt more able to deal with the crisis collectively, thereby increasing their resilience. With regard to certain versus uncertain crisis information, uncertain crisis information did not directly lead to lower intentions to perform self-reliant behavior compared with certain crisis information. However, trust in the government was reduced and it led to less certainty in one's own judgment.

The current thesis also extends knowledge about decision making during a crisis. These decisions are affected by several sources of information and prior knowledge, such as factual (statistical) information, narratives of others and real-time governmental messages.

Our results indicate that a narrative has stronger effects on behavior, compared with statistical information, when the actual situation matches the narrative's content.

Our results also show that the effectiveness of official crisis communication from the government is influenced by peer reactions via social media. The study in Chapter 5 extends the knowledge of the influence of peer reactions by including a condition were participants were exposed to both supporting and opposing information from peers at the same time, as is closer to reality. Our results show that participants who received peer reactions consistent with official crisis communication, and participants who received mixed peer reactions showed higher intentions of self-reliant behavior. This study was also the first empirical study that investigated the effect of peer reactions and type of crisis communication (certain versus uncertain information) on perceptions towards peers and the government, besides the influence of these two information sources on self-reliant behavior. In general, peer reactions are positively influencing citizens' trust in the government. However, when the government provides uncertain crisis information, trust in the government was reduced.

Practical Implications

Besides the theoretical implications, the results of this dissertation have also practical implications for crisis management organizations. First, in all studies we have seen that our participants are willing to act during a crisis: they are willing to help others and are willing to take actions to protect themselves against the consequences of a crisis. This capacity needs to be incorporated in mitigation, or emergency management and recovery plans (Hoss et al., 2014).

Second, in addition to explaining the situation through crisis communication, it is advised to also incorporate information about specific and meaningful actions. In addition, although recent studies underscore the importance of distributing crisis information fast, even when

not all information is certain (Seeger, 2006; Steelman & McCaffrey, 2013), we recommend being careful with providing uncertain crisis information during a crisis, as it leads to less trust in the government.

Third, the results of this dissertation suggest that crisis management organizations should not only focus on stimulating self-reliant behavior with crisis information, but also take underlying perceptions such as trust into account. This is important as we found that perceived trust is related to intended self-reliant behavior. Therefore, we would advise government to continuously invest in building a good relationship with their citizens, as this relationship may influence how citizens respond on future crisis information (Paek et al., 2011; Pieniak et al., 2007).

Finally, our findings suggest that providing empathic information immediately after the occurrence of a crisis is not necessary in order to stimulate self-reliant behavior. Nevertheless we recommend government to convey empathy concern in crisis information, as it can enhance levels of collective efficacy; the believe that citizens collectively can do something to mitigate the consequences of a crisis. Collective efficacy could be particularly important in the recovery phase, after the immediate danger has been dealt with, because that will help citizens to recover.

Final remarks

The relationship between citizens and professionals in crisis management is becoming more import, as a result of the increasing risk of crisis situations, due to population growth, climate change, urban development, and societal changes like citizen empowerment and attention for strengthening community resilience. Responsibility for the safety of citizens is not exclusively a matter for government anymore; government expects that citizens' themselves contribute to their own safety during and after a crisis. With the help of risk- and crisis communication government can stimulate self-reliant behavior, but the influence of this information may be reduced when government is held accountable for the crisis. In addition, due to developments in information and communication technologies, the relationship between citizens and professionals has been changed. Nowadays, citizens not only receive crisis information from professionals, but they also receive crisis information from their own social (online) network, which can influence how citizens respond to a crisis. Despite these changes, professionals still have the ultimate responsibility for the safety of citizens. Therefore, it is important to know how these societal developments affect citizens' behavior during a crisis, and how professionals in crisis management can adequately deal with these developments. Based on evidence from this thesis, professionals have to take into account the influence of different types of risk- and crisis communication, who or what is held accountable for a crisis, and the influence of the social (online) environment, in order to stimulate self-reliant behavior during a crisis.

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Summary

The main research goal of this thesis was to investigate to what extent risk- and crisis communication from government, accountability for a crisis, and information from social environment influence how citizens deal with a crisis. First, government can provide courses of action in risk- and crisis communication. The question would be whether citizens are willing to follow up these courses of action. Whether citizens are willing to do so also depends on the quality of the relationship between citizens and government. When citizens, for example, have less trust in the government, they will be less inclined to follow the governmental advice. Second, who or what is held accountable for the crisis can also affect citizens' behavior and perceptions. For example, when the government is held accountable, it may have a negative effect on the relationship between citizens and the government, possibly resulting in less willingness to follow up the advice. Third, narratives and (online) reactions from peers can also influence behavior during a crisis. The information received from peers may not only affect how citizens deal with the crisis, but it may also affect the perceptions of citizens towards their peers. When the reactions from peers are all different during a crisis, this may lead to less trust in their peers.

In **chapter 1,** we provided an extensive review of the literature about citizens' behavior during a crisis, risk- and crisis communication, accountability for a crisis, and the influence of the social environment.

In **chapter 2**, we reported a study that is conducted to provides insight into the (combined) effects of risk- and crisis communication from the government on adequate, self-reliant behavior during a crisis in a virtual environment (N = 112). In the virtual environment, participants witnessed a car accident with two victims. Our results show that when risk- (before the accident) and crisis communication (after the accident) provided courses of action (i.e., specific information on how to handle the situation), participants showed more adequate helping behavior compared with participants who did not receive these courses of action. In addition, participants who received the courses of action prior to the accident were less worried about the crisis, compared with participants who did not receive this information.

In **chapter 3,** we investigated to what extent the behavior and perceptions of citizens depends on whether the government was held accountable for the crisis or not, and whether it makes a difference if the crisis message is framed neutrally or has a more empathic tone. To test these effects, an online experiment with a large-scale fire scenario with hazardous substances was run (N = 153). Our findings indicated that, in general, citizens' intention to follow the advice of the government was high, even when the government was held accountable for the crisis. However, when the government was held accountable for the crisis, this negatively influenced citizens' relationship with the government. In addition, citizens were less confident that they collectively were able to manage the situation. A more empathic crisis message did not lead to an improved relationship between citizens and the government, but it did make citizens feel more able to collectively manage the situation.

In **chapter 4,** we investigated the influence of narratives of other citizens on helping behavior, compared with the influence of statistical information, and how these two types of information interacted with an official crisis communication message, which was provided shortly after the incident occurred (*N* = 177). We used the same scenario in the virtual environment as in chapter 2. The main dependent variable was whether participants would move the victim, which in general increases the risk of more injuries. Our results indicated that participants who had previously read a narrative about a victim, who suffered from a negative outcome due to not being replaced, moved victims more often. Participants who had received statistical information or statistical information and a narrative, showed the same behavior as participants in the control condition. After the governmental message, which informed participants to keep distance, more victims were moved when participants had received the narrative, but also when participants had received both the narrative and the statistical information. In this case, the narrative had therefore a stronger effect on moving the victim than the statistical information. In contrast with our expectations, affective response did not explain the relationship between narrative information and moving victims. As an alternative explanation we postulated that narratives trigger a more heuristic way of information processing.

In **chapter 5,** we reported two studies that were conducted to gain insight in the interplay between peer reactions on social media and official crisis communication. In the first study (*N* = 176) participants either received supporting, opposing, mixed or no peer reactions, and in the second study (*N* = 263) we also added whether government provided certain or uncertain information about the crisis situation. Our results showed that peer reactions via social media are not necessarily detrimental to the effectiveness of official crisis communication. Only when peer reactions were unanimously opposing the official crisis communication, participants indicated that they were less likely to follow up the recommended actions of government. However, this will usually not be the case in the real world, as it is more likely that citizens are exposed to both supporting and opposing information from peers at the same time. Concerning the type of crisis communication our results showed that participants had less trust in the government when they received uncertain crisis information. Uncertain crisis information also led to less certainty in one's own judgment. As both trust in thegovernment and certainty in own judgment were associated with self-reliant behavior, we recommend to be careful with providing uncertain crisis information during a crisis.

In chapter 6, we discussed the results of previous chapters, we provided theoretical and practical implications, and directions for future research. Our results showed that both risk- and crisis communication, accountability for the crisis, and information from the social environment had an influence on how citizens deal with a crisis. These results can be used by crisis management organizations, such as government, to describe the role of citizens

during a crisis situation in emergency management and recovery plans, as well as how to communicate with citizens in order to stimulate self-reliant behavior. The results of this thesis further showed that crisis management organizations also have to invest time in building a good relationship with their citizens in addition to stimulating self-reliant behavior.

Although this doctoral thesis provides new insights into how various factors regarding government and social environment affect how citizens deal with a crisis, we have to be careful with generalizing our results. In our research we only used two relatively small-scale crisis situations: a traffic accident and a fire with hazardous substances. As a large part of the world is dealing with more devastating crisis types, future research needs to reveal whether the effects found in this thesis also hold for more severe crisis situations. Another limitation of this thesis is that most participants had the Dutch or German nationality. As the Netherlands and Germany are typical individualistic cultures, it would be interesting for future studies to include collectivistic cultures to see what differences can be found in how citizens deal with a crisis.

Taken together, based on this thesis we can conclude that in general citizens are willing to act during a crisis: they are willing to help others and are willing to take actions to protect themselves against the consequences of a crisis. Government can stimulate citizens to act in an adequate way during a crisis by providing risk- and crisis information with courses of action. Whether government is held accountable for the crisis makes no difference for citizens' willingness to take actions. Depending on the context, the influence of the social environment can be both positive and negative for the self-reliant behavior of citizens.

Samenvatting

Het hoofddoel van deze thesis was om te onderzoeken hoe risico- en crisis communicatie van de overheid, verantwoordelijkheid voor de crisis en informatie van medeburgers van invloed zijn op hoe burgers omgaan met een crisis. Ten eerste kan de overheid in haar risico- of crisis communicatie wel of geen handelingsperspectief geven. De vraag is dan of burgers een dergelijk handelingsperspectief op zullen volgen. Of burgers daartoe bereid zijn kan ook afhangen van de kwaliteit van de relatie tussen burgers en de overheid. Als burgers bijvoorbeeld minder vertrouwen hebben in de overheid, dan zullen zij minder geneigd zijn om haar advies op te volgen. Ten tweede kan wie of wat verantwoordelijk wordt gehouden voor de crisis ook het gedrag en percepties van burgers beïnvloeden. Als de overheid bijvoorbeeld verantwoordelijk wordt gehouden voor een crisis, kan dit een negatief effect hebben op de relatie tussen burgers en de overheid, waardoor burgers minder geneigd kunnen zijn het advies van de overheid op te volgen. Ten derde kunnen de verhalen en (online) reacties van medeburgers ook van invloed zijn op het gedrag tijdens een crisissituatie. De informatie van medeburgers zou niet alleen invloed kunnen hebben op de acties die burgers nemen, maar ook op hoe zij die medeburgers zien. Als de reacties van medeburgers tijdens een crisis allemaal verschillend zijn, dan kan dit bijvoorbeeld leiden tot minder vertrouwen in de medeburgers.

In **hoofdstuk 1** hebben we een uitgebreide beschrijving gegeven van de relevante literatuur over het gedrag van burgers tijdens een crisis, risico- en crisis communicatie, verantwoordelijkheid over de crisis en de invloed van de sociale omgeving.

In **hoofdstuk 2** hebben we een studie beschreven die inzicht geeft in de (gecombineerde) effecten van risico- en crisis communicatie van de overheid op adequaat, zelfredzaam gedrag tijdens een ongeval in een virtuele omgeving (*N* = 112). In deze virtuele omgeving waren deelnemers getuige van een auto ongeluk met twee slachtoffers. Onze resultaten laten zien dat wanneer in de risico- (voorafgaand aan het incident) en crisis communicatie (na het incident) handelingsperspectieven werden gegeven (specifieke informatie over hoe er met de situatie omgegaan kan worden), deelnemers meer adequaat hulpgedrag vertoonden in vergelijking met deelnemers die deze handelingsperspectieven niet hadden gekregen. Daarnaast vonden we dat de deelnemers die voorafgaand aan het incident handelingsperspectieven hadden gekregen zich minder zorgen maakten over de crisis in vergelijking met de deelnemers die deze informatie niet hadden.

In **hoofdstuk 3** onderzochten we in hoeverre het gedrag en de perceptie van burgers afhangt van de vraag of de overheid verantwoordelijk is voor de crisis of niet en of het uitmaakt of het crisis bericht neutraal opgesteld is of een meer empathische toon heeft. Om de effecten te onderzoeken werd een online experiment uitgevoerd met behulp van een scenario over een grootschalige brand met gevaarlijke stoffen (*N* = 153). Onze bevindingen toonden aan dat over het algemeen de bereidheid van burgers om het advies van de overheid op te volgen hoog was; zelfs als de overheid verantwoordelijk werd gehouden

voor de crisis. Echter, als de overheid verantwoordelijk werd gehouden voor de crisis zorgde dit wel voor een slechtere relatie tussen burgers en de overheid. Tevens hadden burgers er minder vertrouwen in dat zij samen de situatie het hoofd konden bieden. Een meer empathisch crisis bericht kon de relatie tussen burgers en overheid niet verbeteren, maar zorgde er wel voor dat burgers zich beter in staat achtten om als groep de situatie aan te kunnen.

In **hoofdstuk 4** onderzochten we de invloed van verhalen van medeburgers op hulpgedrag, in vergelijking met statistische informatie, en hoe deze twee typen informatie interacteerden met een overheidsbericht dat vlak na een incident verstrekt werd (*N* = 177). We gebruikten hetzelfde scenario en virtuele omgeving als in hoofdstuk 2. De belangrijkste afhankelijke variabele was of deelnemers een slachtoffer gingen verplaatsen, wat in zijn algemeenheid het risico vergrootte op meer letsel. Onze resultaten lieten zien dat deelnemers die vooraf een verhaal hadden gelezen over een slachtoffer met wie het slecht afliep omdat hij niet was verplaatst, vaker de slachtoffers verplaatsten. Deelnemers die alleen statistische informatie of statistische informatie en een verhaal hadden gekregen lieten hetzelfde gedrag zien als deelnemers in de controle conditie. Na het overheidsbericht, waarin mensen werd geadviseerd om afstand te nemen, werden slachtoffers vaker verplaatst als deelnemers een verhaal hadden gelezen, maar ook als ze een verhaal én statistische informatie hadden gekregen. In dit geval had het verhaal dus een groter effect op het verplaatsingsgedrag dan de statistische informatie. In tegenstelling tot onze verwachtingen verklaarde de affectieve response niet de relatie tussen verhalen en het verplaatsen van slachtoffers. Een alternatieve verklaring kan zijn dat verhalen tot een meer heuristische manier van informatieverwerking leiden.

In **hoofdstuk 5** rapporteerden we twee onderzoeken die uitgevoerd zijn om inzicht te krijgen in het samenspel tussen reacties van medeburgers via sociale media en officiële crisis communicatie. In het eerste onderzoek (*N* = 176) kregen deelnemers ondersteunende, tegengestelde, gemixte of geen reacties van medeburgers en in het tweede onderzoek (*N* = 263) voegden we ook toe of de overheid zekere of onzekere informatie verschafte met betrekking tot de crisis situatie. In beide studies kregen deelnemers hetzelfde scenario van een grootschalige brand met gevaarlijke stoffen als in hoofdstuk 3. Onze resultaten lieten zien dat reacties van medeburgers via sociale media niet perse nadelig zijn voor de effectiviteit van officiële crisis communicatie. Alleen wanneer reacties van medeburgers allemaal tegengesteld waren aan de boodschap in het officiële crisisbericht, waren deelnemers minder geneigd om de adviezen van de overheid op te volgen. In de praktijk zal de kans echter groter zijn dat burgers een mix aan berichten ontvangen die zowel voor als tegen de overheidsboodschap zijn. Met betrekking tot het type crisis communicatie laten de resultaten zien dat deelnemers minder vertrouwen in de overheid hadden, als onzekere informatie werd verstrekt. Onzekere informatie leidde ook tot minder zekerheid in het

eigen oordeel. Aangezien zowel vertrouwen in de lokale overheid als zekerheid in het eigen oordeel samenhingen met zelfredzaam gedrag, bevelen we aan om voorzichtig te zijn met het verstrekken van onzekere informatie tijdens een crisis.

In **hoofdstuk 6** hebben we de resultaten van voorgaande hoofdstukken besproken, hebben we theoretische en praktische implicaties gegeven en hebben we aanbevelingen gedaan voor vervolgonderzoek. Onze resultaten laten zien dat zowel risico- en crisis communicatie van de overheid, als verantwoordelijkheid voor de crisis, als informatie van medeburgers van invloed is op hoe burgers omgaan met een crisis. Deze resultaten kunnen gebruikt worden door crisis management organisaties, zoals de overheid, om de rol van burgers tijdens een crisis situatie in rampenbestrijdings- c.q. crisisbeheersingsplannen te beschrijven, als ook hoe er met burgers gecommuniceerd kan worden om zo het zelfredzame gedrag te vergroten. De resultaten van deze thesis laten bovendien zien dat crisis management organisaties zich niet alleen zouden moeten richten op het vergroten van zelfredzaamheid, maar ook tijd zouden moeten investeren in het opbouwen van een goede relatie met burgers.

Hoewel deze thesis nieuwe inzichten geeft in hoe diverse factoren van de overheid en medeburgers van invloed zijn op hoe burgers omgaan met een crisis, moeten we wel voorzichtig zijn met het generaliseren van onze resultaten. In ons onderzoek hebben we bijvoorbeeld gebruik gemaakt van twee relatief kleinschalige crisis situaties: een auto ongeluk en een brand met gevaarlijke stoffen. Aangezien een groot deel van de wereld te maken heeft met andere soorten crises waarvan de gevolgen veel groter zijn moet vervolg onderzoek testen of dezelfde resultaten als in deze thesis gevonden worden als de crisis situatie meer complex is. Een andere beperking van deze thesis is dat de meeste deelnemers de Nederlandse of Duitse nationaliteit hebben. Aangezien Nederland en Duitsland typische individualistische culturen zijn zou het interessant zijn voor vervolg onderzoek om ook collectivistische culturen mee te nemen om zo te zien wat voor verschillen er gevonden kunnen worden in hoe burgers omgaan met een crisis.

Al met al kunnen we op basis van deze thesis concluderen dat over het algemeen burgers bereid zijn om tijdens een crisis te handelen: ze zijn bereid om anderen te helpen en ze zijn bereid om zelf acties te ondernemen die hen kunnen beschermen tegen de gevolgen van een crisis. De overheid kan burgers stimuleren de juiste handelingen te verrichten tijdens een crisis door het verstrekken van risico- en crisis informatie met handelingsperspectieven. Of de overheid verantwoordelijk wordt gehouden voor de crisis maakt geen verschil voor de bereidheid van burgers om acties te ondernemen. Afhankelijk van de context kan de invloed van de sociale omgeving zowel positief als negatief uitpakken voor het zelfredzame gedrag van burgers.

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The main research goal of this doctoral thesis was to investigate to what extent risk- and crisis communication from government, accountability for a crisis, and information from social environment influence how citizens deal with a crisis. First, government can provide courses of action in risk- and crisis communication. The question would be whether citizens are willing to follow up these courses of action. Whether citizens are willing to do so also depends on the quality of the relationship between citizens and government. When citizens, for example, have less trust in government, they will be less inclined to follow governmental advice. Second, who or what is held accountable for the crisis can also affect citizens' behavior and perceptions. For example, when government is held accountable, it may have a negative effect on the relationship between citizens and government, possibly resulting in less willingness to follow up the advice. Third, narratives and (online) reactions from peers can also influence behavior during a crisis. The information received from peers may not only affect how citizens deal with the crisis, but it may also affect the perceptions of citizens towards their peers. When the reactions from peers are all different during a crisis, this may lead to less trust in their peers.

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